

A model of imperfection

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Introduction

Present day finance theory does a poor job of explaining the reality of how financial markets work and why they fail.

This is no surprise since a theory that predicts perfection cannot be expected to explain imperfection, nor provide guidance to market participants on how to act in conditions of imperfection.

For the past fifty years the twin pillars of standard asset pricing theory have been the Efficient Markets Hypothesis (EMH) and the Capital Asset Pricing Model (CAPM). The first asserts that financial assets are priced to reflect consensus expectations of the future cashflows that assets generate. Against the odds, a modified and qualified EMH still forms the basis for the academic understanding of finance and exerts a strong influence on many aspects of policy and practice.

The second pillar, CAPM, follows from the first and predicts an upward-sloping capital market line with high-risk securities priced to offer a higher return than low-risk securities. Although the idea that investors should receive extra reward for taking on greater risk seems eminently reasonable, empirical tests have consistently failed to validate this prediction.

Both theories are models of how markets *should* function, but the cupboard is bare on anything beyond that. So the challenge is to find a set of theories that are able to adequately explain asset mispricing.

Twelve years of research undertaken at the Paul Woolley Centre for the Study of Capital Market Dysfunctionality (the PW Centre) has been guided

by one overriding principle: the models assume that market participants act rationally in the sense that they seek to maximise profits, subject to risk and given their state of knowledge. In contrast to mainstream finance theory, the research also recognises the near-universal practice that asset owners delegate to asset managers, thus opening the possibility of misaligned incentives, especially the agents' constant need to justify their appointment.

The new body of theory developed at the PW Centre explains how the widespread practice of benchmarking performance against market indexes, coupled with the popular strategy of momentum trading, are creating what amounts to systemic failure in the pricing of financial assets. In the first part of this paper we focus on the theory, presenting a straightforward explanation of how asset mispricing can arise. In the second part, we outline the practical implications of this theory and indicate the key areas where change is needed if asset management is to deliver better returns to investors and society.

PART 1: A theory of asset mispricing

Benchmarking: the original sin of investing

When asset owners or trustees delegate responsibility to external managers they typically establish a benchmark, usually a market index or peer group comparison, against which to judge performance. The main problem for owners and trustees is uncertainty about asset managers' abilities and this is often handled by imposing limits in the form of tracking error constraints on how far performance should be allowed to stray from the benchmark return. Even in the absence of tracking constraints, managers have a commercial imperative to avoid big shortfalls against standard comparators.

The practice of benchmarking is recognised to cause undesirable feedback effects in many areas of human organisation, such as healthcare, education and policing targets, executive pay comparisons and official monetary indicators, and there has been concern for some time that something similar is occurring in asset management. A new academic paper by Buffa, Vayanos and Woolley (2019) suggests a mechanism by which benchmarking to market cap indexes can bring about the inversion of the relationship between risk and return across financial markets.

The paper traces asset managers' responses to an upward price shock occurring in a specific market sector, such as tech stocks. Managers with below-market weights in the sector eventually find themselves in danger of breaching their tracking constraint. They respond by reducing their underweight positions and buying at the now higher prices. Those that were overweight the sector to start with are under no early pressure to sell since they are outperforming the benchmark. The dominant response is therefore to force up prices in the sector above the level justified by the initial shock, ultimately turning them into high-risk, low-return securities.

In the converse situation of a sector with falling prices, overweight positions have a smaller and diminishing impact on relative performance. Managers with overweight positions in the falling stocks may reduce their exposure, but the effect will be less pronounced than in the situation of rising prices. This is because stock prices have an unlimited upside but a finite downside. The absolute mismatch between a portfolio's holding and the index weight declines as prices fall, whereas it expands when prices rise. For example, if prices double, the absolute size of an underweight position also doubles; if prices halve, the absolute size of an overweight position also halves.

The PW Centre model assumes that both parties act rationally given their situations. Asset-owning principals are imposing restrictions on the asset-manager agents to protect against

underperformance and as a precaution against incompetence. Managers are fulfilling their contracts and at the same time protecting their commercial interests.

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The predictions of the model help explain a widely-recognised anomaly. Numerous studies have shown, the first as early as 1972, that the relationship between risk and return is not as predicted by standard asset pricing theory. Specifically, portfolios of high-beta and high-volatility securities have failed to deliver higher long-term returns than their low-beta, low-volatility counterparts, and in some decades high-beta portfolios have systematically underperformed low-beta portfolios (Frazzini and Pedersen, 2014).

The message is clear: tight tracking to market cap benchmarks requires managers to allocate part of their portfolios to expensive, high-risk assets in the attempt to keep the near-term valuation of their portfolio riding high. In the medium and long-run this proves a costly mistake.

The activity described as “performance-chasing” involves much the same chain of action and reaction described above, although the motivation comes from managers' commercial incentives rather than from the terms of their contract. Asset managers are keen to avoid negative attention arising from short-term underperformance and so become late-stage buyers of securities they had deemed unattractive when cheaper. As described in Vayanos and Woolley (2013), a similar performance-chasing dynamic plays out at the asset owner level when underperforming managers are fired and replaced by outperforming managers. This has the effect of placing downward pressure on the underperforming stocks held by the

terminated managers and compounding the upward pressure on outperforming stocks held by the newly appointed managers.

How momentum amplifies the distortions created by benchmarking

Momentum investing has proved a popular and successful investment strategy across a wide range of asset classes for as far back as good data exists (Asness et al., 2013). It is used as the basis for stand-alone portfolios, as a diversifying element in a broader fund, and as an additional screen for selecting individual stocks. The popularity of style and factor investing through ETFs, quant funds and smart beta strategies has contributed to the strong growth in assets allocated to momentum.

The momentum strategy seems too good to be true: buying on the initial rise, anticipating the trend to continue and hopefully selling before a major reversal. Backtests of momentum at the stock and sector level typically show excess returns as good or better than those of the best deciles of value investing. Moreover, the best way of exploiting momentum has remained remarkably stable and readily exploitable across most major equity markets over time. Buying stocks that have risen most strongly in the preceding 6–12 months and regularly rebalancing has been an easy recipe for success. Transaction costs and infrequent momentum crashes (Daniel and Moskowitz, 2013) are the occupational hazards.

Asset managers and academics have long puzzled about the remarkable consistency of momentum's success in equity markets. Who, they have wondered, is on the other side of momentum trades? Who is it that comes in with even deeper pockets to sustain and extend the rallies and why are they joining the rally at so late a stage and so predictably?

A plausible explanation is that the securities exhibiting strong momentum have the same characteristics as those bought by benchmarkers and performance-chasers: large, liquid stocks that have already been on a rising trend for some time. The difference is

that momentum investors buy after the initial rise, making them “early-stage” buyers of such stocks. Benchmarkers and performance-chasers inevitably come along later in the upswing, making them the “late-stage” buyers who give a second wind to prices and enable some early-stage momentum investors to take their profits. The consistency of momentum patterns in equities may be partly explained by the regularity of the performance reporting cycle, which compels managers to control tracking error and benchmark-relative performance.

The implication is that benchmarkers fuel the price rises that help sustain momentum swings. Since the impact of tracking constraints is asymmetric – creating a greater incentive to chase rising stocks than to sell out of falling stocks – it is the upswings that are supercharged. Momentum investors are effectively causing benchmarkers and performance-chasers to pay over the odds to meet their contractual terms. Without these late-stage buyers, momentum would not be the force it is, nor have the success it enjoys.

“Benchmarkers and performance-chasers inevitably come along later in the upswing, making them the ‘late-stage’ buyers who give a second wind to prices”

Normally the returns to any strategy erode as its popularity spreads. In this case, the universality of the practice of benchmarking and its Pavlovian responses dwarfs the scale of trading by momentum funds, so the opportunities on offer are unlikely to diminish any time soon.

PART 2: Implications of the new theory

Strategy choices

For all its apparent complexity, investing boils down to a choice between two distinct strategies. One is to invest based on estimates of the stream of future

cashflows that assets are expected to deliver. This strategy concentrates on the fundamental worth of businesses based on their existing assets and expected future profits; we term this “cashflow investing”. There are many ways to engage in this form of investing, but the distinguishing feature is that investors buy and sell securities based on a comparison between their assessment of fair value and the current market price, and take no account of the ebb and flow of investment funds constantly moving across markets.

The second strategy is to disregard the fundamental worth of companies and to invest purely on the basis of “following the money”, taking into account the expected and actual flows of funds and how they might affect prices. We term this “price-only investing”, of which momentum investing is the best-known application. In passing, it is worth mentioning that price-only investing serves as a useful working definition of short-termism in asset management, something the age-old debate over the issue has always lacked.

All investing constitutes some combination or implementation of these two styles. Benchmarked portfolios are an interesting case because they represent a hybrid, using cashflow investing to buy cheap stocks and price-only investing as needed to keep up with the competition in the short term.

Analysing the risk/return characteristics of strategies

Currently, the only way of comparing the returns of different strategies is by running money or back-testing past data. An advantage of having theoretical models of asset mispricing is that they can provide an additional and independent means of comparing strategy returns. The models developed at the PW Centre are of a technical standard that enables them to provide rich insights into how the strategy returns are generated and their relative merits over varying horizons. The models are also able to compare the risk-adjusted returns available from different

implementations and combinations of the two basic approaches.

The key difference between cashflow and price-only strategies lies in how they handle failure; that is, when the price of securities in the portfolio falls. Both approaches rebalance their portfolios regularly to ensure they hold stocks with the desired characteristics. The difference is that price-only investors have no alternative but to sell stocks that have lost momentum or declined in price. Because losses are crystallised regardless of valuation, price-only investing constitutes a succession of independent bets, meaning that the long-run risk of this style of investing is the sum of the short-run risks.

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Contrast that with the response of a cashflow investor. They are unperturbed by short-term price falls, continuing to hold or even adding to their position so long as the fundamentals have not declined as well. Given the cyclical nature of markets, the long-run risk to cashflow investors is less than the sum of the short-run risks, conferring an advantage over price-only investors that compounds over time. Using the analogy of taxation, the cashflow investor is able to carry losses forward in anticipation of a future recovery, whereas the price-only investor has no such option.

In Part I we argued that momentum investors are price-only investors benefiting from their early-stage status at the expense of their late-stage counterparts, the benchmarkers and performance-chasers. The empirical evidence of returns to momentum investing inevitably reflect this advantage, which is real and

significant. However, it is instructive to make a straight comparison of the returns to momentum and cashflow approaches (the latter proxied by a simple value strategy), with the effect of benchmarkers removed from the system.

The PW Centre model shows that momentum investing wins at the outset because investors are joining a trend that is already in progress. By contrast, cashflow investors have to exercise patience as they wait for prices to respond to fundamentals or for higher cashflows to materialise. Momentum is therefore the winning strategy in the short run. However, as time passes, momentum investors are handicapped by the costs incurred whenever losses are crystallised, and their early advantage starts to erode. In the medium and long run, the risk-adjusted returns to a simple cashflow strategy overhaul those of momentum, making it the outright winner over a long horizon. Without attempting to capture all the complexities and dynamics of the real world, this model provides a useful guide to a possible future in which benchmarking and performance-chasing activities are less prevalent.

The social costs of price-only investing

The standard theory of more-or-less efficient security markets carries with it the implication that investors have no need to consider the social impact of their strategies. Accordingly, if asset managers succeed in delivering excess returns it is assumed that they are helping correct some stray mispricing and that their actions are both privately and socially beneficial. For the same reason, new products and anything that stimulates trading and increases the liquidity of markets are considered positive and utility-enhancing developments. The empirical evidence for asset mispricing, coupled now with theories explaining how mispricing can arise, call for investors to explicitly recognise the social consequences of their investment decisions.

The damage caused by asset mispricing travels through several channels, and it is helpful to distinguish between problems occurring in

the corporate sector and those arising in the macroeconomy.

At the corporate level, asset mispricing damages the real economy via the perverse incentives given to corporate decision-makers. So long as a company's share price is a fair reflection of fundamental value, the CEO and board will see their task as maximising the long-term value of the business. But if the shares are subject to fund flows that drive a wedge between the market price and the fundamental value of the business, management faces a dilemma of whether to target the share price in the short term or future profits over the long term.

Several of the strategies that can boost the corporate share price in the short run are incompatible with the long-term prosperity and sustainability of the business. These include cutbacks to capital investment and spending on R&D, using accruals to flatter current profits, and undertaking buybacks and increasing leverage near the top of the cycle. A focus on the short term can also encourage the pursuit of commercial strategies designed to keep up with peers, without regard to the risks involved. This is the corporate equivalent of performance-chasing and bankers are especially susceptible, as illustrated by their activities in the run-up to the sub-prime crisis in the mid-2000s (Biais, Rochet and Woolley, 2015).

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The incentives of corporate managers will almost always encourage them to seek higher prices for their company's shares in the near term. This has a two-fold impact: the risk of impairing the long-run prospects of the business and another source of

upward pressure on asset prices. The overall picture is one in which investors not only create the potential for over-valuation of financial markets themselves, but where they also provide the motivation for corporate managers to follow suit.

At the macro level, asset price bubbles are initially a happy experience for most market participants. It is their aftermath that is painful, often involving sharp falls in economic growth, banking crises and corporate collapses. While bubbles are undoubtedly complex phenomena, it is clear that the pro-cyclical behaviour of price-only investors and corporate decision-makers can play an important role in their formation. As discussed in Part 1, the pressures on benchmarkers and the motivation for momentum investors are stronger in respect of price rises than price falls. As a result, price-only behaviours can create a bias towards over-valuation in markets, which acts as a latent threat to financial and macroeconomic stability.

Lastly, the revenue earned by the investment industry broadly reflects the cost that society incurs for the management of its long-term savings. In that context, it is clearly not in savers' interests to pay fees for market distortions to be created and amplified by the interaction of benchmarkers, performance-chasers and momentum investors, with the associated trading costs acting as a further tax on their wealth. In some cases, a given fund or endowment will find itself in the perverse situation of paying fees to one set of managers to create inefficiencies, while paying another set of managers to exploit and partially mitigate the very same inefficiencies.

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This is symbolic of much of what is happening in securities markets: one set of participants is distorting prices while another set seeks to benefit from the distortions, allowing the finance industry to generate fees from both sides.

Putting cashflow investing first

Reducing price-only investing would improve returns to the end-saver and promote greater pricing efficiency. Asset owners should seek to identify and reduce their exposure to benchmarking and performance-chasing, the primary sources of dysfunction in financial markets and a constant drag on fund performance. Measures to reduce the sources of late-stage momentum activity would also reduce the scale of the opportunities gifted to early-stage momentum funds.

We recommend that asset owners consider action on three levels: education, social awareness and better manager monitoring.

Education

A deeper understanding of how markets really function should underpin any change in approach and the new theory provides a foundation for this. Currently, investors are basing their decisions on a combination of convention and instinct together with prescriptions drawn from a theory they do not believe in. This has created a financial system in which performance-chasing behaviours are ubiquitous and where the social utility of asset management strategies is rarely questioned. A clearer understanding of the interaction of different strategy-types can help investors build portfolios that are both more privately and socially efficient.

Social awareness

Over the last decade there has been a powerful move to encourage businesses to act more responsibly in their commercial activities. In recent years, the ESG movement has been taken up enthusiastically by investors, asset managers and policymakers. However, socially-motivated initiatives will struggle

to gain real traction if corporate managers choose to prioritise their current share price rather than the long-term cashflows of the business. Large institutional investors should be asked not only what they have been doing to manage ESG risks, but what measures they have taken to ensure their asset managers are using strategies that provide the right incentives to corporate managers.

Manager monitoring

We have shown that principal/agent issues contribute greatly to the dysfunctionality of security markets. Benchmarking to market cap indexes, combined with tight tracking error constraints, is a common device used to limit the scope of managers whose ability is uncertain, while managers chase performance of their own volition even in the absence of such limits.

One implication of the analysis is that asset management contracts and guidelines should provide appropriate incentives to managers. Alongside a reassessment of contract guidelines, a wholesale re-thinking of the approach to asset manager monitoring is required. The current approach, with its fixation on market cap benchmarks, is a major contributor to the problem of performance-chasing at the asset manager and the asset owner level. In particular, asset owners need to develop an approach that enables them to effectively monitor the progress of a portfolio over time, without encouraging performance-chasing behaviours. This approach should extend to a periodic portfolio holdings analysis to assess the extent to which a manager is engaged in tacit performance-chasing activity.

Conclusion

Mainstream finance theory offers an idealised view of how financial markets work and, as a result, fails to provide practitioners with a useful basis for decision-making. By studying the effects of delegation from asset owners to asset managers, the theory developed at the PW Centre sheds light on phenomena that have long been regarded as “anomalies” by the standard theory.

The new theory shows that the behaviour of benchmarkers and performance-chasers is sufficient to explain the existence of momentum and the inversion of risk and return within markets. Moreover, the social costs of price-only behaviours include capital misallocation at the corporate level, the economic damage caused in the aftermath of asset price bubbles, and rent extraction by the finance sector. By addressing the industry bias towards performance-chasing, institutional investors have an opportunity to reduce these social costs whilst also improving the returns to the end-saver. We look forward to engaging with asset owners, asset managers and policymakers as we develop these ideas further.

If you would like to discuss any of the ideas raised in this paper please contact us at:

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