
Theory of Behavioural Finance and its Application to Property Market: A Change in Paradigm.

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Abstract

Behavioural finance is part of finance that seeks to understand and explain the systematic financial market implications of psychological decision processes. It utilises knowledge of cognitive psychology, social sciences and anthropology to explain irrational investor behaviour that is not being captured by the traditional rational based models. This paper analyses the development of behavioural finance, reviews stock market and property market behavioural literature and identifies issues in the property market that can be better understood and explained using behavioural models.

Introduction

The financial theory based on Modern Portfolio Theory (Markowitz, 1952) and Capital Asset Pricing Model (Sharpe, 1964) has long shaped the way in which academics and practitioners analyse investment performance. The theory is based on the notion that investors act rationally and consider all available information in the decision-making process, and hence investment markets are efficient, reflecting all available information in security prices.

However, researchers have uncovered a surprisingly large amount of evidence of irrationality and repeated errors in judgement. The field of “behavioural finance” has evolved that attempts to better understand and explain how emotions and cognitive errors influence investors and the decision-making process. Kahneman and Tversky (1979), Shefrin and Statman (1994), Shiller (1995) and Shleifer (2000)

are among the leading researchers that have utilised theories of psychology and other social sciences to shed light on the efficiency of financial markets as well as explain many stock market anomalies, bubbles and crashes.

To date, much is not known about human psychology and investor irrational behaviour that influence property investors and the decision-making process. Among the limited literature on behavioural property research includes papers from Diaz (1990, 1997), Gallimore (1994, 1996), Wolverton (1996), Hardin (1999) and Levy and Schuck (2002).

The goal of this paper is to critically analyse the behavioural finance theory and identify property issues for behavioural research. The evidence that property market is inefficient or at best only weak-form efficient, suggests that property investors do not always adhere to rationality and are influenced by emotions. As such, it is considered that behavioural finance theories have a lot to offer towards analysing property investments.

The balance of the paper is organised as follows. First, the literature on the two major building blocks of behavioural finance: limit to arbitrage and investor psychology is reviewed. Next, the psychological theories used in behavioural finance are discussed. Then, empirical evidence from behavioural research in stock market and property market are analysed. This is followed by the future research direction for behavioural research in property and the conclusion.

Background to Behavioural Finance

The models within the traditional finance paradigm assume that investors act rationally and consider all available information in the decision-making process. Hence, investment markets are efficient and security prices reflect the true 'intrinsic values' of the assets. That investors act promptly to new information and update

prices correctly within a normatively acceptable process. Investment market returns are believed to follow a random walk pattern; hence considered not predictable. Underlying all these is the theory of arbitrage, which suggests that rational investors undo price deviation away from the fundamental values quickly and maintain market equilibrium. As such, 'prices are right' reflecting all available information and there is no 'free lunch': no investment strategy can earn excess risk-free rate of return greater than that warranted by its risk (Fama, 1965).

The Modern Portfolio Theory (MPT), Capital Asset Pricing Model (CAPM) and Arbitrage Pricing Theory (APT) are the quantitative models that underpin the rational expectations based theories (Markowitz, 1995; Sharpe, 1964; Ross, 1976). Unfortunately, there is a large amount of research which could not confirm this theory in the available investment data. For example, Fama and French, (1993, 1996) and others have shown that the basic facts about the aggregate stock market, the cross-section average returns and individual trading behaviour are not easily understood in this framework. Major property research in this area includes papers by Miles and McCue (1984), Titman and Warga (1986), Lusht (1988) and Liu and Mei (1992).

As such, the behavioural finance paradigm has emerged in the response to the difficulties faced by the traditional paradigm. In essence, it argues that investment choices are not always made on the basis of full rationality, and it attempts to understand the investment market phenomena by relaxing the two doctrines of the traditional paradigm, that is, (1). agents fail to update their beliefs correctly and (2). there is a systematic deviation from the normative process in making investment choices.

The expectations based models argue that the above described irrationality will be undone through the process of arbitrage (Friedman, 1953). Behavioural finance argues that there is '*limits to arbitrage*', which allows investor irrationality to be substantial and have long-lived impact on prices. To explain investor irrationality

and their decision-making process, behavioural finance draws on the experimental evidence of the cognitive psychology and the biases that arise when people form beliefs, preferences and the way in which they make decisions, given their beliefs and preferences (Barberis and Thaler, 2003). As such, limit to arbitrage and psychology are seen as the two building blocks of behavioural finance.

Arbitrage is an investment strategy that offers risk-less profit at no cost. Traditional finance theorists believe that, any mispricing created by irrational traders (noise traders) in the marketplace, will create an attractive opportunity which will be quickly capitalised on by the rational traders (arbitrageurs) and the mispricing will be corrected. Behavioural theorists show that, strategies required to correct the mispricing can both be costly and risky; thus, rendering the mispricing unattractive and allowing them to continue. Detailed analysis of this argument can be found in De Long, Shleifer, Summers and Waldmann (1990) and Shleifer and Vishny (1997).

Human Behavioural Theories

In order to explain the various irrational investor behaviours in financial markets, behavioural economists draw on the knowledge of human cognitive behavioural theories from psychology, sociology and anthropology. Major theories used include:

Prospect Theory

Tversky and Kahneman (1979) by way of developing the Prospect Theory showed how people manage risk and uncertainty. In essence, the theory explains the apparent regularity in human behaviours when assessing risk under uncertainty. That is, human beings are not consistently risk-averse; rather they are risk-averse in gains but risk-takers in losses. According to Tversky and Kahneman, people place much more weight on the outcomes that are perceived more certain than that are

considered more probable, a feature known as the “certainty effect”. People's choices are also affected by ‘framing effect’. Framing refers to the way a problem is posed to the decision maker and their ‘mental accounting’ of that problem.

The value maximisation function of the Prospect Theory is different from that of the value maximisation function of MPT. Wealth maximisation is between gains and losses, rather than over the final wealth position as in MPT (Markowitz, 1952). As such, people may make different choices in situations with identical final wealth levels. Critical to the value maximisation is the reference point from which gains and losses are measured. Usually, the status quo is taken as the reference point and changes are measured against it in relative terms, rather than in absolute terms.

Judgement Under Uncertainty

The following theories summarise how people form beliefs under uncertainty.

Overconfidence: Alpert and Raiffa (1982) showed that people are poorly calibrated in estimating probabilities and usually overestimate their precision of the knowledge and ability to do well. People are also overconfident about good things happening in the future than bad. In addition, people overestimate their confidence in the past positive outcomes and usually recall only their successes rather than their failures.

Fear of Regret: Human beings have the tendency to feel the pain or the fear of regret at having made errors. As such, to avoid the pain of regret, people tend to alter their behaviour, which may end up being irrational at times. Linked with fear of regret is ‘cognitive dissonance’, which is the mental suffering that people experience when they are presented with the evidence that their beliefs have been wrong (Shiller, 1995).

Tversky and Kahneman (1974) identified the influence of human heuristics on the decision-making process. Tversky et al. defined heuristic as a strategy that can be

applied to a variety of problems and that usually—but not always—yields a correct solution. People often use heuristics (or shortcuts) that reduce complex problem solving to more simple judgmental operations. Three of the most popular heuristics discussed by Tversky et al. include:

Representativeness heuristic: What is the probability that person *A* (Steve, a very shy and withdrawn man) belongs to group *B* (librarians) or *C* (exotic dancers)? In answering such questions, people typically evaluate the probabilities by the degree to which *A* is representative of *B* or *C* (Steve's shyness seems to be more representative for librarians than for exotic dancers) and sometimes neglect base rates (there are far more exotic dancers than librarians in a certain sample).

Availability heuristic: This heuristic is used to evaluate the frequency or likelihood of an event on the basis of how quickly instances or associations come to mind. When examples or associations are easily brought to mind, this fact leads to an overestimation of the frequency or likelihood of this event. Example: People are overestimating the divorce rate if they can quickly find examples of divorced friends.

Anchoring and adjustment: People who have to make judgements under uncertainty use this heuristic by starting with a certain reference point (anchor) and then adjust it insufficiently to reach a final conclusion. Example: If you have to judge another person's productivity, the anchor for your final (adjusted) judgement may be your own level of productivity. Depending on your own level of productivity you might therefore underestimate or overestimate the productivity of this person.

Empirical Evidence from the Stock Market

Barber and Odean (1999) highlighted two common mistakes investors make: excessive trading and the tendency to disproportionately hold on to losing

investments while selling winners. They argue that these systematic biases have their origins in human psychology. The tendency for human beings to be *overconfident* causes the first bias in investors, and the human desire to avoid *regret* prompts the second.

The behavioral models have been most successful in explaining stock price anomalies related to overreaction, underreaction, momentum strategies, herding behavior, firm size effect and BV/MV ratio effects. Barberis, Schleifer, and Vishny (1996) formulated a model of security price over and under-reaction to information when investor judgment is biased by conservatism and the representativeness heuristic. Daniel, Hirshleifer, and Subramanyam (1998) explained event-related security price anomalies according to the cognitive biases of investor overconfidence and self-attribution. Daniel and Titman (2000) explained the superior returns of a momentum investing strategy over the past 35 years as the result of investors' overconfidence bias.

Dremen and Lufkin (2000) presented evidence that investor under and overreaction exist and are part of the same psychological process. Chan (2001) found that a large stock price change, unsupported by news, on average was followed by a statistically anomalous price trend reversal over the next month. Chan (2001) illustrated the price trend reversals often occur when a majority of market agents follow the same investing strategy (buying or selling), unsupported by new information. Evidence of investor herding is presented.

Schacter, Oulette, Whittle and Gerin (1987) demonstrated investors' tendencies to reinforce existing price trends and brief price reversals. Statistical support for the idea of a general conformity in investors' behavior preceding price trend reversals ("contrarianism") is shown by Chan (2001). Chopra, Lakonishok, and Ritter (1992) provided compelling evidence in support of the idea that investors make irrational forecasts of future cashflows. If excessive optimism or pessimism is driving these irrational forecasts, then earnings announcement dates should provide the impetus

for correction. Barberis and Thaler (2001) confirmed that the data does indeed show anomalous corrective activity following earnings announcements from these companies. Barberis et al. provide a comprehensive review of behavioral finance literature.

However, Shiller (1998) suggested that descriptions of overreaction and underreaction are not likely to be good psychological foundations upon which to organise a general theory of economic behavior. Cognitive biases inadequately identify the behavioral motivations causing price anomalies.

Empirical Evidence from Property Market

Behavioural property or real estate research is focused on examining the way that judgements and decisions are made in the property and real estate markets from the perspective of human behaviour. The research focus is to understand human judgement towards bias and seemingly irrational behaviour, and examines whether an understanding of these helps to improve our interpretation of the way that players in the market make decisions and reach conclusions (Gallimore, 2004).

However, much of the property behavioural research to date has been targeted towards identifying 'biases' within the cognitive valuation process. Bias within the valuation process is defined as the deviation from the standard procedures in information processing. It is this difference in information processing, which is suggested as one of the potential reasons for valuation inaccuracies (Brown, 1992).

Diaz (1990a) introduced behavioural research in the property valuation field by investigating whether the U.S. residential valuers followed the normative valuation process in their routine valuation tasks. The findings suggest that the U.S. residential valuers, who participated in the study, deviated largely from following the standard deductive valuation process, in which the investigation begins with a

wide focus of the general market. The valuers were found to adhere more to an inductive process, in which the investigation begins with the analysis of the subject property. Adair, Berry and McGreal (1996) studied whether the residential valuers in Belfast followed the normative process. Their findings also indicated that valuers do not adhere to a standard practice, rather viewed critical information differently.

Black and Diaz (1990b) studied comparable sale selection process by valuers. The findings showed that the valuers did not follow any systematic and efficient process in selecting the comparable sales. Wolverton (1996) and Gallimore and Wolverton (1997) further studied the bias in comparable sales selection by valuers in the US and the U.K. These studies produced strong evidence that the knowledge of the sales price of the subject property biased comparable sale selections, as well the assessment of the final value. The authors identified this bias as a 'confirmation bias', whereby the valuers were found to be biased towards selecting only those sales, which confirmed the known price of the subject property.

Researchers have also examined information processing heuristic biases in valuations. By way of questionnaire survey, Gallimore (1994) attempted to find whether anchoring, recency and dilution biases existed in the valuation information processing. The results showed that valuers anchor on prior valuation information, however, the two presentational effects of anchoring, that is, recency and dilution, were not confirmed due to problems related with the method of the analyses. Black and Diaz (1996) provided preliminary confirmation of the asking sale price as a potential for an anchoring bias. Black (1997) showed that when sales were concluded, sale price anchoring bias was evident. However, the asking sales price bias was found to be ineffective when they were set at high levels.

Diaz and Wolverton (1998) findings suggest that valuers might even anchor on their own previous estimates of values. Diaz (1997) investigated if value estimates were influenced by the previous value estimates of other experts. The results were unable to confirm the presence of anchoring bias towards value judgments of the other

experts. Levy and Schuck (2002) findings confirm that clients influence the value estimates. However, clientele influence, in my view, can be classified more as a ‘survival bias’ and to some extent render unethical valuer behaviour, as opposed to being seen as a cognitive behavioural bias.

Barkham and Ward (1999) and Gallimore and Gray (2002) are perhaps the only two behavioural studies that have attempted to analyse investor behaviour in property investment decision-making. Barkham and Ward (1999) examined the reasons for the discount trading (market capitalisation less than net asset value) of the U.K. property companies. Their findings indicated that overestimation of the changes in the fundamental values of the assets by the irrational noise traders was one the significant reasons for the discount trading of the U.K. property companies.

Gallimore and Gary (2002) examined the role of investor sentiment in property investment decision-making. The authors utilised questionnaire survey to explore the perceptions of the sentiment (whether rational or irrational), importance of sentiment and its relationship to the information used in the decision-making. Their results suggest that over half of the respondents rated sentiment as essential to their decision-making. Based on this finding, Gallimore and Gary concluded that investor sentiment is seen as an important factor in making property investment decisions.

Directions for Behavioural Research in Property

Thus far, behavioural theory has been most successful in explaining stock price anomalies related to overreaction, underreaction, momentum strategies, herding behavior, firm size and value versus growth effects (Barberis, Shleifer, and Vishny, 1996; Lakonishok, Shleifer and Vishny, 1997; Daniel, Hirshleifer, and Subramanyam, 1998; Daniel and Titman, 2000 and Barberis and Shleifer, 2003). These trading strategies are called anomalies because they violate the trading rules

of the EMH theory and hence render the CAPM and other rational based models inappropriate in relating investment risk and returns.

Newell and Kishore (1998) and Kishore (2003) have identified that listed property trusts (LPTs) stratified by small size and high BV/MV ratios (value LPTs), render profitable trading rules inconsistent with the EMH and the CAPM. Colwell and Park (1990), McIntosh, Liang and Tompkins (1991) and Peterson and Hsieh (1997) reported similar findings for the U.S. REITs market.

However, none of the researchers have provided explanations for the existence of these pricing anomalies, except Kishore (2003) briefly, for the existence of value and growth phenomenon for the LPT market. As such, studies similar to that conducted by the behavioural researchers in the stock markets, has potential for studying property-pricing behaviour through the listed markets, the likes of LPTs and REITs. The study conducted by Lakonishok, Shleifer and Vishny (1997), which showed that value stocks are underpriced and growth overpriced because irrational investors inappropriately extrapolate earnings, has the most potential for explaining the various pricing anomalies in the listed property markets.

The listed property markets render themselves to further behavioral research similar that conducted in the stock markets. For example, application of preference and ambiguity aversion biases, under prospect theory, in explaining the equity premium and volatility puzzles. Based on the rational expectations theory, LPT yields should be higher than that of bonds, yet investors and analysts almost always compare LPT yields with bond yields. This phenomenon reveals an aspect of irrationality, which requires investigation under the irrational beliefs-based models. Also, similar to the studies in the stock market, LPT discount/premium trading and co-movements with small stocks can be explained using the investor irrational behavioral theories.

Barber and Odean (1999) highlighted two common mistakes investors make: excessive trading and the tendency to disproportionately hold on to losing

investments while selling winners. They argue that these systematic biases have their origins in human psychology. The tendency for human beings to be *overconfident* causes the first bias in investors, and the human desire to avoid *regret* prompts the second. The logic would suggest that these phenomena exist in property markets as well; as such, future behavioural research should investigate the trading and holdings patterns in the property markets.

The resolving of the volatility puzzle can add further to our understanding of the property pricing behaviour, both in direct and listed markets. Campbell and Shiller (1988) and Campbell (2000) described the historical high stock market volatility as a puzzle because it is hard to be rationalised in any consumption-based model. In other words, in an economy with rational investors, long-term stock return volatility should equal to the volatility of dividend growth, holding the discount rates and variation in the price/dividend (P/D) ratios constant. Rational investors would only allow variation in future discount rates and P/D ratios, based on the rational approach to risk aversion as per the CAPM. As such, investor irrationality or the acceptance of risk aversion as per the Prospect Theory, which suggests that investors are risk-averse in gains but risk-takers in losses, offer a more plausible way of thinking about the empirical data.

The recent years have seen a structural change or shift in the property capitalisation process and both prices and valuations have become more volatile relative to the movements in cap rates and changes in rents. This phenomenon suggests the presence of investor irrationality and/or changes in investor risk aversion within the property market. Campbell and Cochrane (1999) proposed a habit/preference information framework in which changes in consumption relative to habit lead to changes in risk aversion and hence variation in P/D ratios. The variation in P/D ratios based on changes in risk aversion, helped plug the gap between the stock market volatility in returns versus the volatility of the dividend growth. A similar behavioural-based framework, based on investor belief and preference arguments, can be used to study the change within the property capitalisation process.

The above model can be applied in reverse to explain the smoothing effects in the valuation process. For example, if the investor irrationality and overreaction make investors act too quickly to the growth expectation in rents and hence pushing prices up relative to the actual rents and adding more volatility to the returns, in the reverse underreaction in estimating the future growth ought to make valuations smoother than prices. Over and under-reaction in different circumstances is caused by the difference in human heuristics in the mental accounting process. Researchers such as Geltner (1991) and others have quantified that valuations are generally smoother than actual prices, but have not fully qualified with a theoretical base why valuations are smoother or property prices more volatile. Future research in this area based on behavioural theories has a potential in solving the valuation smoothing puzzle.

The change in preference from being risk-averse to becoming risk-takers, is perhaps one of the major reasons for the recent property price boom in Australia. This is particularly true in the housing market, which saw the recent housing boom across the major cities generally and Sydney particularly. The latest Australian Bureau of Statistics house price index-regarded as the most accurate overall measure of market activity-shows that Sydney's established house prices rose up a respectable 16.5 per cent over year to September. Over the longer term, that is between June 1999 and June 2003, established house prices have doubled (ABS, 2004).

Why the recent housing boom is considered speculative? It is considered speculative because the high prices were created largely by the investors' enthusiasm rather than by consistent estimate of real value (the current cap rates range between 3-4%). There is a pattern of herd mentality, which can be said to be developed upon 'fear and regret' behaviour of not owning a home and overreaction to future interest rate rises. Rational decision-making seems to be at the bottom of the homebuyers' consideration. This is evident from the rapid rise in loan-to-value ratio on the one hand, and reduction in cap rates (rent/price ratio) on the other. The high house prices/values, in most cases, are held by the value of the debt component

and not equity. As such, these high prices are not considered to be efficient and do not reflect the true 'intrinsic value' of the housing stocks.

Utilising the behavioural framework, Liu and Song (2001), Cooper et al., (2001), Hand (2000), Thaler (1999) and Shiller (1987) have explained the causes and effects of speculative property bubbles. These researchers have mainly drawn upon the psychological knowledge of Fear and Regret, Self-Control, Herd Mentality and Overreaction. The knowledge from similar theoretical background can be applied to study the buyer behaviour in the Australian property markets. This should provide the fundamental theoretical framework for the research. A questionnaire survey can be designed to elicit the relevant information from the buyers, which should provide the empiricism to the study.

The herd mentality and anchoring to the profitable strategy of a few lead players, seems to be the current strategy of the LPT managers. This is particularly evident in the current rapid move by the Australian LPTs towards including international property in their portfolios. The important question is: will the internationalisation of LPTs improve their performances significantly on a risk-adjusted basis? Considering the know how required and the difficulty of managing properties overseas and the cost involved in hedging against the currency risk, the strategy is not that simple as it appears. Furthermore, the critical research that is required for improving offshore investment strategies is seriously lacking at present.

Concluding Remarks

The increasing analysis of the human element in the stock market, a market which is much more rational, has quality available data and is more efficient than the property market, makes behavioural-based research critical for analysing property, a market which is segmented, suffers from unavailability for quality data, is less informed and inefficient and has a high presence of the human element. As such,

going forward the challenge for the property analysts is to properly analyse the human elements within the various property decision-making phases and then develop the trading and investment strategies, which draws upon the knowledge of both the traditional and behavioural framework. The behavioral research issues discussed and analysed in this paper, sets the path for developing such a combined strategy for property investment.

References

- Australian Bureau of Statistics. (2004), *Sydney's Housing Market*, Retrieved January 20, 2004 from http://www.loan.echoice.com.au/pages/h_housing_sydney.html.
- Barber, B. and Odean, T. (1999). The Courage of Misguided Convictions, *Financial Analysts Journal*, November/December 1999.
- Barberis, N. and Thaler, R. (2001). A survey of behavioral finance, Retrieved January 5, 2004 from <http://gsbwww.uchicago.edu/fac/nicholas.barberis/research>.
- Barberis, N., Schleifer, A. and Vishny, R. (1998). A model of investor sentiment. *Journal of Financial Economics*, 49, 307-343.
- Brown, G. (1992). Valuation Accuracy: Developing the Economic Issues, *Journal of Property Research*, 9(3), 199-207.
- Campbell, J. (2000). Asset Pricing at the Millenium, *Journal of Finance*, 55, 1515-1567.
- Campbell, J. and Cochrane, J. (1999). By Force of Habit: A Consumption-based Explanation of Aggregate Stock Market Behaviour, *Journal of Political Economy*, 107, 205-251.
- Campbell, J. and Shiller, R. (1988). Stock Prices, Earnings and Expected Dividends, *Journal of Finance*, 43, 661-676.
- Case, K. and Shiller, R. (1989). The Efficiency of the Market for Single-Family Homes, [*American Economic Review*](#), 79, 125-37.
- Chan, W.S. (2001). Stock price reaction to news and no-news: Drift and reversal after headlines. *NBER Working Paper Series*. Downloaded September 1, 2001 from: <http://www.nber.org/~confer/2001/bfs01/chan.pdf>
- Clayton, J. (1998). Further Evidence on Real Market Efficiency, *Journal of Real Estate Research*, 15, 41-58.
- Cooper, M., Orlin, D. and Raghavendra, R. (2001). A rose.com by any other name, *Journal of Finance*, forthcoming.
- Daniel, K., Hirshleifer, D., & Subrahmanyam, A. (1998). Investor psychology and security market under- and overreactions. *Journal of Finance*, 53, 1839-1886.

- De Long, J., Shleifer, A., Summers, L. and Waldmann, R. (1990). Noise Trader Risk in Financial Markets, *Journal of Political Economy*, 98, 703-738.
- Diaz, J. (1990). The Process of Selecting Comparable Sales. *Appraisal Journal*, 58, 533-540.
- Diaz, J. (1997). How Valuers Use the Value Opinion of Others? *Journal of Property Investment and Investment*, 15, 256-260.
- Dremen, D. & Lufkin, E. (2000). Investor overreaction: evidence that its basis is psychological. *Journal of Psychology and Financial Markets*, 1, 61-75.
- Gallimore, P. (1994). Aspects of Information Processing and Value Judgement and Choice, *Journal of Property Research*, 11, 97-110.
- Gallimore, P. (1996). Confirmation Bias in the Valuation process: A Test for Corroborating Evidence, *Journal of Property Research*, 13, 261-273.
- Gallimore, P. (2004). *Behavioural Real Estate Research*, Retrieved January 17, 2004 from http://construction.ntu.ac.uk/graduate_school/Research/Property.
- Gallimore, P. and Wolverton, M. (1997). Price-Knowledge Induce Bias: A Cross- Cultural Comparison. *Journal of Property Valuation and Investment*, 15, 261-273.
- Geltner, D. (1991). Smoothing in Appraisal-based Returns. *Journal of Real Estate Finance and Economics*, 4, 327-345.
- Fama, E. (1965). Random Walks in Stock Market Prices, *Financial Analysts Journal*, September/October,
- Fama, E. and French, K. (1993). Common Risk Factors in the Returns on Stocks and Bonds. *Journal of Financial Economics*, 33, 3-56.
- Fama, E. and French, K. (1996). Multifactor Explanations of Asset Pricing Anomalies. *Journal of Finance*, 51, 55-84.
- Hand, J. (2000). Profits Losses and Non-linear Pricing of IT Stocks, *Working Paper*, University of North Caroline.
- Hardin, W. (1999). Behavioural Research into Heuristics and Bias as an Academic Pursuit. *Journal of Property Investment and Finance*, 17, 333-352.
- Kahneman, D. and Tversky, A. (1979). Prospect Theory: An Analysis of Decision Under Risk, *Econometrica*, 47, 263-291.
- La Porta, R., Lakonishok, J., Shleifer, A. and Vishny, R. (1997). Good News for Value Stocks: Further Evidence on Market Efficiency, *Journal of Finance*, 52, 859-874.
- Lakonishok, J., Shleifer, A. and Vishny, R. (1994). Contrarian Investment, Extrapolation, and Risk. *Journal of Finance*, 49, 1541-1578.
- Levy, D. and Schuck, E. (1999). The Influence of Clients on Valuations. *Journal of Property Investment and Finance*, 17, 380-400.
- Liu, C. and Mei, J. (1992). The Predictability of Returns on Equity REITs and Their Co-Movement with Other Assets. *Journal of Real Estate Finance and Economics*, 3, 261-282.

- Liu, Q. and Song, F. (2001). The Rise and Fall of IT Stocks: Should Financial Analysts be Blamed?, *School of Economics and Finance*, University of Hong Kong.
- Lusht, K. M. (1988). The Real Estate Pricing Puzzle. *AREUEA Journal*, 16, 95-104.
- Markowitz, H. (1952). Portfolio Selection. *Journal of Finance*, 7, 77-91.
- Miles, M. and McCue, T. (1984). Commercial Real Estate Returns. *AREUEA Journal*, 12, 355-77.
- Ross, S. A. (1976). The Arbitrage Theory of Capital Asset Pricing. *Journal of Economic Theory*, 13, 341-360.
- Sharpe, W. (1964). Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk. *Journal of Finance*, 19, 425-442.
- Schacter, S., Oulette, R., Whittle, B., & Gerin, W. (1987). Effects of trend and of profit or loss on the tendency to sell stock. *Basic and Applied Social Psychology*, 8, 259-271
- Shefrin, H. and Statman, M. (1994). Behavioural Capital Asset Pricing Model. *Journal of Financial and Quantitative Analysis*, 29, 323-349.
- Shleifer, A. (2000). *Inefficient Markets: An Introduction to Behavioural Finance*. Oxford, U: Press, Oxford.
- Shleifer, A. and Vishny, R. (1997). The Limits to Arbitrage. *Journal of Finance*, 52, 35-55.
- Shiller, R. (1987). Investor Behaviour in the October Stock Market Crash: Survey Evidence, National Bureau of Economics Research, Working Paper Number 2446.
- Shiller, R. (1998). Human behavior and the efficiency of the financial system. *NBER Working Paper Series*. Downloaded September 1, 2001 from: <http://www.nber.org/papers/w6375>.
- Shiller, R. (1995). Conversation, Information and Herd Behaviour, *American Economic Review*, 85, 181-185.
- Thaler, R. (1999). The End of Behavioural Finance. *Financial Analysts Journal*, November/December, 12.
- Titman, S. and Warga, A. (1986). Risk and the Performance of the Real Estate Investment Trusts: A Multiple Index Approach. *AREUEA Journal*, 14, 414-31.
- Tversky, A. and Kahneman, D. (1974). Judgement Under Uncertainty: Heuristics and Biases. *Science*, 185, 1124-1131.