

Review

Explaining stock market returns: A review of empirical tests of asset pricing anomalies

Kathleen Hodnett and Heng-Hsing Hsieh*

School of Business and Finance, University of the Western Cape, South Africa.

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Over the last few decades, much debate has arisen regarding the determinants of the factors that help explain the cross-section of equity returns. Four well-known documented anomalies, which represent deviations from the capital asset pricing model, include the size effect, the value effect, the long-term momentum effect and the short-term momentum effect. The purpose of this paper is to review the empirical evidence regarding these anomalies and their possible interpretations within the investment community.

Key words:Size effect, value effect, momentum effect, empirical evidence.

INTRODUCTION

According to asset pricing models based on investor rationality, the cross-section of equity returns can be explained by betas (systematic risk) or factor loadings on a set of common factors. The first test examining the cross-section of equity returns was conducted by Fama and Macbeth (1973) who found the relationship between high beta stocks and average returns to be positive and approximately linear. This evidence supports the Sharpe (1964) – Lintner (1965) version of the capital asset pricing model (CAPM) which postulates that market risk (systematic risk) is the only risk that is relevant to an investor. Researchers began testing whether non-risk characteristics, for example, the earnings-to-price ratio and size (as measured by market capitalization), also affect security returns. If this was the case, then the risk characteristics of securities (betas or factor loadings) are not the sole determinants of expected returns as originally postulated by the CAPM. This research into the effect of non-risk characteristics on security returns continued into the 1980s and 1990s, in an attempt to determine if attributes other than beta account for the variation in equity returns. Fama and French (1992) presented evidence that market betas are unable to explain the cross-sectional variation in equity returns and

that firm size and the ratio of book-to-market equity (B/M) are the two major determinants explaining the cross-sectional variation in average returns.

Four well-known asset pricing anomalies representing deviations from the CAPM are documented. This includes the size effect, the value effect, the short-term momentum effect and long-term momentum effect. This review examines the empirical tests of these anomalies as well as possible documented explanations for the existence of these anomalies.

THE CAPITAL ASSET PRICING MODEL

According to the Sharpe-Lintner CAPM, an investor is exposed to two types of risk, namely unsystematic (diversifiable) risk and systematic (undiversifiable) risk. Unsystematic risk is firm-specific risk, which can be eliminated through the process of diversification. Systematic risk, on the other hand represents portfolio/market risk common to all assets, which cannot be eliminated by diversification. Since firm-specific risk can be diversified away in a large portfolio, according to Sharpe (1964) and Lintner (1965), systematic risk is the only risk that is relevant to this portfolio. The CAPM depicts the relationship between expected returns and beta of a security (or portfolio), where beta is a measure of systematic risk. The theoretical CAPM risk-return relationship is displayed in Equation 1.

*Corresponding author. E-mail: ahsieh@uwc.ac.za. Tel: +27 (0) 843604146.

$$E(R_i) = R_f + \beta_i [E(R_m) - R_f] \quad (1)$$

Where $E(R_i)$ = expected rate of return of asset i ; R_f = the risk-free rate, that is, the rate of return on a theoretical zero-risk asset or portfolio; $[E(R_m) - R_f]$ = the market risk premium; β_i = the measure of systematic risk which measures the tendency of return of asset i to co-vary with the return of the market portfolio $E(R_m)$.

Based on the CAPM, all systematic risk factors are captured by market movements, and hence market risk is the only relevant risk that investors require compensation for. A violation of this systematic risk-return relationship leads to riskless arbitrage opportunities in mispriced securities, which is contradictory to the efficient market hypothesis (EMH). The EMH of Fama (1970) postulates that security prices, in an efficient capital market, accurately reflects their long-term intrinsic values. Thus, tests of the CAPM equate to tests of market efficiency under the notion of the EMH (known as tests of the joint hypothesis). Empirical examination of the joint hypothesis involves investigations of the *ex post* pricing model shown in Equation 2:

$$R_{p,t} - R_{f,t} = \alpha_p + \beta_p \times (R_{m,t} - R_{f,t}) + \varepsilon_{p,t} \quad (2)$$

Where: α_p is the regression intercept representing consistent abnormal returns earned by portfolio p , $r_{p,t}$ is the return on portfolio p in month t ; $r_{f,t}$ is the return on the risk-free proxy in month t ; $r_{m,t}$ is the return on the market portfolio in month t ; and $\varepsilon_{p,t}$ is the regression residual representing the abnormal return of portfolio P in month t .

Deviations from the theoretical framework of the CAPM ("anomalies") are depicted by the significant intercept of Equation 2. The intercept of Equation 2, known as alpha, represents the abnormal profit to the investor. The size effect, the value effect, the long-term momentum (reversal) effect and the short-term momentum effect, were empirically discovered more than three decades ago. According to Equation 2, these effects are anomalous in the sense that alpha is not statistically significantly different from zero as predicted by the CAPM.

EMPIRICAL EVIDENCE REGARDING ASSET PRICING ANOMALIES

The size effect

The size effect refers to the anomaly where small firms

(those with small market capitalizations) outperform large firms (those with large market capitalizations). The first test on the size effect was conducted by Banz (1981) who uses both beta and size to explain the cross-section of stocks listed on the New York Stock Exchange (NYSE) over the period from 1927 - 1975. The author finds evidence of a size effect (after controlling for risk) which he attributes to a misspecification of the CAPM. The results also indicated that the effect lacks a theoretical foundation and that it is not stable over time. Banz (1981) concludes, "we do not even know whether the factor is size itself or whether size is a proxy for one or more true but unknown factors correlated with size...the size effect exists, but it is not at all clear why it exists". Criticism of Banz (1981)'s findings is reported by Roll (1981) who argues that the systematic risk estimates of returns are biased downwards, due to the less frequent trading of small stocks relative to large stocks. There is also evidence that the size effect is most prominent in the month of January (Keim, 1983; Reinganum, 1983; Blume and Stambaugh, 1983). Fama and French (1992) sorted stocks according to both size and beta. Low-beta stocks produce higher returns than high-beta stocks of the same size. International evidence of size effect includes Chan, Hamao and Lakonishok (1991) in Japan from 1971 - 1988; Rouwenhorst (1999) in emerging markets from 1975 - 1997; Anneart et al. (2002) in European economies from 1974 to 2000; and Drew et al. (2003) in China from 1993 - 2000.

Chan and Chen (1991) investigated whether the size effect is attributable to unique risks associated with small firms such as lower operating efficiency or higher leverage. Test results indicate that the size effect can be explained by return variations on firms that recently cut dividends or firms with higher leverage. Dichev (1998) also found that smaller firms are associated with higher probability of bankruptcy. On the other hand, Amihud (2002) found that smaller caps are more sensitive to market liquidity. This argument is supported by Pastor and Stambaugh (2003) who found smaller U.S. firms to have higher liquidity betas over the period from 1996 - 1999. Thus, although small caps offer additional sources of portfolio returns, they might as well introduce the portfolio to additional risks. Large cap indexes that are weighted by the market capitalizations of the constituents remain popular amongst investors who wish to maintain exposure in large, established blue chip companies.

Growing literature on fundamental indexation proposed by the Research Affiliates Fundamental Index (RAFI), offers a more mean-variance efficient alternative of investments in blue chip companies to large cap indexes. Fundamental indexation refers to a portfolio construction method that performs portfolio allocations according to the actual fundamentals of the companies such as gross revenue, book value, number of employees, dividends, cash flows, etc. The rationale of fundamental indexation is that unlike cap-weighted indexes, fundamental indexes are price-insensitive and are hence not subject to investor

overreaction. Arnott et al. (2005) investigated the merits of fundamental indexation on the U.S. equity market over the period from 1962 to 2004. They found that fundamental indexes outperform the S and P 500 index and the cap-weighted benchmarks on a risk-adjusted basis. Hsieh and Hodnett (2011a) further investigated this hypothesis on global equities over the period from 1991 - 2008. They examined the performance of cap-weighted and fundamental-weighted portfolios of different portfolio concentrations measured by the number of constituents in the portfolio. They find that cap-weighted portfolios are subject to the size effect in that portfolios with fewer constituents underperform portfolios with more constituents. This size effect was, however, not detected amongst the fundamentally-weighted portfolios. Hsieh and Hodnett (2011a) concluded that when price-insensitive fundamentals are employed as the proxies for firm size, the effect of the size anomaly dissipates in the global equity market.

The value effect

According to the value effect positive abnormal risk-adjusted returns accrue to value stocks, that is, stocks possessing high ratios of fundamental values relative to their share prices, for example, high dividend-to-price (D/P or dividend yield), high book-to-market (B/M), high cash flow-to-price (C/P), high earnings-to-price (E/P or earnings yield) to name a few. Growth (glamour) stocks, which are stocks possessing low ratios of fundamental values to share prices (low D/P or low B/M) tend to achieve lower returns than predicted by the CAPM. Basu (1977, 1983) found evidence of a value effect around the same time as tests on the size effect are conducted for portfolios of stocks listed on the NYSE over the period 1957 - 1971. The results revealed that high E/P stocks earn significantly higher returns on a risk-adjusted basis than low E/P stocks. The author attributes this finding to a violation of the joint hypothesis. According to Ball (1978), this evidence represents evidence against the CAPM but not evidence against the EMH. A follow-up study by Basu (1983) concludes that the size and earnings-to-price effect are separated from each other, and that, even after controlling for E/P, small firms still tend to have higher returns. Other tests supporting evidence of a value effect include tests conducted by Litzenberger and Ramaswamy (1979), Stattman (1980) and Bhandari (1988) who found a positive relationship between common stock returns and dividend yield, B/M and leverage, respectively.

Fama and French (1992) combines Five (5) explanatory variables, namely size, B/M, E/P, leverage and market beta in the cross-section of returns over the period from 1963 - 1990 for stocks listed on the NYSE, AMEX (American Stock Exchange) and the over-the-counter NASDAQ. According to the results, beta fails to explain the cross-section of returns, as predicted by the

Sharpe-Lintner CAPM. Both B/M and size have a strong relation with returns, although B/M displays the stronger relation. When size and B/M are included in the regression, the explanatory power of the other attributes disappeared. Fama and French (1993) proposed a three-factor model with regressions that use excess market returns and mimicking returns for size and B/M factors, that is SMB ("small capitalization stocks minus big capitalization stocks") and HML ("high B/M stocks minus low B/M stocks"), as explanatory variables. Fama and French (1993) found that the abnormal return from the three-factor model are not reliably different from zero and thus concluded that a market factor and the proxies for risk factors related to size and B/M successfully explain the cross-section of returns. Fama and French (1992, 1993) thus contend that size and value (as measured by B/M) actually represent risk factors missing from the CAPM.

The value effect is also examined by Lakonishok et al. (1994) over the same examination period of Fama and French (1992) for stocks listed on the NYSE and AMEX. Portfolios are formed based on B/M, E/P, C/P and the average 5-year sales growth rate. Portfolios with the highest B/M, highest E/P, highest C/P and lowest growth rates are classified as value portfolios, while those portfolios with the lowest B/M, lowest E/P, lowest C/P and highest growth rates are classified as growth portfolios. The results revealed evidence of a value premium where value stocks outperform growth stocks five years after formation. In order to explain the anomalies identified by Lakonishok et al. (1994), Fama and French (1996) argued that most of the CAPM anomalies are related and captured by their Fama and French (1993) three-factor model.

Tests on the value anomaly are also extended to international economies. Fama and French (1998) extended their tests to international economies, in order to determine if the value-growth effect is an international phenomenon. Data for the period from 1975 - 1995 is downloaded for stocks listed on NYSE, AMEX, NASDAQ and EAFE (Europe, Australia and Far East). Portfolios based on B/M, C/P, E/P and D/P were formed. According to the results, value stocks earned higher risk-adjusted returns than growth stocks over the examination period. High B/M stocks outperform low B/M stocks in 12 out of 13 markets. Portfolios based on C/P, E/P and D/P produce similar value premia. Evidence of a value premium is also found in emerging economies. According to the regression results, the standard CAPM fails to explain the international value premium over the examination period.

Bauman et al. (1998) used the same value proxies of Fama and French (1998) to test the size and value anomalies on EAFE and Canadian stocks for the period from 1986 - 1996. The results revealed that although the value anomaly is not evident every year, when it is evident, value stocks outperform growth stocks by a wide margin. There is also evidence of a size effect across the

economies in most years over the examination period. A further test examining the international value anomaly is conducted by Chan and Lakonishok (2004). The authors constructed a composite value proxy comprising of B/M, C/P, sales-to-price ratio and earnings yield. The sample includes large-caps in the MSCI (Morgan Stanley Capital International) EAFE index. The results reveal evidence of a value anomaly over the period 1989 - 2001.

Ahmed and Nanda (2001) argued that value investors should factor the growth prospects of value stocks in their valuation. When growth in earnings is used in conjunction with the E/P ratio in the valuation approach, it was found that portfolios with high growth and high E/P ratio outperform on a risk-adjusted basis over the period from 1982 - 1997.

Fama and French (2007) dissected the average returns on the value and growth portfolios into dividends and capital gains over the period from 1926 - 2006. The sources of capital gains are defined as growth in book value from retained earnings, convergence in price-to-book (P/B) ratio due to mean reversion and long-term upward drift of P/B ratio. It is found that mean reversion contributes significantly to the returns of the value portfolio. On the other hand, returns of the growth portfolio are mainly attributable to growth in book value.

Yan and Zhao (2011) argued that value stocks may exhibit greater information uncertainty. They investigate the interactions between the post-earnings announcement drift and the value-glamour anomaly on the U.S. stock markets over the period from June 1984 to December 2008. After controlling for the size effects, the authors concluded that value stocks respond more drastically to positive earnings surprises, and more resiliently to negative earnings surprises.

Long-term momentum effect

The momentum effect (long-term and short term) arises when past stock returns are used as explanatory variables in the cross-section of equity returns. De Bondt and Thaler (1985) classify portfolios as "winners" and "losers" and analyze their subsequent performances. Losers are stocks possessing low returns in the prior 3 - 5 years, while winners are stocks with high returns in the prior 3 - 5 years. Winner and loser portfolios are formed from stocks listed on the NYSE over the examination period from 01 January 1933 - 31 December 1982. The average cumulative abnormal returns (ACARs) of the prior winners and losers are computed and subsequently compared. The results reveal an anomaly whereby past losers earn higher average returns than past winners (known as a "contrarian" effect). Over the examination period, the prior 36-month loser portfolios outperform their respective winner portfolios by 24.6%, 36 months after formation, on average. In addition to this, since formation, the loser portfolios accumulate positive abnormal returns, while the winner portfolios accumulate

negative abnormal returns. In terms of the 36-month ACARs, the mean reversals of the loser portfolios are three times stronger than that of the winner portfolios, on average. Since the majority of the positive abnormal returns of the loser portfolios are earned in January, there is an argument that the results are attributable to the tax-loss selling for the losers.

In a follow-up study, De Bondt and Thaler (1987) extended their research by incorporating factors such as firm size, seasonality and market risk in the study. The capital-gains tax lock-in effect was evident for prior winners, since January excess returns are negatively related to prior December excess returns. Tax-loss selling for losers is not evident in this study. Evidence reveals that the mean reversal of prior winners and losers is not explained by the size effect and market risk (CAPM-betas). On the other hand, Chan (1988) argues that the risks of winners and losers are not constant. The betas of the losers are found to increase (following a period of abnormal loss), while the betas of the winners are found to decrease (following a period of abnormal gain) over time. Chan (1988) concludes that when changes in risk are controlled for, abnormal returns between prior winners and losers are a minimum.

Chopra et al. (1992) extended the study of De Bondt and Thaler (1985, 1987) in an attempt to determine the extent to which changes in portfolio beta or size biases the De Bondt and Thaler (1985, 1987) result. Regression analysis was carried out on the abnormal returns of prior winners and prior losers on the NYSE for the period from 1931-1986. Chopra et al. (1992) reported that even when time-varying betas are taken into account, there are still large differences in abnormal returns between prior winners and prior losers. Further to this, since size, prior returns and betas are all interrelated; all three variables have to be included in any study of cross-sectional returns performance in order to eliminate the omitted variables bias problem. Incorporating these three variables in a multiple regression model reveals that prior losers outperform prior winners by 4.8%, on average, five years after formation, after controlling for both size and beta. The authors, however, conclude that the degree of mean reversal is stronger for smaller firms.

Evidence of the long-term momentum effect extends to international economies. Page and Way (1992, 1993) adopted the methodology of De Bondt and Thaler (1985) on the Johannesburg Stock Exchange (JSE) over the period from 1974-1989. The results revealed that the loser portfolios outperform the respective winner portfolios by 14.5%, on average, 36 months after formation. Consistent with the result of De Bondt and Thaler (1985), the asymmetrical reversals of winners and losers are observed. In a follow-up study, Muller (1999) forms portfolios from a sample of shares based on the largest 200 shares by market capitalization on the JSE over the period from 1985 - 1998. The results revealed that positive abnormal returns initially accrue to both winner and loser portfolios. The loser portfolios lose their

initial momentum after 340 days, while the winner portfolios lose their initial momentum after about 600 days.

Balvers et al. (2000) investigated the long-term mean reversion across 18 stock market indexes from Morgan Stanley Capital International (MSCI) over the period from 1969 - 1996. To avoid the monthly seasonality effects (such as the January effect), annual data instead of monthly data was used in their study. Study results confirmed the existence of investor overreaction and mean reversion among the stock indexes under examination.

George and Hwang (2007) investigated whether long-term reversals are related to the capital gains tax argument of De Bondt and Thaler (1987). 5-year winner and loser portfolios are constructed based on U.S. stocks that are subject to capital gains tax from 1963 - 2001, and on stocks in Hong Kong that are not subject to capital gains tax from 1980 - 2000. The results of regression analysis do not support the overreaction hypothesis in both countries. For the U.S. market, the capital gains lock-in hypothesis is established in that portfolios with the largest deferred capital gains tax earn positive abnormal returns 5 years after portfolio formation.

Hsieh and Hodnett (2011b) argued that since mean reversals of stock prices are due to investor overreaction, the timing of mean reversals might be cyclical in nature. They reinvestigated the overreaction hypothesis on the JSE over a prolonged period from 1993 through 2009. Test results revealed that the strength of mean reversals is stronger when investor sentiments are lower, particularly during financial market crises. Hsieh and Hodnett (2011c) extended their studies on the timing of mean reversals to cover global equities over the period from 1999 - 2008. Using the residual returns from both the CAPM and the 3-factor model of Fama and French (1993) as the proxy for abnormal returns, it is found that the long-term (36-month) loser portfolio of global equities is more resilient in the downswing of the global economic cycle.

Short-term momentum effect

While De Bondt and Thaler (1985, 1987) found evidence of a contrarian effect, Jegadeesh and Titman (1993, 2001), on the other hand, found evidence where recent prior winner returns (that is, 1-year or less portfolio return) outperform recent prior loser returns. Jegadeesh (1990) found that stocks that have performed well over the past few months tend to earn high returns over the next month, while stocks that have performed poorly over the past few months, tend to earn low returns over the next month. In a follow-up study, Jegadeesh and Titman (1993) examine the returns to buying past winner portfolios and selling past loser portfolios on the NYSE and the AMEX for the period from 1965-1989 based on 3

to 12 month prior return momentums. Although, abnormal returns for the relative strength strategy are evident in the first year after formation, these abnormal returns disappear within the next two years after formation. Also, the authors concluded that these abnormal returns are not due to systematic factors. These results are later confirmed by Jegadeesh and Titman (2001).

Fama and French (1996), using their three-factor model, test the long-term reversal strategy of De Bondt and Thaler (1985). The results found no estimates of abnormal returns that are reliably different from zero. This finding, however, is not consistent when testing the short-term momentum strategy in the Fama and French three-factor model. Since the intercepts are all reliably positive, Fama and French (1996) concluded that the short-term momentum strategy of Jegadeesh and Titman (1993) is left unexplained by the Fama and French (1993) three-factor model. Similar results was observed by Brennan et al. (1998) who concluded that, given the Fama and French (1993) three-factor model, size and B/M characteristics do explain average return differences. Further to this, the authors found consistency with Fama and French (1996) results, in that the Fama and French three-factor model was unable to explain the momentum effect. On the other hand, Carhart (1997) includes a momentum factor constructed by the monthly return difference between the returns on the high and low prior return portfolios in an attempt to capture the possible momentum anomaly. The 4-factor model of Carhart (1997) is found to capture the momentum anomaly on the U.S. stock market.

Serra (2002) examines the role of a set of *a priori* specified factors in order to determine the commonality in the cross-section of returns across emerging economies. The results reveal that the important factors are common across emerging economies and similar to the factors identified in developed economies and that the driving factors in emerging markets are consistent with Fama and French (1998). The six most important attributes in the cross-section of emerging market returns included technical factors (12-week lagged holding period returns), firm characteristics (earnings-price, book-to-market, dividend yield) and liquidity factors (size and price per share). Results do not reveal evidence of a size effect. Serra (2002) concludes that contrary to evidence from developed markets, the average payoffs of liquidity factors are positive. Consequently, Serra (2002) concludes, "the size effect is thus not supported by the data".

Hameed and Kusnadi (2002) examined the existence of the momentum effect in the Pacific Basin stock markets over the period from 1981 - 1994. Countries covered include Hong Kong, Malaysia, Singapore, South Korea, Taiwan and Thailand. Study results revealed that the momentum effects are country-specific, rather than company-specific among the Pacific Basin stock markets. They also found that the momentum effect is not

consistent across these emerging markets.

The short-term winner-loser effect might be attributable to the excessive risks exhibited by the extreme winner and loser portfolios. Avramov et al. (2007) examined the relation between the credit ratings of the company and momentum profits on the U.S. stock markets over the period from 1985 - 2003. Study results indicated a significant correlation between the company's credit rating and past return momentum. In particular, extreme winner and loser portfolios exhibit relatively higher credit risk (that is, low credit ratings) over the examination period. Matteo et al. (2008) investigated the relationship between past stock returns and idiosyncratic volatility for U.S. stocks over the period from 1965 - 2002. Study results revealed that the momentum effect is pronounced among stocks with high idiosyncratic volatilities. In addition, the momentum effect is, on average, stronger during periods of higher idiosyncratic volatility.

Interpretations of asset pricing anomalies

While some academics explain anomalies as being a consequence of the rational pricing of assets (Fama and French, 1992, 1993, 1996, 1998, 2007), others explained that it is actually a consequence of investor irrationality (Chopra et al., 1992; Lakonishok et al., 1994; Haugen, 1995; Haugen and Baker, 1996, 2009).

Modern finance view: Rational asset pricing

One interpretation of the anomalies is held by Fama and French (1992, 1993, 1995, 1996, 1998, 2007) who interpreted their findings as being consistent with the efficient market hypothesis, but not with the single-factor CAPM. They argued that although the anomalies provide evidence against the CAPM, they do not provide evidence against a rational multifactor model in which there are multiple risk factors. Their argument is that, size and book-to-market proxy was some unobserved risk factors. According to Fama and French (1992), superior returns represent compensation for risk, where portfolios formed based on respective firm-specific attributes are interpreted as mimicking portfolios. The returns of these mimicking portfolios are "correlated with relevant state variables representing consumption or production opportunities" (La Porta et al., 1997). It was also found that some variables are redundant in explaining average returns. The relationship between average returns and other measures of value (earnings yield and leverage) are absorbed by the combination of size and B/M. Fama and French (1993) reported that factor mimicking portfolios related to size and book-to-market add substantially to the variation in stock returns explained by the market portfolio. Regarding the relationship between beta and average returns, the authors conclude that if

there is a role for beta in explaining average returns it most likely will be found in a multifactor model (Fama and French, 1992). Fama and French (1993) conclude that size and B/M proxy for sensitivity of risk factors in returns, thus consistent with rational pricing. Fama and French (1995, 1996, 2007) in support of this risk-based view proposed by Fama and French (1993), argued that the value premium is compensation for risk missed by the Sharpe-Lintner (1964, 1965) CAPM. Accordingly, poor performing small stocks having high B/M ratios are vulnerable to financial distress and thus command a 'distress premium'.

The anomaly left unexplained by the above interpretation is the momentum effect of Jegadeesh and Titman (1993). In explaining the momentum effect, Fama and French (1996), instead of providing a risk-based explanation, argued that the momentum effect arises as a result of data-snooping or survivorship bias.

Behavioural view: Irrational mispricing

Another interpretation is that the anomalies arise as a result of investor irrationality due to psychological biases which causes investors to make irrational forecasts. De Bondt and Thaler (1985, 1987) attributed their results to the overreaction hypothesis. De Bondt and Thaler (1985) asserted that irrational investors persistently overweight recent information and underweight long-term fundamental information. This over- or understated information is expected to correct to its long-term value, given that the fundamentals remain the same. It is this overreaction hypothesis that resulted in the profitability of the momentum and contrarian strategies. Momentum strategies can thus be devised to profit from the temporary overshooting of asset prices before the market corrections take place, while contrarian strategies can be used to take advantage of the reversal of asset prices when the market is ready to correct. Jegadeesh and Titman (1993) also provided evidence of overreaction and subsequent correction/ mean reversal. Barberis et al. (1998), Daniel et al. (1998) and Hong and Stein (1999), present models based on investor behavior, which assume that momentum profits are due to the biases in the manner in which investors interpret and act on information.

According to Chopra et al. (1992), Lakonishok et al. (1994) and Haugen (1995), differentials in predicted returns come as a surprise to investors. Haugen and Baker (1996, 2009) argued that the differentials could be as a result of over- or underreaction to various events and that biases in pricing stocks distort the pattern of expected realised returns, thus masking the true nature of the risk-return relationship. Lakonishok et al. (1994) argued that due to irrationality, naïve investors incorrectly overestimate the difference in future growth rates between glamour and value stocks. Investors extrapolate

past earnings growth into the future and thus become overly optimistic about stocks that have performed well in the past (glamour stocks) and overly pessimistic about stocks that have performed poorly in the past (value stocks). Glamour stocks subsequently underperform once their growth in earnings disappoints investors while value stocks, on the other hand, subsequently outperform once their earnings growth positively surprise investors. Evidence in support of this rationale is provided by La Porta (1996).

An alternative view for the value premium is offered by Daniel and Titman (1997) and Daniel et al. (2001). This view posits that the value premium can be attributed to a behavioural explanation that is not based on investor overreaction, but rather one that traces the attribute characteristics. The value premium argument is not consistent with Fama and French (1993)'s risk argument. For example, investors may have a preference for growth stocks over value stocks because they perceive growth companies to be stronger companies. The resultant value premium thus has nothing to do with risk.

CONCLUSIONS

Early evidence supports the Sharpe (1964) and Lintner (1965) CAPM as well as the EMH. The CAPM postulates that different stocks have different expected rates of return due to their differing betas (non-diversifiable risk). However, evidence of "anomalies" cast doubt on the validity of the joint (EMH-CAPM) hypothesis. Regarding the size effect, Banz (1981) found evidence of a negative relation between the size of a firm and average stocks returns. Fama and French (1992) found that, size and B/M ratio (value) captured the cross-sectional variation of U.S. stock returns over the period from 1963 - 1990. It was found that size and B/M ratio are able to capture the cross-sectional variation better than other combinations of variables. Beta is found to possess almost no explanatory power over the period. De Bondt and Thaler (1985, 1987) found evidence of a long-term momentum effect, while Jegadeesh and Titman (1993, 2001) found evidence of a short-term momentum effect. Evidence of all four anomalies was found in international economies, in addition to the U.S.

There are various different interpretations for the anomalies. Fama and French (1992, 1993, 1995, 1996, 2007) provided a risk-based explanation arguing that although, the anomalies are inconsistent with the CAPM, they do not provide evidence against a rational multifactor model with multiple risk factors. The anomaly, however, not explained by Fama and French's three-factor model is the momentum anomaly of Jegadeesh and Titman (1993). A second interpretation of the anomalies is that, they are a result of investor irrationality which causes investors to overreact/underreact. Advocates of this interpretation include De Bondt and Thaler (1985, 1987), Lakonishok et al. (1994), Haugen

(1995), and Haugen and Baker (1996, 2009). Daniel and Titman (1997), and Daniel et al. (2001) argued in favour of a behavioural explanation and not based on investor reactions, but explained that it is the actual characteristics themselves that explain the cross-section of returns.

This paper provides a review of the empirical evidence regarding four documented anomalies in the pricing of securities. It is in the exploitation of these anomalies that investors are able to devise arbitrage strategies and earn abnormal profits.

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