Ricardo RESEARCH

Fiduciary duty in dysfunctional markets

June 2021

Paul Woolley

Chairman, Ricardo Research

Philip Edwards

CEO, Ricardo Research

Dimitri Vayanos

Professor of Finance, Director of the Paul Woolley Centre for the Study of Capital Market Dysfunctionality, London School of Economics

Fiduciary duty in dysfunctional markets

Introduction

Financial markets play a central role in the capitalist economy, allocating new savings to productive investment, acting as a signalling device to corporate management, and providing liquidity to investors. The efficient markets paradigm claims that competition among investors keeps asset prices close to fair value. A new interpretation contends that stock markets have morphed into a contest between two sets of investors: those seeking short-term gain matched against those targeting long-term value. As we seek to demonstrate, this unending battle corrupts prices, creates macroeconomic instability and costs vast sums in asset management fees.

The new paradigm highlights the role played by principal-agent relationships in leading investors and corporations alike to focus on short-term share price movements at the expense of long-run cashflows. In Part 1, we describe a cascade of agency issues running from savers to asset owners, on to asset managers and ultimately into corporate boardrooms. Agency problems at every level in this chain give rise to a pervasive short-termism that reduces long-run returns to savers while imposing substantial costs on wider society.

We focus on the key link in this chain: the actions of asset owners in delegating responsibility to asset managers. When setting the terms of the contract, asset owners often impose tracking error constraints that limit the scope for divergence from benchmark returns in the short term. Even in the absence of such constraints, managers have a strong commercial incentive to avoid a sustained period of underperformance.

The focus on short-term performance constitutes the original sin of investing and leads to many of the problems in asset pricing and asset management. Managers respond to underperformance by reducing underweight positions in assets with rising prices which they had previously spurned. These purchases penalise long-term returns and amplify the price rise, leading to overvaluation in relation to fundamentals.

A related problem is the propensity for asset owners to hire recently successful managers and fire unsuccessful ones thereby creating fund flows that further amplify price changes in the short term. These procyclical flows create the opportunities which momentum and trend-following investors are then able to exploit.

“Agency problems at every level in this chain give rise to a pervasive short-termism that reduces long-run returns to savers while imposing substantial costs on wider society.”

As we discuss in Part 2, asset mispricing and bubbles damage the real economy, creating macroeconomic convulsions and giving false signals to the corporate sector. If share prices fail to reflect the fundamental value of a company, corporate managers have the dilemma of choosing whether to target the short-term share price or long-term cashflows. The actions relating to each objective are for the most part mutually exclusive.

To target the share price CEOs can reduce capital expenditure and R&D, focus on quick pay-off projects, engage in buybacks at high prices, increase leverage

to benefit short-term earnings, and use accounting devices to flatter current profits. They may also pursue strategies designed to keep pace with their competitors, without paying due regard to the risks involved – the corporate equivalent of a momentum strategy.

One of the great beneficiaries of the present state of financial markets has been the asset management industry whose annual fees amount to around US$300 billion. The industry meets many of the criteria of a highly competitive industry: vast numbers of producers, low barriers to entry and low start-up costs. However, the dynamics we describe give rise to excessive turnover, an inflated asset base on which to charge fees and supernormal profits across the industry.

"The responsibility therefore falls to asset owners to rectify what has become a thoroughly dysfunctional market."

Fiduciary duty requires asset owners to act in the best interests of the ultimate beneficiaries. It can be viewed as mitigating some of the problems that arise in the process of delegation. However, many asset owners are either explicitly authorising or tacitly accepting the use of short-term tracking to market cap benchmarks. Since this activity is likely to reduce long-term returns, there is an ***a priori*** case that these asset owners are in breach of their fiduciary duty.

The body of theory developed over the past decade and a half at LSE's Centre for the study of Capital Market Dysfunctionality and elsewhere suggests that the remedies, outlined in Part 3, depend predominantly on the way that large pools of capital are administered: how the assets are allocated, the terms under which trustees and other fiduciaries delegate to external asset managers, the strategies they endorse, and the way they monitor the results.

The responsibility therefore falls to asset owners to rectify what has become a thoroughly dysfunctional market. As principals, they should verify the implicit time horizon of the strategies adopted by the asset managers they employ, and as agents they should report to their savers on how they are meeting the new interpretation of fiduciary duty. Beneficiaries have important questions to ask of the staff and trustees of the funds that manage their savings. The future of capitalism is at stake.

I. Causes of dysfunctional markets

Principal-agent issues

Emerging first in the 1970s, agency theory has been widely applied to the relationship between shareholders and corporate managers, notably in the work of Michael Jensen.[1] This research emphasised the importance of incentives in determining the actions of corporate managers. Surprisingly, principal-agent issues in asset management have received much less attention.[2] Indeed, the efficient markets paradigm takes no account of delegation despite the highly intermediated nature of modern investing.

Pension funds, charities, endowments and sovereign wealth funds are typically structured so that oversight of the assets is delegated to a board of trustees or an in-house investment team. These "asset owners" in turn mostly delegate the investment of the assets under their supervision to external asset managers. There are therefore three layers of principal-agent relationship: first, between the beneficiaries and the asset owners; second, between the asset owners and the asset managers they employ; and third, between the asset managers and the corporate executives running the businesses in which they invest.

The management of institutional assets leads to a number of other principal-agent relationships involving consultants, index providers, lawyers, administrators, custodians and ratings agencies, but we focus here on the primary chain of delegation from the end-saver to the corporate executive.

At each level of the investment chain there is the potential for misalignments of interest between principals and agents, and questions about the ability of agents. The challenge for principals is to design effective incentive and accountability systems that help mitigate these issues.

"The management of career risk often prevails over long-term decision-making."

The main issue is that principals struggle to assess the competence of their agents and, for their part, agents are keen to avoid creating any perception of incompetence. As a result, the management of career risk often prevails over long-term decision-making.

By emphasising frequently reported performance metrics, measurement systems further embed this tendency to focus on the short term. This applies to trustees wanting to avoid reputational damage, asset managers afraid of losing client assets and corporate executives keen to avoid underperforming their competitors. Collectively, this translates into a myopic focus on short-term share price performance at the expense of long-term value creation.

We begin with the interaction between asset owners acting as principals when they delegate to asset managers acting as their agents.

Delegation from asset owners to asset managers

It is common practice for pension funds, charities and endowments to delegate the portfolio management role to external asset managers. This typically involves the asset owner retaining control over strategic asset allocation decisions, with a number of asset managers being appointed to run mandates for specific asset classes.[3]

These relationships are underpinned by a contract that sets out the objectives of the mandate, the benchmark and any constraints the manager is expected to observe. The choice of benchmark serves to define the investable universe, frames the

[1] For example, Jensen and Meckling (1976)

[2] An early and notable exception is Lakonishok, Shleifer and Vishny (1992)

[3] Even where assets are managed in-house, there will usually exist a form of principal-agent relationship between the governing body and the underlying portfolio management team.

investment objective and provides a yardstick against which performance can be assessed over time. Funds may also impose constraints on the extent to which a manager is expected to deviate from the benchmark. These can take the form of stock, sector or regional limits, or may be defined by a tracking error target.[4] The aim is to protect the fund from manager incompetence and undue concentrations of risk.

The monitoring process usually involves quarterly reporting of fund and benchmark performance together with risk and attribution analysis. The combined effect of mandate constraints and frequent monitoring is a high degree of sensitivity to benchmark and peer group performance on the part of both asset owners and asset managers.

A well-defined mandate and a monitoring approach designed to identify problems is, on the face of it, consistent with accepted standards of prudent oversight. However, as we discuss below, such an approach exposes the fund to procyclical decision-making that carries both private and social costs.

Cashflow and price-only investing

To understand the impact of principal-agent issues on market dynamics, it is helpful to distinguish between two basic approaches to investing.

The predominant strategy is where funds assess the fundamental value of businesses based on the future cashflows they are expected to generate. This is what most savers expect is happening when they hand over their savings and we term this "cashflow investing". There are many ways to engage in this form of investing, but the essential feature is that investors buy and sell securities based on a comparison between their assessment of fair value and the current market price.

The second approach is to disregard the fundamental worth of companies and to invest solely on the basis of recent and expected price movements. We term this "price-only investing" of which momentum and trend-following strategies are the clearest example.

The distinction between these two approaches has the added advantage of providing an operationally useful definition of short-termism and long-termism in financial markets. Cashflow investors are concerned with long-term business prospects, while price-only investors focus on short-term changes in security prices. In their various implementations and combinations, these two approaches account for pretty well everything done in the name of active asset management.

> *"Cashflow investors are concerned with long-term business prospects, while price-only investors focus on short-term changes in security prices"*

A refinement to this dichotomy is to recognise that price-only investing takes two forms that differ in both timing and motivation. The best-known version of price-only investing is momentum investing, which takes advantage of the extensively documented propensity for the prices of stocks, sectors and asset classes to display patterns of trending over the short and medium term. We describe this strategy as "early-stage" price-only investing because it involves joining market trends soon after they emerge.

By contrast, "late-stage" price-only investing arises as a response to the incentives created by the delegation process. By placing benchmarks centre-stage, delegation from asset owners to asset managers creates an incentive – and in some cases an obligation – for managers to engage in price-only strategies. For example, managers with below-market weights in an outperforming sector may find themselves at risk of breaching their tracking error constraint or enduring a protracted period

[4] Stock, sector and regional limits will often be defined as an acceptable range around the corresponding benchmark weights. Tracking error is typically defined as the volatility of excess returns (vs benchmark) over time.

of underperformance. They will often respond by reducing their underweight positions, buying in at the now higher prices. Those that were overweight the sector at the outset are under no early pressure to sell since they are outperforming the benchmark. The dominant response is therefore to add further upward pressure to stock prices in that sector, thus amplifying the trend.

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 the absolute mismatch between a portfolio's holding and the index weight declines as prices fall, whereas it expands when prices rise. As a first approximation, if prices double, the mismatch doubles; if prices halve, the mismatch halves.

While they differ in motivation, the two forms of price-only investing are interrelated: by amplifying price trends, late-stage investors contribute to the profitability of early-stage momentum investing. Since the impact of tracking constraints and commercial pressures is asymmetric – creating a greater incentive to chase rising stocks than to sell out of falling stocks – it is the upswings that are supercharged. In effect, late-stage price-only investors pay over the odds to avoid breaching their mandate constraints and to manage the risk of benchmark underperformance. Without these late-stage buyers, momentum would not be as potent a force in markets, nor as profitable a strategy.

Price-only investing along the investment chain

The vast majority of asset owners are keenly aware of their obligation to deliver satisfactory results for the beneficiaries of the funds under their supervision. They therefore monitor closely the performance of their underlying managers and feel compelled to react to a run of poor performance. The trouble is that it is difficult for asset owners to know whether underperformance is a result of the prudent avoidance of overvalued assets or an absence of skill. They also have to take into account the reputational costs of retaining underperforming managers. All this contributes to the widely recognised procyclical bias in hiring and firing decisions.

> *"Performance-chasing by asset owners begets performance-chasing by asset managers."*

The importance of past performance in manager selection and termination decisions means that asset managers hoping to preserve and grow their assets under management are incentivised to maintain a marketable track record. This creates a clear commercial imperative for asset managers to control the short-term risk of underperforming their benchmark at the expense of longer-term considerations. In effect, performance-chasing by asset owners begets performance-chasing by asset managers.

As a result, benchmarks have become a convenient hiding place for portfolio managers – a safe harbour to which they can retreat in order to manage their career risk. The cost of this behaviour is greatest when a bubble emerges and the most overvalued stocks come to dominate market cap benchmarks. Unfortunately for savers, this is precisely the time when performance-chasing and index-hugging are most likely to arise as asset owners and managers seek to control their rising career and business risk.[5]

Unconstrained cashflow approaches are not uncommon and have enjoyed popularity with some institutional investors, notably large endowments and foundations. Such strategies typically involve significant deviations from index weights and focus on absolute returns and capital preservation. However, even unconstrained managers are not immune to the commercial challenges presented by a sustained

[5] Such activity was clearly evident in the build-up to the Tech bubble in the late 1990s when managers in aggregate significantly reduced the size of their active bets against market cap indices (Petajisto, 2013).

period of underperformance. Beyond a certain point, the business risk arising from client losses gives rise to performance-chasing by all but the most resilient and determined of portfolio managers.

Why is mispricing not corrected?

Those trusting in the power of free and unfettered markets would expect asset mispricing to be identified and promptly rectified by the actions of profit-seeking market participants. Surely hedge funds would take the opposite side of the performance-chasers' trades and bring prices back towards fair value?

Hedge funds are often viewed as the ultimate unconstrained investors, but in practice they face very similar commercial pressures to more conventional asset managers. Much of hedge funds' asset base derives from large institutions sensitive to short-term performance data and peer group comparisons, making it difficult for a manager to maintain an underperforming position in the face of a powerful market trend.

> *"Markets are not self-correcting because both asset owners and asset managers are agents facing incentives that militate against a focus on the long run."*

Another reason is that the practice of shorting – selling assets you do not hold – carries greater risks than going long. The potential losses on a failed long position are finite, whereas those from a short position that goes wrong are open-ended. Similarly, underweighting assets with rising prices is riskier than overweighting assets with falling prices, since the underweight position creates the potential for unlimited underperformance against the benchmark. This asymmetry means that overvalued assets can prove stubbornly resistant to correction.

More generally, markets are not self-correcting because both asset owners and asset managers are agents facing incentives that militate against a focus on the long run. Such is the magnitude and persistence of price-only pressure that mispricing can persist for much longer than can be tolerated by most investment professionals facing career, business and reputational risks.

As a result, institutional investors exhibit a structural bias towards procyclical decision-making, evident at both the asset owner and the asset manager levels. Incentives effectively act as a barrier to any self-correction mechanism, leading to persistent and chronic asset mispricing.

Empirical evidence

A growing body of empirical research provides evidence of performance-chasing by both asset owners and asset managers. While this research provides only limited insights into the motivation for procyclical decision-making, it clearly illustrates the extent of such behaviour and the negative impact on the returns to savers.

Evidence for procyclicality in hiring and firing decisions by asset owners is provided by Goyal and Wahal (2008). Based on the selection and termination of asset managers by 3,400 pension plans between 1994 and 2003, they find strong evidence that asset owners hire managers after large positive excess returns and somewhat mixed evidence in relation to termination decisions. Specifically, across all termination events, pre-firing performance was close to zero (a small positive) over the prior three years, significantly negative over the prior two years, and a small negative over the year before termination. Notably, around a third of termination decisions were explicitly connected to performance concerns and, as expected, the pre-firing performance of these managers was significantly negative.

These findings are supported by Jones and Martinez (2015), who observe that "institutional investors allocate funds mainly on the basis of fund managers' past performance and of investment consultants' recommendations". Further, they find evidence that hiring and firing decisions are more strongly related to past performance and consultant recommendations than to trustees' own expectations of future performance. To the extent that performance data and consultant advice may be seen as more defensible than their own views, the authors argue that this supports the hypothesis that agency issues play a significant role in the decision-making of asset owners.

In 2009, Cremers and Petajisto introduced a new measure of active management. They defined a manager's "active share" as "the fraction of the portfolio that is different from the benchmark".[6] Using active share in combination with tracking error, they put forward a classification of asset managers on the basis of these portfolio characteristics.

Their key finding – based on US mutual fund performance covering the period 1990-2003 – is that active share is a good predictor of fund performance. Specifically, funds with the highest active share significantly outperformed their benchmarks (both before and after fees), while funds with the lowest active share underperformed their benchmarks. The gap between the excess returns of high and low active share funds averaged 2.5% p.a. (net of fees) over the period and was found to be statistically significant. Petajisto (2013) extended this analysis to 2009 with very similar results.

This research also found that closet indexing[7] had dramatically increased over the period since 1980. At the start of the period, less than two percent of funds would have been classified as closet indexers, with the majority exhibiting an active share above 80%.

By 2009, over a third of active managers could be described as closet indexers, while the most active group (with an active share above 80%) had shrunk to around a fifth of the active universe. Interestingly, Petajisto notes that closet indexing emerged around the mid-1980s, became increasingly widespread during the Tech bubble of the late 1990s, receded somewhat in the early 2000s, before re-emerging in the years leading up to the financial crisis.

This line of research leads to two observations. First, that managers who seek to minimise their career and business risk by sheltering near the benchmark typically deliver poor performance.

Second, that the extent to which managers engage in closet indexing fluctuates over time. The evidence from the Tech bubble in 1999/2000 shows that managers find the temptation to chase performance particularly hard to resist when a large segment of the market becomes increasingly mispriced.

> *"Managers who seek to minimise their career and business risk by sheltering near the benchmark typically deliver poor performance."*

These findings are supported by Anton, Cohen and Polk (2021), which shows that active equity managers' highest conviction positions outperform the market ***and*** other stocks in their portfolio by a large margin (c.2.8-4.5% p.a. depending on the methodology and benchmark employed). The authors note "that while the typical manager has a small number of good investment ideas that provide positive alpha in expectation, the remaining ideas in the typical managed portfolio add little or no alpha."

[6] Formally defined as the sum of the absolute deviations in stock weights between the portfolio and the index, divided by two. For long-only funds, active share will fall between 0% and 100%. A portfolio that mimics the index will have an active share of 0%, while a portfolio whose holdings are not present in the index will have an active share of 100%.

[7] Defined as having an active share of less than 60% for the purpose of this analysis. Justification for this cut-off is set out in Cremers and Petajisto (2009).

As the authors suggest, managers might choose to dilute their best ideas in order to reduce the business risk associated with significant benchmark underperformance or due to a commercial preference for managing a large volume of assets, which precludes holding a small number of concentrated positions.

Lastly, recent empirical work by Buffa, Vayanos and Woolley (2021) finds clear evidence of performance-chasing by asset managers. They find this to be most pronounced in situations where managers with a low active share find themselves holding underweight positions in outperforming sectors. Essentially, managers who seek refuge near the benchmark, due to constraints or commercial concerns, have a greater tendency to respond in a procyclical fashion to price moves than less constrained (higher active share) managers. This provides further evidence of the link between benchmarking in the context of a principal-agent relationship and price-only investing.

II. Consequences of dysfunctional markets

In Part 1, we described how principal-agent issues lead to perverse responses on the part of asset owners and asset managers. Here we consider the repercussions in four discrete areas: market efficiency, corporate decision-making, asset manager fees and fiduciary duty.

Market efficiency

For fifty years and counting, the paradigm of efficient markets has dominated the teaching and understanding of financial markets. The core propositions are that competition among investors ensures that prices reflect a best estimate of the future stream of cashflows from every asset, and that new and relevant information is immediately reflected in prices. Academics have qualified and modified the Efficient Market Hypothesis (EMH) over the years, notably incorporating the effect of macroeconomic risk factors on the discount rate applied to expected cashflows. Despite widespread scepticism among market professionals, and in the absence of an obvious alternative, the EMH continues to underpin some of the most important decisions taken by policymakers and investors.

> *"Efficient markets thinking has cemented the role of capitalisation-weighted indices at the heart of the benchmarking and performance monitoring process."*

On the policy front, regulators have adopted a "light touch" approach to financial markets under the assumption that they tend to be self-stabilising. New products and anything that stimulates trading and increases the liquidity of markets have generally been considered positive and utility-enhancing developments. In addition, mark-to-market rules – predicated on more-or-less efficient prices – are widely required in financial disclosures despite their procyclical consequences.[8]

In asset management, the standard theory of efficient markets carries with it the implication that investors have no need to consider the social impact of their investment strategies. If asset managers succeed in delivering excess returns, it is assumed that they are helping correct some stray mispricing and that their actions are therefore both privately and socially beneficial. Moreover, efficient markets thinking has cemented the role of capitalisation-weighted indices at the heart of the benchmarking and performance monitoring process.

The continued application of ideas that derive from the efficient markets paradigm is all the more remarkable in light of the large body of evidence that undermines its predictions. In particular, two so-called anomalies stand out. The first is the momentum effect, which Eugene Fama has described as "the biggest embarrassment for efficient markets."[9] Building on earlier literature that identified a momentum effect in US stock prices (Jegadeesh and Titman, 1993), Asness et al (2013) documented pervasive momentum effects across multiple asset classes and geographies over four decades.[10]

---

[8] A joint working group of the Financial Stability Forum and the Committee on the Global Financial System published a report in 2009 exploring the links between valuation methodologies, leverage and procyclicality: https://www.fsb.org/wp-content/uploads/r_0904h.pdf?page_moved=1

[9] https://www.top1000funds.com/2015/12/investors-from-the-moon-fama/ (c.25mins)

[10] Subsequent work by Geczy and Samonov (2016) also finds a momentum effect in over two centuries of stock price data. Similarly, Goetzmann and Huang (2018) provide evidence of a momentum effect in Imperial Russia. While the institutional structures giving rise to the principal-agent dynamics we describe in this paper were largely absent in the late 19th and early 20th centuries, we posit that procyclical retail flows effectively played the same role in generating market trends in those earlier periods.

The second challenge comes from the "beta anomaly". Black (1972) and Black, Jensen, and Scholes (1972) showed 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).

Spurred on by the conflict between established theory and evidence, the Centre for the study of Capital Market Dysfunctionality at the LSE takes as its starting point the reality of markets in which asset price bubbles periodically emerge, momentum strategies have been able to deliver consistently high returns, and where the risk/return relationship predicted by CAPM is flat or inverted. Research undertaken at the Centre assumes a framework in which both principals and agents act rationally given their state of knowledge and the incentives they face. The emerging body of theory demonstrates a mechanism by which delegation from asset owners to asset managers, with benchmarks playing a central role, can result in momentum, the inversion of risk and return, and a generalised bias to overvaluation in markets.

Vayanos and Woolley (2013) presents a model that explains the momentum and reversal effects as a by-product of procyclical flows by asset owners. When underperforming managers are replaced by those exhibiting outperformance, the resulting asset flows exert negative pressure on the weakest performing stocks and upward pressure on recent outperformers. To the extent that these dynamics persist, they can give rise to a momentum effect in stocks held by the recipient managers and the emergence of a value opportunity in stocks held by the terminated managers.

In more recent work, Buffa, Vayanos and Woolley (2021) outlines a model in which benchmark-relative constraints result in a procyclical response to price movements by constrained asset managers, with tighter constraints resulting in a more pronounced response. Stocks that are subject to this buying activity become more volatile and more expensive, ultimately delivering lower long-term returns.[11] Thus, benchmarking and constraints can help explain the existence of the low volatility anomaly. In addition, because it is riskier for managers to underweight assets with rising prices than to overweight assets with falling prices, the model predicts a generalised bias towards overvaluation in markets.

In the extreme, the positive feedback effects described above lead to chronic mispricing that erupts in the form of sector or market-wide bubbles. The aftermath of an asset price bubble is invariably painful, often involving sharp falls in economic growth, banking crises and corporate collapses. Alongside the ultra-stimulative policy response of central banks in recent decades, the short-termism embedded in markets via price-only strategies is seen as a key contributor to asset mispricing and market instability in general.

The efficient markets paradigm has justified indifference by investors to the impact of their strategy choices. However, if price-only strategies are recognised as an important driver of mispricing, then by addressing the agency issues that give rise to them, investors could help deliver more efficient and stable markets, with both private and social benefits.

"The short-termism embedded in markets via price-only strategies is seen as a key contributor to asset mispricing and market instability in general."

Corporate short-termism

The study of principal-agent relationships first gained traction not in asset management but in the field

[11] This is consistent with recent research by Favilukis and Zhang (2021) which shows that momentum profits are larger in overvalued stocks.

of corporate management. Beginning in the 1970s economists and management specialists started to examine the interplay between the interests of shareholders in a company and those of the managers delegated to run the business. The debate for the last half century has circled around the goals of CEOs and their boards, how to incentivise managers and the extent to which firms should take account of other stakeholders, such as employees, customers, and local communities.

The basic assumption underlying this debate, and indeed most of the academic and policy work in corporate finance, has been that stock markets are broadly efficient and that share prices represent a reasonable proxy for the expected future cashflows of a business. Many have recognised that there was a problem with short-termism in both asset management and corporate strategy, but in the countless studies on short-termism over the decades this has not been explicitly associated with asset prices being wrong. It followed that shareholder value and the success of a business could be fairly represented by the prevailing share price.

The analysis presented here paints an entirely different picture, with agency problems in asset management causing asset prices to be chronically and systematically mispriced. This implies that every aspect of corporate management and the relationship between shareholders and corporate bosses needs to be assessed in a new light.

The starting point is to recognise that if the share price of a company does not reflect a reasonable estimate of its future cashflows, corporate executives have a dilemma: do they target the best possible share price in the short term or should they focus on securing the best long-term cashflows? The strategies needed to fulfil the two objectives are in most cases mutually exclusive, so that to focus on one will likely fail to deliver on, or be detrimental to, the other.[12]

If CEOs decide to concentrate on strategies they expect to deliver the best long-term outcomes, the near-term earnings of their companies may underperform those of their competitors. Any hit to short-term profitability is likely to attract a negative reaction from short-term investors, with the resulting share price underperformance inviting criticism as well as leaving the company vulnerable to takeover. The experience of Paul Polman during his time as CEO of Unilever is an example of what may happen. He encountered both a threat to his continued leadership and a hostile takeover bid when he tried to put the long-term success of the business ahead of short-term profits.[13]

“If the share price of a company does not reflect a reasonable estimate of its future cashflows, corporate executives have a dilemma: do they target the best possible share price in the short term or should they focus on securing the best long-term cashflows?”

Corporate executives are under pressure to keep their share prices riding high to avoid doubts about the wisdom of their strategies. This choice is then encouraged by a reward system geared to short-term profit targets and early-exercise stock options. The scenario is a perfect match for what is going on in the asset management industry where portfolio managers must decide between targeting a fund’s near-term market value or its long-term cashflows.

[12] A related point is made in Stein (1996) where it is argued that if markets are not efficient, corporate managers have a choice as to whether to set a hurdle rate based on the stock price or one based on the fundamental riskiness of expected future cashflows.

[13] Further detail can be found in this FT article: https://www.ft.com/content/76cddc3e-d42e-11e7-a303-9060cb1e5f44

The main difference is that corporate executives have a much wider range of strategies with which to pursue their chosen goals than the two – cashflow and price-only – available to asset managers. A firm that targets the current share price can reduce capital investment, spending on research and development, even advertising to boost current earnings, all to the detriment of future growth. Executives can increase debt in order to leverage current earnings and growth, but this will have negative repercussions in any future downturn. Share buybacks may provide a direct boost to the share price, but if undertaken when markets are buoyant, as is invariably the case, this will erode value for the remaining shareholders. Another, more subtle, but equally effective tactic is the use of accounting devices, such as accruals, to bring forward expected future cashflows in order to flatter current earnings.

All these strategies have been in extensive use in the bull market of the past ten years. Companies have been reinforcing what is happening in the asset management industry. The principal-agent issues in asset management create fund flows that are then amplified by the agency problems in the next tier down. Share buybacks have pushed prices higher and compounded the distortion created by momentum and benchmarking in fund management. Increased leverage has been used to boost the return on equity, contributing to upward pressure on share prices with greater risk. In effect, CEOs incentivised to maximise share prices have become another procyclical participant in the system, further contributing to market instability. [14]

The problem is broader than financial engineering alone. A short-term mentality also encourages 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 the finance sector is especially susceptible, as illustrated in the run-up to the sub-prime crisis.[15] The claim by Citibank's Chuck Prince in July 2007 that "as long as the music is playing, you've got to get up and dance" perfectly captured the short-termism that had engulfed the banking sector at that time.

If financial markets were efficient and share prices a more reliable reflection of future cashflows, short-termist strategies such as these would not be rewarded by investors. Short-term tactics would be seen for what they are: tricks to enhance the current share price to the detriment of future cashflows.

The asset management industry and the funds that employ them are creating the conditions that allow this to happen. The only way to incentivise corporate managements to pursue long-term strategies is to ensure that the asset management industry is itself investing for the long term.

Firms that focus on the short term are doing a disservice to their shareholders and all other stakeholders in the long run. They will also fail to meet the demands of society for actions that address prominent environmental and social challenges. All the talk of stakeholders and social goals is empty rhetoric so long as investors give priority to the next quarter's performance figures and firms target the near-term share price.

"The only way to incentivise corporate managements to pursue long-term strategies is to ensure that the asset management industry is itself investing for the long term."

[14] There is strong evidence that share buybacks are undertaken in greater volumes when share prices are high than when they are low (see, for example, Andrew Smithers in the FT: https://www.ft.com/content/3d1fda01-cbd9-3ffc-a211-80ed57c5ad0b).

[15] A model proposed by Biais, Rochet and Woolley (2015) helps explain the process by which the rapid growth of securitisation in the US housing market, together with the rise of new financial instruments such as CDOs and CDS, provided the raw materials for the sub-prime mortgage crisis of 2007-08.

Asset management fees

The supply and demand for investment services bears many of the features expected of a competitive market. There are vast numbers of buyers and sellers, few barriers to entry, low costs of start-up, and few restrictions apart from the need to act within the law. No manager or group of managers has a monopoly on the ability to outperform and the evidence points to an absence of persistence in manager performance over time.

Some features of the industry actually make the competitive pressures stronger than in other industries. Asset management is effectively a zero-sum game before fees and charges, so that less than half the managers by value will achieve the excess returns they are being hired to deliver. Moreover, there is an alternative product – passive investing – that offers market returns at minimal cost.

Nevertheless, asset management is one of the most consistently profitable industries in existence. It is difficult to get an accurate figure for the total fee income of the asset management industry, especially as fee rates range widely from low-cost passive at one extreme through to hedge funds and private equity at the other. Based on total invested funds in excess of US$100trillion and an average fee rate of around 0.3% p.a., total annual charges are estimated at more than US$300billion.[16] This figure has been inflated by ten years of rising markets, but partially offset by the seismic shift to passive management.

The impact of price-only strategies is the nub of the problem. If cashflow investing was the sole strategy in use by all funds, prices would converge towards the consensus estimate of fair value for every asset. Competition among investors would promote stable and efficient pricing while at the same time limiting the opportunities for adding value and constraining the profits earned by asset managers. Individual managers would gain by making better estimates of fundamental value and simultaneously contribute to price efficiency.

But funds also adopt price-only strategies that pay no regard to fundamentals and drive prices away from fair value. In using both strategies, asset owners are effectively paying one set of managers to promote the distortion of prices while rewarding others for trying to correct the damage done. Volatile and inefficient markets create limitless opportunities for sizeable gains and losses, which translates into substantial opportunities for fees. Stock markets are in effect a perpetual motion machine for the creation of demand for asset management services.

Inefficient markets not only misallocate capital and cause periodic crises when bubbles burst, they are also associated with supernormal profits for the industry. Moreover, the upward bias to prices means that asset managers have an inflated asset base on which to charge fees.

Dysfunctional markets therefore go hand in hand with excessive fees. Dealing with the first problem will help address the second. That has special significance for funds turning from active to passive management of their assets. The shift to passive deals with the problem of high fees, but leaves the investor hostage to the broader problem of mispriced markets. By reducing the extent of price-only investing in markets, asset owners could help foster more efficient and stable markets in which an even higher proportion of funds could safely take the low-cost passive route to investing.

“Inefficient markets not only misallocate capital and cause periodic crises when bubbles burst, they are also associated with supernormal profits for the industry.”

[16] Source: https://www.thinkingaheadinstitute.org/news/article/global-asset-manager-aum-tops-us100-trillion-for-the-first-time/ and BCG Global Asset Management 2020 report

Fiduciary duty

The analysis presented in this paper shows that the current process of delegation by fund principals to asset manager agents, through its impact on incentives and investment strategies, is the source of many of the problems in present-day finance. These failings have an important bearing on the concept of fiduciary duty which specifically deals with the manner in which agents act on behalf of principals. Our analysis of this complex system of principal-agent relationships shows that there is a strong case for reviewing and potentially reinterpreting the application of fiduciary duty and its companion code, the "Prudent Man" rule. This could help greatly in securing a delegation process that works more effectively.

Fiduciary duty places an obligation on those managing other people's money to act responsibly in the interests of the beneficiaries. It constitutes a direct attempt to mitigate the principal-agent problems that arise when the oversight or management of assets is delegated by one party to another. It therefore applies to trustees and others acting on behalf of savers, and also to the next tier down where asset owners retain asset managers to act on their behalf.[17]

The framing of fiduciary duty varies to some degree across countries and jurisdictions, but the basic concept has broad application. The duty is conventionally interpreted as requiring the agent to strive for the best possible return on the assets in their charge, subject to risk and over a time horizon consistent with the goals or liabilities of the fund. Most pension funds, endowments and sovereign wealth funds have long-term goals, so the objective for these funds will be to obtain the best possible long-term return.

The first step is to understand where in the chain of principal-agent relationships the obligations of fiduciary duty fall most heavily. That is clearly in the court of asset owners, since they both dictate the terms under which their appointed managers operate and are also responsible to the savers and beneficiaries whose interests they serve. Asset owners set the tenor of financial markets by the way they distribute their assets and through the strategies they endorse.

Laws and legal obligations need effective monitoring and sound policing. The problem with fiduciary duty is the difficulty in knowing whether or not the agent is compliant. The duty of fund staff and the asset managers they appoint is only to "do their best" to deliver satisfactory results. Fiduciary duty cannot protect the principal from disappointing outcomes. Indeed, poor performance can arise from a range of causes: a lack of skill or effort, the prudent avoidance of over-valued assets that keep rising, or simply happenstance – a run of bad luck, just as good luck can win unwarranted plaudits. Without the right information it is next to impossible for principals to be certain whether agents are acting in their best interests.

> *"Asset owners set the tenor of financial markets by the way they distribute their assets and through the strategies they endorse."*

Our analysis suggests an important link between fiduciary duty and the use of cashflow and price-only strategies. Specifically, we show that constraints that are tightly linked to market cap benchmarks incentivise performance-chasing. To the extent that this reduces long-term returns, there is an ***a priori*** case that asset owners employing such constraints are in breach of their fiduciary duty.

There may also be situations where the asset owner has deliberately chosen not to impose formal tracking error constraints, but the managers may nevertheless be chasing performance on their own initiative. This

[17] The extent to which fiduciary duties can be applied to the parties engaged in a contractual relationship (as between asset owners and asset managers) is somewhat debatable and explored in detail in Chapter 10 of the UK Law Commission Review of the Fiduciary Duties of Investment Intermediaries (2014).

arguably amounts to a breach of fiduciary duty on the part of the asset manager rather than the asset owner. However, asset owners seeking to meet their duty to deliver the best possible long-run returns should be monitoring their managers in a way that enables them to identify and neutralise such behaviour, while ensuring that managers are not given a license to take excessive risks.

The main obstacle to assessing the competence and diligence of managers is the opacity of the investment process. The performance of a given fund will be determined both by the choice of strategies and the success with which they are implemented. By establishing a better understanding of the strategies their managers are using, the principal can see more clearly where the gains and losses are coming from: strategy selection, skill, careful execution or luck. Such analysis will also reveal the implicit time horizon of a fund, a function of the extent to which the appointed managers are targeting short-term valuations or long-term cashflows.

We earlier identified three generic strategies: cashflow investing and early- or late-stage price-only investing. Using this simple framework, a careful analysis of changing holding weights and trading data will enable asset owners to get a better grasp on whether their long-run returns are being undermined by the use of late-stage price-only strategies. In the absence of such analysis, asset owners' compliance with their fiduciary duty is being treated as little more than a token sign-off.

Impact on Market Pricing

Fiduciary duty is all about agents' obligations to fulfil the aims of their principals, and is therefore concerned with meeting private rather than social objectives. However, curtailing the practice of close tracking to index returns also contributes to the social benefit of lower levels of performance-chasing and thus improved market efficiency.

It might be tempting for some policymakers and market reformers to think of extending the application of fiduciary duty to include purely social goals. An example of this would be to urge the curtailment of all versions of price-only investing, especially momentum trading. The argument would be that every fund benefits from more efficient and stable markets. The problem with this is that momentum can be, and often is, a privately profitable strategy. It is therefore debatable whether it would be appropriate to use fiduciary duty to discourage or prevent funds from doing something that is privately profitable and a rational response to trending markets.

Fortunately, the issue of how to deal with momentum should largely take care of itself. Early-stage momentum investors depend on late-stage buying by benchmarked funds to secure their profits. A more effective application of fiduciary duty to curb closet-indexing and performance-chasing should therefore help to ratchet down the scope for momentum profits.

Fiduciary duty and the "Prudent Man" rule

There are overlaps between the obligation of agents to observe their fiduciary duty and the "Prudent Man" rule dating back to a judgement in the Massachusetts' courts in the 19th century. The rule calls upon trustees to "take such care as an ordinary prudent man would take if he were minded to make an investment for the benefit of other people for whom he felt morally bound to provide" and is best known for its place in the US ERISA legislation of 1974.

Fiduciary duty addresses the manner in which agents execute all aspects of their roles and is essentially about trust and responsibility between agent and principal. The Prudent Man rule is primarily about the suitability of strategies, and therefore also relevant in the present context. It has played a significant role in promoting the diversification of asset portfolios which has helped new asset classes and strategies to gain wider and quicker acceptance. For example, the rule was supportive of the idea that US institutional funds should begin investing in overseas securities and foreign currencies in the late 1970s.

> *"What may be prudent if practised in moderation by a minority of funds, may be less so when adopted widely."*

There are some valid criticisms of the Prudent Man rule. It is reactionary in the sense of endorsing strategies that are already in widespread use. The drawback here is that the unquestioned pursuit of commonly adopted strategies can result in herding: what may be prudent if practised in moderation by a minority of funds, may be less so when adopted widely. Also, the notion of what is believed prudent may change in the light of experience and circumstances, as is happening in the present example of tight tracking to market cap benchmarks.

Seen for decades as a prudent measure of risk control, there is now growing concern that the use of benchmarks leads to performance-chasing and market dysfunction – a major theme of this paper. Until now the Prudent Man rule has been invoked mainly to endorse strategies rather than to inhibit their adoption. The present situation is one in which the rule may serve a useful purpose in discouraging the use of tight tracking to benchmarks. In this it would be working in tandem with a reinterpreted fiduciary duty to counter the negative impact of agency problems by encouraging trustees and fund staff to pursue only those strategies that are in the best interests of the beneficiaries of the funds they manage.

III. Meeting a higher standard of fiduciary duty

The proposed re-interpretation of fiduciary duty calls for significant changes in the way asset owners manage, monitor and report their investment practices. These changes offer the potential for private gains as well as social benefits through more stable and efficient markets. We propose action in three areas.

i. Assessing exposure to price-only strategies

In order to limit the private and social damage inflicted by price-only strategies, asset owners need to make an objective and unvarnished assessment of their exposure to such strategies. This will be straightforward in the case of managers that declare their strategies to be based in whole or part on momentum or trend-following. It will be more challenging for those that draw on an unspecified mix of inputs in the construction of portfolios. As illustrated by the empirical research cited earlier, many strategies that purport to invest on the basis of fundamentals are often engaging in performance-chasing to some degree.

Commonly used tools, such as attribution analysis, style or factor analysis, and peer group comparisons, typically fail to reveal the extent to which managers engage in performance-chasing. The presence of a momentum bias in a factor or regression analysis may be suggestive of price-only investing, but could also reflect a spurious correlation or some long-held positions that happen to be exhibiting a positive bias to momentum at the time of the analysis. Above all, current practice fails to take account of the timing of portfolio trades in relation to the trajectory of a stock's price over time.

A diagnostic test developed by Ricardo Research and the Centre at the LSE uses portfolio holdings data through time to determine the degree to which trading activity is driven by price-only considerations. A key indicator is whether portfolio purchases (sales) occur after prices have been rising (falling), and if so, for how long and to what extent. For example, if a manager frequently adds to positions following a significant rise in the stock price, this would be indicative of performance-chasing. If these purchases typically relate to positions that are held at below benchmark weight, this would also suggest that the manager is seeking to reduce the risk of underperforming the benchmark in the short term.

> *"The goal is to assign an overall 'horizon score' that reflects the extent to which a given portfolio is being managed for the short or long term."*

When assessing the procyclicality of trading activity, turnover and active share are additional indicators that can help identify performance-chasing and closet indexing. Combining these indicators offers a robust approach to distinguishing between cashflow and price-only approaches. At one end of the spectrum sit highly diversified strategies with high turnover, a low active share and a tendency to buy in response to price appreciation; at the other end are relatively concentrated strategies with low turnover, a high active share and a neutral or contrarian response to price moves. Asset owners should be able to confidently place their appointed managers at some point along this spectrum.

The diagnostic also helps to establish whether a price-only strategy is being implemented in the early or late stage of price trends. This will have a bearing on both the motives for momentum buying and its likely success. It will also flag cases where performance-chasing is subconscious or surreptitious. The goal is to assign an overall "horizon score" that reflects the extent to which a given portfolio is being managed for the short or long term.

The diagnostic shines a bright light on one of the most important aspects of how a fund is being managed, but which is generally overlooked in traditional analysis. It gives principals vital information about the strategies employed and mitigates a significant part of the opacity created by delegation. At the same time, it should help to bring a greater degree of professionalism to the way portfolios are managed and support a more productive dialogue between asset owners and asset managers.

ii. Allocating to cashflow strategies

Asset owners intending to move away from running a fund dominated by benchmark-constrained managers, might choose to dedicate part of the total assets to unconstrained cashflow strategies. Initially, this allocation could be populated with any existing strategies that are constructed on the basis of fundamental data and without reference to benchmark considerations. The diagnostic test could be used to confirm the integrity of the arrangement.

This cashflow allocation could be treated initially as an experimental portfolio, allowing trustees and fund executives to become familiar with the new approach and its monitoring system. As confidence builds over time, the allocation could be expanded.

The label "cashflow investor" should not be interpreted in an overly prescriptive way. Rather, it should be treated as a broad category that includes strategies that may have an explicit style bias – whether value, growth, quality or some other category – driven by their specific application and interpretation of fundamental data. If genuinely cashflow only, the portfolios would be expected to exhibit low portfolio turnover and a high active share.

The timing of moves from price-only to cashflow approaches is best staggered over several years to avoid the risk of making a large shift at what subsequently turns out to have been an inopportune moment. The most favourable time for a shift from price-only to cashflow strategies is when markets are substantially overvalued and the risks embedded in market cap-weighted indices are likely to be greatest. Given the current elevated state of markets, the present time may offer a good opportunity for long-horizon investors to start implementing a shift from price-only to cashflow approaches.

iii. Monitoring and reporting

Performance reports play a central role in supporting investor decision-making. By focusing on short-term fund and benchmark performance data – without any attempt to uncover the extent to which cashflow and price-only strategies are driving returns – such reports can encourage procyclical hiring and firing of managers by asset owners.

The first step towards a more effective monitoring approach is to recognise that short-term performance data are at best a weak indicator of success for strategies with long-term objectives. Investment cycles can be long-lasting, so even over periods of 5-10 years investors should be wary of drawing overly strong conclusions from performance data alone.

Moreover, the widespread use of late-stage price-only strategies by managers seeking to control their career and business risks makes it more difficult for asset owners to separate luck from skill. For example, a manager's poor fundamental stock-picking decisions might be bailed out by performance-chasing that happens to benefit returns over a given period, or vice versa.

By distinguishing between cashflow and price-only strategies, asset owners will be able to more confidently assess manager skill on the basis of long-term returns. It will also be possible to compare the returns of managers adopting a cashflow strategy. While there are many different ways to approach cashflow investing, peer group comparisons within recognised style categories will be more meaningful without the intrusion of price-only effects.

"By distinguishing between cashflow and price-only strategies, asset owners will be able to more confidently assess manager skill on the basis of long-term returns"

In addition to gauging manager success based on regularly updated performance data, we suggest that investors try to make an assessment of whether the underlying portfolio is delivering what might be expected, given the manager's stated philosophy and approach. This requires that investors also focus on the fundamental characteristics of stocks held in the portfolio.

For an equity mandate, the characteristics of interest would include measures such as the growth in cashflow, earnings, book value or dividends of the portfolio. These measures are likely to be much less volatile than market performance data and provide a better indication of whether managers are staying true to their stated investment philosophy.

To meet the higher standard of fiduciary duty outlined in this paper, asset owners should ensure that when reporting to beneficiaries they evidence their efforts to manage the principal-agent issues under their control. At a minimum, such reporting should cover the approach to selecting, monitoring and engaging with the underlying asset managers to ensure that portfolios are being managed in a way that is consistent with the long-term objectives of the fund.

Ideally, asset owners would describe the steps taken to assess the time horizon of their managers and the extent to which cashflow and price-only strategies are being employed. In the interests of transparency, asset owners could also provide data relating to their own decisions – at both the manager and asset class level – that might reveal any tendency towards performance-chasing. In the absence of such reporting, it will remain extremely difficult for beneficiaries to hold their asset owner agents to account.

By distinguishing between cashflow and price-only approaches, monitoring their managers more effectively, and clearly reporting on their efforts to implement a long-term investment approach, asset owners have the potential to incentivise a shift towards longer horizons within financial markets, with both private and social benefits.

Conclusion

Principal-agent problems in asset management are causing asset owners to target incompatible objectives. They pursue cashflow strategies to achieve the best possible long-term stream of cashflows, but are simultaneously authorising price-only strategies that target the short-term market value of their funds. This is damaging their individual long-run returns. For society in general, the battle of the horizons creates chronic mispricing, the propensity for bubbles and crashes, the misallocation of capital, and vast and unnecessary fees.

Asset owners have a fiduciary obligation to focus predominantly on the long-run cashflows of their investments. There is now a better understanding of what is going wrong in financial markets and the remedy is shown to be in both the private interest of their beneficiaries as well as the wider public interest.

"The battle of the horizons creates chronic mispricing, the propensity for bubbles and crashes, the misallocation of capital, and vast and unnecessary fees."

The onus falls especially on high profile funds to take the initiative for reform and there is even an early mover advantage in doing so. Funds are agents to

their principals, the savers and investors around the world who are dispersed, largely uninformed and powerless. Asset owners need to inform their beneficiaries of the actions and progress they are taking to meet this higher standard of fiduciary duty.

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

Philip Edwards
phil.edwards@ricardoresearch.com

Paul Woolley
p.k.woolley@lse.ac.uk

Find more of our ideas at:
ricardoresearch.com

References

Anton, Miguel, Randolph Cohen, and Christopher Polk, 2021, Best Ideas, working paper

Asness, Clifford, Tobias Moskowitz, and Lasse Pedersen, 2013, Value and momentum everywhere, ***Journal of Finance*** 68 (3), 929-985

Biais, Bruno, Jean-Charles Rochet, and Paul Woolley, 2015, Dynamics of Innovation and Risk, ***Review of Financial Studies*** 28 (5), 1353-1380

Black, Fischer, 1972, Capital market equilibrium with restricted borrowing, ***Journal of Business*** 45 (3), 444-455

Black, Fischer, Michael Jensen, and Myron Scholes, 1972, The capital asset pricing model: Some empirical tests, in Michael Jensen, ed.: ***Studies in the Theory of Capital Markets***, 79-121

Buffa, Andrea, Dimitri Vayanos, and Paul Woolley, 2021, Asset management contracts and equilibrium prices, working paper London School of Economics

Cremers, Martijn, and Antti Petajisto, 2009, How active is your fund manager? A new measure that predicts performance, ***Review of Financial Studies*** 22 (9), 3329-3365

Favilukis, Jack, and Terry Zhang, 2021, One anomaly to explain them all, working paper

Frazzini, Andrea, and Lasse Pedersen, 2014, Betting against beta, ***Journal of Financial Economics*** 111 (1), 1-25

Geczy, Christopher, and Mikhail Samonov, 2016, Two centuries of price return momentum, ***Financial Analysts Journal*** 72 (5), 32-56

Goetzmann, William, and Simon Huang, 2018, Momentum in Imperial Russia, ***Journal of Financial Economics***, Forthcoming

Goyal, Amit, and Sunil Wahal, 2008, The selection and termination of investment management firms by plan sponsors, ***Journal of Finance*** 63 (4), 1805-1847

Jegadeesh, Narasimhan, and Sheridan Titman, 1993, Returns to buying winners and selling losers: implications for stock market efficiency, ***Journal of Finance*** 48 (1), 65-91

Jensen, Michael, and William Meckling, 1976, Theory of the firm: Managerial behavior, agency costs and ownership structure, ***Journal of Financial Economics*** 3 (4), 305-360

Jones, Howard, and Jose Martinez, 2017, Institutional investor expectations, manager performance, and fund flows, ***Journal of Financial and Quantitative Analysis***, 52 (6), 2755-2777

Lakonishok, Josef, Andrei Shleifer, and Robert Vishny, 1992, The structure and performance of the money management industry, ***Brookings Papers on Economic Activity*** 23, 339-391

Petajisto, Antti, 2013, Active share and mutual fund performance, ***Financial Analysts Journal*** 69 (4), 73-93

Stein, Jeremy, 1996, Rational capital budgeting in an irrational world, ***Journal of Business*** 69 (4), 429-455

Vayanos, Dimitri, and Paul Woolley, 2013, An institutional theory of momentum and reversal, ***Review of Financial Studies*** 26 (5), 1087-1145

Important Information

No investment decision should be made based on this information without first obtaining appropriate professional legal, tax and accounting advice and considering your circumstances.

The findings and opinions expressed herein are the intellectual property of Ricardo Research and are subject to change without notice. They are not intended to convey any guarantees as to the future performance of the investment products, asset classes or capital markets discussed.

This does not contain investment advice relating to your particular circumstances. No investment decision should be made based on this information without first obtaining appropriate professional advice and considering your circumstances.

Information contained herein may have been obtained from a range of third party sources. While the information is believed to be reliable, Ricardo Research has not sought to verify it independently. As such, Ricardo Research makes no representations or warranties as to the accuracy of the information presented and takes no responsibility or liability (including for indirect, consequential, or incidental damages) for any error, omission or inaccuracy in the data supplied by any third party.

This contains confidential and proprietary information of Ricardo Research and is intended for the exclusive use of the parties to whom it was provided by Ricardo Research. Its content may not be modified, sold or otherwise provided, in whole or in part, to any other person or entity, without Ricardo Research's prior written permission.

Telephone: **+44 (0)7719 311 105**

Email: **phil.edwards@ricardoresearch.com**

ricardoresearch.com