- SSRN POSTED -

Consistent Valuation Cash Flow

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November 29, 2011
Revised: June 22, 2013

Abstract

The Free Cash Flow (FCF) concept of corporate finance and related statement is derived from the firm's Balance Sheet and Income Statement and designed to support those statements in estimating the economic value of the firm and its potential investment projects. This paper questions the common procedure of calculating the FCF, by which a significant portion of the firm's Current Liabilities is offset against Current Assets, creating a hybrid asset defined as Net Working Capital. We argue that this procedure distorts the FCF size, composition, and volatility by misstating the firm or project size, financial leverage, risk profile, and estimated value. Our empirical analysis reveals that a managed "offset" can readily facilitate manipulation of those parameters to the detriment of the firm's stockholders, lenders, and stakeholders. We propose an offset-free FCF that would avoid those distortions.

JEL classification: G30, G31, G32, G35, G38, H32, K22, L21, M14, M40, M41

Keywords: Financial Reporting, Free Cash Flow, Net Working Capital, Cost of Capital, Corporate Valuation, Investment Decision

> *"… Free cash flows can also be massaged by companies, say, by adjusting capital expenditures. They can deceive, too. Fast-growing retailers often have ongoing negative working capital positions as shoppers pay upfront for goods while suppliers get paid later..."*
>
> (Financial Times, August 1, 2010, Lex Column)

1. Introduction

The finance-based Free Cash Flow (FCF) statement aims at providing a basic tool for the valuation of the firm and its individual projects. Projection of past periodic net cash flows to or from claimants can provide corporate managers and investors at large with useful data for estimating the value of the firm and its initiated projects. Based on the firm's traditional financial statements and consistent with financial-economic methodology, the FCF should report the periodic cash flow components generated by the firm's Operations and Investment activities on behalf of its debt and equity holders providing the firm's Financing activities.

The *positive* FCF considered here, which measures the net periodic flow, differs from Jensen's (1986) *normative* FCF, which seeks the firm's valuation-based *optimal* distribution to claim holders. It also differs from the flow measured by the accounting-based Statement of Cash Flow (SCF) (FASB 95, 1987), which is designed to measure the firm's liquidity, solvency, and financial flexibility with only indirect implications for investment and valuation (Kieso et al., 2010).

The apparent influence of the SCF on the FCF could originate from the focus of the former on the firm's Operating activities, which include unpaid or partially-paid transactions (accrual accounts) classified as Accounts Receivable (AR) and Accounts (or Notes) Payable (AP). By focusing in addition on the periodic change in the amount of cash held by the firm, the accounting-based offset "AR minus AP" implicitly ignores the unique and permanent economic roles played by short-term Accounts Receivable vs. Accounts Payable both individually and as part of the overall sets of Current Assets (CA) vs. Current Liabilities (CL). In this respect the

SCF approach should differ from the FCF valuation-based approach since the latter ought to focus on the flow of financial claims facing the firm's Operations and Investment activities.

Despite conceptual differences, corporate finance textbooks commonly follow the SCF procedure by offsetting the flow of CL, or a significant portion thereof, against the flow of CA to define the differential flow of Net Working Capital (NWC). This procedure denies a reality in which short-term debt is the main source of funding of most firms.

Direct consequences of the common FCF offset include distortions of the firm's size, debt and asset compositions, financial leverage, and risk profile. Indirect consequences include wider opportunities to manipulate the firm's FCF and estimated market value. Our empirical analysis shows that the offset can make the FCF systematically larger and more stable. An average sample of 1,220 U.S. public corporations studied over 22 years (1988-2009) reveals that the offset overstates the FCF mean by 33.7% and median by 128.2%. This result is explained by a typically large share of CL, representing 19.8% and 24% of the average and median size firm respectively.

U.S. firms are currently free to publish an unofficial FCF report subject to constraints of Regulation G (2002). Since our study does not rely on data of those reports but on official, accounting based filings of Income Statement, Balance Sheet, and Statement of Cash Flow, our analysis is limited to identifying *opportunities* for manipulating a FCF through the use of an offset. Our concern of such behavior is supported by evidence from financial statements in general[1] and recent cash flow statements in particular.

Adhikari and Duru (2006) study the role of *voluntary* FCF statements designed by filing firms (subject to Regulation G during 2002-2004) to be published side-by-side with mandatory GAAP-based financial statements during 1994-2004. Firms that engaged in FCF disclosure were

[1] See Hackel and Livnat (1992).

found to pay higher dividends, but were more leveraged and less profitable, and had a lower credit rating than matched non-disclosing firms. The same pattern was observed in the behavior of individual firms over time: Years of FCF disclosure were associated with higher dividends, higher leverage, and lower profitability. In other words, poorly-performing firms had both the incentive and confidence to design and publish their own FCF report side-by-side with their official financial reports, thereby mitigating the undesirable impact of the latter.

Siegel (2006) questions the reliability of cash flows presented in the Statement of Cash Flow compared to earnings presented in the traditional Income Statement. The author argues that, despite early expectations, constraints set by GAAP did not prevent firms from manipulating their cash flow. Of the various examples analyzed by the author, the most basic concerns the overstatement of *operating* cash flow. This objective could be accomplished, at least temporarily, by slowing down the rate of payment to vendors (in itself a sign of weakness) to increase Accounts Payable. A shrinking *difference* between the flows of Accounts Receivable and Accounts Payable ($\Delta AR - \Delta AP$) is translated to an increasing cash flow from Operations. A more subtle variation of this device calls for the compensation of the vendor in a timely manner through a financial institution acting as third party.

We propose an offset-free FCF to be named "Valuation Cash Flow" (VCF), which would correctly measure the periodic cash flow from and to those funding the firm, long and short-term lenders included, allowing an unbiased and more accurate estimation of the firm and its individual projects.

The paper proceeds as follows. Part 2 analyzes conceptual errors and implied distortions inherent to the FCF offset. Part 3 tests for opportunities to manipulate the offset-based FCF by comparison to the offset-free VCF. Part 4 offers a summary and conclusions.

2. The Offset Rationale

2.1 The Offset in a Project

The offset flaw becomes apparent when applied in the valuation of an investment project. The typical projected cash flow consists of a periodic *investment* flow side by side with a flow from *operations*. The former often includes (1) an initial investment in Fixed Assets supplemented by (2) an "investment" in *Net Working Capital*, both to be liquidated at the end of the project life. Unlike the ambiguity between Current Liabilities and Operations in the accounting Statement of Cash Flow, the static offset in capital budgeting is explicitly of liabilities against assets! This distortion leads to misspecifications of the project size, cost of capital, risk, and value – errors replicated at the level of the firm.

2.2 FCF Distortion

The textbook FCF statement subtracts the periodic cash flow of all or part of CL from the cash flow generated by CA, juxtaposing any remaining CL and a composite asset identified as Net Working Capital. Our survey of the finance literature revealed the following justifications for the offset.

(1) "Current Liabilities are short lived." Since the company is viewed as a going concern, the focus must be on the *flow* generated by debt contracts of any maturity. Short-term contracts roll over frequently, but remain a component of the firm's debt.

(2) "Current Liabilities pay no interest." There is no systematic free lunch. This statement overlooks interest paid on CL explicitly, as in long-term coupon bonds approaching maturity, or implicitly, as in Accounts Payable offering a discount on

early repayment.[2] Besides, a financial claim of zero or negative effective interest would still be a claim against the company.

(3) "Since a dollar of CL is a mirror image of a dollar of CA, the two can be restated as a net asset identified as NWC (usually CL< CA)." Underlying this claim is the strong assumption that a dollar increase in CA is economically equivalent to a dollar decrease in CL. Such symmetry is inconsistent with economic logic or casual observation for the following reasons:

a. The firm has less control over repayment of its loans to customers as it has over repayment of its debt to suppliers.

b. The offset is likely to distort the firm's stated FCF.

c. The offset opens the door to manipulating CL to overstate and smooth the firm's FCF, leading to overstatement of its estimated market value.

2.3 Assets, Liabilities, and Risk Distortion

Like FCF calculations, empirical studies of capital structure often ignore CL or their subset of trade credit, implicitly offsetting them against CA. We question the rationale behind this practice. The offset directly distorts the firm's measured Debt/Equity and Long-Term/ Short-Term debt ratios.[3]

In addition, the offset hides but does not mitigate the default risk attached to short-term liabilities. The offset understates the firm's leverage.

Finally, offset distorts the firm's measured financial risk by changing the overall risk profiles of its assets and liabilities.

[2] See Petersen and Rajan (1997).
[3] This error is avoided by some authors, more recently Levy and Sarnat (1990), Palmon and Yaari (1991), Kahya et al. (1992), Weston and Copeland (1992), Lemmon et al. (2008), and Welch (2010).

3. Empirical Evidence

Most finance textbooks define FCF as follows:

$$FCF = EBIT + Depreciation - Taxes - Capital\ Expenditures - Increase\ in\ NWC^{4}$$

where EBIT stands for Earnings Before Interest and Tax. The change in Net Working Capital (ΔNWC) includes full or partial offset of Current Liabilities against Current Assets, calculated by

$$\Delta NWC_t = \{(CA_t - CA_{t-1}) - (CL_t - CL_{t-1})\}$$

where the content of CA remains intact, but that of CL may vary from partial to full offset, depending on the inclusion of short-term "unfunded" debt. Other things equal, an increase of the CL offset will raise the apparent FCF, and vice versa. Since the publication of the FCF statement by U.S. firms is voluntary and the offset is left to the discretion of the individual firm, the range of the offset, and therefore the FCF error, is significant.

In contrast to the textbook version of FCF with an offset, we argue that the only version of FCF that makes economic sense is the one without the offset. Specifically, we define Valuation Cash Flow (VCF) as a special case of the FCF which is free of a Current Liabilities offset:

$$VCF = EBIT + Depreciation - Taxes - Capital\ Expenditures - \Delta CA^{5}$$

Our empirical tests do not rely on FCF filings, but estimate the extent of freedom available to U.S. firms in publishing their voluntary FCF, namely the range of the FCF error.

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[4] With greater detail and reference to actual COMPUSTAT items, Free Cash Flow with full offset (FCF(F)) is calculated as the sum of net cash flows from operations (excluding deferred taxes, extraordinary items, and interest paid) plus net cash flows from investing activities, minus increase in cash and marketable securities, plus exchange rate effect:

$$FCF\ (F) = Net\ Cash\ from\ Operations\ (308) - Deferred\ Taxes\ (126) - Interest\ Paid\ (315) - Extraordinary\ Items\ (124) + Net\ Cash\ from\ Investing\ Activities\ (311) + Interest\ paid - Increase\ in\ Cash\ (274) + Exchange\ Rate\ Effect\ (314) + \Delta\ in\ ST\ Debt\ (301)$$

Numbers in parentheses represent item identifiers in the COMPUSTAT annual file. The Net Cash flow from Operations includes changes in Net Working Capital, and the addition of changes in Short-Term Debt insures the full-offset.

[5] We realize that there is no single definition of FCF used in practice. However, all mainstream formulas for calculating FCF include the offset. To adjust any version of FCF to reflect the true economic cost of short-term capital, the offset (Increase in NWC) should be removed and the changes in Current Assets should be put back in.

3.1 Data and Methodology

Data used in this study are from two sources. The accounting information is extracted from the COMPUSTAT annual dataset, and the stock market information from the CRSP monthly stock file. To ensure consistency in reported numbers and provide adequately long time series, we include all publicly-traded firms in the 22 year period from 1988 to 2009.

Figure 1: Chevron Inc., VCF vs. FCF, Current Liabilities Offset Dynamic, 1988–2006. Chosen as an example for its common features, this case demonstrates a firm's *access* to manipulating the common FCF in terms of its *size* and *volatility*. The choice between full and partial offset flows (FO, PO), shown respectively as dotted curves at the top and bottom graphs, is subject to management discretion. The offset flows equal the modification in the firm's CL and CA flows, and the vertical shift in the overall FCF[6] (FOCF, POCF) shown as segmented curves. The offset *impact* is measured by the vertical distance between each version of the FCF and the offset-free VCF represented by a solid curve common to both graphs. A positive difference FCF-VCF measures an *overstatement* of the firm's performance as seen under full offset in 2001. Here the positive value of the dotted FO curve equals the positive difference between FOCF and VCF, namely \$7,422 - \$4,334 = \$3,088 million. In 2003, a negative offset causes FOCF that is smaller than VCF, namely \$7,090 – \$3,704 = -\$3,386 million. Further comparison among the three versions of FCF reveals that the offset generally lowers the FCF volatility.

The basic economic relationship among the three curves, VCF vis. FOCF or POCF, can be summarized as follows. (1) The level and changes of VCF are the basic factors determining FOCF (or POCF); (2) FO (or PO) modifies the level and changes of FOCF (or POCF);

[6] Note that an apparent increase in the firm's FCF can be achieved without increasing the firm's debt (1) by expanding the set of CL accounts subject to offset, or (2) by compensating for any increase in offset borrowing by a decrease in non-offset debt of short or medium term.

specifically, (3) FOCF (or POCF) runs above VCF if FO (or PO) is positive; or below VCF if FO (or PO) is negative. In short, offset>0 causes FCF>VCF, and offset<0 causes FCF<VCF.

Figure 2: Distribution of the Ratio (FOCF – VCF) / |VCF| Across Firms, 1988, 2008.

The following salient features are observed:

(1) Even within industries, the errors of FCF vis. VCF are systemic and robust but not ordered. (2) The mode statistic of distributions within industries is close to zero, the point of parity between FOCF and VCF. The graphs *do not* indicate the relationship FOCF>VCF, suggesting the absence of significant FCF size manipulations by firms in those industries. The graphs demonstrate a widespread *neglected opportunity* to gain from overstatement of the FCF through the use of an offset.[7] (3) Limited to one method, firms above parity would prefer the FOCF for its flexibility in promoting a good image. (4) Firms positioned significantly below parity would prefer the VCF. (5) There is no presumption that the first group of firms is economically superior. (6) All firms may prefer the current regime of a flexible FCF with voluntary reporting.

Table 1: Descriptive Statistics of VCF and Competing Versions of FCF, 1988–2009.

There are over 26.8 thousands firm-year observations with an average of 1,340 unique firms per year. The average firm assets size is about $750 million, with Current Assets of $200 million (26% of total assets) and Current Liabilities of $150 million (19.7% of total assets). If all current debt (including the short-term portion of long-term debt) is removed from Current Liabilities, the remainder would still represent a substantial amount relative to Total Assets ($112 million or 15%).

The large amounts and relative values of current assets and liabilities lead to economically significant differences between the three versions of the FCF – full offset, partial offset, and no offset of CL against CA. While each of the three versions has a positive mean, the median VCF

[7] The absence of widespread corporate manipulation should make it easier for policymakers to switch to VCF.

is negative, implying that the other versions overstate the FCF of the median firm. In dollar terms, the average FCF with full offset exceeds the VCF by more than $5 million per year (33.7%). The more popular FCF with a partial offset artificially increases the average cash flows to claimholders by almost $4 million per year (26.1%). The Median and Mean annual FCF at the level of the firm increases monotonically from VCF to FOCF, namely FOCF>POCF>VCF, implying the same order in dollar and relative terms. In contrast, the *volatility* of FCF as measured by the CV *increases* monotonically from FOCF to VCF. The combination of the two features is confirmed by the common preference of firms for FOCF or POCF. The offset facilitates low-cost enhancement and stabilization of the voluntary FCF.

The effect of the offset as measured by the Relative Difference is far greater in small median firms as opposed to large firms about the mean. The same is true for Full and Partial offsets.

Table 2: Time Patterns of the Three Versions of FCF, 1988–2009. During the first 13 years, the full-offset and partial-offset FCF exhibit systematically higher values than the VCF. The year 2000 records the largest differences between the offset-based FCF and VCF – over 200%! The most plausible explanation is the bubble in equity market prices. As equity values rose during 1999 and 2000, firms gradually increased their liabilities, including CL, to maintain an optimal capital structure. With the market collapse in 2001, the FCF-VCF difference dropped sharply and became negative, encouraging companies to reverse the process by paying off Current Liabilities. A similar pattern repeated itself in the housing market bubble of 2007-2009.

Despite the systematic ordering FOCF>POCF>VCF in large and small firms, an individual firm's POCF can be larger or smaller than the parallel FOCF in any given year, depending on the sign of the incremental CL offset. This suggests that a switch across versions of FCF should be viewed as a form of manipulation that can affect financial appearance. In addition, both the

mean of larger firms and the median of smaller ones show that the positive Serial Correlation across years is highest under FOCF and lowest under VCF. These statistics confirm the advantage of smoothing facilitated by the CL offset, a potential element of the FCF manipulation. A higher annual Standard Deviation of VCF is common only in smaller, less diversified firms.

Table 3: Free Cash Flows across Industry Groups (GICS), 1988–2009. The FCF size ranking of FOCF>POCF>VCF at the level of the firm is preserved within individual industries, reconfirming the reliable advantage of the CL offset in that context.

The private advantage of avoiding VCF may vary significantly across industries. Industries with the largest differences between offset and non-offset FCF are food companies and retailers, followed by telecoms and utilities. The groups with the smallest differences are banks, financials, real estate, and insurance companies. Companies that rely more on trade credit (food and retailers) would gain more by a greater offset, inviting a greater distortion in their valuation. The valuation of financial institutions would be the least affected.

Table 4: Free Cash Flows by Size Quintiles, 1988–2009. To determine the effect of size, we divide our sample of over 26 thousand firm-year observations into size quintiles with an approximately equal number of observations in each. A *positive (negative)* offset difference would *improve (damage)* the firm's cash flow appearance regardless of whether VCF is positive or negative. As seen in the two smallest quintiles, the systematic negative offset difference deprives such firms of access to this reporting advantage. In contrast, the dollar and relative offset differences in the three largest quintiles is systematically positive and large, suggesting overstatement of FCF and estimated value.

Table 5: Correlation among the Three Versions of FCF, 1988–2009. We observe that all pairs exhibit relatively high correlation above 90 percent with a 95% Pearson confidence interval. The highest correlation is between VCF and FCF with partial offset. The lowest correlation is between VCF and FCF with full offset. Spearman correlations exhibit the same pattern but with lower values in the 70's and 80's due to the non-parametric nature of this statistic.

The high correlation across versions of FCF explains the low cost of potential manipulation. A positive offset would boost FCF and with it the firm's financial appearance without significantly modifying FCF volatility. This may explain the absence of a serious challenge to the different versions of FCF.

4. Summary and Conclusions

This paper challenges the common valuation procedure adopted in corporate finance in which the flow of Current Liabilities or a significant portion thereof is offset against the flow of Current Assets to create the hybrid flow of Net Working Capital. While consistent with the methodology of the accounting Statement of Cash Flow, this offset is inconsistent with the economic-based FCF, a financial tool designed for firm and project valuation. We demonstrate that the offset can significantly distort the FCF in terms of size, composition and volatility, leading to additional distortions in the firm or project size, debt and asset composition, financial leverage, risk profile, and estimated value. Our conceptual and empirical analyses indicate that management may prefer the offset-based FCF, which can be better controlled in terms of size and stability. The corrected narrower definition of FCF would eliminate this flexibility. The proposed offset-free VCF is a logical substitute, which would better serve investors and their

loyal management, lenders, and stakeholders by leading to more accurate, unbiased value estimates of the firm and its planned projects.

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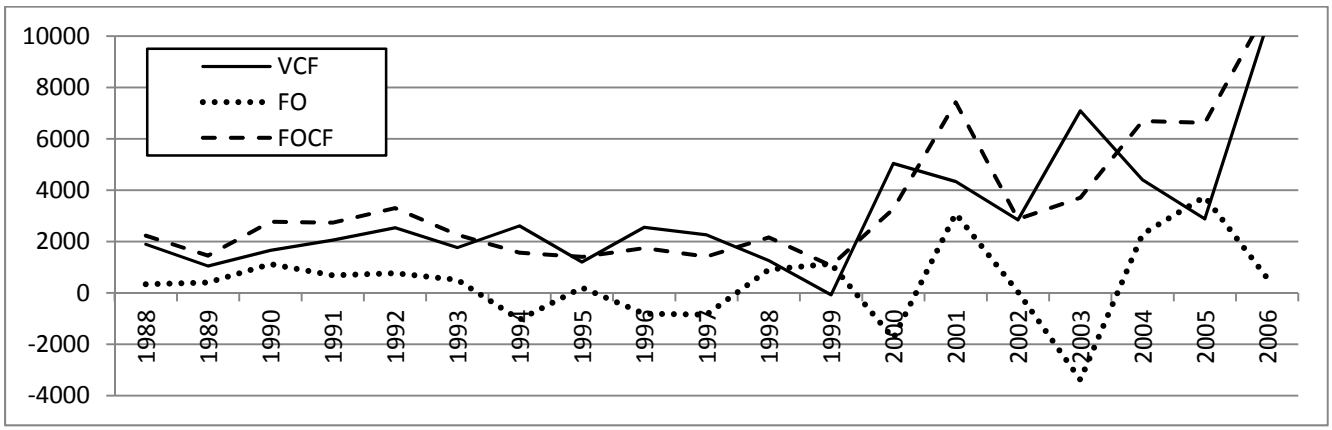
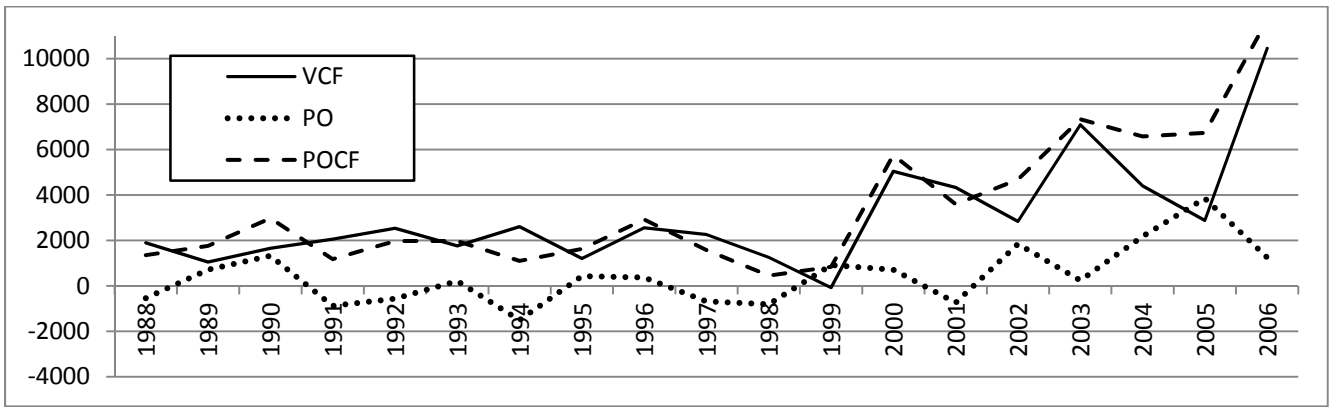
Figure 1

Chevron Inc., VCF vs. FCF, Current Liabilities Offset Dynamics, 1988-2006. The figure shows the time series from 1988 to 2006 of three versions of the Free Cash Flow of Chevron Inc.: Full Offset of Current Liabilities against Current Assets (FOCF, top drawing), Partial Offset of Current Liabilities less short-term debt against Current Assets (POCF, bottom drawing), and no liability offset, named Valuation Cash Flow (VCF, both drawings). The annual flow of Current Liabilities offset against Current Assets equals the *vertical* distance FOCF-VCF or POCF-VCF. All figures are in millions of dollars.



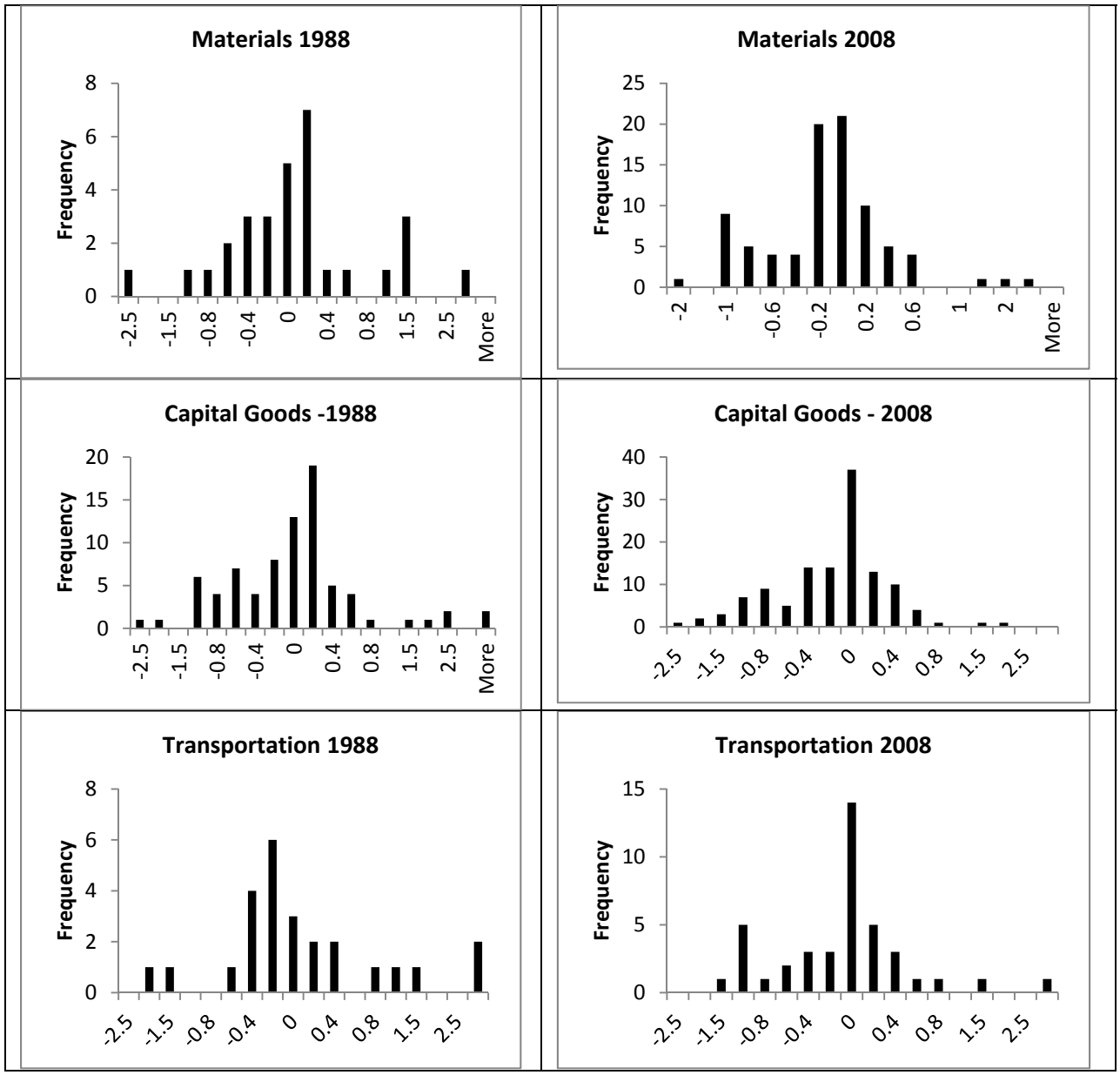
	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
VCF	1894	1046	1654	2053	2536	1760	2607	1201	2555	2259	1256	-77	5039	4334	2838	7090	4401	2879	10458
FO	338	405	1120	684	766	507	-1044	201	-810	-848	906	1134	-1772	3088	35	-3386	2289	3742	569
FOCF	2232	1451	2774	2737	3302	2267	1563	1402	1745	1411	2162	1057	3267	7422	2873	3704	6690	6621	11027



	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
VCF	1894	1046	1654	2053	2536	1760	2607	1201	2555	2259	1256	-77	5039	4334	2838	7090	4401	2879	10458
PO	-545	713	1326	-880	-567	214	-1510	428	369	-685	-807	915	712	-742	1845	242	2175	3851	1246
POCF	1349	1759	2980	1173	1969	1974	1097	1629	2924	1574	449	838	5751	3592	4683	7332	6576	6730	11704

Figure 2

Distribution of the Ratio (FOCF-VCF) / |VCF| Across Firms, 1988 and 2008. The figure shows the histograms of the distribution of differences between FOCF and VCF relative to the absolute value of the VCF for six selected industries for two years: 1988 and 2008.



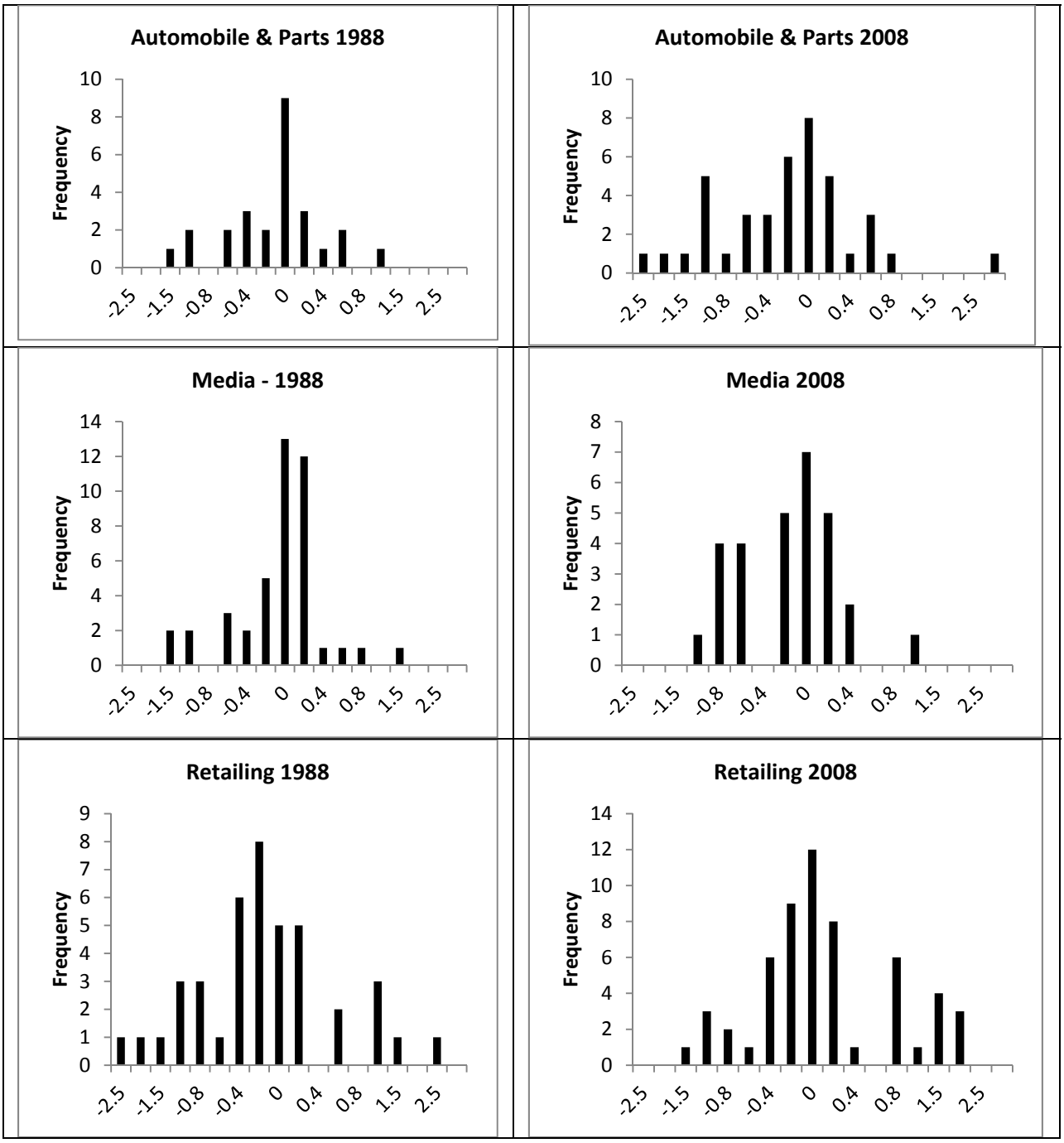

Automobile & Parts 1988
Frequency
10
8
6
4
2
0
-2.5
-1.5
-0.8
-0.4
0
0.4
0.8
1.5
2.5
Automobile & Parts 2008
Frequency
10
8
6
4
2
0
-2.5
-1.5
-0.8
-0.4
0
0.4
0.8
1.5
2.5
Media - 1988
Frequency
14
12
10
8
6
4
2
0
-2.5
-1.5
-0.8
-0.4
0
0.4
0.8
1.5
2.5
Media 2008
Frequency
8
7
6
5
4
3
2
1
0
-2.5
-1.5
-0.8
-0.4
0
0.4
0.8
1.5
2.5
Retailing 1988
Frequency
9
8
7
6
5
4
3
2
1
0
-2.5
-1.5
-0.8
-0.4
0
0.4
0.8
1.5
2.5
Retailing 2008
Frequency
14
12
10
8
6
4
2
0
-2.5
-1.5
-0.8
-0.4
0
0.4
0.8
1.5
2.5

Table 1

Descriptive Statistics of VCF and Competing Versions of FCF, 1988-2009. The table shows the median and mean of the three versions of Free Cash Flows (FCF): with *full* offset of Current Liabilities against Current Assets (FOCF), with *partial* offset of Current Liabilities excluding Short-Term Debt against Current Assets (POCF), and *without* offset of Current Liabilities against Current Assets, VCF, or Valuation Cash Flow. CA=total Current Assets, CL=total Current Liabilities, DCL=short-term Debt in Current Liabilities, CV=Coefficient of Variation. The Relative Difference between flows is calculated as the ratio of the difference between the means of either FOCF and VCF, or POCF and VCF, divided by the absolute value of VCF. All non-percentage values are in millions of dollars.

Variable	Median	Mean	CV
Annual Flow:			
FOCF =VCF+ΔCL	0.04	20.28	6.63
POCF =VCF+ΔCL-ΔDCL	0.00	19.12	6.94
VCF	-0.13	15.17	8.79
Flow Difference:			
FOCF – VCF=ΔCL	0.1635	5.112443	
POCF – VCF=ΔCL-ΔDCL	0.1275	3.956955	
Relative Flow Difference:			
(FOCF - VCF) / |VCF|	128.2%	33.7%	
(POCF - VCF) / |VCF|	100.0%	26.1%	
Year-End Value:			
Total Assets	56.15	748.45	2.59
Total Current Assets	29.17	197.44	2.33
Total Current Liabilities	13.45	147.87	2.60
Total Debt in Current Liabilities	0.77	35.88	3.52

N=26,864 firm years.

Table 2

Time Patterns of Three Free Cash Flows, 1988-2009. The three FCF versions are with full offset of current liabilities against current assets (FOCF), with partial offset of current liabilities excluding short term debt against current assets (POCF), and without offset of current liabilities against current assets, VCF, or Valuation Cash Flow. The relative difference between flows is calculated as the ratio of the difference between the means of either FOCF and VCF, or POCF and VCF, divided by the absolute value of VCF. The Coefficient of Variation, CV, is presented in absolute value. All non-percentage values are in millions of dollars.

	Medians			Means			Relative Difference	
Year	FOCF	POCF	VCF	FOCF	POCF	VCF	FOCF	POCF
1988	0.87	0.72	0.31	44.85	44.21	37.91	18%	17%
1989	0.76	0.52	0.20	38.26	33.73	25.49	50%	32%
1990	1.17	0.94	0.59	42.82	37.02	33.57	28%	10%
1991	1.01	1.16	1.12	37.04	39.28	38.00	-3%	3%
1992	0.34	0.20	0.06	26.25	24.63	22.00	19%	12%
1993	0.12	0.07	-0.01	32.08	32.41	29.46	9%	10%
1994	0.21	0.13	-0.03	35.77	34.64	29.70	20%	17%
1995	0.20	0.06	-0.07	32.13	30.71	25.39	27%	21%
1996	0.10	0.00	-0.21	26.86	26.46	20.44	31%	29%
1997	0.01	-0.02	-0.27	20.38	17.56	14.42	41%	22%
1998	0.00	-0.05	-0.32	19.39	17.42	13.93	39%	25%
1999	0.01	-0.01	-0.23	19.35	12.45	8.32	133%	50%
2000	0.00	-0.15	-0.49	21.01	14.56	4.75	342%	206%
2001	0.01	0.00	-0.01	5.82	8.64	11.08	-47%	-22%
2002	0.01	0.00	0.03	15.30	20.65	18.71	-18%	10%
2003	0.00	-0.01	-0.11	12.15	15.42	13.50	-10%	14%
2004	-0.08	-0.26	-0.67	12.52	13.89	7.06	77%	97%
2005	-0.02	-0.23	-0.77	15.71	12.50	4.11	282%	204%
2006	0.00	-0.16	-0.62	15.39	13.94	11.05	39%	26%
2007	-0.02	-0.24	-0.79	4.70	2.46	-0.94	603%	363%
2008	0.06	0.00	-0.05	6.75	4.27	3.81	77%	12%
2009	0.42	0.57	1.42	16.15	22.13	28.82	-44%	-23%
Serial Correlation	0.84	0.70	0.53	0.85	0.77	0.67		
Standard Deviation	0.37	0.39	0.55	12.01	11.66	11.64		
Abs. Value of CV	1.58	2.63	13.10	0.53	0.54	0.64		

The number of firms (N) varies from the lowest 644 in 1988 to the highest 1,732 in 2005, adding to a total of N=26,864 firm years.

Table 3

Free Cash Flows across Industry Groups, 1988-2009. The three FCF versions are with full offset of current liabilities against current assets (FOCF), with partial offset of current liabilities excluding short term debt against current assets (POCF), and without offset of current liabilities against current assets, VCF, or Valuation Cash Flow. The relative difference between flows is calculated as the ratio of the difference between the means of either FOCF and VCF, or POCF and VCF, divided by the absolute value of VCF. Industry groups correspond to GICS industry classification standards. Mean values and their differences are in millions of dollars. All non-percentage values are in millions of dollars.

Industry Name	Group	N	Means			Relative Differences	
			FOCF	POCF	VCF	(FOCF-VCF)/ |VCF|	(POCF-VCF)/ |VCF|
Energy	1010	1701	-12.84	-12.90	-17.25	26%	25%
Materials	1510	1527	28.18	28.41	26.14	8%	9%
Capital Goods	2010	2537	13.60	11.65	8.59	58%	36%
Commercial & Professional Services	2020	1124	8.13	7.68	5.43	50%	41%
Transportation	2030	368	-1.55	1.17	-6.08	75%	119%
Automobile & Components	2510	384	14.77	12.15	7.04	110%	73%
Consumer Durables & Apparel	2520	1485	18.53	17.97	15.34	21%	17%
Consumer Services	2530	813	9.51	8.41	6.70	42%	26%
Media	2540	586	11.12	9.55	4.36	155%	119%
Retailing	2550	1100	18.91	16.95	5.90	221%	187%
Food & Staples Retailing	3010	203	92.02	93.41	77.32	19%	21%
Food, Beverage & Tobacco	3020	731	48.96	45.27	41.22	19%	10%
Household & Personal Products	3030	501	12.73	12.73	10.03	27%	27%
Health Care Equipment & Services	3510	2179	-1.44	-1.31	-3.33	57%	61%
Pharmaceuticals, Biotechnology & Life Sciences	3520	1880	-6.06	-6.16	-7.23	16%	15%
Banks	4010	6	0.02	0.11	0.08	-88%	38%
Diversified Financials	4020	313	15.44	15.00	12.63	22%	19%
Insurance	4030	78	0.79	2.35	-0.39	303%	703%
Real Estate	4040	199	2.18	2.10	1.67	31%	26%
Software & Services	4510	2278	-2.28	-1.90	-3.44	34%	45%
Technology Hardware & Equipment	4520	2500	-2.52	-2.48	-5.66	55%	56%
Semiconductors & Semiconductor Equipment	4530	752	-1.85	0.40	-3.35	45%	112%
Telecommunication Services	5010	404	56.59	52.79	45.52	24%	16%
Utilities	5510	2908	123.48	116.49	106.75	16%	9%
Unspecified Industry Group		438	-12.49	-12.58	-13.05	4%	4%

N=26,864 firm years.

Table 4

Free Cash Flows by Size Quintiles, 1988-2009. The three FCF versions are with full offset of current liabilities against current assets (FOCF), with partial offset of current liabilities excluding short term debt against current assets (POCF), and without offset of current liabilities against current assets, VCF, or Valuation Cash Flow. The relative difference between flows is calculated as the ratio of the difference between the means of either FOCF and VCF, or POCF and VCF, divided by the absolute value of VCF. All non-percentage values are in millions of dollars. Size quintiles are based on year-end market capitalizations obtained from the CRSP dataset.

	Size Quintile				
	1=small	2	3	4	5=big
Annual Flow:					
FOCF =VCF+ΔCL	-0.01	-0.62	-3.56	4.88	107.11
POCF =VCF+ΔCL-ΔDCL	-0.10	-0.66	-3.90	4.95	101.79
VCF	0.04	-0.62	-5.11	1.94	86.05
Flow Difference:					
FOCF – VCF=ΔCL	-0.05	-0.01	1.55	2.94	21.06
POCF – VCF=ΔCL-ΔDCL	-0.14	-0.04	1.21	3.01	15.74
Relative Difference:					
(FOCF - VCF) / |VCF|	-121%	-1%	30%	151%	24%
(POCF - VCF) / |VCF|	-343%	-7%	24%	155%	18%
Year-End Value:					
Total Assets	23.98	81.71	200.76	643.72	3397.84
Total Current Assets	13.57	40.49	94.36	243.99	941.24
Total Current Liabilities	8.68	22.77	48.39	142.07	722.49
Total Debt in Current Liabilities	3.15	6.28	10.48	27.38	174.45
N=26,864					

Table 5

Correlation among the Three Versions of Free Cash Flow, 1988-2009. The correlations are Pearson and Spearman correlation coefficients with 95% confidence intervals. We calculate correlations for each firm and then equally-weight them to calculate the cross-sectional average. The three versions are: the FCF with full offset of total current assets by total current liabilities (FOCF), the FCF with partial offset of the total current assets by current liabilities without the short term debt (POCF), and the FCF with no offset which we call VCF (Valuation Cash Flow).

Pearson Correlation Statistics

Variable	Variable	N	Correlation Coefficient	95% Confidence Limits	
VCF	FOCF	26,905	0.92	0.919	0.923
VCF	POCF	26,905	0.98	0.980	0.981
FOCF	POCF	26,905	0.94	0.940	0.943

Spearman Correlation Statistics

Variable	Variable	N	Correlation Coefficient	95% Confidence Limits	
VCF	FOCF	26,905	0.79	0.782	0.791
VCF	POCF	26,905	0.89	0.894	0.898
FOCF	POCF	26,905	0.87	0.865	0.871