Rosefinch Research | 2022 Series # 19

The Optical Illusions of Investing

According to Wind, since the market rebound from April 26th, 726 stock mutual funds recovered their losses, with 357 of them up over 40%. In another small market survey, 32% of the mutual fund investors are now back on the positive side, while 25% remain deeply under water for now. Some investors regret missing the move, and are now hoping for a retracement for reentry. Even though we're busy with numbers all the time with investing, it's worth taking some time to look at the math in investing to gain more clarity on some of the "optical illusions."

Optical Illusion 1: your return just dropped from +100% to +50%, did you just lose half your money?

Many investors saw their fund return statement showing the drop from 100% to 50%. This may look like a loss of half the value, but it's actually not. If you assume your initial investment was 100, then a 100% return means you have 200. A drop to only 50% return means you have 100+50%*100 = 150. So your loss is from 200 to 150, or loss of 50 which is only 25% of 200. Your loss of 50% in return corresponds to only loss of 50% on your portfolio. The same logic also applies when you have gains: when your fund return goes from +50% to +100%, it doesn't mean your money doubled in that period: your starting amount was 150, your ending amount is 200, so your return is 50/150 or 33.3%. Compound interest works both ways: it'll magnify gains as well as losses. **So the lesson here is that: offense and defense are both important.** Of course equity investment will have volatility and we will get our bumps along the road. But this doesn't invalidate our long-term goal of compounded returns. As long as we avoid liquidating risks and accumulate small wins over time, we will still win out at the end.

Optical Illusion 2: what's the difference between one fund that returned +427% and another fund that returned +263%?

There are two fund managers with over 5 years' experience. As of end of 2021, their 5-year cumulative returns were +427% and +263% respectively. The same 1 million USD investment will yield a difference of 1.64 million USD. You can look at the last 3y and 1y returns below:

业绩区间	基金 A（%）	基金 B（%）
近一年	47.69	1.73
近三年	350.76	179.97
近五年	427.28	262.92

Source: Wind, Rosefinch.

Actually, before 2021, fund A and fund B had similar performances. In 2021, fund A was up +45% while fund B was down slightly at -0.7%. In the world of compound returns, this made a world of difference:

Source: Wind, Rosefinch.

If these two managers were neck-in-neck in the first four years, and only diverged in the fifth year, does that mean one completely dominates the other? One annual return doesn't tell the whole story, and the race is still on. **If we only judge by one data point, it maybe too short-sighted.**

Optical Illusion 3: even if you have a 50% win-rate, you may still lose it all.

Let's assume I play a fair game with 50% win-rate like a coin toss, can I still lose it all? The answer is unfortunately YES. First of all, the return is random, i.e. even though individual game has equal chance of win-loss, you may get a series of losses in a row. And if you don't have the chips to stay in the game, you will have to end the game on that low point. The 50% win-rate simply reflects the Law of Large Numbers. If you have 1 million USD, and you play the coin-toss game 1 USD at a time for a million times, you will likely win about 50% of the time. But if you bet the entire 1 million USD in one game, then you can lose it all right away. **This is why we establish "margin of safety" when doing value investing.** Chinese philosopher Meng-Zi once said: "the virtuous person does not stand below a dangerous wall," and Charlie Munger said something similar: "all I want to know is where I'm going to die so I will never go there." In order to benefit from the Law of Large Numbers where the observed win-rate is close to the theoretical win-rate, we have to make sure we can stay in the game and repeat it a large number of times. This means avoiding deadly mistakes that may cause untimely termination. So long as we can survive, even the short-term losers can shine in the future. Every strategy has its appropriate environment, and no one strategy can win across all environments. A long-term strategy may have short-term setbacks, and we should stay firm in our resolve if the underlying logic still holds.

Optical Illusion 4: how to turn 93% winning rate into 50%?

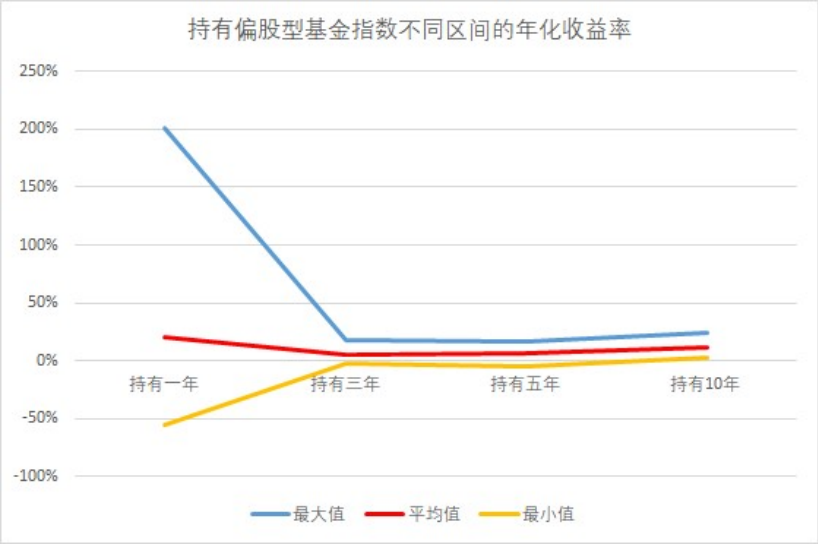
In Nassim Taleb's 2001 book "Fooled by Randomness: The Hidden Role of Chance in Life and in the Markets", he gave an interesting example: a dentist is a very wise long-term investor with 15% annualized returns and 10% annualized volatility. According to the statistics analysis of his return profile, his one-year win-rate is 93%, which is a great result. But as observation time shortens, his win-rate decreases as well until his "one-second" win-rate reaches only 50%, obliterating his win-rate advantage.

时间尺度	概率（%）
一年	93
一季	77
一个月	67
一天	54
一个小时	51.3
一分钟	50.17
一秒钟	50.02

Source: Taleb "Fooled by Randomness," tenors go from year, quarter, month, day, hour, minute, second.

But the dentist doesn't look at his win-rate advantages. When the short-term losses jump out at him, he is stressed with high anxiety. And when the gains show up on his screen, he feels happy – though somehow, the intensity of happiness when return is up isn't as much as the intensity of pain when the return is down. At the end of each day, the dentist feels exhausted. In fact, if he checks the market every minute for 8 hours a day, according to his 50.17% minute-win-rate, he'll have 241 minutes of happiness, and 239 minutes of pain. For the year, it's 60,688 minutes of happiness and 60,271 minutes of pain. And since his emotional intensity for pain is stronger, the dentist may very well have a net negative emotion experience at end of the year. If your investment horizon is too short, the return is more random. Whether or not you win in that short-period is literally reduced to a coin toss.

We looked at the data of equity mutual funds and found that on a one-year horizon, your return may range from +200% to -55%. But as time extends, the annualized return range will tighten until they converge to the long-term average. In another words, as your investment horizon increases, you have a higher chance of receiving a more stable investment return.



Source: Wind, Rosefinch as of 2021/12/31.

Optical Illusion 5: what's the return difference between "do nothing" and "add on dip"?

Let's say you invested 10k USD in fund A at price of 2 USD. When the price goes down to 1 USD, you invest another 10k USD, when can you breakeven?

In the case where you "add on dip," you just need the fund A to go up by +33% to breakeven: your investment value is 10k (new add-on) + 5k (old valuation) = 15k, and 15k * 133% = 20k.

In the case where you "do nothing," the fund A needs to go up by +100% to breakeven: your investment value is now 5k, so 5k * 200% = 10k.

Your "add-on-dip" strategy can take form of Averaging Purchases which reduces the pressure to find the best entry points. Of course, once your initial investment is large, the smaller averaging purchases will have less impact on the portfolio return profile. Nonetheless, the Averaging Purchases will provide a psychological advantage to reduce anxiety and apathy, and allow time to work in your favor.