SIZE EFFECT AND STOCK RETURNS IN EMERGING MARKETS: A TEST OF MARGINAL FIRM CHARACTERISTICS IN HONG KONG STOCK MARKET

by

Professor Wilson E. Herbert
Professor of Accounting & Financial Management and Head of Division of Financial Studies, School of Business, University of Derby, England.

ABSTRACT

This paper examines the relationship between firm capitalisation and stock returns in Hong Kong stock market. In particular, the study looks at the effect of small capitalisation on stock returns in the context of the marginal firm characteristics. Major attributes of marginal firm behaviour tested are poor dividend pay-out and high financial leverage. While these features might be evident in bear periods in Hong Kong stock market, the results in general contradict the notion that investors have the tendency of buying large capitalisation stock in bear market periods.

INTRODUCTION

The relationship between firm size and stocks returns has been of interest to both researchers and investment practitioners. Since the development of the arbitrage pricing theory (APT) which suggests the use of multi-factor model to explain asset returns, there has been a growing literature in investment finance on the relevance of multiple (k) factors to stock market returns (Roll and Ross 1980, Huberman, 1982; Chamberlain and Rothschild 1983, and Ingersoll 1984). More refined tests of the theory of equilibrium arbitrage-pricing conditions include the work by Dybvig (1983), Grinblatt and Titman (1983), Connor and Korajczyk (1989). More recently, researchers have been looking at practical ways of identifying the factors that explain asset prices. Two recent representative studies explicitly considering the mundane factors which explain asset prices under the APT are Fama (1991) and Fama and French (1992). While Fama (1991) used multiple regression of asset returns against hypothesised factors to identify the factors that explain asset prices, Fama and French (1992) examined the problems of joint hypothesis testing and the limitations of the single-factored capital asset pricing.

Of the explanatory factors, firm size, as measured by market value of equity or assets, is about the most extensively used micro structure factor in estimating the return on an asset. Firm size has also been intensively used either as a collective factor (Lakonishok and Shapiro, 1984, 1986; Chan et al., 1985 and Chan and Chen, 1988), or with related attributes like earnings-to-price ratios (Basu, 1983; Jaffe et al; 1989), debt-equity ratios (Bhandari, 1988), earnings yield (Jaffe et al., 1989, Chan et al., 1991), cash flow yield and book-to-market ratio (Fama and French, 1992; and Chan et al., 1991).

ON THE CONCEPT OF 'MARGINAL FIRM'

The term 'marginal firms' is used to characterise firms (Chan and Chen, 1991) that:

- have lost market value owing to a history of poor performance are inefficient producers;
- are likely to have high financial leverage and cash flow problems;
- have a history of poor to nil dividend pay-outs;

- have limited access to capital markets for external financing; and
- are less likely to survive adverse economic conditions.

The economic interpretation of 'marginal firms' is based on those characteristics which distinguish healthy firms from unhealthy ones. Unhealthy firms are on average riskier, have limited capacity to negotiate in capital markets. Such firms, and are more volatile than the healthy firms. Because of these characteristics, marginal (unhealthy) firms react differently from the healthy firms to the same piece of economic news. Thus, the same piece of economic news affects the return of marginal firms more than it affects the return of large firms. These attributes are commonly associated with small firms since, as a group, they are not only heavily populated by marginal firms, but also are prone to behave like marginal firms (Chan and Chen, 1991).

The empirical evidence of the potential significance of marginal firm behaviour or small firm effect was first documented by Banz (1981), Reinganum (1981), and Lakonishok and Shapiro (1982). The conclusion from these studies was that small capitalisation stocks outperformed large one by at least ten percent per year on risk-adjusted basis. Recently Chan and Chen (1991) examined the relevance of size to asset returns in the context of the differences in structural characteristics that lead firms of different sizes to reach differently to the same piece of information. Essentially, the authors examined why the stocks of small firms produce superior average returns than those of large firms, arguing that the prices of risky stocks are more sensitive to economic news. The authors further suggest that the identity of marginal firms is commonly linked with poor performance, production inefficiency, cash flow problems and high financial leverage.

Chan and Chen then used the impact of changes in dividend profile and financial leverage to test the relationship between firm size and asset returns. Their results suggest a strong positive relationship between small capitalisation stocks (small firms) and poor dividend pay-out cum high financial leverage. Firms that exhibit these characteristics on a sustained basis are regarded as "marginal firms" and small firms are, in general, associated with this behaviour. From this Chan and Chen concluded that low dividend pay-out and high financial leverage are important micro structure variables in explaining small firm effect on US stock returns.

The issue of whether the stocks of small firms are fundamentally riskier than those of large firms and the potential significance of marginal firm characteristics on asset returns has provoked a lot of interest among finance scholars and investment professionals. Current interest in the significance of marginal firm behaviour has implicated the strategies adopted by investment professionals. For example, the most obvious implication of *contrarianism*[1] is that it is closely associated with *value* stocks which have been empirically found to outperform *glamour* stocks (see for example, Lakonishok et al., 1994). Recent research has also associated this strategy with small capitalisation stocks. Studies have found superior returns on the strategy of buying stocks of small firms (generally believed to be undervalued) and selling stocks of large firms (believed to be overvalued) in the stock market (Chan, 1988). Small capitalisation stocks are, on the average, riskier than large capitalisation stocks; also, they tend to react differently to economic news (see for example, Chan and Chen 1991). This idiosyncratic behaviour is intrinsically linked with the marginal firm hypothesis. Thus, it can be argued that the marginal firm hypothesis has a contrarian predictive behaviour (see for example, DeBondt and Thaler, 1985 and Chan, 1988)

This paper reports the results of small firm effect in Hong Kong stock market in the context of the marginal firm hypothesis proposed by Chan and Chen (1991). First, a variety of sample classification schemes for small and large firms is examined based on their market capitalisation at the end of each year. This is then followed by a cross-reference of identities of small firms and the two attributes of marginal firm behaviour suggested by Chan and Chen, namely, past dividend changes and financial leverage. Formal correlation tests of monthly size-matched return indices constructed from differences in returns of stocks grouped by types of dividend changes

(DIV) and levels of financial leverage (LEV) are performed against those constructed from differences in returns of stocks grouped by size (DIFF) and a value-weighted market index, i.e. the Hang Seng Index (HSI). By reviewing the magnitude of correlations, the relevance of the marginal firm argument for small firm effect, as contrasted to market influence in general, can be quantified and better assessed.

II. DATA AND METHODOLOGY

The sample data are extracted from the Pacific-Basin Capital markets (PACAP) Data base on Hong Kong stock market for the period of 1980 to 1992. The selection of sample stocks is based on the availability of accounting data for the whole sample period. The sample excludes finance companies because of their high leverage ratios. Also, although stocks which have been newly listed or delisted during the sample period may offer a better indication of successful or unsuccessful firms, they are excluded from the sample. Finance companies' stocks have, on the average, higher capitalisation and price; they are popular with investment analysts and may considerably have higher up-market than down-market beta (see for example, DeBondt and Thaler, 1987, and Chopra et al., 1992). Newly listed or delisted stocks (for financial distress related reasons) have lower average capitalisation and are likely to have considerably down-market beta[2]. This selection criterion sorts out highly capitalised companies, newly started ones and those that ceased operations during the sample period. For each type, there can be significant deviations from other companies which would not necessarily reflect the norm. This sample selection ensured that the sample stocks are from a homogeneous group of surviving companies throughout the sample years. Including homogeneous stocks would make both contrarian and small firm (micro structure) more pronounced and thus more observable. The sample selection criterion is also designed to mitigate the possibility of contamination of stock returns by look-ahead or survivorship bias (Banz and Breen, 1986; Conrad and Kaul, 1993; Ball, Kothari, and Shanken, 1995)

A total of 131 stocks are selected. The value of each stock is computed by multiplying the number of ordinary shares outstanding by the closing price per share on the last trading day of the year. For comparability of firm size, each year we classify and rank all sample stocks and Hang-Seng stocks on the PACAP Database into nine groups on the basis of their end-of-year market capitalisation. We classify as small firms (S) those stocks in groups 1 to 3, medium firms (M) those in groups 4 to 6, and large firms (L) those in groups 7 to 9. Further, we estimate the percentages of the total market value of all Hang-Seng stocks taken by each size group as shown below. This distribution is designed to depict a genuine difference in size rather than just an artificial separation of stocks of similar sizes.

% of Total Market Value at end of each year

Small	**0.5% - 1.1%**
Medium	**2.1% - 4.5%**
Large	**36% - 52%**

For the measurement of dividend payments, both cash and scrip dividends are taken into account. Then the value of annual dividend payment per share is computed by aggregating the cash amount with the dollar equivalent value of bonus share issued for each existing ordinary share. The percentage change in dividend in year (t) is computed as follows:

$$\frac{D_t - D_{t-1}}{D_{t-1}} x100\%$$

Further, a firm's financial leverage is measured by calculating the ratio of fixed payment liabilities to the market value of equity, as follows:

$$\frac{\text{Current Liabilities + Long term Debt + Preference Shares}}{\text{Market Value of Equity}}$$

III. SMALL FIRM EFFECT

To examine small firm effect, we compute the average monthly returns of the three firm-size groups. Table 1 presents the results of the size return and the mean returns of HSI as well as their associated significance tests.

Table 1: Percentage Return of Each Size Group and Hang Seng Index

Year	S	M	L	HSI
1981	2	-7	-34*	-5
1982	-47*	-53*	-70*	-58*
1983	-7	-9	7	11
1984	-3	15	22**	32**
1985	7	21*	25**	38**
1986	29*	38*	28**	38
1987	-8	-48*	-60*	-11**
1988	-5	14	26**	15
1989	-8	-14	-2	5
1990	-32*	-27*	-12*	6
1991	-1	16	31*	35**
1992	17*	27*	21	25

* **Returns are significant at the 0.01 level or better**

** **Returns are significant at the 0.05 level or better**

The stocks of small firms outperformed the market in general, including stocks of larger firms in 1981, 1982 and 1987. The period 1981-1982 represented the bear period for the Hong Kong stock market while 1987 witnessed the crash in global stock markets. The medium-sized firms behaved similarly to small firms, but they outperformed small and large firms in 1986 and 1992 due possibly to the high interest rates and political uncertainty in Hong Kong in these years. For the other years, large firms outperformed smaller ones. This may be attributable to the relatively small percentage of total market values taken up by the medium firms sampled in the study, in which case they tend to behave more like the small firm group. However, over the 12-year study period, the stocks of large firms outperformed both small and medium firms in the periods 1983-85 and 1988-91 - the bull years in Hong Kong stock market.

While these observations do not provide a strong evidence that small firms outperformed large firms, the so-called 'small firm effect', they do not necessarily contradict the expected risky characteristics of small firms. In fact, what is apparent from Table 2 is that during 'bad economic times, the stocks of small firms outperformed those of the larger firms. Conversely, during 'good economic times, they tended to fair badly compared to the stocks of the larger firms. This trend could be associated with a reversal of investors' expectations towards large firms at different market periods. This tendency appears to ignore the probability of low risk commonly attributed to stocks of large firms.

Consequently smaller firms are more preferred by Hong Kong market participants in bear years, but less so in bull years. If this is the case, this influence of contradictory investors' expectation may have added a directional bias to the high risk characteristics of small firms (a feature of marginal firms), or may have counteracted it.

Small Firm Effect, Past Dividend Changes and Financial Leverage

An important issue in the marginal firm argument is that small firms have a high risk profile. This feature associates the abundance of marginal firms amongst small-sized stocks with unfavourable past dividend changes and high financial leverage. To examine this, we perform cross-tabulations of firm-size groups with these two factors. Tables 2 and 3 present the results for changes in dividend and financial leverage, respectively.

The measures of dividend changes and financial leverage are based on the previous financial year's financial data. As listed companies are normally required to make announcements of financial results and dividend payments no later than five months after the end of the financial year, the market values of stocks at the end of May are used in estimating firm size, instead of December 31 of the previous year as employed by Chan and Chen (1991).

Table 2. Firm Size and Dividend Changes in Year(t-1)

	Dividend Decrease		No	Dividend Increase		
Size	50% - 100%	0% - 50%	Change	0% - 50%	50% - 100%	>100%
Small	9	5	15	6	2	4
Medium	10	5	8	7	2	6
Large	9	6.0	4	12	2	7

NB: Numbers represent average number of firms with dividend changes in the previous year

Table 2 shows that a greater number of large firms are associated with dividend increase, particularly at the 0-50 percent range. For their part, small firms are mostly associated with no dividend change, while medium firms (which can indeed be counted as smaller firms for the same reason given above) are more associated with high dividend decrease in the 50-100 percent range.

message than financial leverage level as perceived by investors.

The observations in Tables 2 and 3 generally support the idea that small-capitalisation stocks are better characterised by a history of nil or unfavourable dividend changes. To further confirm whether it is poor dividend pay-outs that contribute to changes in firms' values, two size-matched indices were constructed, each carrying

Table 3. Firm Size and Changes in Financial Leverage Ratios in Year(t-1)

	Financial Leverage Ratio					
Size	0% - 20%	21% - 40%	41% - 60%	61% - 80%	81% - 100%	>100%
Small	14	8.0	4.0	4	2	10
Medium	9	8	5	4	3	12
Large	11	10	6	4	2	9

NB: Numbers represent average number of firms with changes in financial leverage ratios in the previous year.

As shown in Table 3, a greater number of firms are found at the two ends of the financial leverage profile. The distribution of small and large firms are very similar, both with more firms tied to the lower end of zero to 40 percent. Whereas for the upper end with leverage ratio more than 100 percent, the number of related medium firms far exceed those of the other size groups.

In general, the association of firm size with dividend changes in previous financial year seems more apparent than that with financial leverage. While most of the findings about dividend changes conform with the usual interpretation of informational contents of dividend announcements, this may also indicate that dividend pay-out does carry more significant

the isolated impact of either dividend decrease or high financial leverage. By correlating these indices with an index carrying only the isolated impact of smaller firm size, a positive association of these two factors with firm size can be established if such correlations are significantly positive, or vice versa.

SIZE-MATCHED RETURN INDICES

To construct a size-matched return index with impact of dividend decreases, a portfolio of stocks is first constructed for each year to compute an equally-weighted monthly return index. For any year (t), each of the sampled stocks with a dividend cut in previous year (t-1) is paired with

another stock which (a) did not have any change in dividend, and (b) is slightly smaller in market value at the end of (t-1).

The portfolio will be applicable for only the year (t), and the matching will be repeated for each of the other sample years. Only small difference in market value is considered in this matching process. This is to minimise the impact of size difference so that subsequent correlation will truly measure the relationship of impacts of dividend decrease with size difference, and not relationship of size differences themselves.

To compute the return index for each month of year (t), the difference in returns of each pair of stocks is calculated by subtracting the return of the size-matched stock from that of the stock with dividend decrease at (t-1). An equally-weighted average of the return differentials is then calculated to form a return index figure for that month. The resultant 132 monthly figures for years 1982 to 1992, which is termed DIV, represents the average differences in monthly stocks returns, on a diversified basis, which are caused by dividend decreases in previous year.

A smaller process is used to construct the size-matched portfolios with impact of high financial leverage for each year. The criteria for matching are that, for any year (t), each of the sampled stocks in the top one-third group of financial leverage level in (t-1) is paired with another stock which is (a) in the bottom one-third group and (b) slightly smaller in market value at end of (t-1).

The monthly return index, termed LEV, consists of equally-weighted averages of return differentials calculated by subtracting the return of the size-matched stock from that of the stock with higher financial leverage at (t-1).

For the size-matched index which carries only implied return difference from small firm size, the matching is done on the basis that, for any year (t), a stock in the bottom one-third size in the previous year is paired with another stock which is in the top one-third size group in that year. The monthly return index of DIFF consists of equally-weighted averages of return differentials calculated by subtracting the return of the size-matched stock from that of the stock with smaller sizes at (t-1)

To examine if return differences implied by size differentials can be associated with the two factors of poor dividend pay-outs and high financial leverage, correlation tests of DIV with DIFF and LEV with DIFF are done.

Table 4. Correlations of Size-Matched Return Indices

	DIFF
DIV	-0.3972 **
LEV	-0.2100 *

* significant at 5% level
** significant at 1% level

The negative correlations shown in Table 4 indicate that the return differentials implied by small firm size do not accord with dividend decrease or high financial leverage. While the latter case may be explained by the findings in Table 3, where both large and small firms have similar leverage profiles and therefore impacts of financial leverage cannot be paralleled with those of firm sizes, the former case of dividend decreases seems to contradict the contention previously made based on the findings in Table 2. Perhaps it is because the positive returns of large firms in the longer period of bull markets have more than compensated the spontaneous out performance of small firms in the comparatively short period of bear markets in Hong Kong. If this is the case, the expected series of positive return index of DIV may have lost track of the predominantly negative returns index of DIFF, thus showing a negative correlation. Therefore, if one falls back to the factor of different investors' attitudes in rising against falling markets as mentioned in respect of findings in Table 1, it may be worth trying to correlate the indices of DIFF, DIV and LEV with the Hang Seng Index returns instead.

Table 5. Correlations of Size-Matched Indices with Hang Seng Index

	HSIF
DIV	0.2372 *
LEV	0.4764 *
DIFF	-0.3339 *

* significant at 5% level

In Table 5, the negative correlation between DIFF and HSI confirms the point made regarding different investors' attitudes in rising versus falling markets. The predominantly negative return index of DIFF, caused by better performance of large firms in bull years, shows an opposite relationship with the market index returns. On the other hand, positive correlations are found between DIV and LEV with HSI, which indicates the existence of market influence underlying the two factors.

CONCLUSIONS

While results of this study reveal the presence of small firm effect in bear market periods in Hong Kong in the sample years, they also show only poor history of dividend pay-out and not high financial leverage, only the former one seems to be associated with small firms. Dividend pay-out appears to be of primary interest to investors. Although not conclusive in itself, this finding seems to partially invalidate the marginal firm behaviour hypothesis in explaining the performance of small-sized stocks in Hong Kong. In general, the results of this study suggest the following:

(a) Large firms have been more risky than small firms during the sample years. Not only did Hong Kong investors prefer large firms to small firms in rising markets than in falling markets (contrary to the general expectations), but also investors showed a greater propensity to invest in large firms. This tendency joins with the longer period of bull markets in the period 1980-1992 to explain why negative correlations are found between DIFF and HSI.

(b) Inferring from (a) above, market sentiments seem to play a more significant (but not the only) role in affecting investors' decision. If investment decisions have been based purely on risks, there should have been a consistent small firm effect present in the market, which would have strengthened the argument of marginal firm behaviour.

(c) While the small firms sampled in this study do not show distinguished features of marginal firms, but only the mobility across size rank groups, the research findings may have been complicated by the aggregation of more successful small firms with the unsuccessful small firms. This situation can perhaps be resolved by either classifying the small firms further into two groups by their movements to other size rank groups in the next one or two years in the matching process, or by including stocks which have been subsequently delisted as in Chan and Chen (1991).

END NOTES

[1] ***Contrarianism*** *is an investment philosophy which has been followed in one way or another by all the great investors, from John Maynard Keynes through Sir John Templeton to George Sorros. A contrarian investment strategy, also known as value strategy, is an opportunistic trading strategy that seeks to operate against market trends. It involves buying undervalued stocks and selling overvalued stocks. Contrary to glamour or overvalued (winner) stocks, undervalued (loser) stocks have a history of low prices relative to earnings, dividends, past prices, book assets or other measures of fundamental value (Lakonishok, Shleifer and Vishny, 1994). The premise of the contrarian investment philosophy is that the herd-like behaviour of investors and that stock market overreacts to economic news; thus, an active opportunistic stock selection strategy which exploits this inefficiency would gain when stock prices revert to equilibrium (fundamental) values. Recent research has found superior returns on the strategy of buying value stocks (i.e. stocks of small firms) and selling glamour stocks (i.e. stocks of large firms) in the stock market (Chan, 1988). Value stocks are, on the average, thought to be riskier than glamour stocks and consequently tend to react differently to the same piece of news (see, Chan and Chen, 1991). This contrarian predictive behaviour would appear to be intrinsically linked with the marginal firm hypothesis (see, DeBondt and Thaler, 1985 and Chan, 1988).*

[2] *This differential beta behaviour suggests that the distribution of the returns of these stocks (higher-than-average capitalisation versus lower-than-average capitalisation) will be highly skewed.*

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