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Growth Opportunities, Earnings Permanence and the Valuation of Free Cash Flow

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Keywords

Free cash flow, agency theory, growth opportunities, earnings quality

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Keywords: Free cash flow, agency theory, growth opportunities, earnings quality

JEL Classification: M40.

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Introduction

The purpose of this paper is to document empirically the effect of firm growth opportunities and earnings quality on the market valuation of free cash flow (hereafter FCF). In a seminal contribution, Jensen (1986) argues from an agency theory perspective that managers are inclined to squander FCF (internally generated cash flows in excess of that required to maintain existing assets in place and finance profitable projects) when their objectives differ from those of shareholders. Empirical research has provided some support for the agency cost explanation of the FCF problems. Blanchard, Lopez-di-Silanes and Shleifer (1994) document excessive investment and acquisition activity for eleven firms that experienced a large cash windfall due to a legal settlement. Harford (1999) finds that cash-rich firms are more likely to make acquisitions that subsequently experience abnormal declines in operating performance. Bates (2005), in a sample of 400 subsidiary sales, finds firms that retain cash tend to invest more, relative to industry peers. Richardson (2006) finds that over-investment is concentrated in firms with the highest levels of FCF.

This FCF agency problem becomes particularly acute for firms with low growth opportunities. In the absence of effective monitoring or disciplinary actions by stakeholders, managers of firms with positive FCF but low growth opportunities (hereafter suspect firms) are more likely to invest in marginal or even negative net present value (hereafter NPV) projects to maximise their private benefits. This value-destroying investment activity eventually results in lower stock prices, and may trigger shareholder actions to remove directors and senior executives (Jensen 1986). Rational managers may mask such activities by deploying accounting discretion to increase reported earnings. Chung, Firth and Kim (2005) support this proposition by reporting that managers of suspect firms tend to use income-increasing discretionary accruals to increase reported earnings. Evidence of managerial opportunism regarding FCF is also reported by Gul and Tsui (1998; 2001) and Gul (2001). Gul and Tsui (1998) conclude that managers of suspect firms mask non-optimal expenditures by using accounting manipulation that requires auditors to charge high audit fees in order to detect it. This evidence, however, is absent for suspect firms with a high level of director equity ownership, which acts to monitor possible managerial opportunism with FCF (Gul & Tsu 2001). Gul (2001) reports that managers with FCF agency problems prefer first-in-first-out, an income-increasing inventory method, as opposed to a last-in-first-out inventory method, which results in maximisation of tax benefits in periods of rising prices and, hence, is preferred by shareholders.

The studies mentioned above provide interesting insights into the effect of FCF on certain outcomes but remain silent as to the market valuation of FCF. In a recent Swedish study Zerni, Kallunki, and Nilsson (2010) provide evidence of a positive market valuation of FCF with an increase in INCENTIVES (largest shareholders' cash flow rights), and BOARDINCE (board member wealth). The FCF for firms with high ENTRENCHMENT (the wedge between control and cash flow rights), however, suffer from valuation discounts. Lang and Litzenberger (1989) provide strong support for an FCF impact when they find that the positive share price response associated with dividend increases is concentrated in firms having poor investment opportunities, as measured by Tobin's Q. Vogt and Vu (2000) analyse the long-run price performance of firms appearing on Value Line's weekly "Largest FCF Generators" list. They document an above-average long run return for firms distributing excess cash to shareholders. Hackel, Livant and Rai (2000) document an FCF anomaly when they find that long positions in stocks of the firms that consistently generate FCF, outperform the market portfolios, and the portfolios of other firms of

similar risk and size. The present study follows an accounting-based valuation framework, to establish that the accrual accounting principle of a lack of association between FCF and stock returns may be conditional on firm growth opportunities and the quality of earnings.

Penman and Yehuda (2009) examine the market valuation of FCF using accrual-based valuation principles. They reveal that earnings are priced positively as expected but, given earnings, FCF does not have any explanatory power for stock returns.[2] This latter finding contradicts the findings from a substantial volume of research documenting that cash flow from operations does have relative and incremental explanatory power, vis-à-vis earnings, for explaining stock returns.[3] However, they reconcile the findings by noting that, "…accrual accounting operates in a way that recognises Miller and Modigliani (1961) notion of dividend displacement and …dividend irrelevance…free cash flow,…is a dividend from the firm that reduces the value of the firm but does not affect the cum-dividend value of the firm" (pp. 454-55).

Penman and Yehuda (2009, p.463), however, acknowledge the informational role of FCF by stating that "…Free cash flow can, of course, have information content but only because of imperfections in the measurement of accrual earnings." Following that argument, this paper attempts to extend Penman and Yehuda (2009) by investigating the valuation relevance of FCF for firms with differing growth opportunities and quality of earnings. The agency theoretic view proposes that managers are more likely to expropriate excess cash to benefit themselves, rather than the shareholders, and that this is most acute for suspect firms. It is therefore hypothesised that the stock market will assign a lower (higher) weight to the FCF component for firms having fewer (greater) growth opportunities. FCF is also likely to be more value-relevant for firms with transitory (low quality) earnings. Earnings that are more persistent are more predictable and enjoy a market premium (Francis et al. 2004). Persistent earnings should, therefore, be more strongly associated with contemporaneous stock returns compared to earnings that are transitory. When earnings are transitory, investors need to rely on alternative accounting information sources for decision-making, and FCF may then play a role.

This paper uses data from the Australian market to test the valuation relevance of FCF for two important reasons. Firstly, revisiting this research in Australia provides external validity to the Penman and Yehuda (2009) findings from the US market. Generalisation of US findings in

[2]The role of earnings in security price setting has been at the forefront of accounting research. Beginning with the seminal work of Ball and Brown (1968) and Beaver (1968), the last four decades of accounting research have produced a substantial volume of analytical and archival works on the relationship between accounting earnings and firm value. On the other hand, some accountants believe that cash flows, not earnings, are the primary source of information that affects the relative market price of firm securities. Lee (1974) argues that investors' demand for information is best served by cash flow analysis because cash portrays the ability of the enterprise to survive, is not contaminated by innumerable measurement problems, and facilitates the prediction of future dividends, credit and loan payments.

[3] Previous research addressing the relative and incremental information content of earnings and cash flows in the context of the United States of America (USA) generally supports the hypotheses that (1) both cash flows and accruals have incremental information content for stock returns, and (2) the explanatory power of earnings is superior to that of cash flows (e.g. Bernard and Stobber (1989); Biddle, Seow and Siegel (1995); Bowen, Burgstahler and Daley (1987); Dechow (1994); Rayburn (1986) and Wilson (1986; 1987)). These studies use cash flow from operations as the primary metric. However, standard textbooks on equity valuation prescribe FCF as the appropriate valuation tool (discounted cash flow technique) (e.g. Penman 2010).

other countries is always complicated by diversity in the financial reporting environment and stock market behavior in different countries. Brimble and Hodgson (2007) while investigating the inter-temporal value-relevance of accounting information in Australia, argue that: "…firm conditions, competitive and economic structures, and business culture vary significantly in a global sense. Hence, there is no compelling reason to assume that the US results will also hold in Australia" (2007, p. 602). Secondly, Penman and Yehuda (2009) acknowledge that investigating the association between accounting numbers and equity prices is contingent on the assumption of an "efficient market" hypothesis. Although the US market is widely recognised to be semi-strong efficient, market efficiency assumption can vary outside the USA and, therefore, it is important to investigate the affirmative role of accrual accounting in a market different from that of the USA to provide indirect evidence on the market efficiency assumption.

Building on the extensive model specifications of return regressions involving earnings, equity book values and FCF developed by Penman and Yehuda (2009), this paper finds that the stock market values FCF positively for firms with attractive growth opportunities, implying that the market expects these cash flows to be invested in positive NPV projects. With respect to the information content of FCF in the presence of poor earnings measurement, this study documents that FCF becomes an important valuation metric when earnings are transitory. The paper proceeds as follows. The following section develops regression equations designed to assess how market valuation of FCF might be conditional on firm growth opportunities and transitory earnings. The third section provides the data description and test results. The fourth section concludes the paper.

The Structure

To examine how market valuation of FCF might be conditional on firm growth opportunities and earnings permanence, this paper starts with the basic accounting-based valuation framework of stock return as a function of earnings and equity book values (Ohlson 1995). It then extends this basic formulation by incorporating and interacting FCF variables with firm growth opportunities and earnings permanence as the independent variables vis-à-vis stock returns.

A substantial volume of archival and analytical research demonstrates the importance of both aggregated and disaggregated fundamental accounting information, namely earnings, book values and cash flows in equity valuation. Kothari (2001) provides an extensive survey of this literature. Earnings and cash flows would not have been relevant had the accounting system produced a book value number exactly the same as the market value number. However, extant accounting rules make market values deviate substantially from the book values (accounting conservatism), and enable other accounting variables to play an informational role (Penman & Yehuda 2009). This presumption states that the change in market value is always equal to earnings, net of dividends, plus the change in the market premium over book value (Easton, Harris & Ohlson 1992). If the change in premium is zero, then the stock return must equal earnings. The fact that conservative accounting practices produce a book value number which measures equity prices with error is stated as follows[4]:

$$P_{it} = BV_{it} + (P_{it} - BV_{it}) \quad (1)$$

[4] The derivation of the structures relies heavily on Penman and Yehuda (2009).

and

$$P_{it} - P_{it-1} = \Delta BV_{it} + (P_{it} - BV_{it}) - (P_{it-1} - BV_{it-1}) \quad (2)$$

where P is stock price and BV is equity book values. This expression of change in equity price incorporates the updating of equity book values and produces a model that includes accounting variables as the fundamental drivers of stock returns. Dividing through by equity prices at the beginning of the year, we derive a complete accounting formulation for explaining price changes as follows:

$$\frac{P_{it} - P_{it-1}}{P_{it-1}} = \frac{E_t}{P_{it-1}} - \frac{D_{it}}{P_{it-1}} + \frac{BV_{it-1}}{P_{it-1}} + \frac{P_{it} - BV_{it}}{P_{it-1}} - 1 \quad (3)$$

where E is earnings and D is dividends and other variables are defined as before. Stock returns, however, are influenced by a number of factors other than the accounting information alone, and this other information, which has the ability to explain stock returns, must inform the end-of-period-premium. This other information component (Ohlson 1995) is proxied by the error term and results in the following baseline regression equation:

$$\frac{P_{it} - P_{it-1}}{P_{it-1}} = \beta_0 + \beta_1 \frac{E_{it}}{P_{it-1}} + \beta_2 \frac{D_{it}}{P_{it-1}} + \beta_3 \frac{BV_{it-1}}{P_{it-1}} + \varepsilon_t \quad (4)$$

The dependent variable is annual return, calculated as the annual changes in share price data over the fiscal year period, in order to align dividends with the earnings and book values they affect.[5] *EARNINGS* are earnings before extraordinary items. Equation (1) establishes that the complete accounting for periodic price changes requires an accounting for earnings, dividends, equity book values and end-of-period market premium. This is an extensively researched model in the capital market domain. The coefficients on earnings and dividends are expected to be 1 and -1 respectively, but only if earnings and dividends are uncorrelated with changes in the end-of-year premium, which is unlikely. A coefficient greater than 1 associated with earnings implies an earnings multiplier that helps explain the premium. Two important features of the model are (i) the exclusion of cash flows, because cash flows do not affect owners' equity under accrual accounting; and (ii) inclusion of other variables besides earnings is justified because of their ability to explain changes in the premium (Penman & Yehuda, 2009). If earnings are measured such as to increase price dollar-for-dollar, then other information has zero informational value. Similarly, if earnings are permanent, i.e. the current earnings stream does a good job of predicting future earnings then other variables besides earnings will have no informational value. The coefficient of -1 on dividends is explained by the Miller and Modigliani (1966) 'dividend irrelevance' hypothesis, which suggests that dividends reduce price dollar-for-dollar and do not impact the premium. However, there seems to be some evidence in the literature on 'dividend signaling' and this, therefore, justifies a coefficient different from -1 (Chen, Shevlin & Tong 2007; Skinner & Soltes 2011).[6] Hand and Landsman (2005) document a

[5] The analysis was repeated using stock price data three months after the fiscal year end to account for the incorporation of the latest financial statement information into stock prices. The results remain qualitatively similar and, therefore, this paper presents evidence using the former approach.

[6] Academic research on the signaling hypothesis of dividends has provided mixed evidence. Earliest studies by Watts (1973) and Gonedes (1978) conclude that dividends provide very limited information to the marketplace. Benartzi, Michaely, and Thaler (1997) find that dividends actually tell the past rather than signaling the future.

positive coefficient on dividends using the Ohlson (1995) equity-based valuation framework, but conclude that dividends are positively priced only because they are correlated with investors' mispricing of book equity, or earnings.

To investigate the explanatory power of FCF for stock returns, the following regression equation, which incorporates FCF as an additional explanatory variable, is estimated.

$$\frac{P_{it}-P_{it-1}}{P_{it-1}} = \beta_0 + \beta_1 \frac{E_{it}}{P_{it-1}} + \beta_2 \frac{D_{it}}{P_{it-1}} + \beta_3 \frac{BV_{it-1}}{P_{it-1}} + \beta_4 \frac{FCFCAPEX_{it}}{P_{it-1}} + \varepsilon_t . \quad (5a)$$

In equation (2) FCFCAPEX is defined as the difference between operating cash flows (hereafter OCF) and cash outflows associated with capital expenditures (hereafter CAPEX), and is used as the FCF proxy. However, a more comprehensive FCF measure should include not just *CAPEX* but also cash outlays associated with acquisition and investment activities (Richardson 2006). Equation (5b) below captures this notion:

$$\frac{P_{it}-P_{it-1}}{P_{it-1}} = \beta_0 + \beta_1 \frac{E_{it}}{P_{it-1}} + \beta_2 \frac{D_{it}}{P_{it-1}} + \beta_3 \frac{BV_{it-1}}{P_{it-1}} + \beta_4 \frac{FCFCOMPR_{it}}{P_{it-1}} + \varepsilon_t \quad (5b)$$

where FCFCOMPR is a comprehensive measure of the FCF variable and is defined as the difference between the OCF and cash expenditures associated with CAPEX plus acquisition and investment activities. Because accrual accounting prescribes that unconditional FCF be valuation-irrelevant, it is expected that β_4=0 in the above two equations. However, FCF can have information content and this study specifies two such contexts where this is likely to be the case. These are discussed below.

Firm Growth Opportunities

As is mentioned in the previous section, managers of firms with positive FCF but low growth opportunities are crippled by FCF agency problems. In an ideal world, however, there should be no association between firms' investment decisions and internally generated cash flows, because firms would have the opportunity to raise as much capital as they required from the stock market. Therefore, firms envisioning future growth opportunities could use FCF to finance future growth opportunities, with the expectation of generating future abnormal profits. However, in the real world, firms don't enjoy this luxury because of the presence of capital market imperfections like information asymmetry and transaction costs that force corporate managers to rely on internally generated funds for investing in growth opportunities.[7] The agency theory view suggests that if managerial goals are not aligned with those of the shareholders, then the former group will have an incentive to use FCF for reasons other than value maximisation. Empirical evidence supports this proposition (Chung et al. 2005; Gul, 2001; Gul & Tsui 1998, 2001).[8] To incorporate the

Grullon et al. (2005) and Nissim and Ziv (2001) provide evidence on the signaling role of dividend information after adjusting for the mean reversion in earnings.

[7] Consistent with this argument, prior research has documented a positive relation between investment expenditure and cash flow (e.g. Hubbard 1998).

[8] Chung, Wright and Charoengong (1998) provide evidence that the announcement of a CAPEX increase affects the increase in share prices positively only in the presence of valuable growth opportunities.

impact of firm growth opportunities on the market valuation of FCF, the following expanded equation is estimated:

$$\frac{P_{it}-P_{it-1}}{P_{it-1}} = \beta_0 + \beta_1 \frac{E_{it}}{P_{it-1}} + \beta_2 \frac{D_{it}}{P_{it-1}} + \beta_3 \frac{BV_{it-1}}{P_{it-1}} + \beta_4 \frac{FCFCAPEX_{it}}{P_{it-1}} + \beta_5 GROWTH_{it} + \beta_6 GROWTH_{it} * \frac{FCFCAPEX_{it}}{P_{it-1}} + \varepsilon_t \quad (6a)$$

where *GROWTH* is a dummy variable coded 1 for firm-year observations with a market-to-book ratio greater than the sample median, and zero otherwise. We are interested in the market valuation of positive FCF numbers in the presence of growth opportunities, because this situation provides a natural testing ground for examining value-increasing versus value-destroying managerial behavior.[9]

If managers invest FCF in managing growth then we should expect a positive coefficient on the interaction term β_6. We again estimate the same regression equation after substituting *FCFCAPEX* with a more comprehensive *FCFCOMPR* measure:

$$\frac{P_{it}-P_{it-1}}{P_{it-1}} = \beta_0 + \beta_1 \frac{E_{it}}{P_{it-1}} + \beta_2 \frac{D_{it}}{P_{it-1}} + \beta_3 \frac{BV_{it-1}}{P_{it-1}} + \beta_4 \frac{FCFCOMPR_{it}}{P_{it-1}} + \beta_5 GROWTH_{it} + \beta_6 GROWTH_{it} * \frac{FCFCOMPR_{it}}{P_{it-1}} + \varepsilon_t \quad (6b)$$

Earnings Permanence

While the persistence of earnings is unlikely to be a complete definition of earnings quality, it is considered to be an important qualitative characteristic of earnings. Lipe (1990) considers earnings persistence as the degree to which the current period's innovation becomes a permanent part of the earnings stream. Earnings that are more persistent are more predictable and enjoy a market premium (Francis et al. 2004) and, therefore, should be more strongly associated with contemporaneous stock returns compared to earnings that are transitory. Because transitory earnings are valuation irrelevant, investors shift their focus from such transitory earnings to some other valuation matrix, e.g., FCF, as an input into the equity valuation model. To examine whether the market values FCF positively when earnings are transitory, the following regression specifications are estimated.

$$\frac{P_{it}-P_{it-1}}{P_{it-1}} = \beta_0 + \beta_1 \frac{E_{it}}{P_{it-1}} + \beta_2 \frac{D_{it}}{P_{it-1}} + \beta_3 \frac{BV_{it-1}}{P_{it-1}} + \beta_4 \frac{FCFCAPEX_{it}}{P_{it-1}} + \beta_5 EPERS_{it} + \beta_6 EPERS_{it} * \frac{FCFCAPEX_{it}}{P_{it-1}} + \varepsilon_t \quad (7a)$$

[9] At the other end of the spectrum, firms with negative FCF can squander cash only if they are able to raise ''cheap'' capital. This is less likely to occur because these firms need to be able to raise finance and, thereby, place themselves under the scrutiny of external markets (DeAngelo, DeAngelo,& Skinner 2004; Jensen 1986).

$$\frac{P_{it}-P_{it-1}}{P_{it-1}} = \beta_0 + \beta_1 \frac{E_{it}}{P_{it-1}} + \beta_2 \frac{D_{it}}{P_{it-1}} + \beta_3 \frac{BV_{it-1}}{P_{it-1}} + \beta_4 \frac{FCFCOMPR_{it}}{P_{it-1}} + \beta_5 EPERS_{it} + \beta_6 EPERS_{it} * \frac{FCFCOMPR_{it}}{P_{it-1}} + \varepsilon_t \quad (7b)$$

EPERS represents earnings persistence, and is coded 1 if the absolute value of the change in year-to-year earnings deflated by the lagged market value of equity is **below** the median, and 0 otherwise.[10] This means that above-median changes in earnings deflated by the lagged market value of equity observations are transitory in nature and, hence, should have a low correlation with contemporaneous raw returns (Ali & Zarowin 1992). The coefficient β_4 is expected to be positive and statistically significant, implying that FCF is value-relevant when earnings are transitory (recall that when earnings are transitory both β_5 and β_6 take the value of zero).

Sample Selection, Descriptive Statistics and the Substantive Test Results

This research starts with an initial sample of 15,773 Australian Stock Exchange listed firm-year observations, excluding financial institutions, spanning the period from 1992 to 2005. The required financial statement data is sourced from the ASPECT-HANTLEY database. Stock return data is based on stock price information retrieved from DATASTREAM. The sample is substantially reduced to 7,804 firm-year observations, owing to missing financial statements and stock returns data. A further 575 firm-year observations are deleted owing to negative book value observations. Negative book value observations are excluded because they represent the characteristics of distressed firms, and should be studied on their own right. Therefore, a final usable sample of 7,229 firm-year observations is used to examine the market pricing of FCF. The sample selection procedure is explained in Panel A, Table 1.

Panel B reports the descriptive statistics. There is wide variation in the annual returns measure with a mean (standard deviation) of 0.17 (0.81) respectively and a fairly equal distribution between positive and negative returns. The mean earnings is negative -0.04 although the median is positive 0.016. Both the FCF measures have negative mean and median values. Finally, Panel C presents a correlation analysis for the regression variables. Stock returns are positively correlated with earnings and equity book values, and negatively so with dividends. Returns are negatively correlated with both the FCF proxies, inconsistent with accrual accounting principles. All these correlation coefficients are statistically significant at better than the 1% level (two-tailed test). Among the independent variables, earnings and book values are positively and significantly correlated as expected.

[10] This paper uses EPERS for expositional purposes only and focus more on the coefficient that represents the valuation multiplier of FCF when earnings are transitory.

Table 1
Sample selection and descriptive statistics

Panel A: Sample selection procedure

Selection criteria	Firm-year observations
Initial sample consisting of firm-year-observations excluding financial institutions	15,773
Less: Observations deleted due to missing financial statements and stock returns data as well as data lost due to matching with the previous year	(7,969)
Available observations	7,804
Other elimination (negative *BV* observations, observations with positive values of acquisition of subsidiaries and investments)	(575)
Final sample from 1992 to 2005	**7,229**

Panel B: Descriptive statistics

Variables	Mean	Median	S.D.	1st quartile	3rd quartile
Returns (RET)	0.1657	0.0000	0.8102	-0.2941	0.3710
Earnings (E)	-0.0389	0.0167	0.2424	-0.0974	0.0863
Dividends (D)	-0.0224	0.0000	0.0340	-0.0403	0.0000
Book value$_{t-1}$ (BV)	1.0091	0.7530	0.9639	0.4311	1.2470
FCFCAPEX	-0.0793	-0.0487	0.2681	-0.1758	0.0565
FCFCOMPR	-0.1361	-0.0864	0.3167	-0.2268	0.0250

Panel C: Correlation analysis

Variables	RET	E	D	BV	FCFCAPEX	FCFCOMPR
RET	1.0000					
E	0.0565*	1.0000				
D	-0.0417*	-0.4005*	1.0000			
BV	0.0987*	0.1788*	-0.0128	1.0000		
FCFCAPEX	-0.0750*	0.4443*	-0.2876*	-0.1038*	1.0000	
FCFCOMPR	-0.1332*	0.3666*	-0.2098*	-0.1420*	0.8561*	1.0000

Note: Sample consists of 7,229 firm-year observations from 1992 to 2005 with available financial statement and returns data. Return (RET) is defined as (P_t-P_{t-1}/P_{t-1}). Earnings (E), is earnings after tax but before abnormal items. Dividends (D), is cash dividend paid. BV is book value of shareholders' equity. All these variables are on a per share basis and are deflated by the lagged stock price. The two FCF variables are:

$$FCFCAPEX_t = \frac{[(OCF_t - CAPEX_t)/Shares_t]}{P_{t-1}}, \text{ and}$$

$$FCFCOMPR_t = \frac{[(OCF_t - CAPEX_t - Acqusition\ \&\ investment_t)/Shares_t]}{P_{t-1}}$$

where CAPEX is cash outlay associated with capital expenditures.

* represents statistical significance at the 1% level (two-tailed test)

Panel A of Table 2 provides the regression result of the baseline model (equation 4) followed by Panels B and C, which report regression results of equations 5(a) and 5(b) respectively. Pooled analysis shows that the coefficients on both earnings and book values are positive (coefficient estimates of 0.30 and 0.10 respectively) and statistically significant at better

than the 1% level in equation (4), confirming the well-established capital market research evidence that accounting information is value-relevant. The coefficient on dividends is negative as expected and is also significant at better than the 1% level. The three fundamental accounting variables explain about 9% of the variation in stock returns.

Table 2

Mean estimates of regressions relating annual equity price changes to contemporaneous earnings, dividends, and equity book values

Panel A: Baseline regressions relating annual equity price changes to contemporaneous earnings, dividends, and equity book values

$$\frac{P_{it} - P_{it-1}}{P_{it-1}} = \beta_0 + \beta_1 \frac{E_{it}}{P_{it-1}} + \beta_2 \frac{D_{it}}{P_{it-1}} + \beta_3 \frac{BV_{it-1}}{P_{it-1}} + \varepsilon_t \quad (4)$$

	β_0	β_1	β_2	β_3	*Adjusted* R^2
Pooled	0.06	0.30*	-0.87*	0.10*	0.09
	(0.59)	(4.28)	(-2.79)	(7.37)	
1992-1995	0.08	0.35	0.55	0.16*	0.05
	(0.76)	(1.07)	(0.49)	(2.99)	
1996-2000	0.28	-0.03	-0.04	0.08*	0.08
	(1.63)	(-0.17)	(-0.07)	(3.57)	
2001-2005	-0.22**	0.40*	-1.64*	0.10*	0.10
	(-2.05)	(5.25)	(-4.37)	(6.01)	
Industry & year	*	*	*	*	
N	7,229	7,229	7,229	7,229	

Panel B: Mean estimates of regressions relating annual equity price changes to contemporaneous earnings, dividends, equity book values, and FCF proxied by FCFCAPEX

$$\frac{P_{it} - P_{it-1}}{P_{it-1}} = \beta_0 + \beta_1 \frac{E_{it}}{P_{it-1}} + \beta_2 \frac{D_{it}}{P_{it-1}} + \beta_3 \frac{BV_{it-1}}{P_{it-1}} + \beta_4 \frac{FCFCAPEX_{it}}{P_{it-1}} + \varepsilon_t. \quad (5a)$$

	β_0	β_1	β_2	β_3	β_4	*Adjusted* R^2
Pooled	0.03	0.46*	-1.26*	0.09*	-0.36*	0.10
	(0.32)	(6.58)	(-3.93)	(7.08)	(-6.69)	
1992-1995	0.04	0.70**	-0.16	0.15*	-0.77*	0.17
	(0.42)	(2.16)	(-0.15)	(3.04)	(-3.53)	
1996-2000	0.26	0.15	-0.36	0.07*	-0.35*	0.10
	(1.47)	(1.01)	(-0.60)	(3.31)	(-3.83)	
2001-2005	-0.24**	0.49*	-1.92*	0.09*	-0.24*	0.10
	(-2.22)	(6.67)	(-4.96)	(5.84)	(-4.05)	
Industry & year dummies	*	*	*	*	*	
Observations	7,229	7,229	7,229	7,229	7,229	

Panel C: Mean estimates of regressions relating annual equity price changes to contemporaneous earnings, dividends, equity book values, and FCF proxied by FCFCOMPR

$$\frac{P_{it}-P_{it-1}}{P_{it-1}}=\beta_0+\beta_1\frac{E_{it}}{P_{it-1}}+\beta_2\frac{D_{it}}{P_{it-1}}+\beta_3\frac{BV_{it-1}}{P_{it-1}}+\beta_4\frac{FCFCOMPR_{it}}{P_{it-1}}+\varepsilon_t \qquad (5b)$$

	β_0	β_1	β_2	β_3	β_4	*Adjusted* R^2
Pooled	0.01	0.49*	-1.26*	0.08*	-0.44*	0.11
	(0.11)	(7.23)	(-4.01)	(6.47)	(-9.57)	
1992-1995	0.04	0.69**	-0.04	0.13*	-0.80*	0.20
	(0.39)	(2.20)	(-0.04)	(2.58)	(-4.62)	
1996-2000	0.20	0.23***	-0.46*	0.06*	-0.50*	0.11
	(1.33)	(1.65)	(-0.79)	(2.77)	(-6.76)	
2001-2005	-0.25**	0.51*	-1.88*	0.09*	-0.27*	0.11
	(-2.35)	(6.91)	(-4.92)	(5.57)	(-5.36)	
Industry & year dummies	*	*	*	*	*	
Observations	7,229	7,229	7,229	7,229	7,229	

Note: Sample consists of 7,229 firm-year observations from 1992 o 2005 with available financial statement and returns data. Return (RET) is defined as (P_t-P_{t-1}/P_{t-1}). Earnings (E), is earnings after tax but before abnormal items. Dividends (D), is cash dividend paid. BV is book value of shareholders' equity. All these variables are on a per share basis and are deflated by the lagged stock price. The two FCF variables are:

$$FCFCAPEX_t=\frac{[(OCF_t-CAPEX_t)/Shares_t]}{P_{t-1}},\text{and}$$

$$FCFCOMPR_t=\frac{[(OCF_t-CAPEX_t-Acqusition\ \&\ investment_t)/Shares_t]}{P_{t-1}}$$

All the variables are winsorised at the top and bottom 1% of the respective distributions to eliminate the effect of outliers. t-statistics are in parentheses. *,**,*** represent statistical significance at the 1% , 5%, and 10% levels respectively (two-tailed test).

In addition to a pooled regression analysis, this paper also divides the sample into three sub-periods, namely 1992-1995, 1996-2000 and 2001-2005, and perform separate regression analyses for these sub-periods. The coefficient on equity book values (BV) is found to be consistently positive and statistically significant in all the three sub-periods concerned. However, the coefficient on earnings and dividends is found to be significant only in the 2001-2005 period. The coefficients on earnings are not consistently positive and statistically significant, primarily because the sample contains both profitable as well as loss-making firms. Hayn (1995) shows that negative earnings are transitory and, therefore, not priced in the market. When regressions were estimated for profit-making observations only, the coefficients on earnings become positive and statistically highly significant in all the sub-periods considered (results not reported).

Panel B of Table 2 reports the regression result of equation (5a) which includes FCF (denoted as FCFCAPEX) as an additional explanatory variable for stock returns. Pooled analysis reveals that the coefficient on FCFCAPEX is negative and statistically significant at better than the 1% level. This is contrary to the theoretical underpinnings of accrual accounting, which suggest that FCF and stock returns should be uncorrelated because cash flows do not affect

owners' equity. This is where the information content hypothesis of FCF becomes relevant and will be investigated in the following sub-section. Panel C provides the result for equation 5(b) which is the same as equation 5(a) except for the FCFCAPEX being replaced by FCFCOMPR, a more comprehensive measurement of FCF. The coefficient on FCFCOMPR is negative and statistically significant in both the pooled and sub-sample analyses, consistent with the FCFCAPEX result.

Differential Market Valuation of Positive Versus Negative FCF

One notable characteristic of the sample observations is the dominance of negative FCF values. For example, when FCFCAPEX (FCFCOMR) is used as the FCF measure, 62% (71%) of those observations represent negative values. To examine whether the market puts different weights on FCF based on their positive versus negative realisations, Table 3 reports regression results of equations (5a) and (5b) for the separate sub-sample of positive and negative FCF observations.

Table 3

Mean estimates of regressions relating annual equity price changes to contemporaneous earnings, dividends, equity book values, and FCF for positive and negative FCF realisations

Panel A: FCFCAPEX is the FCF proxy

$$\frac{P_{it}-P_{it-1}}{P_{it-1}} = \beta_0 + \beta_1 \frac{E_{it}}{P_{it-1}} + \beta_2 \frac{D_{it}}{P_{it-1}} + \beta_3 \frac{BV_{it-1}}{P_{it-1}} + \beta_4 \frac{FCFCAPEX_{it}}{P_{it-1}} + \varepsilon_t . \qquad (5a)$$

	N	β_0	β_1	β_2	β_3	β_4	*Adjusted* R^2
Negative FCF	4,538	0.08	0.33*	-1.08***	0.02	-0.96*	0.14
		(0.48)	(4.27)	(-1.83)	(1.53)	(-12.04)	
Positive FCF	2,828	-0.06	1.08*	-0.03	0.07*	0.86*	0.22
		(-0.52)	(7.68)	(-0.10)	(2.95)	(7.51)	
Industry & year dummies	*	*	*	*	*	*	

Panel B: FCFCOMPR is the FCF proxy

$$\frac{P_{it}-P_{it-1}}{P_{it-1}} = \beta_0 + \beta_1 \frac{E_{it}}{P_{it-1}} + \beta_2 \frac{D_{it}}{P_{it-1}} + \beta_3 \frac{BV_{it-1}}{P_{it-1}} + \beta_4 \frac{FCFCOMPR_{it}}{P_{it-1}} + \varepsilon_t \qquad (5b)$$

	N	β_0	β_1	β_2	β_3	β_4	*Adjusted* R^2
Negative FCF	5,207	0.11	0.34*	-0.57	0.02	-0.76*	0.13
		(0.81)	(4.62)	(-1.20)	(1.52)	(-12.57)	
Positive FCF	2,159	-0.15	1.12*	-0.55	0.08*	0.79*	0.24
		(-1.45)	(7.78)	(-1.42)	(3.20)	(6.98)	
Industry & year dummies		*	*	*	*	*	

Note: Sample consists of 7,229 firm-year observations from 1992 to 2005 with available financial statement and returns data. Return (RET) is defined as (P_t-P_{t-1}/P_{t-1}). Earnings (E), is earnings after tax but before abnormal items.

Dividends (D), is cash dividend paid. BV is book value of shareholders' equity. All these variables are on a per share basis and are deflated by the lagged stock price. The two FCF variables are:

$$FCFCAPEX_t = \frac{[(OCF_t - CAPEX_t)/Shares_t]}{P_{t-1}} \text{,and}$$

$$FCFCOMPR_t = \frac{[(OCF_t - CAPEX_t - Acqusition\ \&\ investment_t)/Shares_t]}{P_{t-1}}$$

All the variables are winsorised at the top and bottom 1% of the respective distributions to eliminate the effect of outliers. t-statistics are in parentheses. *,**,*** represent statistical significance at the 1% , 5%, and 10% levels respectively (two-tailed test).

Pooled analysis shows that the coefficients on both the FCF measures are positive and statistically significant at the 1% level for the positive FCF sub-sample (coefficient estimates of 0.86 and 0.79 respectively). For the negative FCF sub-sample, the coefficients are likewise negative and statistically highly significant at better than the 1% level (coefficient estimates of -0.86 and -0.76 respectively). The explanatory power of the positive FCF model is much higher than that of its negative counterpart (22% versus 14% for the FCFCAPEX model, and 24% versus 13% for the FCFCOMPR model).

The result for the positive sub-sample group is interesting. Managers with positive FCFs have the opportunity to either squander such FCF (entrenchment view) or use this surplus cash to finance projects with positive NPVs (efficiency view). The positive coefficient seems to support the efficiency view. Such a conclusion, however, should be interpreted with caution, because the regression equation does not incorporate the impact of other mechanisms (e.g., a good corporate governance structure) which could force managers to use FCFs in a productive way.

Firm Growth Opportunities and the Valuation of FCFS

Table 4 presents regression results of equations 6(a) and 6(b), which attempt to examine the effect of firm growth opportunities on the market valuation of FCF. Only positive FCF observations are used to run the regression, since firms with positive FCF but low growth opportunities are likely to suffer from acute agency problems and, therefore, are prone to valuation discount. The coefficient of primary interest is β_6, which captures the incremental effect of firm growth opportunities on the pricing of FCF. When FCFCAPEX is used as the FCF measure, the coefficient on β_6 is 1.02, which is positive and statistically highly significant. This implies that the market favourably values the FCF generated by growth firms which lends support for the efficiency, rather than the entrenchment, view. The coefficient drops down slightly to 0.90 when FCFCOMPR is used as the FCF measure, but remains statistically highly significant. The coefficients on FCFCAPEX and FCFCOMP capture the market valuation of positive FCF numbers generated by the low growth firms and are also positive, but the combined coefficient for high growth firms [β_4+ β_5+β_6] of 1.59 is significantly higher than β_4 (0.33) alone (f statistics of 43.96 and 34.61 for FCFCAPEX and FCFCOMPR respectively).

Table 4

Mean estimates of regressions relating annual equity price changes to contemporaneous earnings, dividends, equity book values, and FCF conditional on firm growth

Panel A: FCFCAPEX is the FCF proxy

$$\frac{P_{it}-P_{it-1}}{P_{it-1}} = \beta_0 + \beta_1 \frac{E_{it}}{P_{it-1}} + \beta_2 \frac{D_{it}}{P_{it-1}} + \beta_3 \frac{BV_{it-1}}{P_{it-1}} + \beta_4 \frac{FCFCAPEX_{it}}{P_{it-1}} + \beta_5 GROWTH_{it} + \beta_6 GROWTH_{it} * \frac{FCFCAPEX_{it}}{P_{it-1}} + \varepsilon_t \quad (6a)$$

	β_0	β_1	β_2	β_3	β_4	β_5	β_6	Adjusted R^2
Pooled	-0.25**	1.02*	0.29	0.19*	0.46*	0.32*	1.02*	0.33
	(-2.49)	(8.32)	(0.87)	(7.66)	(4.63)	(10.91)	(4.55)	
Industry & year dummies	*	*	*	*	*	*	*	
N	2,806	2,806	2,806	2,806	2,806	2,806	2,806	2,806

Panel B: FCFCOMPR is the FCF proxy

$$\frac{P_{it}-P_{it-1}}{P_{it-1}} = \beta_0 + \beta_1 \frac{E_{it}}{P_{it-1}} + \beta_2 \frac{D_{it}}{P_{it-1}} + \beta_3 \frac{BV_{it-1}}{P_{it-1}} + \beta_4 \frac{FCFCOMPR_{it}}{P_{it-1}} + \beta_5 GROWTH_{it} + \beta_6 GROWTH_{it} * \frac{FCFCOMPR_{it}}{P_{it-1}} + \varepsilon_t \quad (6b)$$

	β_0	β_1	β_2	β_3	β_4	β_5	β_6	Adjusted R^2
Pooled	-0.30	1.20*	-0.02	0.20*	0.33*	0.31*	0.94*	0.34
	(-.351)	(7.90)	(-0.05)	(7.004)	(2.78)	(9.21)	(4.05)	
Industry & year dummies	*	*	*	*	*	*	*	
N	2,139	2,139	2,139	2,139	2,139	2,139	2,139	

Note: Return (RET) is defined as (P_t-P_{t-1}/P_{t-1}). Earnings (E), is earnings after tax but before abnormal items. Dividends (D), is cash dividend paid. BV is book value of shareholders' equity. All these variables are on a per share basis and are deflated by the lagged stock price. The two FCF variables are:

$$FCFCAPEX_t = \frac{[(OCF_t - CAPEX_t)/Shares_t]}{P_{t-1}}, \text{ and}$$

$$FCFCOMPR_t = \frac{[(OCF_t - CAPEX_t - Acqusition\ \&\ investment_t)/Shares_t]}{P_{t-1}}$$

All the variables are winsorised at the top and bottom 1% of the respective distributions to eliminate the effect of outliers. t-statistics are in parentheses. *,**,*** represent statistical significance at the 1% , 5%, and 10% levels respectively (two-tailed test). Only positive FCF observations are included because of managerial propensities to squander FCF for positive FCF but low growth firms.

Transitory Earnings and the Valuation of FCFS

Extant literature on the pricing of earnings and cash flows recommends the persistence of these variables as being the most important indicator of their quality (Ali 1994; Charitou, Clubb & Andreou, 2001; Cheng, Liu & Schaffer 1996; Freeman & Tse 1992). This paper investigates the valuation implications of FCF when earnings are transitory by running equations 7(a) and 7(b) in

Table 5. The coefficient of primary interest is β_4, which is the valuation multiplier associated with FCF when earnings are transitory (recall that firm-year observations with a permanent earnings stream are coded 1, and those with a transitory earnings stream, 0). The coefficient on β_4 is 0.92 which is statistically highly significant, suggesting that the market values FCF information positively when earnings are transitory. The coefficients on EPERS and EPERS*FCF enter the regression with negative coefficients of -0.06 and -0.63 respectively when FCFCAPEX is used as the FCF proxy. The positive coefficient value of 0.92 associated with the valuation of FCF in the presence of transitory earnings is significantly greater than the sum of the permanent earnings coefficients [0.92-0.06-0.63] (f statistic of 21.20). The results are quite consistent when FCFCOMPR is substituted for FCFCAPEX as the FCF measure. Taken together, the empirical results provide a basis for concluding that FCF is valuation-relevant in specific contexts, although principles of accrual accounting do not recognise that.

Table 5

Mean estimates of regressions relating annual equity price changes to contemporaneous earnings, dividends, equity book values, and FCF conditional on earnings quality

Panel A: FCFCAPEX is the FCF proxy

$$\frac{P_{it}-P_{it-1}}{P_{it-1}} = \beta_0 + \beta_1 \frac{E_{it}}{P_{it-1}} + \beta_2 \frac{D_{it}}{P_{it-1}} + \beta_3 \frac{BV_{it-1}}{P_{it-1}} + \beta_4 \frac{FCFCAPEX_{it}}{P_{it-1}} + \beta_5 EPERS_{it} + \beta_6 EPERS_{it} * \frac{FCFCAPEX_{it}}{P_{it-1}} + \varepsilon_t \quad (7a)$$

	β_0	β_1	β_2	β_3	β_4	β_5	β_6	Adjusted R^2
Pooled	0.01	1.06*	-0.39	0.05*	0.92*	-0.06**	-0.63*	0.23
	(0.12)	(15.40)	(-1.31)	(3.51)	(10.88)	(-1.98)	(-4.07)	
Industry & year dummies	*	*	*	*	*	*	*	
N	7,229	7,229	7,229	7,229	7,229	7,229	7,229	

Panel B: FCFCOMPR is the FCF proxy

$$\frac{P_{it}-P_{it-1}}{P_{it-1}} = \beta_0 + \beta_1 \frac{E_{it}}{P_{it-1}} + \beta_2 \frac{D_{it}}{P_{it-1}} + \beta_3 \frac{BV_{it-1}}{P_{it-1}} + \beta_4 \frac{FCFCOMPR_{it}}{P_{it-1}} + \beta_5 EPERS_{it} + \beta_6 EPERS_{it} * \frac{FCFCOMPR_{it}}{P_{it-1}} + \varepsilon_t \quad (7b)$$

	β_0	β_1	β_2	β_3	β_4	β_5	β_6	Adjusted R^2
Pooled	0.03	1.10*	-0.42	0.04**	0.82*	-0.08**	-0.57*	0.24
	(1.02)	(14.40)	(-1.25)	(2.47)	(8.07)	(-2.32)	(-3.09)	
Industry & year dummies	*	*	*	*	*	*	*	
N	7,229	7,229	7,229	7,229	7,229	7,229	7,229	

Note: Sample consists of 7,229 firm-year observations from 1992 o 2005 with available financial statement and returns data. Return (RET) is defined as (P_t-P_{t-1}/P_{t-1}). Earnings (E), is earnings after tax but before abnormal items. Dividends (D), is cash dividend paid. BV is book value of shareholders' equity. All these variables are on a per share basis and are deflated by the lagged stock price. The two FCF variables are:

$$FCFCAPEX_t = \frac{[(OCF_t - CAPEX_t)/Shares_t]}{P_{t-1}}, \text{and}$$

$$FCFCOMPR_t = \frac{[(OCF_t - CAPEX_t - Acqusition\ \&\ investment_t)/Shares_t]}{P_{t-1}}$$

All the variables are winsorised at the top and bottom 1% of the respective distributions to eliminate the effect of outliers. t-statistics in parentheses *,**,*** represent statistical significance at the 1% , 5%, and 10% levels respectively (two-tailed test). EPERS is earnings persistence and is coded 1 if the absolute value of the change in year-to-year earnings deflated by lagged market value of equity is below the median, and zero otherwise. Above-median change in earnings deflated by lagged market value of equity observations are considered to be transitory in nature and hence should have low correlation with contemporaneous raw returns.

Sensitivity Tests

ALTERNATIVE FCF MEASURES

In the absence of a consensus on which is the most appropriate FCF measure, I use an alternative proxy for FCF developed by Lehn and Poulsen (1989) as follows (see the appendix for a variety of FCF definitions used in the literature):

$$RCF_{it} = (INC_{it} - TAX_{it} - INTEXP_{it} - PSDIV_{it} - CSDIV_{it})/TA_{it\_1} \qquad (8)$$

where RCF is the retained cash flow; INC is the operating income before depreciation; TAX is the total taxes; INTEXP is the interest expense; PSDIV is the preferred stock dividends; CSDIV is the common stock dividends and TA is the total assets at the beginning of the fiscal year. The untabulated regression results for equation (4) reveal that, in the pooled analysis, the coefficient on RCF is negative (-0.12) and statistically significant at better than the 5% level, consistent with the findings from the FCFCAPEX analysis. The magnitude of the coefficient, however, is quite small compared to the FCFCAPEX coefficient (-0.36). The coefficient signs and statistical significance of the other variables remain unchanged.

To examine the market pricing of FCF in the presence of growth opportunities with this alternative FCF measure, equation 6(a) is estimated for the positive FCF sub-group only. Untabulated regression results again confirm the main findings. The coefficients on RCF, GROWTH and the interaction term GROWTH*RCF are 0.55, 0.35 and 1.21 respectively, and are statistically highly significant. Since GROWTH is a dummy variable coded 1 for firm-year observations above the sample median, and zero otherwise, the sum of these coefficient values of 1.57 (0.55+0.35+1.21) represents the market valuation of positive FCF for high growth firms. This combined coefficient is significantly higher than the coefficient on RCF, which represents the market valuation of FCF for low growth firms (f statistic 30.19)

ALTERNATIVE FCF MEASURE AND TRANSITORY EARNINGS

When RCF is used as an alternative FCF measure to examine the effect of transitory earnings on the valuation of FCF, results become less convincing. Untabulated results show that the coefficient on RCF which represents the valuation multiplier of FCF in the presence of transitory earnings is negative and insignificant (coefficient value -0.11, t-statistic -1.48). The

corresponding multiplier of FCF in the presence of permanent earnings, too, is negative and insignificant [-0.11+ (-0.16) +0.09] = -0.18.

ALTERNATIVE GROWTH PROXIES

In the main analysis market-to-book ratio is used as a proxy for growth that is common and extensively used in the academic literature. The investment opportunity set (*IOS*) is unobservable, as it is related to discretionary expenditures like R&D, and firm-specific factors, such as the physical and human capital in place (Hutchison & Gul 2004). Because of the noise associated with measuring firm growth opportunity, an alternative growth measure is also used that is price-based, and three variables are used as the proxy: the market value of assets to book value of assets, the market-to-book value of equity (the one used in this study) and the gross property, plant and equipment to market value of the firm. A factor analysis is then performed to reduce these three variables to a single factor, the factor score is used as a proxy for growth, and regression equations 6(a) and 6(b) are rerun. Results reveal that the valuation multiplier on the interaction term FCF*GROWTH for high growth firms is positive and significant (coefficient value of 0.56, significant at better than the 5% level). Also the combined coefficients of [β_4+ β_5+β_6] are significantly higher for the high growth firms than for their low growth counterparts (f statistic 14.95). Similar results are obtained when FCFCOMPR rather than FCFCAPEX is used as the FCF proxy. Thus, analysis using the alternative growth proxy supports the finding from the main analysis: that FCF generated by firms characterised by high growth opportunities are valued favorably by the stock market.

Conclusion

Jensen (1986) argues that managers have incentives to misuse FCF in the absence of proper monitoring. Prior literature also supports this view. However, there is a paucity of research regarding the market valuation of FCF. Penman and Yehuda (2009), in one such attempt, examine the valuation implications of FCF. They provide theoretical support for the notion that FCF are valuation-irrelevant because they represent a dividend from the firm that reduces its value without affecting its cum-dividend value. This paper extends Penman and Yehuda (2009) by considering two contexts in which FCF could become an important explanatory variable for stock returns: firm growth opportunity and the quality of earnings. The evidence shows that there is a positive and significant valuation multiplier associated with the FCF variable in the presence of attractive growth opportunities. This positive coefficient implies that the stock market expects the positive FCF to be invested in future positive NPV projects and, hence, puts a premium on such FCF. The evidence further reveals that FCF becomes an important explanatory variable for stock returns when earnings are transitory. The results remain robust to a number of sensitivity tests.

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Appendix

Diversity of FCF definitions in the extant literature

Authors and year	**FCF definition used**
Lehn and Poulsen (1989)	$RCF_{it} = (INC_{it} - TAX_{it} - INTEXP_{it} - PSDIV_{it} - CSDIV_{it})/TA_{it\_1}$ RCF is the retained cash flow; INC is the operating income before depreciation; TAX is the total taxes; INTEXP is the interest expense; PSDIV is the preferred stock dividends; CSDIV is the common stock dividends; and TA is the total assets at the beginning of the fiscal year.
Lang et al. (1991)	The same as Lehn and Poulsen (1989) and supplemented by cash flow measures proxied by, (1) net income plus depreciation plus adjustments for 'other' elements in income that do not affect working capital, (2) OCF, (3) OCF without adjustment for changes in 'other' current assets and liabilities, (4) two-year average of OCF, (6) operating income, (7) operating income plus change in inventory, and (8) net income plus depreciation.
Gul and Tsui (1998)	*FCFBEQ= (INC-TAX-INTEXP-PREDIV-ORDIV)/BEQ,* *FCFBA= (INC-TAX-INTEXP-PREDIV-ORDIV)/BA,* INC is the operating income before depreciation; TAX is the total taxes; INTEXP is the gross interest expenses on short- and long-term debt; PREDIV is the total dividend on preferred shares; ORDIV is the total dividend on ordinary shares; BEQ is the total book value of equity in the previous year and BA is the total assets in the previous year.
Hackel et al. (2000)	Two definitions of FCF. One is the traditional one that subtracts cash investments (CAPEX) from OCF. The second definition adds discretionary cash outlays (DCO) and discretionary CAPEX (DCAPEX) to the traditional FCF.
Chung et al. (2005)	$RCF_{it} = (INC_{it} - TAX_{it} - INTEXP_{it} - PSDIV_{it} - CSDIV_{it})/TA_{it\_1}$ RCF is the retained cash flow; INC is the operating income before depreciation; TAX is the total taxes; INTEXP is the interest expense; PSDIV is the preferred stock dividends; CSDIV is the common stock dividends; and TA is the total assets at the beginning of the fiscal year.
Richardson (2006)	*FCF = CFAIP – I*NEW* CFAIP= Net Cash flow from Operating Activities - Maintenance Investment Expenditure (*IMAINTENANCE)* + Research and Development Expenditure (*RD*) - *I*NEW (*Expected Investment on New Projects).
Penman and Yehuda (2009)	C-I= Cash flow from operations minus the cash component of the investment
Fresard and Salva (2010)	Excess cash is defined as the cash that is not needed for operations or investments. Specifically, excess cash is the cash held above a predicted ''normal'' (or ''optimal'') level. To compute the normal level, total cash is regressed on variables that serve as proxies for genuine motives to hold cash such as hedging needs, growth options, or financing restrictions.
Zerni et al. (2010)	FCF=OCF - dividends on preferred - common dividends - CAPEX