Free cash flow return regularities

Cash is king especially after all the bills are paid but, as **MUHAMMAD ARIF** and **NEIL HARTNETT** show, free cash flow and its effect on stock return behaviour is not easily explained.

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It is generally well recognised that the cash flow component of earnings can provide important insights into a company's future prospects. The financial performance attributable to the 'accrual' component of earnings has been shown to exhibit lower persistence than that attributable to the 'cash' component (Beaver, 1989; Sloan, 1996; Hodgson and Clarke, 2000; among others).

The importance of cash flow data is manifest within associated research areas such as those involving signalling and agency theory, with the proposition that share prices reflect market perceptions of a firm's generation of 'free cash flow' (FCF) and the risks associated with its disposition—for example, using FCF to acquire wealth-creating projects, vis-à-vis sub-optimal and wasteful activities (Jensen, 1986).

The literature has recently reported a possible pricing 'regularity' regarding 'FCF firms', with positive abnormal returns observed in a USA study (Hackel et al., 2000).

Our paper outlines an Australian study of FCF and thus provides insight into how pervasive the return regularity might be. Unadjusted, market-adjusted, beta-adjusted, size-adjusted and book-to-market-ratio-adjusted returns of 'FCF portfolios' are investigated and positive returns are observed. The results support the proposition that a regularity exists and that 'FCF risk' is priced but not in a manner explained by traditional risk measures or other well-documented regularities.

FREE CASH FLOW, SIGNALLING AND AGENCY ISSUES

The term 'free cash flow' (FCF) is now often used to describe a firm's net cash flow remaining after all other expenditure and investments outlays—for example, Leebert, (1979), Hackel and Livnat (1995), Copeland et al. (1996). Jensen (1986) was more specific, with FCF representing cash in excess of that needed to fund all positive net present value projects.

Residual funds should be distributed (through share repurchase or increased dividend payout) to minimise sub-optimal investments or agency conflicts. FCF can thus represent shareholder value that might be paid out, or retained for good or bad reasons: quite diverse, possible outcomes. Share price might reasonably reflect such 'FCF risk' depending upon information asymmetries and the market's assessment of the situation. For example, a negative price adjustment might be expected when a firm is perceived to be a FCF generator but does not signal its intentions.

There is some support in the literature for a 'FCF effect'. For example, Lang et al. (1991) found firms with high FCF and poor quality investment opportunities suffered abnormally low stock returns around periods of 'successful' takeover activity. Dividend signalling literature also supports a FCF effect, whereby favourable stock returns accompany increased share repurchases and special dividend distributions. Charest (1978), Brickley (1983), Lang and Litzenberger (1989), Koch and

Shenoy (1999) and Hackel et al. (1994) found small-capitalisation 'FCF firms' in the USA market generally outperform risk-adjusted benchmarks. Vogt and Vu (2000) investigated the long-term performance of USA firms with large FCF and reported positive raw and risk-adjusted returns.

Hackel et al. (2000) found FCF-generating, large-capitalisation companies in the USA outperformed the relevant benchmarks, and also dismissed the possible association between the returns and several other 'anomalies' reported variously in the literature (such as earnings/price ratios, dividend yield, recent cumulative return).

METHODOLOGY

Estimation of Free Cash Flow

The central proposition is that FCF generation provides a firm and its shareholders with a unique and diverse range of possible wealth outcomes and thus, ceteris paribus, it is reasonable to suggest FCF risk might be priced and in a manner not explained by conventional risk metrics or other well-known market regularities such as size or book-to-market effects.

Embracing the definitions of FCF by Jensen (1984) and Copeland et al. (1996), a firm's true FCF is not readily discernible. Consequently FCF is usually estimated by the net cash flow from operating activities minus capital expenditures. Prior to 1992 in Australia, a company's explicit cash flow was not reported and net cash flow from operations was bluntly estimated as net income plus any non-cash expenses (e.g. depreciation, amortisation). As cash flow statements are now routinely published with balance sheet and earnings information, more precise FCF estimates can be derived.[1]

In this study, FCF was defined as net cash flow from operating activities in excess of capital expenditures:

FCF = (OCR – OCO) – CEX
= NOCF – CEX

where FCF = Free cash flow
OCR = Operating cash receipts
OCO = Operating cash outlays (including tax and interest)
NOCF = Net operating cash flow available to shareholders
CEX = Capital expenditure = capital investments – disposals

The definitions follow those of Copeland et al. (1996) and Hackel et al. (1994, 2000) and key data was obtained from company cash flow statements.

Data and Portfolio Formation

Accounting data for FCF estimation were extracted from the Connect 4 Company Annual Reports Database of Australian Stock Exchange (ASX)-listed firms. As cash flow statements were unavailable before 1992 and as three prior years of data were used to compile selection criteria averages, portfolios were constructed from 1995 onwards.

The 'FCF portfolios' were modelled as equally weighted parcels of ordinary shares, purchased on 31 December (the formation date) and held until the end of the following year. Some company reporting dates occurred on the formation date (31 December) or near to it and so the presumption of data availability prior to 31 December (to enable portfolio selection) was not always tenable.

Consistent with the discussion by Hackel et al. (2000) regarding the obvious need for the financial data to be actually published and readily available yet not 'stale' from further news releases (for example, from quarterly or other financial disclosures), an interval of at least three months was imposed between company financial year-end and the December portfolio formation date.[2]

For each year of study, a FCF portfolio was formed from the Top 150 ASX-listed firms ranked by market capitalisation as at 31 December of the prior year. A number of FCF-relevant criteria were imposed for the selection process with the aim of identifying firms at the upper end of sustainable FCF activity and project investment capacity. The filtering method is similar to that of Hackel et al. (2000). As stated by Hackel, the use of multi-period data for averaging cash flow measures and other filtering was intended to better capture sustained FCF generation and reduce biases from unusual and non-recurring effects.

The criteria are outlined below:

1. **Large capitalisation firms**: serving to standardise size effects in the first instance, but also ensuring active, synchronous returns for modeling.

The top 150 ASX-listed companies (ranked by market capitalisation of ordinary equity as at formation date) were used for portfolio and control group selection, representing approximately 90% of the total capitalisation of listed companies during the study period.

2. **Firms with persistent, positive free cash flows**: to help ensure selected firms have a strong cash flow performance and are not slowly liquidating:

i. Positive three-year average operating and free cash flow;

ii. Positive growth in operating and free cash flow over the last three years.

3. **Firms with sound debt coverage**

The set of criteria follows the rationale of Hackel et al. (2000).

The debt filter assisted to neutralise possible return 'noise' related to disparate leverage amongst firms. Also, lower leverage firms should have a greater capacity for project investment (and thereby possess greater 'FCF risk'), given (i) the negative association between leverage and investment opportunities reported in the literature [for example, Jensen and Meckling (1976), Stulz (1990)] and (ii) the possibility of higher leverage serving to signal the ongoing efficient (yet zero net present value creating) disposition of any FCF rather than its placement into wealth creating or squandering projects (Jensen, 1986). As in Hackel's study, the ratio of total debt to the three-year average FCF (hereinafter termed the Debt/FCF Multiple) was required to be less than 10. The ratio indicates that firms can repay debt from FCF within 10 years.[3]

Financial, trust and resource listings were excluded from the study, due to their specialised debt and cash flow peculiarities.

Firms were not filtered according to FCF multiples, unlike Hackel et al. where only 'low' FCF multiples were retained (noting the FCF multiple is the ratio of company equity to average annual FCF and in this form is analogous to a price/earnings multiple).[4]

This minimised arbitrary interpretations as to what the pricing multiple might imply regarding mispricing and avoided further sample size reduction.[5] To the extent Hackel's filtering has merit, then any positive abnormal returns observed with our approach would represent quite a robust outcome. The FCF multiple is considered later as an independent regression variable in the analysis of abnormal return behaviour so that particular associations (if any) might be observed.

For additional clarity, we use the term Equity/FCF multiple in this study. Whilst selection criteria are somewhat arbitrary, they nevertheless purposely identify a portfolio of particular FCF character: positive, growing FCF over the previous three years. A trade-off necessarily exists between the imposition of different strength selection criteria and the procurement of a sample size amenable to meaningful analysis.

Calculating Returns

Share price and dividend data were extracted from the Bridge DFS IRESS database. Portfolio returns were accumulated to a one-year holding period return. Raw (unadjusted) returns and several adjusted returns were measured and analysed:

Raw Return: A security's actual return was modelled as the natural logarithm of the price relative, with prices adjusted for dividend and capitalisation effects if any.

Market-adjusted Return: This return was defined as the raw return minus the return on the value-weighted All Ordinaries Accumulation Index (AOAI).

Systematic Risk (Beta)-adjusted Return: conventional 'market model' parameters for each security were estimated by ordinary least squares regression, using continuously compounded daily return data over the year prior to the portfolio formation date. The AOAI proxied the market. Beta-adjusted return was defined as the raw return minus the 'expected' return predicted by the market model.

Size-adjusted Return: This adjustment recognises the potential for the widely documented 'size effect' to drive share returns in a manner not explained by systematic risk (Banz, 1981). The return was modeled as the raw return minus the equally-weighted average return of a 'control' portfolio of securities within the same size decile as at the portfolio formation date, and as such follows the approach by Fama and French (1992) and Hackel et al. (2000).[6]

Book/Market-adjusted Return: This modeling recognises the possible 'book-to-market' effect documented variously in the literature [notably Reinganum (1988), Fama and French (1992)] and follows the approach by Fama and French (1992) and Hackel et al. (2000). The adjusted return equals the raw return minus the equally-weighted average return of the 'control' portfolio of firms with comparable book-to-market ratios (within the size decile). That is, firms were grouped by size decile and then, within each size, further classified into deciles of book-to-market ratios. The book-to-market ratio was defined as the book value of shareholder's equity divided by market value of equity, using the most recent balance sheet data and market capitalisation data at portfolio formation date.

RESULTS

Sample Characteristics

After the filtering, 60 'FCF firms' were identified for analysis during the six-year study period. Portfolio size ranged from 8 (1995 and 1998) to 12 firms (2000), with an average of 10.5. Whilst defined as 'FCF firms', they nevertheless reflected a good diversity across industry sector, size and other financials (details omitted for brevity).[7]

The potential differential effect of the financial variables upon security returns is controlled by group matching and regression techniques, discussed more fully in the following sections.

Portfolio Performance

Returns are summarised in Table 1. The unadjusted portfolio return averaged 14.98% p.a. over the six years and all annual returns were positive. The return distribution was quite symmetric around the six-year mean (noting a six-year median return of 15.20%) and thus sample parameters did not appear driven by extreme cases.[8] The assumption of underlying normality was easily corroborated using the Shapiro-Wilk test ($W = 0.995$, $p > 0.99$). (See Table 1, below)

Table 1 also reported market-adjusted, beta-adjusted, size-adjusted, and book/market (within size)-adjusted returns of the FCF portfolios. The returns of the market proxy (All Ordinaries Accumulation Index, AOAI) are also shown here for comparison. The diversity of annual market returns over the six years, whilst all positive, nevertheless suggest a wide range of market sentiment and thus our results were unlikely to have been confounded by any sustained market trend across the study period.

TABLE 1 ANNUAL RETURNS OF THE MARKET INDEX AND FCF PORTFOLIOS

Year	n	Market Index Return %	FCF Portfolio Return (%)				
			Unadjusted Return	Market-adjusted Return	Beta-adjusted Return	Size-adjusted Return	B/M-adjusted Return
1995	8	18.830	21.388	2.558	15.336	7.595	4.230
1996	11	13.400	17.875	4.475	11.821	4.748	3.014
1997	10	10.810	14.887	4.077	9.069	23.298	16.423
1998	8	8.140	7.104	-1.036	0.650	15.313	25.968
1999	11	16.910	13.989	-2.921	2.275	3.677	0.772
2000	12	5.630	14.658	9.028	10.231	16.571	11.745
Mean Return (& Student–t[1])		12.287 (5.922 ***)	14.983 (7.735 ***)	2.697 (1.551*)	8.230 (3.551***)	11.867 (3.749 ***)	10.358 (2.629 **)

[1] Significant at the 0.01 (***), 0.05 (**) or 0.10 (*) level.

For the unadjusted returns and every type of adjusted return, the mean annual return was positive and statistically significantly different from zero, consistent with results from the USA studies by Hackel et al. (1994, 2000). The adjusted returns also appeared to be material from an economic standpoint—for example, after allowing for average 'round trip' transaction costs of say 5% for wholesale market transactions (or 2% retail). Of the 24 adjusted annual returns tabulated, only two were negative and both occurred in the market-adjusted return category. It is noted that the market-adjusted return category provides only a market-wide 'average' matching for risk factors and was thus a relatively coarse adjustment. Cumulative returns over the six years are provided for illustrative purposes in Figures 1 and 2.

FIGURE 1 FCF PORTFOLIO CUMULATIVE RAW RETURN

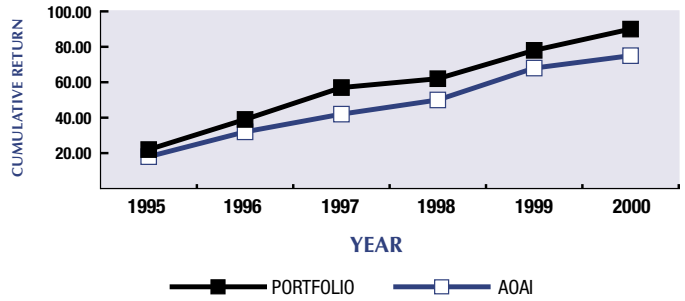
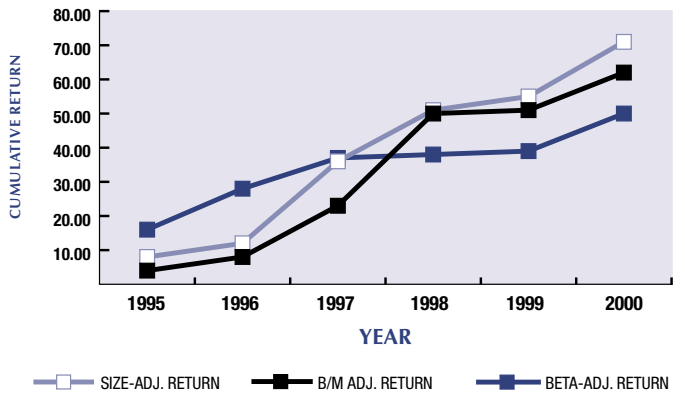


FIGURE 2 FCF PORTFOLIO CUMULATIVE ADJUSTED RETURNS



Overall, the study reveals a superior return performance of Australian FCF portfolios over the market index and other portfolios of similar size, similar systematic risk and similar book-to-market ratios. The results are consistent with those of the USA research by Hackel et al. (1994, 2000) and Vogt and Vu (2000), and are supportive of the FCF hypothesis in that 'FCF risk' appears to be priced but its premium is not properly captured using conventional risk measures.

Cross-sectional Regression Analyses Regarding Other Anomalies

A natural question to consider is to what extent the adjusted return behaviour of the FCF portfolios is simply the result of other regularities previously documented in the literature. Drawing from Holthausen and Larcker (1992), and Hackel et al. (2000), regression analyses were modeled to consider the possible associations between the adjusted returns and the following factors: earnings/price ratio, unexpected earnings, prior returns of the stock (the so-called contrarian effect) and dividend yield. Further, we included additional controls for beta risk, firm size and book/market ratio, given that some remaining 'within decile' effects have been noted in the literature (for example, Holthausen and Larcker, 1992).[9]

Thus we separately regressed each adjusted return measure, as the dependent variable, by the seven independent variables summarised above for the sample of 60 firms. As reasoned by Holthausen and Larcker (1992), the regression coefficient of each independent variable indicates the mean extent by which the adjusted return varied with a change in that independent 'regularity' variable. Therefore in our study, the intercept term represents that portion of the adjusted return that remained unassociated with any of the regularity variables. The regressions appeared well specified, with an acceptable number of variables given the sample size, and no multicollinearity or variance heteroscedasticity problems indicated.[10]

The regression results are summarised in Table 2 (see over). The overall model was statistically significant for every regression. Further, all intercept coefficients were positive and statistically significant, indicating that adjusted (abnormal) returns persisted even after controlling for the other potential market anomalies.[11] The beta coefficient was conspicuous with its lack of significance in any model. In contrast, the size coefficient was of the expected sign and statistically significant in all models, even in the size-adjusted and B/M (within size)-adjusted models. This indicated some 'within decile' size effect, consistent with the literature noted earlier. The remaining variables reported some regression coefficients with sizeable yet non-significant t-statistics (specifically, the Previous Return variable in the Market-adjusted, Beta-adjusted and Book/Market-adjusted return models; the Book/Market variable in the Size-adjusted return model, and the Earnings/Price variable in the Book/Market return model), but were otherwise unremarkable.[12]

Finally, the study considered the possible association between a firm's Equity/FCF multiple (measured as at the start of the holding period) and the firm's adjusted return for the period. Recall that Hackel et al. (2000) controlled for Equity/FCF multiple as a selection criterion 'to identify firms that are currently undervalued by the market' (p. 4), with only low-multiple firms included. We observed significant, positive adjusted returns across all four adjustment categories, without the additional filtering of the Equity/FCF multiple. This is in contrast to Hackel et al. who did not observe statistical significance when they relaxed their filter for the Equity/FCF multiple.

While our study purposely sought to focus upon 'high FCF' firms with regard to the FCF sustainability criteria, a wide range of Equity/FCF multiples were observed within the sample (for brevity not tabulated). That is, all firms in the sample generated a sustained FCF, but the size of the FCF relative to underlying asset value at the start of the holding period differed across firms. It may be possible to discern

TABLE 2 REGRESSION OF ADJUSTED RETURNS AGAINST ANOMALY VARIABLES

	Return Type				
Whole Model: Adjusted R^2	**Unadjusted**	**Market-adjusted**	**Beta-adjusted**	**Size-adjusted**	**B/M-adjusted**
	0.13	0 .13	0.13	0.17	0.13
F ratio[1]	2.23**	2.21**	2.21**	2.67**	2.31**
Independent Variables	**Regression Coefficients (and Student–*t*[1])**				
Intercept	82.78 (2.99***)	0.61 (2.19**)	0.66 (2.34**)	0.82 (2.80**)	0.74 (2.54***)
Earnings/Price	-45.95 (-0.58)	-0.34 (-0.42)	-0.22 (-0.27)	-0.22 (-0.26)	-1.18 (-1.42)
Unexpected Earnings	98.56 (0.81)	1.23 (1.01)	1.04 (0.84)	0.76 (0.60)	-0.36 (-0.29)
Previous Returns	9.68 (1.36)	0.11 (1.57)	0.11 (1.52)	0.09 (1.16)	0.10 (1.40)
Dividend/Price	63.35 (0.55)	0.52 (0.46)	1.16 (0.99)	0.67 (0.55)	-1.19 (-0.99)
Size (Ln)	-8.88 (-2.69)***	-0.08 (-2.32**)	-0.09 (-2.51***)	-0.10 (-2.91***)	-0.08 (-2.30**)
Book/Market	-13.80 (-1.02)	-0.16 (-1.14)	-0.09 (-0.68)	-0.22 (-1.56)	-0.07 (-0.47)
Beta	-2.86 (-0.30)	-0.01 (-0.14)	-0.02 (-0.21)	0.09 (0.93)	0.10 (0.99)

[1] Significant at 0.01 (***), 0.05 (**) or 0.10 (*) level.

TABLE 3 REGRESSIONS OF ADJUSTED RETURNS AGAINST EQUITY/FCF MULTIPLE AND OTHER SELECTED VARIABLES

	Return Type				
Whole Model: Adjusted R^2	**Unadjusted**	**Market-adjusted**	**Beta-adjusted**	**Size-adjusted**	**B/M-adjusted**
	0.13	0 .13	0.12	0.17	0.15
F ratio[1]	2.45**	2.47**	2.28**	2.99**	2.74**
Independent Variables	**Regression Coefficients (and Student-*t*[1])**				
Intercept	81.14 (2.82***)	0.54 (1.89*)	0.75 (2.52**)	0.76 (2.50**)	0.56 (1.88*)
Earnings/Price	-12.56 (-0.16)	0.08 (0.10)	0.05 (0.06)	0.12 (0.14)	-1.25 (-1.52)
Previous Returns	8.92 (0.95)	0.11 (1.17)	0.09 (0.91)	0.10 (0.99)	0.12 (1.20)
Book/Market	-13.42 (-0.99)	-0.16 (-1.14)	-0.06 (-0.45)	-0.21 (-1.49)	-0.10 (-0.70)
Size (Ln)	-9.18 (-2.89)***	-0.08 (-2.43**)	-0.09 (-2.76***)	-0.10 (-2.82***)	-0.07 (-2.08**)
Equity/FCF	0.01 (0.03)	0.00 (0.04)	0.00 (0.18)	0.00 (0.18)	0.00 (0.33)
Debt/FCF	0.55 (0.33)	0.01 (0.65)	-0.01 (-0.30)	0.01 (0.76)	0.02 (1.09)

[1] Significant at 0.01 (***), 0.05 (**) or 0.10 (*) level.

differences in the pricing of 'FCF risk' (via the calculated abnormal return) across these firms. That is, was the sample able to reflect any differential abnormal return behaviour amongst firms of different Equity/FCF multiples? In the following multiple regressions, the various adjusted return series were regressed against the Equity/FCF multiple, along with the Debt/FCF multiple,[13] and several other anomaly variables of particular note from the previous regression analyses (size, book/market ratio, earnings/price ratio and previous returns). Again, investigations of variable correlations and residual distribution indicated that regression modeling assumptions were easily defensible. The regression results are summarised in Table 3 (see, page 10, bottom left).

All of the regression models were statistically significant. The intercept coefficient (again proxying the adjusted return of the FCF portfolio after controlling for the other variables) remained significant and positive in all models. Firm size was again the more notable of the anomaly variables, with significant, negative coefficients in all models. The FCF multiple was not a significant discriminator for adjusted return behaviour and this again provided a contrast to the reasoning of Hackel et al. (2000). No significant associations were observed for the debt multiple or the remaining anomaly variables.

LIMITATIONS AND FUTURE RESEARCH

The usual caveats regarding market model estimation, sampling technique and statistical inference are noted. Also, the study utilises estimates of traditional FCF and necessarily imposes somewhat arbitrary filters to identify FCF-sustaining firms. A tradeoff will necessarily exist between the imposition of different strength selection criteria and the procurement of a sample size amenable to analysis. Nevertheless, it is worth reiterating that the filtering criteria resulted in firms with unambiguously positive and growing FCF, (an imperative to the study), remarkably symmetrical raw return distributions and a good spread of financial and other background characteristics over quite diverse market conditions (recall markets returns ranging from 5.6% up to 18.8% p.a.).

Future research into the generality of the FCF hypothesis would seem a useful endeavour. Alternative samples and time periods (for example the period of share market downturn over 2002–2003), filtering methods and the differential effect of other factors upon perceived 'FCF risk' (for example, quality of audit and other governance mechanisms) are some avenues for ongoing research in this area.

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NOTES

[1] Hackel et al. (2000) noted an alternative to this 'traditional' estimation method. The traditional method assumes all capital expenditure is necessary to sustain the current growth rate, whilst in practice, many firms with large FCFs may have excessive funds that, even if distributed to shareholders, would not materially restrict future growth. Further, some operational expenditures are discretionary and these could feasibly be distributed to shareholders without affecting current growth. Also, operating cash flow may consist of non-recurring expenses and this may lead to anomalous FCF estimation. The alternative approach calculates FCF as net operating cash flow less non-discretionary capital expenditures, with the net operating cash flow excluding non-recurring cash flows from operations. Due to resource limitations and the potential arbitrariness in distinguishing 'non-discretionary' items, this alternative approach to FCF estimation is not investigated here.

[2] The literature has suggested the data can be (but is not always) available within three months after the annual report date (Basu, 1983) so our filtering was considered reasonable (or, if anything, slightly conservative).

[3] Result sensitivity to the debt proxy was also considered. Alternative debt measures, such as debt/assets and debt/equity, were highly correlated to the debt multiple and as noted later in the Results section, the use of these other measures did not materially alter outcomes.

[4] Result sensitivity to the FCF proxy was also considered. The ratio of Total Assets (equity plus debt) to FCF was used to recast later regression analyses but this did not materially alter the outcomes.

[5] Relatively high price multiples at the start of a period do not necessarily suggest lower returns over the holding period. Analogous to the concepts underlying conventional price/earnings multiples, an intrinsic FCF multiple would likely reflect not only estimates of a share's expected return for the period, but also prospective growth and payouts. The market's perception of how the FCF might be utilised or disposed of will influence such estimates. The further reduction of sample size was thus considered unduly limiting.

[6] We sampled the top 150 firms of the approximate 300 that formed the market index across the period of study. Our five groups of 30 firms represented the top five size deciles of 10 deciles that could be formed from the index. As such the partitioning method remained entirely consistent with that of Fama and French (1992) and Hackel et al. (2000).

[7] Available upon request.

[8] For brevity, we simply note each year's portfolio median return as 19.21, 23.64, 14.84, 5.13, 7.18 and 21.20% respectively.

[9] Earnings/price was modeled as the most recent reported earnings per share deflated by share price as at portfolio formation date. Unexpected earnings was modeled as the most recent earnings per share minus the previous year's earnings per share, deflated by share price at formation date. Recent return was modeled as the firm's market-adjusted buy and hold return over the previous 36 months up to formation date. Dividend yield was modeled as the most recent total dividend per share deflated by share price as at formation date. See Basu (1983), Bernard and Thomas (1989), Charest (1978), DeBondt and Thaler (1985), Koch and Shenoy (1999), Lang and Litzenberger (1989), Reinganum (1981, 1988) and Watts (1978). The size and book/market effects were referenced earlier in the paper.

[10] Regarding the number of independent variables (v) for a sample size (n), our model (v = 7 and n = 60) was within acceptable maximums such that $v^2 \leq n$ (Altman, 1991). Regarding collinearity, correlations were low and, more specifically, variance inflation factors and correlation eigenvalues were all within accepted limits [Chatterjee and Price, (1977); Bowerman et al. (1986)]. Regression residual distribution indicated the assumptions of normality and variance homoscedasticity were tenable. As in Holthausen and Larcker (1992) and Hackel et al. (2000), we assume negligible serial correlation for changes in variable values over the study period.

[11] It is interesting to note that these results for the intercept term represent a stronger outcome compared to that of Hackel et al. (2000). In their study, the regressions for size-adjusted and book-to-market-adjusted returns revealed intercept coefficients of nil/marginal statistical significance (t-statistic 0.880 and 1.580, respectively).

[12] It is notable that the negative direction of association observed between adjusted returns and the 'Earnings/price' variable is different to the posited positive effect documented in the literature and thus the 'near significance' would not have been registered using a directional ('one-tailed') test under the presumption of the commonly documented effect. This was similarly the case with the 'Previous returns' variable, where a contrarian negative (not positive) association has been suggested in the literature.

[13] The results were insensitive to the use of alternative debt measures, such as debt/assets and debt/equity. J