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Why Does Momentum Persist?

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ABSTRACT

The phenomenon of short-term momentum in intriguing because it directly contradicts the notion that in an efficient market stock prices should lack memory. Three classes of possible explanation for momentum are (1) it is consistent with tenets of efficient markets after appropriate risk adjustment; (2) it is consistent with tenets of behavioral finance because of investors' cognitive biases; and (3) it is consistent with structurally-based positive feedback loops. The presence of extreme bubbles provides evidence against the first explanation. The fact that prices are effectively set by institutional investors who are aware of the cognitive biases in question and have a financial incentive to avoid them provides evidence against the second. Structurally-based explanations include the short-term incentives of institutional money managers and the impact of indexing. We believe that considering structural factors affecting the behavior of stock prices provides an additional perspective, to be used in combination with behavioral finance and market efficiency.

Keywords: behavioral finance; investment strategies; market efficiency; momentum.

INTRODUCTION

The stock market can be described as a pas de deux between value and momentum, the latter of which is of primary interest here. A key early citation in the literature on momentum investing is by Jegadeesh and Titman [1]. For example, they created portfolios of stocks which had performed particularly well during the previous 6-12 months (i.e., exhibiting positive price momentum) and observed that such portfolios generated a significant excess return during the next such time period.

The phenomenon of momentum in intriguing because it directly contradicts the notion of a fairly weak form of capital market efficiency (i.e., that markets do not have memory with respect to past prices). [2] Indeed, while the efficient market hypothesis approaches all putative market anomalies with skepticism, it considers with particular skepticism the persistence of anomalies after they have been publicized. [3] Proponents of behavioral finance assert that the likely cause of such recurrent anomalies (if they actually exist) are cognitive biases inherent in human nature.

Our interest is not in every possible manifestation of momentum in the stock market. Instead, it is in relatively large-capitalization stocks using an investment horizon of 3-12 months. More specifically, we exclude stocks whose capitalization is so small that their prices are effectively set

by the behavior of individual investors, and instead focus on stocks whose prices depend upon the behavior of their institutional counterparts (e.g., mutual funds, pension funds, hedge funds). The rationale is that institutional investors are aware of cognitive biases and have a strong financial incentive to avoid them. We exclude very short-term time horizons and thus, for example, treat the literature on investors' immediate response to corporate news as outside the present scope. We also exclude time periods which are sufficiently long that value tends to outweigh momentum, as manifested by regression toward the mean [4], for example, 24 months and beyond. [1]

Assuming for the sake of argument that institutional investors can, if they choose, avoid the various cognitive biases catalogued by behavioral finance, we ask what can instead cause momentum. Although the literature is not entirely consistent about this, for the present purposes we stipulate that (a) short-term momentum exists (indeed, this phenomenon has been observed across various asset classes); and (b) momentum tends to reverse itself over longer time horizons. [5] Because of the tendency for momentum to be reversed, we in effect are assuming that momentum has induced a temporary mispricing.

OPERATIONAL DEFINITION OF MOMENTUM

Momentum can be operationally defined as the relative persistence of winning and losing investments. In other words, investments which are performing well will tend to continue to do so, at least in the short term, and investments which are performing poorly will continue to do so, at least in the short term. The former will be termed "positive momentum" and the latter termed "negative momentum". The operational definition of short-term depends on context: for a day trader the context might be a matter of minutes, whereas for the present purposes this is 3-12 months.

SOME POSSIBLE CAUSES OF MOMENTUM

Subrahmanyam [2], in a review article which provides an excellent instruction to the literature on momentum investing, lists some possible explanations for the apparent excess returns associated with this strategy. One set of explanations (not considered in detail here, given that we have assumed that momentum induces a temporary mispricing) is that momentum is nevertheless consistent with efficient markets, for example:

- High past returns are correlated with high growth rate risk, which leads to higher required returns in the future [6] (more generally, that proper risk adjustment will remove the apparent short-term excess returns of momentum-based strategies).
- Uncertainty about the implication of news resolves slowly rather than immediately [7], implying that what appears to be a single economic signal in fact is many.
- Another set of explanations is consistent with behavioral finance, namely that cognitive and behavioral biases cause stocks to be mispriced, that these biases are corrected over a period of 3-12 months, and that the manifestation of these corrections is momentum. Among the causes of this putative mispricing include the following:
- Overconfidence causes investors to initially discount information which should be relevant to stock price. [8]
- Investors underreact to news because of a psychological tendency to sell winners and retain losers. [9]
- Investors do not process news simultaneously. [10]

- Investors use overly simplistic mental models when evaluating stocks. [11]
- Investors underreact to information arriving in small bits. [12]
- Investors underreact to news which is inconsistent with their prior beliefs. [13]
- Investors overreact to noise in stock prices, and temporarily treat this noise as a continuing signal. [14]
- Yet another set of explanations pertains to the role of market dynamics in determining stock prices, for example:
- Stock prices tend to show greater covariance than do corporate fundamentals (i.e., they "move together more than they should"). [15]
- The incentives of institutional investors favor momentum.
- When investors apply momentum-based trading strategies this imparts stock prices with additional momentum.

SIGNAL-BASED CAUSES OF MOMENTUM

The above behavioral science explanations posit a temporary mispricing in response to an improperly interpreted economic signal. For example, suppose that the stock in question has outperformed the market during the previous 6 months, and thus that the economic "signal" is (unexpectedly) positive information about that company revealed during that time period. For most of these explanations investors initially underreact to this economic signal, causing a temporary mispricing which is then corrected during the next 6 months by positive momentum.

A counter-argument raises three questions. First, aren't the people whose trading behavior effectively set stock prices highly-trained analysts who are aware of the above putative biases? After all, institutional investors aren't the 30 sophomore economics students, volunteers recruited from a local shopping mall, etc., sometimes used to demonstrate the behavioral biases in question. Second, don't these same institutional investors have a strong financial incentive to override these biases (i.e., by taking advantage of this temporary mispricing)? Finally, why aren't the prices of "momentum stocks" immediately bid up to reflect their anticipated performance, thus correcting the reaction to the signal (and, in the process, eliminating the short-term correlation among stock prices)?

STRUCTURAL CAUSES OF MOMENTUM

The market-dynamics-based explanations above each propose some form of positive feedback loop embedded within the structure of the market -- indeed, a feedback loop which is sufficiently powerful to override the usual economic forces acting to cause stock prices to immediately account for all available information. This positive feedback could be initially triggered by previous price changes, by changes in the prices of related stocks, or, indeed, a feedback loop need not have an initial "cause" beyond random noise. In general, a feedback loop need not necessarily imply a mispricing, although in this case we assume that it is sufficiently strong as to overshoot true value, inducing underperformance in the longer term.

An extreme example of a positive feedback loop is a bubble whereby stock prices are temporarily bid up beyond any reasonable economic justification. Such bubbles, ranging from the tulip bulb mania in the 1600s to recent bubbles in cannabis and crypto-currencies, provides some of the strongest evidence against the hypothesis that markets are always efficient and, indeed, leaves

believers in efficient markets with the somewhat unsatisfying response that "It's one thing to recognize a bubble, but since you don't know when it will burst it's quite hard to profit from this recognition, and an anomality which can't be easily exploited doesn't really count".

A number of factors could be sufficiently strong to override the economic forces which typically cause stock prices to account for all available information. One such factor pertains to the incentives of mutual fund managers, hedge fund managers, and others who trade regularly and thus whose actions tend to set prices in the short-term. For them, assets under management is a key component of compensation. Reports are made quarterly, and customers tend to flee from funds with poor short-term performance. Thus, there is little incentive to create a portfolio with excellent long-term prospects if the manager won't be around to enjoy its benefits. Among others, this incentive can induce "window dressing", where portfolio managers sell losers and buy winners before a quarterly report of portfolio holdings, and "herding", which allows managers to contend that their performance is no worse than others, even if it is poor in absolute terms.

Eventually, these "perverse incentives" are overridden by the actions of the largest investors such as pension fund managers. This latter group of investors can't trade regularly, because of the associated friction costs, and by necessity must move at a pace which recalls a Monte Python skit about low-energy cricket being played by various items of furniture. Their incentive is to slowly accumulate shares of sound businesses at advantageous prices, which purpose is aligned with investment rather than speculation, and they eventually bring the "value" to the dance between value and momentum.

Another structural factor is correlation of returns within funds. For example, a fund which suffers poor returns will have "outflows", requiring the manager to sell shares, causing the stocks within that portfolio to perform poorly. The impact is indiscriminate, and is exacerbated by herding when different managers sell the same stocks.

Yet another structural factor is the increasing popularity of indexing. Stocks which are performing well receive greater weight as indices are rebalanced, and this induces positive momentum. Indeed, the more the amount of indexing the greater is the impact on momentum. Even if the incentives of regular traders were changed, the impact of indexing would remain.

Because of these structural factors, it is reasonable to anticipate that the impact of momentum will continue into the foreseeable future.

THE ENDGAME

One can ask how all of this will end. Our answer is "asymmetrically". For clarity of exposition we will consider two bubbles, one positive and one negative. Essentially the same argument will apply to less dramatic examples of feedback loops.

A current example of a negative feedback loop is that of energy stocks. Without recapitulating the multiple reasons why such stocks are profoundly unpopular at present, we note that corporate management has the option of sending three concrete signals to highlight their belief that their stock price has fallen below true economic value. Management can buy back shares at (presumably) bargain prices, thus increasing earnings per share, which in turn should eventually

be correlated with stock price. Management can pay (or increase) dividends out of their free cash flow, which is an even more tangible signal as investors receive actual cash. Finally, management can take the company private at a buy-out price which significantly exceeds the current stock price. This is, of course, the ultimate economic signal. In summary, negative bubbles eventually end because economic reality, as signaled by buy-backs, dividends, and take-overs, intervenes.

As an example of the resolution of a less dramatic negative feedback loop, managers of value-based funds eventually provide the impetus toward equilibrium by basing their decisions on metrics such as the above (e.g., price-earnings ratio, dividend yield, takeover value). Unless a take-over suddenly occurs the process tends to be rather gradual, as value-based managers are more price-sensitive and patient than their momentum-based counterparts. One exception to this observation occurs when a "technical bottom" has been achieved, where it is clear to all market participants that sellers no longer exist at a certain price, with this price also offering a good economic value, and the long-suffering stock finally begins to rise. At this point the perspectives of value and momentum coincide, and the "breakout" can be dramatic.

In contrast to the above, the response to a bubble involving overvaluation can be quick and extreme. The psychological rationale is that those momentum-based traders who set prices in the short term understand that a market anomality is present, they understand why this anomality might continue in the short-term but not permanently, and all of the participants already have one foot out the door. When momentum slows a stampede begins, which can become exacerbated if the institutional investors in question are using leverage. Simply stated, positive bubbles eventually end because economic reality intervenes, and the process can proceed quite quickly because if a stock price is significantly supported by psychology (i.e., the expectations about the behavior of other market participants) rather than economics all it takes is for the psychological dynamic to begin to change.

DISCUSSION

The efficient market hypothesis in effect asserts that, simply by becoming known, known anomalies in stock prices should immediately disappear. Nevertheless, short-term momentum serves as a prominent counterexample. Within the universe of stocks, momentum can be observed at various levels of granularity: for example, globally, within countries, within sectors, within industries, within groups of stocks having similar characteristics, etc. Indeed, we have argued that, even though the institutional investors whose behavior serves to set prices in the short term are aware of this phenomenon, they are not in a position to override those structural factors which lead to momentum. Ultimately, whether or not momentum is caused by cognitive biases on the part of investors is immaterial, as what is instead crucial is that these structural factors, prominent among them being the increasing popularity of indexing, are likely to continue into the future.

This analysis illustrates the benefits of applying multiple theoretical models of market behavior rather than a single one. A believer in efficient markets would likely find an ongoing anomality to be disturbing and try to make it disappear -- for example, by asserting that although short-term absolute returns for momentum-based strategies are above average such is not the case after risk adjustment, at which point a highly technical and potentially circular argument about how to properly perform risk adjustment begins. In any event, the reasoning of institutional traders is difficult to reconcile with the notion of optimizing expected long-term returns: "I know that

momentum stocks tend to be overpriced, and buying them will reduce my long-term returns, but I anticipate that my short-term returns will be above average, and also that I can beat my competitors out the door when the time comes".

Similarly, interpreting momentum purely from the perspective of behavioral finance induces problems of its own -- most particularly, how to address the fact that institutional investors "know better". Indeed, we argue that institutional investors are not generally driven by an "invisible hand of cognitive biases", but rather that they have an incentive to behave as if they suffer from the biases in question.

We have focused on stocks with such large capitalizations that their prices are driven by the action of professional institutional investors rather than individual amateur investors, as we have posited that the actions of the former are likely to be more "rational" than the actions of the latter. However, the distinction between these two groups is blurred by the impact of advertising. More specifically, when institutions advertise momentum funds based on short-term performance and the exciting prospects of the innovative companies which their portfolios contain they in effect are encouraging their less-well-informed customers to act upon various cognitive biases, which in turn provides additional incentives for fund managers to behave as if they also suffer from these same biases.

We believe that considering structural incentives affecting the behavior of stock prices provides an additional perspective which is helpful. As above, this perspective should not be applied in isolation, but instead as a supplement to notions from behavioral finance and market efficiency.

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