Swiss Finance Institute
Practitioner Roundups

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KNOWLEDGE

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Financial Forecasting

Forecasting, whether done by a seer examining the entrails of sacrificial beasts or an econometrician flipping a matrix, has always been essential to our society as well as magical. Humanity's aspiration to forecast the future is linked to its ambition to manipulate it by steering toward favorable outcomes and preventing evil ones. Today's press and general public tend to consider economists to be forecasters. While this is an oversimplification of the profession, it is true that countless economists working in many fields—in academia or for private entities, national governments, central banks, or international organizations—seek to predict economic outcomes such as GDP, inflation, unemployment, interest rates, corporate profits, and fiscal deficits as accurately as possible. The quality of a forecast should be based on its ability to both be accurate and to explain the outcome. But as long as financial decisions are made by humans, who can be seen as atoms and molecules bouncing against one another, one should be content with predictions that are accurate only on average.

What methods are used to predict financial returns?
The prediction of financial returns is generally carried out using regression models and past data on asset characteristics, such as size or book-to-market ratios. There are two schools of thought regarding the way in which such models should be computed: one uses a cross-sectional approach and considers multiple stocks at a single point in time, the other uses a time-series approach and considers a single stock over multiple periods.

What do the differences between these two models imply?
In a cross-sectional momentum strategy, investors take long positions in assets that have returns greater than the cross-sectional average return and short positions in those that have lower returns. A cross-sectional strategy is therefore by definition a zero-net investment strategy, meaning that for every 1 dollar invested on the long side, 1 dollar is divested on the short side. In a time-series momentum strategy, investors take long positions in assets that show returns above zero and short positions in assets that show returns below zero. A time-series strategy is therefore net long when the market is bullish and gains value, and net short when the market is bearish and loses value.

Empirical results covering NYSE quoted stocks between 1946 and 2013 reveal, with stocks selected based on their performance over the past 12 months and held for the next month, that cross-sectional strategies show an annual return of 5.0 percent, while time-series strategies show an annual return of 9.3 percent. But because these strategies are based on different investment bases it is not possible to conclude that one type of strategy outperforms the other.

How is it possible to make cross-sectional and time-series strategies comparable?
The primary issue one needs to solve relates to the financing gap between a cross-sectional and a time-series strategy. As explained above, cross-sectional strategies are zero-net investment strategies by construction, while by contrast, times-series strategies take net long or net short positions depending on the number of stocks with positive or negative returns and may require third-party funding. As the NYSE grew strongly during the period considered, the time-series-constructed portfolio had a net long position of USD 0.4 in risky assets, with USD 1.2 invested long and USD 0.8 divested short, while the cross-sectional-constructed portfolio had a zero net position. As the premium for risky assets was positive during this period, the time-series-constructed portfolio earned returns for simply being net long during a bullish period. To place time-series strategies on a common footing with cross-section strategies, one needs to adjust the cross-sectional return by including a risk asset premium return in it.
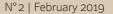
What can one therefore conclude in terms of return predictability?
Further analysis of the same NYSE quoted stocks reveal that adjusted cross-sectional strategies show an annual return of 9.4 percent, instead of the 5.0 percent previously found. This adjusted cross-sectional return is actually similar to the return of 9.3 percent found when using time-series strategies. The same conclusion was found—the returns of the cross-section and time-series strategies being generally equal to one another after adjusting for the net long positions of time-series strategies—in a wide set of selection and holding periods.

What is the best tool available for predicting financial returns?
A part of the existing literature claims that time-series return predictability methods are significantly more profitable than cross-sectional ones. This claim is erroneous. The latest models show that, when forecasting the returns of stocks, time-series strategies and adjusted cross-sectional strategies offer the same quality in terms of predictability. And when trying to predict the returns of international asset classes, times-series strategies perform significantly worse than adjusted cross-sectional strategies.

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Diversification through Cross-Sectional and Time-Series Approaches

SFI Professor Amit Goyal and his coauthor Professor Jegadeesh compare the return predictability of cross-sectional and time-series investment strategies. The authors' empirical analysis indicates that any relative outperformance in the time-series approach is a result of the compensation of its time-varying net long position in risky assets, which earns the risk premium. The data show that relative to the cross-sectional approach, the time-series approach benefits from market timing because markets have positive performance on average. In reality, when choosing between the two strategies investors need to understand the risk exposure and implications for diversification that come with each approach.

Not all strategies are created with equal risk-return exposure

Investors either build their portfolio with a cross-sectional approach with zero net exposure or in time-series one with a directional exposure. In particular, the time-series momentum concentrates on absolute performance, in other words buying securities that are going up and short selling ones that are going down, while the cross-sectional momentum utilizes the relative performance cutoff based on the average return. This implies that while both approaches generate alpha, the time-series approach exposes investors to a greater market risk as equal long and short positions in the cross-sectional approach reduce the "beta risk". For investors, the choice of the time-series or the cross-sectional approach also depends on their diversification needs. For instance, with the time-series approach investors will have variable diversification due to varying net exposure. Interestingly, there may be diversification benefits from blending both approaches. Ultimately, the choice of approach also depends on the market environment.

Market timing and position size matter

During turbulent market periods, momentum portfolios perform very poorly. From a quantitative perspective decomposing equity returns into N factors will show that there exists first and foremost a market factor. If this factor is trending positively, then the strategy choice should favor the time-series approach rather than the cross-sectional one in order to benefit from the positive autocorrelation of market returns at the relevant horizon. Effectively, this first prevailing factor is hedged out by construction in the cross-sectional approach. Furthermore, the academic literature points out that the cross-sectional approach loses on its short bucket due to the January effect. Finally, the time-series approach does not place constraints on the number of positions within the winner and loser portfolio, and since every position may be traded, the size of each may be smaller than in cross-sectional, where the number of positions and their size will depend on the strategy parameters.

Don't put all your eggs in one style

There is another reason why the quantitative conclusions of the research paper should not sway investors away from the time-series approach. Some investment styles work better in time-series than in cross-sectional. The literature shows, for example, that momentum style performs better in time-series whilst value style performs better in cross-sectional. To generate positive returns across all market conditions, investors would need to diversify across the time-series or cross-sectional approach, styles, and asset classes.

"Permanent superiority has never been realized in history"

Whilst from the newly provided academic perspective the cross-sectional approach when adjusted may look superior, investors' choices will depend on the market environment and the strength of its direction. A considerable amount of research reveals the performance of various strategies in time-series and cross-sectional across different countries, horizons, and asset classes. But there are many other factors that may explain the difference in performance. Further research may incorporate correlation of returns, and consider other factors that explain the market. These factors play an important role in explaining the return difference between the two methods and investors need to be aware of them when making a choice between a time-series and a cross-sectional approach.