

# Behavioural Finance: A Review and Synthesis

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## Abstract

*I provide a synthesis of the Behavioural finance literature over the past two decades. I review the literature in three parts, namely, (i) empirical and theoretical analyses of patterns in the cross-section of average stock returns, (ii) studies on trading activity, and (iii) research in corporate finance. Behavioural finance is an exciting new field because it presents a number of normative implications for both individual investors and CEOs. The papers reviewed here allow us to learn more about these specific implications.*

**Keywords:** *behavioural finance, market efficiency, cross-section of stock returns*

**JEL classifications:** G00, G10, G11, G14, G31, G32, G34

## 1. Introduction

The field of finance, until recently, had the following central paradigms: (i) portfolio allocation based on expected return and risk (ii) risk-based asset pricing models such as the CAPM and other similar frameworks, (iii) the pricing of contingent claims, and (iv) the Miller-Modigliani theorem and its augmentation by the theory of agency. These economic ideas were all derived from investor rationality. While these approaches revolutionised the study of finance and brought rigour into the field, many lacunae were left outstanding by the theories. For example, the traditional models have a limited role for volume, yet in actuality, annual volume on the NYSE amounts to somewhere in the region of 100% of shares outstanding. Second, while the benefits of diversification are emphasised by modern theories, individual investors often hold only a few stocks in their portfolios. Finally, expected returns do not seem to vary in the cross-section only because of risk differentials across stocks.

Based on the above observations, traditional finance appears to play a limited role in understanding issues such as (i) why do individual investors trade, (ii) how do they perform, (iii) how do they choose their portfolios, and (iv) why do returns vary across stocks for reasons other than risk. In the arena of corporate finance, as we will see later, recent evidence indicates that mergers and acquisitions and capital structure decisions do not seem to conform to rational managers behaving as per the theories, so again, there is a puzzle to be explained.

Finance education in general can be more useful if it sheds specific light on active investing by addressing aspects such as (i) what mistakes to avoid while investing,

and (ii) what strategies in financial markets are likely to work in terms of earning supernormal returns. Those are the main pedagogical goals of behavioural finance, which allows for explanations of financial phenomena based on nonrational behaviour amongst investors. Of late, another area of application in behavioural finance is in corporate finance—namely, to link behavioural characteristics of top executives (such as their level of confidence) and their decision-making.

Traditional finance academics often offer a few common objections to behavioural finance. First, it is often said that theoretical behavioural models are somewhat ad hoc and designed to explain specific stylised facts. The response is that behavioural models are based on how people actually behave based on extensive experimental evidence, and explain evidence better than traditional ones. Another common objection is that the empirical work is plagued by data-mining (that is, if researchers set out to find deviations from rational pricing by running numerous regressions, ultimately they will be successful). However, much empirical work has confirmed the evidence out-of-sample, both in terms of time-periods as well as cross-sectionally across different countries. Finally, it is often claimed that behavioural finance presents no unified theory unlike expected utility maximisation using rational beliefs. This critique may well be true at this point, but traditional risk-based theories do not appear to be strongly supported by the data. Thus, it appears that there is a strong case to build upon some theories that are consistent with evidence, than theories based on rational economics whose empirical support appears quite limited. Indeed, a ‘normative’ theory based on rational utility maximizers cannot be construed as a superior alternative to behavioural approaches merely because it discusses how people should behave. If people do not behave in this way, this approach has limitations in helping us understanding financial phenomena.

This review is divided into three parts. The first part discusses anomalous evidence on stock returns. The second part discusses evidence on how investors trade. The last part summarises research in corporate finance. The author recognises that the field of behavioural finance is far too vast and it is impossible to cite every known work. Therefore, some subjective choices in terms of which scholarly works to mention are inevitable. The papers below reflect those works which have influenced the author significantly.

## 2. Stock Returns

### 2.1 *The cross-section of average stock returns*

We first consider the evidence on risk pricing and the pricing of other characteristics. In general, the evidence in favour of the notion that systematic risk matters in asset pricing remains quite tenuous at best. Other characteristics seem far more relevant in the cross-section of expected returns.

Early empirical studies by Black *et al.* (1972) and Fama and MacBeth (1973) suggest a significant positive cross-sectional relation between security betas and expected returns, and this evidence supports the capital asset pricing model (Sharpe, 1964; Lintner, 1965; Mossin, 1966). However, more recently, Fama and French (1992) find that the relation between return and market beta is insignificant. Internationally, Rouwenhorst (1999) finds no significant relation between average return and beta with respect to the local market index. Tests of the consumption-based capital asset pricing model (Breedon, 1979) have also led to inconclusive results; see, for example, Hansen and Singleton (1983). Jagannathan and Wang (1996) find a modest positive relation between

conditional beta and expected returns when the market is expanded to include human capital.

On the importance of other variables, the evidence is much more compelling. A landmark study by Fama and French (1992) finds that size and the book-to-market ratio strongly predict future returns (returns are negatively related to size and positively to book-market). Fama and French (1993) provide evidence that a three-factor model based on factors formed on the size and book-market characteristics explains average returns, and argue that the characteristics compensate for 'distress risk.' But Daniel and Titman (1997) argue that, after controlling for size and book/market ratios, returns are not strongly related to betas calculated based on the Fama and French (1993) factors (see, however, Davis *et al.* (2000) for a contrary view). Ferson and Harvey (1997) find that book/market and the Fama-French loadings are both relevant for determining expected returns in the international context. More recently, Daniel and Titman (2006) argue that the book/market effect is driven by overreaction to that part of the book/market ratio not related to accounting fundamentals. The part of this ratio that is related to fundamentals does not appear to forecast returns, thus raising questions about the 'distress-risk' explanation based upon fundamentals.

Brennan *et al.* (1998) find that investments based on book/market and size result in reward-to-risk ratios which are about three times as high as that obtained by investing in the market. These seem too large to be consistent with a rational asset pricing model. Given the Euler equation for the representative investor, as Hansen and Jagannathan (1991) point out, a high Sharpe ratio implies highly variable marginal utility across states. Moreover, the returns of small and high book/market stocks would need to covary negatively with marginal utility. This implies that the returns would need to be particularly high in good times when marginal utility is low and vice versa. Lakonishok *et al.* (1994) do not find any evidence that this is true.

Rouwenhorst (1999) finds that firm size and book-to-market ratios predict returns in several emerging markets. Daniel and Titman (1997) also find that the common stocks of firms with higher book/market ratios are more liquid than vice versa, so that the book/market effect cannot be justified by way of an illiquidity premium.

Turning now to other effects, Jegadeesh and Titman (1993) provide evidence of the important 'momentum anomaly,' namely, the cross-sectional predictability of returns over 6–12 month horizons. Rouwenhorst (1998) finds out-of-sample evidence of a momentum effect in many European countries. The momentum anomaly has been analyzed extensively in subsequent literature, and there is little doubt that it is robust across time, and across many countries. While Conrad and Kaul (1998) attribute the momentum anomaly to time-variation in expected returns, Jegadeesh and Titman (2002) argue that methodological issues in their study negate their conclusions.

Evidence of long-term reversal (negative autocorrelation of returns over 3–5 year horizons) is found by DeBondt and Thaler (1985, 1987), and Chopra *et al.* (1992). Though there also is evidence of a negative relation between current and lagged returns at monthly and weekly horizons (Jegadeesh, 1990; Lehmann, 1990) the economic causes are unclear. For example, while Cooper (1999) suggests that overreaction is the cause of this phenomenon, Avramov *et al.* (2006) and Gutierrez and Kelley (2006) suggest that part of the phenomenon may be caused by illiquidity-related price reversals.

Haugen and Baker (1996) find that the strongest determinants of expected returns are past returns, trading volume and accounting ratios such as return on equity and price/earnings. They find no evidence that risk measures such as systematic or total volatility are material for the cross-section of equity returns. Lakonishok *et al.*

(1994) show that the return performance of glamour stocks (measured by high price/fundamental ratios such as market/book) is not impressive and value stocks do better. Baker and Stein (2004) argue that the negative relation between returns and past volume is driven by optimistic investors generating volume, and their optimism getting reversed in subsequent periods. Due to short-selling constraints, pessimism does not adequately get reflected in stock prices. In a similar vein Diether *et al.* (2002) find that stocks with higher dispersion of analyst earnings forecasts earn lower returns than other similar stocks. They suggest this happens because while dispersion implies high optimism and pessimism, the latter does not get into prices because of short-selling constraints. Thus the negative relation between future returns and dispersion can obtain because the high optimism inherent in high dispersion gets reversed out in subsequent stock prices. Chen *et al.* (2002) provide a related argument by positing that low breadth of long ownership in a stock indicates that the short-selling constraint is binding, so that prices in these stocks become very high relative to fundamentals. This suggests that prices should reverse more in stocks experiencing reductions in breadth; they find some empirical support for this phenomenon.

Some recent papers shed light on the type of stocks in which mispricing may be most intense. For example, Baker and Wurgler (2006) define a number of investor sentiment proxies at the aggregate level. These include share turnover, the closed-end fund discount (used by Lee *et al.* (1991)) and first-day IPO returns (suggested by Ritter, 1991). They find that stocks that are difficult to arbitrage (e.g., small, highly volatile ones) exhibit the maximum reversals in subsequent months when investor sentiment is high in a given period. Similarly, Zhang (2006) argues that stocks with greater information uncertainty (e.g., those which are small and have low analyst following) exhibit stronger statistical evidence of mispricing in terms of return predictability from book/market and momentum within cross-sectional regressions. Finally, Nagel (2005) provides evidence that the mispricing is greatest for stocks where institutional ownership is lowest; here institutional ownership is a proxy for the extent to which short-selling constraints bind (the assumption is that short-selling is cheaper for institutions).

In sum, the evidence indicates that support for non-risk related characteristics as predictors of stock returns is far more compelling than risk-based ones. This has led to some prominent theoretical attempts to explain patterns in the cross-section of returns, as discussed in the next subsection.

## 2.2 Theoretical literature

Prominent attempts to explain patterns in stock returns are Daniel *et al.* (1998, 2001), Barberis *et al.* (1998), and Hong and Stein (1999). The first paper attempts to explain patterns using overconfidence and self-attribution. Overconfidence about private signals causes overreaction and hence phenomena like the book/market effect and long-run reversals., whereas self-attribution (attributing success to competence and failures to bad luck) maintains overconfidence and allows prices to continue to overreact, creating momentum. In the longer-run there is reversal as prices revert to fundamentals as a consequence of Bayesian updating by agents. In a related paper Gervais and Odean (2001) formally model self-attribution bias in a dynamic setting with learning, and show that if this bias is severe, it may prevent a finitely-lived agent from ever learning about his true ability.

The Barberis *et al.* (1998) theory states that extrapolation from random sequences, wherein agents expect patterns in small samples to continue, creates overreaction (and

subsequent reversals), whereas conservatism, the opposite of extrapolation, creates momentum through underreaction. Hong and Stein (1999) suggest that gradual diffusion of news causes momentum, and feedback traders who buy based on past returns create overreaction because they attribute the actions of past momentum traders to news and hence end up purchasing too much stock, which, when positions are reversed, causes momentum. While Brav and Heaton (2002) use a model with uncertainty about model parameters such as the asset value's mean and rational Bayesian learning to explain predictable return patterns, it appears that their explanation relies on the specific nature of the prior uncertainty and its resolution to generate over- versus underreactions. For example, if agents are concerned with structural change in the mean and it does not occur, there will be overreaction due to too much weight on recent data. On the other hand, if agents are unsure whether structure change has occurred and it indeed has occurred there will be underreaction.

Hong *et al.* (2005) suggest a model where agents use overly-simplified models to evaluate stocks, ignoring the true, more complex model. They use this notion to explain a variety of phenomena including momentum and asset bubbles. For example, an agent who believes in a particular model uses this model to make persistent forecast errors while ignoring a persistent but pertinent information signal, which leads to momentum. Further, an agent using a particular model while seeing a sequence of positive earnings, can drastically re-evaluate his beliefs after seeing the sequence being broken, leading to dramatic changes in stock prices.

A notable recent addition to theoretical thought is Barberis and Shleifer (2003), which argues that the tendency of investors to heuristically categorize objects can lead to the emergence of style-based mutual funds. Further, assets within a style co-move more than those outside of that style. The paper by Barberis *et al.* (2005) follows up by documenting that S&P 500 betas of stocks go up when these stocks are added to the index, and, in effect, arguing that this comovement, at least in part, is simply because investors treat S&P stocks as belonging to one category.

Other empirical evidence on the theories is preliminary at this point. For example, Kausar and Taffler (2006) provide evidence supporting the Daniel *et al.* (1998) arguments. They show that stocks initially exhibit continuation in response to an announcement (a going-concern audit report) that the firm is in distress, but later exhibit reversals. Chan *et al.* (1996), however, argue that momentum is due to slow diffusion of news, because they do not find any evidence that high momentum stocks reverse later. Doukas and Petmezas (2005) find support for the self-attribution hypothesis in the market for corporate control. Specifically, they find that managers earn successfully smaller returns in each successive acquisition, suggesting they become more and more overconfident with each successful acquisition.

Chan *et al.* (2003) find no evidence in favour of the Barberis *et al.* (1998) implication of extrapolation following a sequence of news events within returns data, but, using order flow data around earnings announcements, Frieder (2004) does. Hong *et al.* (2000) find that stocks with fewer analysts following them have greater momentum, suggesting that less analyst following, by causing slower diffusion of news creates more momentum, thus supporting the Hong and Stein (1999) arguments. Doukas and McKnight (2005) show that the Hong *et al.* (2000) results also hold in Europe, providing out-of-sample confirmation to the Hong and Stein (1999) theory.

In other attempts at modelling behavioural biases, Barberis *et al.* (2001) and Barberis and Huang (2001) have attempted to incorporate the phenomenon of loss aversion into utility functions. Loss aversion refers to the notion that investors suffer greater disutility

from a wealth loss than the utility from an equivalent wealth gain in absolute terms. Barberis and Huang (2001) show that loss aversion in individual stocks leads to excess stock price fluctuations, i.e., more than that justified by fluctuations in dividends (viz. Shiller, 1981). This happens because, for example, agents' response to past stock gains is to increase their desire to hold the stock and thereby, in effect, lower the discount rate, raising the stock price still further. Further, a book/market effect also obtains because stocks with high market/book are ones that have done well and thus require lower returns in equilibrium. Barberis *et al.* (2001) use similar arguments to justify aggregate phenomena of excess volatility. In essence, the high volatility leads excessive losses, that, in turn, cause the investor to require a high premium to hold stocks, which leads to an explanation of the equity premium puzzle. Grinblatt and Han (2005) argue that loss aversion can also help explain momentum. Specifically, past winners have excess selling pressure and past losers are not shunned as quickly as they should be, and this causes underreaction to public information. In equilibrium, past winners are undervalued and past losers are overvalued. This creates momentum as the misvaluation reverses over time.

Scheinkman and Xiong (2003) analyse the interaction of overconfidence and short-sale constraints. They show that agents with positive information may be tempted to buy overvalued assets because they believe they can sell that asset to agents with even more extreme beliefs. With short-sale constraints, negative sentiment is sluggish to get into prices, and this can lead to asset pricing bubbles. Hong *et al.* (2006) show that such phenomena can be exacerbated if assets have limited float (i.e., if a large number of shares are locked up with insiders who face selling restrictions). Hirshleifer and Teoh (2003) model the notion that individual investors may have limited attention spans and this may cause them to miss certain important aspects of financial statements (e.g., stock options) that are disclosed subtly and not directly. This may cause dramatic valuation shifts when full and direct disclosure is made. Bernardo and Welch (2001) show that overconfidence in an economy is beneficial because increased risk-taking by overconfident agents facilitates the emergence of entrepreneurs who exploit new ideas.

Can psychological arguments about investor biases be tested in an *ex ante* manner? In a recent attempt to do this Sorescu and Subrahmanyam (2006) test the argument of Griffin and Tversky (1992) that agents overreact to the strength of a signal (e.g., the warmth of a recommendation letter) and underreact to its weight (the letter-writer's reputation). Using analyst experience and the number of categories spanned by analyst revisions as proxies for weight and strength, respectively, they find some support for this hypothesis. This type of approach appears to have promise, but much work remains to be done along these lines.

### 2.3 *Investor moods*

A separate line of research documents the effects of moods on investors. Saunders (1993) documents that the NYSE stock market tends to earn positive returns on sunny days and returns are mediocre on cloudy days. Hirshleifer and Shumway (2003) confirm this evidence across a number of international markets. This suggests that investor mood (ostensibly negative on cloudy days) affects the stock market. Goetzmann and Zhu (2005) find suggestive evidence that this effect is not due to the trading patterns of individual investors, thus leaving open the possibility that it may arise from the moods of market makers.

Kamstra *et al.* (2000) document that returns around the weekend of the switch to standard time from daylight savings time are very negative, and suggest that induced depression from the switch amongst investors suffused with seasonal affective disorder causes the negative return. Edmans *et al.* (2005) indicate that outcomes of sporting events involving the country as a whole impact the stock market of the country. It is hard to imagine what else but mood could cause this effect.

Overall, the evidence in favour of inefficient financial markets is far more compelling than that in favour of efficient ones. It is noteworthy that just because there is evidence of predictable patterns in stock returns does not mean individual investors can make superior returns. In many of the studies, the magnitude of the effects are not large enough for retail investors to earn superior returns after accounting for transaction costs. However, institutions may well be able to take advantage of such pricing problems (in fact, casual empiricism indicates that many do).

#### 2.4 *Limits to arbitrage and the survival of irrational traders*

If it is indeed the case that financial market prices are driven at least in part by irrational agents, then two issues arise: (i) why does arbitrage not remove any mispricing? (ii) why do irrational traders, who would lose money on average, not get driven out of the market in the long-run? Recently, progress has been made in answering both of the preceding questions. First, Shleifer and Vishny (1997) argue that arbitrage may be restricted because it is costly precisely when it would be useful in removing pricing inefficiencies. For example, because of marking-to-market, arbitrageurs may require more and more capital as prices diverge more and more from their efficient values. Furthermore, Daniel *et al.* (2001) argue that owing to risk aversion, arbitrageurs may not be able to remove all systematic mispricing.

There are at least three counter-arguments to the notion that irrational traders would cease to be influential in the long-run. First, DeLong *et al.* (1991) argue that irrational agents, being overconfident, can end up bearing more of the risk and can hence earn greater expected returns in the long-run. Second, Kyle (1997) argue that even if agents are risk-neutral, overconfidence acts as a precommitment to act aggressively, which causes the rational agent to scale back his trading activity. In equilibrium, this may cause overconfident agents to earn greater expected profits than rational ones. Finally, Hirshleifer *et al.* (2006) argue that when stock prices influence fundamentals by affecting corporate investment, irrational agents can earn greater expected profits than rational ones. This happens because irrational agents act on sentiment sequentially. Agents who act on sentiment early benefit from late arriving irrationals who push prices in the same direction as the early ones. If private information is noisy, this can result in situations where the irrationals as a group, outperform the rationals in terms of average profits. As we mention in the next section, however, if individual investors trade in financial markets just to obtain pleasure from trading as a consumption good, they may continue to trade even if they lose money on average.

### 3. Trading Activity and Portfolio Choice

#### 3.1 *Patterns in the trades of individual investors*

Traditional finance focuses on explaining asset prices, while trading activity is generally ignored. Yet, the NYSE website indicates that the annual share turnover rate in 2003

on the NYSE was about 99%, amounting to a total volume of about 350 billion shares. Using reasonable estimates of per-trade costs, this implies that the investing public voluntarily pays several billion dollars to financial intermediaries every year.

As finance scholars, it is our responsibility to analyse where this extreme level of volume comes from, but we have made scant progress on the subject. The recent papers of Odean, some with Barber, using a proprietary dataset from a discount brokerage firm, however, have made excellent progress in helping us understand the trading activities of individual investors in particular.

The precursor of the Odean papers is a paper by Shefrin and Statman (1984a) which documents a disposition effect among individual investors, which can be termed as a tendency to sell winners too soon and hold on to losers too long. Odean (1998) also finds evidence of a disposition effect. This is consistent with the notion that realising profits allows one to maintain self-esteem but realising losses causes one to implicitly admit an erroneous investment decision, and hence is avoided. Interestingly, past winners do better than losers following the date of sale of stock by an individual investor, suggesting a perverse outcome to trades by individual investors. Odean (1999) further shows that individuals who trade the most are the worst performers. Barber and Odean (2001) provide interesting evidence on investor profits and performance by arguing that women outperform men in their individual stock investments. They attribute this to the notion that men tend to be more overconfident than women. The allusion is to an evolutionary rationale where men, as hunter-gatherers, are required to be overconfident to take risks for the purposes of hunting in order to acquire food, an essential need for survival.

Barber and Odean (2002) find that investors who choose to make investments online are better performers than those who do not go online before the switch but worse performers after the shift. The idea is that overconfidence induces them to switch but then excessive trading after the switch dissipates their profits. Kumar (2006) shows that individuals appear to particularly prefer stocks with lottery-like characteristics (i.e., high volatility and skewness). Barber *et al.* (2005) indicate that individual investor trading has a significant systematic component, suggesting that the biases of individuals do not cancel in aggregate. This is important for theoretical models such as Daniel *et al.* (1998), which assume that errors in information signals are correlated across agents.

Recently Hvidkjaer (2006) shows that small traders, on net, buy loser momentum stocks and subsequently become net sellers in these stocks, suggesting that by underreacting to negative information, they may create momentum. In another intriguing paper, Hvidkjaer (2005) documents that trade imbalances of small investors are negatively related to future stock returns in the cross-section. While the exact rationale for this finding remains to be explored, the result is consistent with the notion that small investors overreact to information, and the reversal of their sentiment may cause stock return predictability. However, this inference appears to be at odds with Hvidkjaer (2006) so that much more needs to be done to understand the long-run relation between trade imbalances and returns.

In a comprehensive study of trading activity using a Finnish data set, Grinblatt and Keloharju (2001) confirm a disposition effect. They also show that there are reference price effects, in that individuals are more likely to sell if the stock price attains a past month high. A particularly elegant test of disposition and reference price effects is provided by Kaustia (2004) in the context of IPO markets. Since the offer price is a common purchase price, the disposition effect is clearly identifiable. Kaustia (2004) finds that volume is lower if the stock price is below the offer price, and that there is a sharp upsurge in volume when the price surpasses the offer price for the first time.



Furthermore, there also is a significant increase in volume if the stock achieves new maximum and minimum stock prices, again suggesting evidence of reference price effects. Such studies have added to our understanding of why people trade, but a calibration of a specific model that would deliver the magnitudes of volume observed in reality appears desirable to build a complete understanding of trading activity.

### 3.2 Evidence from derivatives markets

A small but growing line of literature also provides evidence from derivatives markets that investors do not seem to incorporate information properly. For example, Poteshman and Serbin (2002) provide evidence that agents undertake clearly irrational actions like exercising options when it would be wealth-enhancing to sell them. Stein (1989) and Poteshman (2001) provide evidence that agents in the options market do not react properly to volatility information about the stock market. Finally, Bakshi *et al.* (2000) provide evidence that agents often trade in a manner that causes option prices to move in a manner inconsistent with comparative statics obtained from traditional assumptions of rationality.

Another relevant question is whether behavioural biases of agents actually affect prices through trading activity. Coval and Shumway (2005) provide some evidence on this by arguing that proprietary traders on the Chicago Board of Trade exchange (which mainly trades derivatives) take more risk late in the day (as measured by number of trades and trade sizes) to cover their losses in the beginning of the day. This implies loss averse behaviour. Prices are affected by this behaviour in that they are willing to buy contracts at higher prices and vice versa than those that prevailed earlier.

### 3.3 Portfolio choice

Benartzi and Thaler (2001) show evidence of clearly irrational investor behavior where investors follow a “ $1/n$ ” allocation rule across investment choices regardless of the stock-bond mix of the available choices. In a related paper Benartzi (2004) show that reducing investor autonomy by forcing investors by default to participate in a savings plan until they choose to opt out (as opposed to requesting them to enroll in the plan) actually increases their savings rate.

The evidence on portfolio choice of individual investors is rather scant at this point. However, Goetzmann and Kumar (2003) show that individual investors who are young and less wealthy hold more under-diversified portfolios, suggesting that they may exhibit stronger behavioural biases. Huberman (2001) indicates that investors have localised preferences for stock by documenting their preference for holding stocks in a regional telephone company in preference to other investments. Frieder and Subrahmanyam (2005) present evidence that individual investors prefer stocks with high brand recognition, supporting the familiarity hypothesis. Further, Grinblatt and Keloharju (2001b) indicate that Finnish agents are more prone to hold stock in firms which are located close to the investor.

Coval and Moskowitz (1999) show that the above preference for local stocks extends to mutual fund managers, in the sense that such managers tend to show a proclivity for stocks headquartered in the region that the managers are based. Finally, in the context of professional money managers, Hong *et al.* (2005) argue that mutual fund managers are more likely to buy stocks that other managers in the same city are buying, suggesting

that one factor impacting portfolio decisions is a word-of-mouth effect by way of social interaction between money managers.

Quite apart from portfolio choice across different equities, using survey data, Hong *et al.* (2004) address the issue of which agents invest in equities at all. They suggest that stock market participation is influenced by social interaction, i.e., agents that are more social, in the sense of interacting more with peers at collective gatherings such as at church, are more likely to invest in the stock market. More broad-based studies would doubtless shed reliable light on the important issue of precisely how portfolios are chosen.

In general, the evidence on individual investors suggests that such agents are not particularly sophisticated in designing trading strategies. The papers that study individuals' trading activity document that such agents do not achieve particularly impressive returns. Indeed, Barber *et al.* (2004) document a wealth transfer from individuals to institutions via the stock market. Why then do individuals trade? Perhaps for these investors trading is akin to a consumption good – i.e., they trade for the sheer pleasure that trading provides in a manner similar to watching a sport or a film, or gambling in Las Vegas or Atlantic City. Further investigation on why such agents may be willing to trade while continuing to lose money on average would be extremely useful.

## 4. Corporate Finance

### 4.1 Corporate events

The most robust finding regarding return reactions to corporate events has been that long-run returns following events have been found to drift in the direction of short-term return reactions to the events. Thus, Grinblatt *et al.* (1984), and Desai and Jain (1997) find evidence of drift following stock splits. Furthermore, after seasoned equity offerings individual stock returns are poor, and continue to be mediocre for more than a year following the offering (Loughran and Ritter, 1995; Spiess and Affleck-Graves, 1995). Baker and Wurgler (2000) show that return predictability from aggregate security issuances obtains at the market level as well. Further, Loughran and Ritter (1995) find similar negative drift after IPOs. Finally, dividend initiations lead to positive drift and dividend cuts to the opposite (Michaely *et al.*, 1995).

Short-run post-earnings announcement stock price 'drift' in the direction indicated by the earnings surprise is found by Bernard and Thomas (1989, 1999). In another well-known paper, Teoh *et al.* (1998) present evidence in favour of the notion that managers manipulate earnings and investors do not entirely see through this activity. Specifically they show that firms whose managers who manipulate accruals to raise income before a seasoned equity offering have higher stock prices before the offering but show smaller stock returns after the offering.

A relevant question is the following. Given that return reactions to corporate events are not complete for a substantial period after the event, which agents are failing to process information properly? Huh and Subrahmanyam (2005) attempt to shed light on this issue by examining trading activity and institutional holdings around SEOs. They find that small investors (as reflected in trade number imbalances) appear to continue to be net buyers of SEO stocks even after the SEO. This presumably is because they are naively extrapolating stock price performance from before the SEO (recall that SEOs are timed by managers during overvalued periods, which imply a stock price run-up

prior to the SEOs). Further, SEOs that are purchased by individuals on net exhibit significantly stronger underperformance relative those purchased by institutions (this finding overlaps with that in Gibson *et al.*, 2004). This indicates that individual investors have difficulty accounting for the notion that SEOs are timed to take advantage of most favourable valuations from the managerial perspective.

The reaction to corporate events is rationalised by managerial timing in Daniel *et al.* (1998). The basic idea is that managers time their issues to take advantage of misvaluation based on investors' signals. Thus, the timing pre-selects for returns that are in the direction of the news conveyed by the event. For example, if managers issue stock when their stock is overvalued (the pricing error is negative) or repurchase stock when it is undervalued, then SEOs will predict negative abnormal returns and repurchases will imply the opposite. In fact, Brav *et al.* (2005) indicate using survey evidence that a significant consideration for repurchases among managers is precisely this sort of market timing.

#### 4.2 Ongoing corporate financial decisions

Apart from episodic events such as stock splits and mergers, there also is a question about how managers make more mundane decisions such as capital budgeting, the choice of capital structure, and the initiation/maintenance of dividends. While traditional finance texts contain a lot of classical insights about such issues, lately, behavioural finance researchers have started to take a keen interest in the subject.

Stein (1996) discusses the important issue of how to budget capital in a world where investors are irrational. In his model, investors mis-assess the cash flow of the firm by a random amount. He shows that if the manager's goal is to maximise the current stock price, then the discount rate should not be the CAPM rate but a rate that adjusts for the error made by the investor (which can be obtained from misvaluation proxies such as book/market). On the other hand if the goal is to maximise long-run value, the hurdle rate equal to traditional CAPM cost of capital, with the proviso that the beta used in the CAPM formula uses the unobserved rational beta that can be measured using accounting numbers and cash flows, as opposed to returns.

An interesting paper by Gervais and Goldstein (2004) argues that overconfidence may actually permit better functioning of organisations. The notion is that each team member's marginal productivity depends on others. An overconfident agent may overestimate his marginal productivity and work harder, thereby causing others to work harder as well. While overconfidence causes the agent to overwork, the organisation as a whole can benefit from the positive externality that other players generate.

In an important recent paper Baker and Wurgler (2002) attempt to upend traditional finance texts, which teach that the debt-equity choice is a tradeoff between interest tax shields and bankruptcy costs or some other such story rooted in rationality. They show that the debt-equity choice appears to be a function of whether managers perceive their stock to be overvalued. The financing mix of a firm is simply an outcome of cumulative historical attempts by managers to time the market. The fraction of equity is explained to a large extent by financing with equity during historical periods of high market to book ratios. In another significant paper Welch (2004) argues that corporations do not adjust their capital structures in response to market price fluctuations in their issued claims. This runs counter to rational theories of capital structure choice.

In an interesting application of sociological considerations, Stulz and Williamson (2003) argue that the culture of a country influences creditor rights. They find

that Catholic countries have poorer creditor protection, suggesting that the historical opposition of Catholicism to capitalism and private property causes this phenomenon. Much work along these lines needs to be done, however. More specifically, it remains to be seen if culture can explain cross-country variations in other aspects of corporate finance such as the form of governance, executive compensation, and labour protection.

An enduring puzzle in corporate finance has been the persistence of dividends in spite of the recognition that share repurchases as a means of cash distribution confer tax advantages. The literature on behavioural dividend policy dates back to Shefrin and Statman (1984), who argued that firms pay dividends simply because investors exercise better self-control with their expenditures if they get a 'check in the mail' in the form of a dividend than if they have to take a conscious action (sell shares), because the latter may allow faster liquidation of the portfolio than is desirable. More recently Baker and Wurgler (2004) rationalise dividends by arguing that during certain times, investors are more desirous of dividends. The desire can be captured by empirical differences between market to book ratios of dividend paying and nonpaying firms. They argue that time variations in dividend policy can be effectively explained by the empirical proxy for dividend desire.

#### 4.3 *Mergers and acquisitions*

The most logical reason to undertake merger activity is synergistic benefits from integrating two firms. The enduring puzzle has been the issue of why acquiring firms do not earn superior returns after the takeover activity, while targets do (the evidence is well-summarised in early work by Jensen and Ruback (1983), Bradley *et al.* (1983), and Asquith *et al.* (1983)). Roll (1986) suggests that this is because bidders are smitten with 'hubris,' i.e., they simply overestimate merger gains and overpay for the target. More recently, in a diametrically opposite view, Shleifer and Vishny (2003) provide a theory where sophisticated managers merge with other firms when they are overvalued because their stock is a particularly attractive currency for acquiring other firms. Shareholders of acquirers may benefit from acquisitions because otherwise, the stock price performance of overvalued firms could potentially be even worse. The managers of the acquired firms then receive a side payment to provide target management with the right incentives. This payment can, for example, take the form of accelerated exercise of stock options after the takeover. The key implication of the theory, that firms with high market valuations acquire those with low market valuations is borne out by Rhodes-Kropf *et al.* (2005) and Dong *et al.* (2006).

#### 4.4 *Other applications*

Contributing to the analysis of the relation between CEO attributes and the activities of firms, Subrahmanyam (2005) considers disclosure policy when managers and outside investors have differential cognitive ability. He shows that managers with higher cognitive ability have a greater tendency to misrepresent disclosures because they are less likely to get caught while lying. He also shows that the optimal compensation policy builds in an optimal deterrence from fraud.

Malmendier and Tate (2005a) suggest that an overconfident CEO will overinvest in his firm's projects thinking that they are better than they actually are. Using a variable that is related to the length of time over which stock options are unexercised as a proxy for

overconfidence in the firm, they find a strong link between this variable and corporate investment.

Malmendier and Tate (2005b) consider the behaviour of CEOs who win awards in the popular press. They argue that such recognition causes wasteful behaviour (e.g., writing books) that distracts from their jobs. They find that firms headed by such CEOs do poorly after the granting of the award relative to a control group both in terms of the stock price as well as accounting performance, and also tend to manipulate earnings more than average.

The field of behavioural corporate finance is a growth area. The theory appears to be plagued with assumptions that could be viewed by some as ad hoc, and it appears that its modelling rigour could be improved. A basic question that arises from the literature is whether managers dealing with an irrational market, or whether a rational market dealing with irrational managers, or both. The papers adopt one approach or the other, but some synergistic approach would appear to be valuable.

## 5. Conclusion

In sum, behavioural finance literature has grown by leaps and bounds in recent years. However, much work remains to be done in the field. In particular, the literature could shed specific light on which agents are biased and whose biases affect prices. There also is room to analyse the fast-growing field of market microstructure and behavioural finance. For example, a central role played by financial markets is that of price discovery. What is the effect of cognitive biases of market makers on price formation? A start on the study of this subject is the paper by Corwin and Coughenour (2005) who argue that limited attention influences transaction costs. Specifically, it is shown that specialist attention gets diverted to the most active stocks in their portfolio, thus raising transaction costs and leading to less frequent price movements in the less active ones. The impact of well-documented biases such as overconfidence and the disposition effect on market makers and the concomitant implications for transaction costs would seem to be a valuable topic for research.

Another interesting issue is whether we can predict corporate events such as M&A activity, splits, security offerings, etc. using CEO profiles and observable CEO characteristics. Our review has cited some initial studies on the subject but much remains to be done. Finally, there is room to study cross-country and cross-firm variation in biases (based on investing clientele) and their implications for return predictability. Studies of these and other issues should keep the field alive and vibrant for many years to come.

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