

# Refinement of the FCF motive for stock repurchases

FCF motive  
for stock  
repurchases

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## Abstract

**Purpose** – The purpose of this paper is to investigate factors that influence the free cash flow (FCF) motive for stock repurchases. Specifically, it examines whether the positive association between FCF and open-market repurchases is partially driven by abnormal cash flows, and whether external analyst monitor and financial crisis influence the association.

**Design/methodology/approach** – The study employs a tobit regression model to test the hypotheses.

**Findings** – First, the results suggest that the positive association between FCF and stock repurchases is partially driven by abnormal cash flows. Second, the association between pre-managed FCF and stock repurchases is strengthened as more analyst following the firms. Third, firms repurchase less when they report more negative abnormal cash flows, and that tendency is more pronounced during the 2008 financial crisis period. Further analysis shows that during the crisis period, the effect of negative abnormal cash flows on operating performance gets stronger.

**Originality/value** – The study makes several contributions to the literature. This paper is the first to show that managers use abnormal cash flows to fulfill the share buy-backs. In addition, it shows that analysts provide effective external monitoring by strengthening the association between pre-managed FCF and repurchases. Furthermore, it finds that firms adjust their strategy in times of financial crisis period in response to the increased risk. Finally, it contributes to the earnings management literature by showing the differential effects of accruals management and cash flow management on earnings performance.

**Keywords** Stock repurchases, Financial crisis, Analyst coverage

**Paper type** Research paper

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## 1. Introduction

Brav *et al.* (2005) conducted a survey of public and private firms and found that executives tend to repurchase shares to reduce extra cash, supporting the free cash flow (FCF) theory proposed by Easterbrook (1984) and Jensen (1986). The theory posits that payouts are important corporate governance mechanisms to help control for the FCF available to managers and thus mitigate agency cost. Prior empirical studies document a positive association between cash flows and repurchases, consistent with the notion that firms use share repurchases to mitigate the agency costs of FCF (Stephens and Weisbach, 1998; Dittmar, 2000; Hsieh and Wang, 2009). However, none of the prior papers examines whether abnormal cash flows, as the consequence of real earnings management (REM), relates to stock repurchases. Due to the mixed evidence on the performance effect of REM (Roychowdhury, 2006; Vorst, 2016), it is an unknown question whether firms use abnormal cash flows for stock repurchases as they balance the costs and benefits of doing so. This study investigates whether the positive association between FCF and open-market repurchases is partially driven by abnormal cash flows, and whether analyst coverage and financial crisis influence the association.

To test the aforementioned hypotheses, we examine open-market repurchases using a sample of firm-years obtained from Compustat's ExecuComp database over the period 1992–2014[1]. We measure *FCF* as operating cash flows minus capital expenditures and cash dividends scaled by beginning assets, and decompose *FCF* into abnormal cash flows and pre-managed *FCF*, where pre-managed *FCF* equals *FCF* minus abnormal cash flows. The univariate analysis shows that firm with positive *FCF*, positive abnormal cash flows or positive pre-managed *FCF* buy back a higher dollar amount of shares than firms with negative *FCF*, negative abnormal cash flows or negative pre-managed *FCF*, respectively.



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We then run tobit regression models to test our hypotheses, controlling for various factors that potentially affect firms' incentives to repurchase. Consistent with the univariate analysis, we document a positive coefficient on *FCF* and the two components of *FCF*, namely, abnormal cash flows and pre-managed *FCF*.

We next explore factors that could influence the association between *FCF* and repurchases. On the one hand, when external monitoring improves, firms may have an increased propensity to strengthen the *FCF*-repurchase relationship. We document that the sensitivity of repurchases to pre-managed *FCF* increases as analyst coverage gets higher. In addition, the increased sensitivity is driven by both positive and negative pre-managed *FCF*, indicating the effective monitoring of managers' activities. On the other hand, during the financial crisis period, firms could modify their repurchase behavior due to the increased risk. Consistent with our expectations, we find that the positive association between abnormal cash flows and repurchases is strengthened during the financial crisis period, and the strengthened association is driven by negative abnormal cash flows.

We then examine the performance effect of abnormal cash flows to better understand the reasons why the association between negative abnormal cash flows and repurchases changed during the financial crisis period. Controlling for the reversal of abnormal accruals (Gong *et al.*, 2008), the regression results show that while the effect of positive abnormal cash flows on operating performance does not change during the crisis period, the effect of negative abnormal cash flows is strengthened during the crisis period. Overall, the results suggest that during the financial crisis period, firms would decrease their repurchase more when they have to report negative abnormal cash flows because the effect of negative abnormal cash flows on operating performance gets stronger. Further analysis shows that our results are robust by controlling for the effect of 2003 tax cuts and cash holdings.

The results derive important implications for investors, security regulators and accounting professionals. First, while the literature proposes that the positive association between *FCF* and repurchases is strong evidence supporting the agency costs argument of *FCF* motive, it is unknown whether the association is at least partially driven by manipulated cash flows. We document that abnormal cash flows, as a component of *FCF*, influences stock repurchases. Our results thus raise questions about the effectiveness of repurchases in mitigating the agency problem when firms use abnormal cash flows to buy back shares.

Second, we provide evidence about whether analysts play an important role in monitoring firms' distribution of cash flows to investors. Our results suggest that more analyst coverage strengthens the positive association between pre-managed *FCF* and repurchases, but does not influence the association between abnormal cash flows and repurchases. On the one hand, analysts as external monitors effectively motivate firms to repurchase shares based on their cash flows available. On the other hand, they are not effective in distinguishing abnormal cash flows from true cash flows, leaving room for managers to use abnormal cash flows for distribution.

Third, and as importantly, we document that firms adjust their actions as a response to changes of external risk. That is, we show that during the financial crisis period, firms decrease their repurchase to a greater extent when they report negative abnormal cash flows. Negative abnormal cash flows could result from price discounts, increase in production spending or increase in abnormal selling, general and administrative expenses (SGA) (Roychowdhury, 2006). Our results imply that firms would reduce repurchases to a greater extent to support their daily operations when external risk is higher.

Finally, unlike accruals, the effect of abnormal cash flows on earnings is ambiguous (Roychowdhury, 2006). Gong *et al.* (2008) document that the income-decreasing abnormal accruals prior to open-market repurchases announcement is negatively related to post-repurchase performance. We find that after controlling for the reversal of abnormal accruals, abnormal cash flow is positively related to earnings improvement. Our results thus

provide further support to Gong *et al.* (2008), and shed light on the role of abnormal cash flows on earnings performance.

We have organized the rest of this paper as follows. We discuss prior literature and develop our hypotheses in Section 2. We describe our methodology and data in Section 3. We report empirical results in Section 4, and conduct supplemental analyses in Section 5. We offer concluding remarks in Section 6.

## 2. Theoretical background and hypotheses

### 2.1 Related literature

We focus on four sets of studies that relate to our research questions. The first set is about the FCF motive for repurchase and the association between FCF and repurchases. Easterbrook (1984) and Jensen (1986) argue that payouts can reduce the internal cash flow available to managers and force firms to seek more external financing, and the scrutiny of capital market thus mitigates both monitoring costs and overinvestment problems. Consistent with the FCF motive, prior research has shown a positive association between cash flows and repurchases and positive abnormal returns for repurchasing firms. Stephens and Weisbach (1998) find that actual repurchase in a quarter is positively correlated with current quarter expected and unexpected cash flows. In addition, the abnormal return around the repurchase announcement is positively related to the actual repurchase size but not the announced repurchase target, suggesting that the investors have some ability to forecast actual repurchase and react to their expectation accordingly. Both Jagannathan *et al.* (2000) and Guay and Harford (2000) find that open-market repurchases are distributed by less permanent cash flows. Similarly, Dittmar (2000) documents a positive association between repurchases and cash flows, after controlling for cash holdings and investment opportunities. Lie (2005) shows that firms that repurchase a significant fraction of shares outstanding shortly after the announcement exhibit performance improvements, which is mostly pronounced in the year of repurchases. In addition, he finds that these firms also experience positive abnormal stock returns around the earnings announcement. More recently, Leng and Noronha (2013) document that both expected and unexpected cash flows actually affect the likelihood to announcement repurchases, and the market waits for the actual repurchase to further assimilate managers' private information.

Another set of studies examines REM and its effect on operating performance. The survey studies indicate that earnings management is motivated by a host of intertwined factors; managers prefer REM over accruals management to boost the quarterly earnings above important earnings benchmark; and executives believe that future performance improvement will offset reversals from past earnings management activities (Graham *et al.*, 2005; Dichev *et al.*, 2013). Consistent with the survey evidence, empirical studies have documented multiple incentives for REM. Burgstahler and Dichev (1997) conclude that firms manipulate cash flow from operations to avoid losses, and firms reporting small losses are likely to face high costs to manipulate earnings upward. Dechow and Sloan (1991) and Ali and Zhang (2015) document a reduction in R&D in CEOs' final year of office. Bens *et al.* (2002) find that the value of employee stock option exercises is positively related to repurchases and negatively related to investment. Roychowdhury (2006) finds that firms manipulate real activities to avoid reporting negative earnings, and Cohen *et al.* (2008) show that after the Sarbanes-Oxley Act, firms switch from accrual management to REM. However, the effect of REM on future performance significantly depends on the motive of earnings management. While Gunny (2010) finds a positive effect of cutting R&D and SGA on future operating performance under the context of meeting important earnings benchmark, Cohen and Zarowin (2010) and Kothari *et al.* (2015) document a negative effect of REM on subsequent operating performance in a seasoned equity offerings scenario. Vorst (2016) concludes that a reversal of a discretionary expenditure cut is indicative of REM and

REM in response to debt issues or meeting earnings benchmarks is not harmful to the operating performance. The positive association between REM and future operating performance is consistent with the notion that the firms attain benefits from the enhanced credibility and reputation that enable them to perform better in the future, and managers' choice of REM could signal their expectation about future performance (Burgstahler and Dichev, 1997; Gunny, 2010).

The third set of research relates to the role of analyst following in reducing agency problems. Jensen and Meckling (1976) conjecture that the monitoring activities performed by analysts can reduce agency costs. Healy and Palepu (2001) conclude that analysts could help detect the misuse of firm resources by managers, and thus reduce agency problems. Using UK data, Farinha (2003) documents a positive association between analyst coverage and dividend payout ratio over a five-year period from 1992 to 1996. Jung *et al.* (2012) find that higher analyst coverage leads to higher firms' asset values, and contributes to the association between change in cash and change in subsequent total cash payout. They conclude that their result are consistent with the notion that analyst coverage constrains management's cash-wasting behaviors, and, thereby, mitigates agency costs.

Finally, the fourth set of research relates to the effect of financial crisis on firms' payout behavior. While many scholars have explored the role of financial crisis on earnings management behavior (Francis *et al.*, 2013; Trombetta and Imperatore, 2014), little has examined its role on payout decision. Floyd *et al.* (2015) show that over the financial crisis period, the fraction of firms that repurchase and the magnitude of repurchases both declined due to economic uncertainty, without controlling for other potential factors that may significantly influence the payout decision. They conclude that "our evidence is suggestive and does not allow us to rule out alternative explanations" (p. 313). Using a sample of firms from nine Asian countries, Choi *et al.* (2011) find that the Asian financial crisis of 1997–1998 had no significant impact on the association between operating cash flows and annual stock return, suggesting that the value relevance of operating cash flows does not change during the Asian financial crisis period.

## 2.2 Hypothesis development

There are several implications from the prior research (presented above). First, firms have incentives to increase actual repurchases to gain higher abnormal stock returns, which are evidenced around repurchases events and earnings announcement (Stephens and Weisbach, 1998; Lie, 2005; Leng and Noronha, 2013). Second, REM results in abnormal cash flows (Roychowdhury, 2006), and can be conducted throughout the fiscal year for capital market motivations or contract motivations (Healy and Wahlen, 1999; Matsunaga and Park, 2001; Graham *et al.*, 2005; Gunny, 2010; Cohen and Zarowin, 2010). Third, managers could also manipulate cash flows upward for the purpose of buy-backs as suggested by the indirect evidence of Bens *et al.* (2002). Fourth, REM does not necessarily lead to a quick reversal and may have a positive effect on future financial performance (Graham *et al.*, 2005; Gunny, 2010; Vorst, 2016). We thus expect that if managers believe that the benefits from abnormal returns and/or the benefits from the enhanced performance are large enough, they would use abnormal cash flows, in addition to pre-managed FCF, to buy back shares. Therefore, the positive association between cash flows and repurchases is driven by both pre-managed FCF and abnormal cash flows. Formally stated, our two main hypotheses are:

*H1a.* There is a positive association between pre-managed FCF and repurchases.

*H1b.* There is a positive association between abnormal cash flows and repurchases.

Jung *et al.* (2012) find that the association between change in cash and change in subsequent total cash payout is stronger for firms with higher analyst coverage, supporting the notion

that analyst following constrains management's cash-wasting behaviors. Since both Easterbrook (1984) and Jensen (1986) emphasized the importance of distributing current cash flow, we thus argue that analyst following influences the association between pre-managed FCF and contemporaneous repurchases. Thus, our next hypothesis is:

*H2a.* The positive association between pre-managed FCF and repurchases gets stronger for firms with higher analyst following.

There are mixed results about the effect of analyst following on REM. While Cohen and Zarowin (2010) find that analyst following reduces the tendency of total earnings management, Irani and Oesch (2016) conclude that analyst following pressures managers to meet earnings benchmarks by reducing discretionary expenditures. Actually, Dichev *et al.* (2013) find that CFOs believe that earnings management is difficult for outsiders to observe and "[...] distinguishing between business-driven economic reasons to cut spending vs. opportunistic cuts aimed at hitting earnings targets is difficult for an outside analyst" (p. 29). We argue that if analysts can effectively detect abnormal cash flows, we expect that abnormal cash flows of firms with higher analyst following is related to lower stock repurchases. On the other hand, if analysts cannot effectively detect abnormal cash flows, higher analyst coverage would not weaken the association between abnormal cash flows and repurchases. The competing arguments lead to the following null hypothesis:

*H2b.* The positive association between abnormal cash flows and repurchases does not change for firms with higher analyst following.

Our last hypothesis is about the effect of the 2008 financial crisis on the association between cash flows and repurchases. While Floyd *et al.* (2015) show that over the financial crisis period, the fraction of industrial firms that repurchase and the magnitude of repurchases both declined, they do not examine the association between cash flows and repurchases. Using a sample of firms from nine Asian countries, Choi *et al.* (2011) find that the value relevance of operating cash flows does not change during the Asian financial crisis period, implying that the performance effect of operating cash flows does not change. If the performance effect of operating cash flows does not change during the US financial crisis, then we would expect that the crisis has no effect on the association between FCF and repurchases. However, if the performance effect varies, then the association between FCF and repurchases will change. Thus, we state the null hypotheses as follows:

*H3a.* The positive association between pre-managed FCF and repurchase does not differ during the financial crisis period.

*H3b.* The positive association between abnormal cash flows and repurchase does not differ during the financial crisis period.

### 3. Methodology and data

We employ the following three tobit regressions to test the hypotheses respectively because repurchases have a lower bound of zero (Dittmar, 2000; Bens *et al.*, 2003). Firm and period subscripts are omitted in the text for simplicity:

$$REPUR = \beta_0 + \beta_1 Pre\_FCF + \beta_2 ACFO + \sum \beta_j Control\ variables_j + \varepsilon. \quad (1)$$

$$REPUR = \beta_0 + \beta_1 Pre\_FCF + \beta_2 ACFO + \beta_3 Pre\_FCF \times COVRG + \beta_4 ACFO \times COVRG + \beta_5 COVRG + \beta_j Control\ variables_j + \varepsilon. \quad (2)$$

$$REPUR = \beta_0 + \beta_1 Pre\_FCF + \beta_2 ACFO + \beta_3 Pre\_FCF \times Crisis + \beta_4 ACFO \times Crisis + \Sigma \beta_j \text{Control variables}_j + \varepsilon. \quad (3)$$

*REPUR* is the dollar value of open-market repurchases divided by the market value of equity at the beginning of the year. We measure the dollar value of open-market repurchases using the Compustat data item "Purchase of common and preferred stock"[2]. Following the literature (Berger *et al.*, 1997; Dittmar, 2000), we first reduce the volume by any decrease in preferred stock that occurs in the current year. We then further screen stock repurchases by setting repurchases to zero for any firm that does not repurchase stocks with a value of at least 1 percent of the market value of its equity.

Brav *et al.* (2005) find that repurchase decisions are made after dividends and investment decisions. We thus define *FCF* as operating cash flows minus capital expenditures and cash dividends scaled by beginning assets to controls for investment spending and dividend distribution (Grullon and Michaely, 2002; Skinner, 2008). Following Stephens and Weisbach (1998) and Bens *et al.* (2003), we use current *FCF*.

To estimate abnormal cash flows (*ACFO*), we use the models developed by Dechow *et al.* (1998) and implemented in other earnings management papers (Roychowdhury, 2006; Cohen *et al.*, 2008; Cohen and Zarowin, 2010). We also include abnormal total accruals in the model to control for the negative association between abnormal accruals and repurchases (Gong *et al.*, 2008). We measure abnormal total accruals in the prior year (*ATA*) adopting the cross-sectional model of Jones (1991) and make adjustments for financial performance (Dechow *et al.*, 1995; Kothari *et al.*, 2005). Specifically, we develop the following regressions:

$$CFO_t/Assets_{t-1} = \alpha_0(1/Assets_{t-1}) + \alpha_1(Sales_t/Assets_{t-1}) + \alpha_2(\Delta Sales_t/Assets_{t-1}) + \varepsilon_t. \quad (4)$$

$$TA_t/Assets_{t-1} = \alpha_0(1/Assets_{t-1}) + \alpha_1(\Delta Sales_t/Assets_{t-1}) + \alpha_2(PPE_t/Assets_{t-1}) + \alpha_3ROA_{i,t} + \varepsilon_t. \quad (5)$$

In the above regressions, *CFO* is cash flow from operations as reported on the statement of cash flows; *Assets* is total assets; *Sales* is total revenues; *TA* is total accruals, defined as income before extraordinary items less *CFO*; *PPE* is property, plant and equipment; and *ROA* is return on assets. To estimate the normal level of cash flows and total accruals, we require at least eight observations in each two-digit SIC industry for each year (Cohen *et al.*, 2008; Cohen and Zarowin, 2010) and estimate Equations (4) and (5) cross-sectionally for each two-digit SIC industry for each year. *ACFO* is computed as the difference between the actual *CFO* and the normal levels predicted (i.e. they are the residuals) from regression (4). Pre-managed FCF (*Pre\_FCF*) thus equals *FCF* minus *ACFO*. And abnormal total accruals equal the difference between the actual total accruals and the normal levels predicted from regression (5). Following Gong *et al.* (2008), *ATA* equals abnormal total accruals in the prior year.

We calculate analyst coverage (*COVRG*) as the natural logarithm of number of analysts following the firm (Farinha, 2003). We define financial crisis period (*Crisis*) as years 2008–2010. Following the literature (Dittmar, 2000; Fenn and Liang, 2001; Kahle, 2002; Bens *et al.*, 2003; Bergstresser and Philippon, 2006; Hribar *et al.*, 2006; Gong *et al.*, 2008; Denis and Osobov, 2008), we control for undervaluation (*RET*), incentive to avoid reporting losses (*EPSDUM*), management shareholdings (*SHR*), management option holdings (*OPTN*), firm size (*SIZE*), sales growth (*GRWTH*), leverage (*LEV*), income volatility (*StdROA*), capital expenditures (*CAPEX*) and retained earnings (*RETAIN*). We also include two-digit SIC and year dummies in the regressions. Table A1 describes the variables used in this study.

Our sample consists of all publicly traded firms in Compustat's Execucomp database for the period 1992–2014 because our analyses involve managerial compensation data. We limit the sample to firms with sufficient annual data to calculate the variables listed in

Table AI. Consistent with the literature (Dittmar, 2000; Bens *et al.*, 2003; Roychowdhury, 2006; Cohen *et al.*, 2008), we exclude firms in regulated industries (SIC codes 4400–4999) and financial institutions (SIC codes 6000–6999) from the sample. In order to control for outliers, we delete firm-years with *REPUR*, *SHR* and *OPTN* at the extreme 99th percentile levels and all other continuous variables at the 1st and 99th percentiles of their respective distributions (Burgstahler and Dichev, 1997; Dechow *et al.*, 1998, 2003). Our final sample includes 13,646 firm-years.

#### 4. Empirical results

Table I presents the summary statistics for the variables that we use in the empirical analyses. With regard to the entire sample, open-market repurchases average 1.9 percent of the market value of equities and FCF is approximately 4.0 percent of beginning assets ( $FCF = 0.045$ ). While *ACFO* has a mean of 0.066, *Pre\_FCF* has a mean of  $-0.021$ . The mean of *ATA* is  $-0.029$ . On average, a firm's stock price has increased ( $RET = 0.118$ ).

Panel A of Table II presents a correlation matrix of the study's main variables. All coefficients are significant at the 1 percent level. The significant positive correlations between *REPUR* and cash flow proxies (*FCF*, *Pre\_FCF* and *ACFO*) are consistent with *H1*. *REPUR* negatively relates to *ATA*, indicating the importance of controlling for the abnormal accruals prior to repurchases. Panel B reports the magnitude of repurchases given the sign of cash flows. The first row shows that when *FCF* is negative, the mean of *REPUR* is 0.010 and when *FCF* is positive, the mean of *REPUR* is 0.021. The difference of the two groups is significant at the 1 percent level. Similarly, the magnitude of repurchase is also significantly different between the negative *Pre\_FCF* group and positive *Pre\_FCF* group, and between negative *ACFO* group and positive *ACFO* group.

Variable	Mean	Median	SD	25th Pctl.	75th Pctl.
<i>REPUR</i>	0.019	0.000	0.031	0.000	0.029
<i>FCF</i>	0.045	0.045	0.077	0.003	0.089
<i>Pre_FCF</i>	-0.021	-0.014	0.071	-0.053	0.018
<i>ACFO</i>	0.066	0.062	0.086	0.011	0.117
<i>COVRG</i>	2.058	2.079	0.755	1.609	2.639
<i>ATA</i>	-0.029	-0.027	0.062	-0.065	0.009
<i>RET</i>	0.118	0.105	0.259	-0.050	0.273
<i>EPSDUM</i>	0.867	1.000	0.339	1.000	1.000
<i>SHR</i>	0.039	0.012	0.068	0.004	0.035
<i>OPTN</i>	0.026	0.020	0.022	0.009	0.036
<i>SIZE</i>	7.274	7.146	1.350	6.287	8.172
<i>GRWTH</i>	0.093	0.086	0.169	0.013	0.171
<i>LEV</i>	0.183	0.177	0.148	0.032	0.293
<i>StdROA</i>	0.031	0.021	0.031	0.011	0.040
<i>CAPEX</i>	0.056	0.041	0.049	0.023	0.072
<i>RETAIN</i>	0.543	0.623	0.726	0.298	0.884

**Notes:**  $n = 13,646$ . *REPUR* is open-market repurchases; *FCF* is free cash flow; *Pre\_FCF* is pre-managed free cash flow; *ACFO* is abnormal cash flow from operations; *COVRG* is lagged value of natural logarithm of analyst coverage; *RET* is average stock returns; *ATA* is lagged value of abnormal total accruals; *EPSDUM* is earnings per share dummy variable; *SHR* is lagged value of management shareholdings; *OPTN* is lagged value of management option holdings; *SIZE* is lagged value of natural logarithm of market value; *GRWTH* is lagged value of changes in the natural logarithm of sales; *LEV* is lagged value of total debt over total assets; *StdROA* is standard deviation of operating income over total assets; *CAPEX* is lagged value of capital expenditures scaled by total assets; *RETAIN* is lagged value of retained earnings over book value of equity. Variables are defined in Table AI

**Table I.**  
Descriptive statistics

**Table II.**  
Correlation  
coefficients and  
univariate analysis

Panel A. Person correlation coefficients					
	REPUR	FCF	Pre_FCF	ACFO	COVRG
FCF	0.198***				
Pre_FCF	0.098***	0.328***			
ACFO	0.098***	0.630***	-0.528***		
COVRG	0.116***	0.052***	-0.104***	0.132***	
ATA	-0.114***	-0.268***	0.047***	-0.279***	-0.089***

  

Panel B. Comparison of the level of repurchases between groups with positive vs negative cash flows					
Classification variable	(1) Negative values		(2) Positive values		(2)-(1)
	n	REPUR	n	REPUR	Difference
FCF	3,213	0.010	10,433	0.021	0.011***
Pre_FCF	8,425	0.018	5,221	0.021	0.003***
ACFO	2,744	0.013	10,902	0.020	0.007***

**Notes:** n = 13,646. Variables are defined in Table A1. \*\*\*Denotes significance at the 1 percent level

We extend our univariate analysis by examining the association between FCF and repurchases controlling for other factors prior research has shown to affect repurchases. Table III reports the results of our multivariate tests of *H1*. The first two columns show that the coefficient of *FCF* in the baseline model is 0.147 ( $p < 0.001$ ), consistent with the FCF theory. For model (1) results, the coefficient for *Pre\_FCF* is 0.184 ( $p < 0.001$ ), and that for *ACFO* is 0.133 ( $p < 0.001$ ). These results suggest that both pre-managed FCF and abnormal cash flows contribute to the positive association between *FCF* and repurchases, supporting *H1a* and *H1b*. The higher coefficient for *Pre\_FCF* than that for *ACFO* also suggests that repurchases is more sensitive to pre-managed cash flows than to abnormal cash flows ( $p < 0.001$  for the test of the difference), consistent with the notion that the effect of REM on operating performance is more uncertain, which in turn influences firms' payout decision. Furthermore, the sign for all the control variables are consistent with prior literature (Dittmar, 2000; Fenn and Liang, 2001; Kahle, 2002; Bens *et al.*, 2003; Gong *et al.*, 2008).

**Table III.**  
The association  
between FCF  
and repurchases:  
results for *H1*

Variable	(a) FCF		(b) PRE_FCF and ACFO	
	Estimate	p-value	Estimate	p-value
Intercept	-0.100	< 0.001	-0.107	< 0.001
FCF	0.147	< 0.001		
Pre_FCF			0.184	< 0.001
ACFO			0.133	< 0.001
ATA	-0.066	< 0.001	-0.072	< 0.001
RET	-0.020	< 0.001	-0.019	< 0.001
EPSDUM	0.018	< 0.001	0.018	< 0.001
SHR	-0.047	< 0.001	-0.045	< 0.001
OPTN	0.314	< 0.001	0.317	< 0.001
SIZE	0.009	< 0.001	0.010	< 0.001
GRWTH	-0.050	< 0.001	-0.049	< 0.001
LEV	-0.039	< 0.001	-0.039	< 0.001
StdROA	-0.153	< 0.001	-0.149	< 0.001
CAPEX	-0.059	< 0.001	-0.027	0.103
RETAIN	0.007	< 0.001	0.007	< 0.001
Industry dummies	Controlled		Controlled	
Year dummies	Controlled		Controlled	
Number of observations	13,646		13,646	
Maximum log likelihood	4,460		4,473	

**Note:** Variables are defined in Table A1



Table IV presents the results for *H2*. The first two columns show that the interaction of FCF and analyst coverage (*FCF*×*COVRG*) is insignificant ( $p = 0.139$ ). For our model (2), the coefficient for *Pre\_FCF*×*COVRG* is significantly positive ( $\beta_3 = 0.041, p = 0.002$ ), while that for *ACFO*×*COVRG* is insignificantly different from zero ( $p = 0.587$ ). The significant positive coefficient on *Pre\_FCF*×*COVRG* is consistent with the notion that analyst following mitigates management's cash-wasting behaviors (Jung *et al.*, 2012), supporting *H2a*. On the other hand, the significant positive coefficient on *ACFO* and the insignificant coefficient on *ACFO*×*COVRG* suggest that higher analyst coverage does not change the positive association between abnormal cash flows and repurchases. This result does not reject the null hypothesis of *H2b*. The positive coefficient on *Pre\_FCF*×*COVRG* could either be driven by the positive or negative *Pre\_FCF*, or both, depending on whether managers are more likely to increase distribution of extra cash flows and/or to cut distribution of deficit cash flows under high analyst coverage. We thus conduct the additional test and report the results in Section 5.

The multiple regression results for testing *H3* are reported in Table V. The coefficient for *FCF*×*Crisis* is 0.053 and is significantly positive ( $p = 0.013$ ) in the baseline model. The last two columns show that while the coefficient on *Pre\_FCF*×*Crisis* is insignificant ( $p = 0.396$ ), the coefficient on *ACFO*×*Crisis* is significantly positive ( $\beta_4 = 0.059, p = 0.007$ ). These results thus do not reject the null hypothesis of *H3a*, but reject the null hypothesis of *H3b*, suggesting that the association between abnormal cash flows and repurchases is strengthened during the financial crisis period. There could be two alternative explanations for the strengthened positive effect. On the one hand, firms could increase repurchases when *ACFO* is positive. If this is the case, we should find that the positive coefficient on the interaction term is driven by positive *ACFO*. On the other hand, firms may decrease repurchase to a greater extent when *ACFO* is negative. If this is the case, we should find that the significant coefficient on the interaction term is driven by negative *ACFO*. The results of these additional tests are reported below.

Variable	(a) <i>FCF</i>		(b) <i>PRE_FCF</i> and <i>ACFO</i>	
	Estimate	<i>p</i> -value	Estimate	<i>p</i> -value
<i>Intercept</i>	-0.100	< 0.001	-0.109	< 0.001
<i>FCF</i>	0.117	< 0.001		
<i>FCF</i> × <i>COVRG</i>	0.015	0.139		
<i>Pre_FCF</i>			0.099	0.001
<i>ACFO</i>			0.122	< 0.001
<i>Pre_FCF</i> × <i>COVRG</i>			0.041	0.002
<i>ACFO</i> × <i>COVRG</i>			0.006	0.587
<i>COVRG</i>	-0.002	0.181	-0.001	0.463
<i>ATA</i>	-0.066	< 0.001	-0.073	< 0.001
<i>RET</i>	-0.021	< 0.001	-0.020	< 0.001
<i>EPSDUM</i>	0.018	< 0.001	0.018	< 0.001
<i>SHR</i>	-0.048	< 0.001	-0.046	< 0.001
<i>OPTN</i>	0.317	< 0.001	0.319	< 0.001
<i>SIZE</i>	0.010	< 0.001	0.010	< 0.001
<i>GRWTH</i>	-0.050	< 0.001	-0.049	< 0.001
<i>LEV</i>	-0.039	< 0.001	-0.039	< 0.001
<i>StdROA</i>	-0.152	< 0.001	-0.147	< 0.001
<i>CAPEX</i>	-0.056	< 0.001	-0.021	0.208
<i>RETAIN</i>	0.007	< 0.001	0.007	< 0.001
Industry dummies	Controlled		Controlled	
Year dummies	Controlled		Controlled	
Number of observations	13,646		13,646	
Maximum log likelihood	4,462		4,479	

Note: Variables are defined in Table AI

Table IV.  
The role of  
analyst coverage:  
results for *H2*

Variable	(a) FCF		(b) PRE_FCF and ACFO	
	Estimate	p-value	Estimate	p-value
<i>Intercept</i>	-0.100	< 0.001	-0.106	< 0.001
<i>FCF</i>	0.140	< 0.001		
<i>FCF×Crisis</i>	0.053	0.013		
<i>Pre_FCF</i>			0.180	< 0.001
<i>ACFO</i>			0.125	< 0.001
<i>Pre_FCF×Crisis</i>			0.024	0.396
<i>ACFO×Crisis</i>			0.059	0.007
<i>ATA</i>	-0.066	< 0.001	-0.072	< 0.001
<i>RET</i>	-0.020	< 0.001	-0.019	< 0.001
<i>EPSDUM</i>	0.018	< 0.001	0.018	< 0.001
<i>SHR</i>	-0.047	< 0.001	-0.046	< 0.001
<i>OPTN</i>	0.314	< 0.001	0.316	< 0.001
<i>SIZE</i>	0.009	< 0.001	0.010	< 0.001
<i>GRWTH</i>	-0.050	< 0.001	-0.049	< 0.001
<i>LEV</i>	-0.039	< 0.001	-0.039	< 0.001
<i>StdROA</i>	-0.152	< 0.001	-0.147	< 0.001
<i>CAPEX</i>	-0.060	< 0.001	-0.027	0.096
<i>RETAIN</i>	0.007	< 0.001	0.007	< 0.001
Industry dummies	Controlled		Controlled	
Year dummies	Controlled		Controlled	
Number of observations	13,646		13,646	
Maximum log likelihood	4,464		4,477	

**Table V.**  
The role of financial crisis: results for H3

**Note:** Variables are defined in Table AI

## 5. Supplemental analyses

In this section, we first explore the effect of positive vs negative cash flows as mentioned above. Panel A of Table VI reports the results for H2 when we divide *Pre\_FCF* into positive and negative values. The coefficients on the two interactions with *COVRG* are 0.054 and 0.044, respectively, and both are significant at the 5 percent level. Thus, the results suggest that analysts effectively monitor managers to increase distribution when they have extra pre-managed cash flows and to decrease distribution when they are short of pre-managed cash flows. Panel B presents the results for H3 when we divide *ACFO* into positive and negative values. While the coefficient on *Negative\_ACFO×Crisis* is significantly positive ( $p = 0.004$ ), the coefficient on *Positive\_ACFO×Crisis* is insignificant ( $p = 0.257$ ). The results imply that during the financial crisis period, firms would reduce their repurchase to a greater extent when they report a negative *ACFO*, probably due to the changes of the effect of *ACFO* on financial performance.

Our next supplemental test thus relates to the effect of abnormal cash flows on financial performance. We extend the model proposed by Gong *et al.* (2008) by including abnormal cash flows and the interactions with *Crisis* into the model. Specifically, we employ model (4) for two period tests:

$$\begin{aligned}
 ROACH = & \beta_0 + \beta_1 Positive\_ACFO + \beta_2 Negative\_ACFO + \beta_3 ATA \\
 & + \beta_4 Positive\_ACFO \times Crisis + \beta_5 Negative\_ACFO \times Crisis \\
 & + \beta_6 ATA \times Crisis + \beta_7 SIZE + \beta_8 MTB + \beta_9 LEV \\
 & + \beta_{10} CASH + \sum \gamma_k Industry_k + \sum \delta_t Year_t + \varepsilon.
 \end{aligned} \tag{6}$$

*ROACH* is the percentage changes of *ROA* relative to year  $t-1$ . It either equals the changes of year  $t$  relative to year  $t-1$  (*ROACH0*) or the changes of year  $t+1$  relative to year  $t-1$

Variable	Estimate	p-value
<i>Panel A. The effect of positive and negative Pre_FCF</i>		
Intercept	-0.096	< 0.001
Positive_Pre_FCF	0.079	0.166
Negative_Pre_FCF	0.112	0.004
ACFO	0.124	< 0.001
Positive_Pre_FCF×COVRG	0.054	0.035
Negative_Pre_FCF×COVRG	0.044	0.010
ACFO×COVRG	0.010	0.348
COVRG	-0.002	0.258
Other controls	Included	
Industry dummies	Controlled	
Year dummies	Controlled	
Number of observations	13,646	
Maximum log likelihood	4,379	
<i>Panel B. The effect of positive and negative ACFO</i>		
Intercept	-0.093	< 0.001
Pre_FCF	0.195	< 0.001
Positive_ACFO	0.125	< 0.001
Negative_ACFO	0.179	< 0.001
Pre_FCF×Crisis	0.034	0.237
Positive_ACFO×Crisis	0.029	0.257
Negative_ACFO×Crisis	0.221	0.004
Other controls	Included	
Industry dummies	Controlled	
Year dummies	Controlled	
Number of observations	13,646	
Maximum log likelihood	4,380	

FCF motive  
for stock  
repurchases

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**Table VI.**  
The effect of  
positive and  
negative cash flows

**Notes:** Variables are defined in Table AI. Other controls are as those included in Tables III–V

(*ROACHI*). Both *Positive\_ACFO* and *Negative\_ACFO* are measures of year *t*. All the other variables, including abnormal total accruals (*ATA*), firm size (*SIZE*), market to book value of equity (*MTB*), firm leverage (*LEV*) and cash holding (*CASH*), are measured at year *t*–1. The samples are smaller due to the missing values of the new variables. The regression results are reported in Table VII. The first two columns show that there is a weak effect of *Crisis* on the association between *Negative\_ACFO* and changes of *ROA* ( $p = 0.093$ ) in the year of repurchases. And the last two columns show a significant effect of *Crisis* on the association between *Negative\_ACFO* and next period *ROA* performance ( $p = 0.035$ ). In addition, consistent with Gong *et al.* (2008), we find a reversal of abnormal accruals over a one-year and two-year horizons.

Overall, the findings in Tables VI and VII are consistent with the notion that when firms have to decrease their net operating cash flows, for example, when they have to offer price discounts, pay more for production/suppliers or to increase their SGA, the effect of such manipulation on financial performance is more pronounced during the financial crisis period. As a result, firms decrease repurchases to a greater extent when they report negative *ACFO* during the financial crisis period.

Our third supplemental analysis is to address the effect of 2003 tax reform in firms' propensity to distribute cash through repurchases. We re-run our tests for periods after 2003, and report our results in Table VIII. Similar to Table VI, Panel A shows that analyst coverage influences the association between *Pre\_FCF* and repurchases through both positive *Pre\_FCF* ( $p = 0.022$ ) and negative *Pre\_FCF* ( $p = 0.056$ ). In addition, Panel B shows that during the financial crisis period, the effect of negative *ACFO* is strengthened ( $p = 0.050$ ).

ARA 28,2	Variable	ROACH0		ROACH1	
		Estimate	p-value	Estimate	p-value
224	<i>Intercept</i>	0.034	0.822	0.079	0.609
	<i>Positive_ACFO</i>	1.657	< 0.001	0.874	0.029
	<i>Negative_ACFO</i>	2.163	0.009	0.365	0.762
	<i>ATA</i>	-1.026	0.000	-1.083	0.003
	<i>Positive_ACFO</i> × <i>Crisis</i>	1.440	0.120	-0.864	0.337
	<i>Negative_ACFO</i> × <i>Crisis</i>	7.678	0.093	7.063	0.035
	<i>ATA</i> × <i>Crisis</i>	-0.647	0.485	1.018	0.309
	<i>SIZE</i>	-0.011	0.436	-0.015	0.418
	<i>MTB</i>	-0.011	0.171	-0.048	< 0.0001
	<i>LEV</i>	0.394	0.002	0.929	< 0.0001
	<i>CASH</i>	-0.417	0.003	-0.250	0.180
	Industry dummies	Controlled		Controlled	
	Year dummies	Controlled		Controlled	
	Number of observations	12,884		10,035	
	Adjusted R <sup>2</sup>	0.051		0.051	

**Table VII.**  
The effect of  
manipulation on  
earnings performance

**Notes:** *ROACH0* is the percentage changes of *ROA* in year *t*; *ROACH1* is the percentage changes of *ROA* in year *t+1*; *ACFO* is abnormal cash flow from operations; *ATA* is lagged value of discretionary accruals; *SIZE* is lagged value of natural logarithm of market value; *MTB* is lagged value of market to book value; *LEV* is lagged value of total debt over total assets; *CASH* is lagged value of cash holding

Variable	Estimate	p-value
<i>Panel A. The effect of positive and negative Pre_FCF</i>		
<i>Intercept</i>	-0.113	< 0.001
<i>Positive_Pre_FCF</i>	0.017	0.828
<i>Negative_Pre_FCF</i>	0.139	0.008
<i>ACFO</i>	0.149	< 0.001
<i>Positive_Pre_FCF</i> × <i>COVRG</i>	0.077	0.022
<i>Negative_Pre_FCF</i> × <i>COVRG</i>	0.043	0.056
<i>ACFO</i> × <i>COVRG</i>	0.001	0.915
<i>COVRG</i>	0.001	0.636
Other controls	Included	
Industry dummies	Controlled	
Year dummies	Controlled	
Number of observations	7,794	
Maximum log likelihood	3,106	
<i>Panel B. The effect of positive and negative ACFO</i>		
<i>Intercept</i>	-0.112	< 0.001
<i>Pre_FCF</i>	0.207	< 0.001
<i>Positive_ACFO</i>	0.122	< 0.001
<i>Negative_ACFO</i>	0.235	< 0.001
<i>Pre_FCF</i> × <i>Crisis</i>	0.040	0.195
<i>Positive_ACFO</i> × <i>Crisis</i>	0.024	0.384
<i>Negative_ACFO</i> × <i>Crisis</i>	0.162	0.050
Other controls	Included	
Industry dummies	Controlled	
Year dummies	Controlled	
Number of observations	7,794	
Maximum log likelihood	3,106	

**Table VIII.**  
Controlling for the  
effect of tax policy

**Notes:** Variables are defined in Table AI. Other controls are as those included in Tables III–V

The last test examines the sensitivity of our results to including cash holdings (*CASH*) in our main regressions. While most prior studies only examine the effect of cash flows on repurchases (Stephens and Weisbach, 1998; Leng and Noronha, 2013; Jagannathan *et al.*, 2000; Guay and Harford, 2000), Dittmar (2000) includes both cash flows and cash holdings in the model. To address the concern about the sensitivity of our results, we re-run all the tests in Tables III–VI and VIII after including *CASH* into the regressions. All the results, untabulated, are consistent with our main tests, suggesting the robustness of our results.

## 6. Conclusion

While prior studies on the association between cash flows and repurchases focus either on expected/unexpected cash flows (Stephens and Weisbach, 1998; Leng and Noronha, 2013), or on permanent/temporary cash flows (Jagannathan *et al.*, 2000; Guay and Harford, 2000), none of them examines the role of abnormal cash flows on repurchases. Due to the potential cost of REM, it is an unknown question whether firms use abnormal cash flows for share repurchases. First, this paper shows that the previously documented positive association between FCF and stock repurchases is partially driven by abnormal cash flows. Second, the association between pre-managed FCF and stock repurchases is strengthened as analyst coverage increases, suggesting the effectiveness of analysts as an external monitor. Third, during the 2008 financial crisis period, the tendency to decrease repurchases when firms show negative abnormal cash flows gets stronger as the effect of negative abnormal cash flows on operating performance is strengthened. This paper thus provides incremental evidence about the FCF theory of repurchases.

## Notes

1. We examine open-market repurchases because these are the dominant form of repurchases by US firms (Grullon and Ikenberry, 2000; Hsieh and Wang, 2009).
2. Because these data overstate open-market stock repurchases, we make adjustments following the literature. Please see Dittmar (2000, p. 336) for further discussion.

## References

- Ali, A. and Zhang, W. (2015), "CEO tenure and earnings management", *Journal of Accounting and Economics*, Vol. 59 No. 1, pp. 60-79.
- Bens, D.A., Nagar, V. and Wong, M.F. (2002), "Real investment implications of employee stock option exercises", *Journal of Accounting Research*, Vol. 40 No. 2, pp. 359-393.
- Bens, D.A., Nagar, V., Skinner, D.J. and Wong, M.F. (2003), "Employee stock options, EPS dilution, and stock repurchases", *Journal of Accounting and Economics*, Vol. 36 No. 1, pp. 51-90.
- Berger, P.G., Ofek, E. and Yermack, D.L. (1997), "Managerial entrenchment and capital structure decisions", *The Journal of Finance*, Vol. 52 No. 4, pp. 1411-1438.
- Bergstresser, D. and Philippon, T. (2006), "CEO incentives and earnings management", *Journal of Financial Economics*, Vol. 80 No. 3, pp. 511-529.
- Brav, A., Graham, J.R., Harvey, C.R. and Michaely, R. (2005), "Payout policy in the 21st century", *Journal of Financial Economics*, Vol. 77 No. 3, pp. 483-527.
- Burgstahler, D. and Dichev, I. (1997), "Earnings management to avoid earnings decreases and losses", *Journal of Accounting and Economics*, Vol. 24 No. 1, pp. 99-126.
- Choi, J.H., Kim, J.B. and Lee, J.J. (2011), "Value relevance of discretionary accruals in the Asian financial crisis of 1997–1998", *Journal of Accounting and Public Policy*, Vol. 30 No. 2, pp. 166-187.
- Cohen, D. and Zarowin, P. (2010), "Accrual-based and real earnings management activities around seasoned equity offerings", *Journal of Accounting and Economics*, Vol. 50 No. 1, pp. 2-19.

- Cohen, D., Dey, A. and Lys, T. (2008), "Real and accrual-based earnings management in the pre- and post-Sarbanes-Oxley periods", *The Accounting Review*, Vol. 83 No. 3, pp. 757-787.
- Dechow, P., Kothari, S. and Watts, R. (1998), "The relation between earnings and cash flows", *Journal of Accounting and Economics*, Vol. 25 No. 2, pp. 133-168.
- Dechow, P., Richardson, S. and Tuna, I. (2003), "Why are earnings kinky? An examination of the earnings management explanation", *Review of Accounting Studies*, Vol. 8 No. 2, pp. 355-384.
- Dechow, P., Sloan, R. and Sweeney, A. (1995), "Detecting earnings management", *The Accounting Review*, Vol. 70 No. 2, pp. 193-225.
- Dechow, P.M. and Sloan, R.G. (1991), "Executive incentives and the horizon problem: an empirical investigation", *Journal of Accounting and Economics*, Vol. 14 No. 1, pp. 51-89.
- Denis, D.J. and Osobov, I. (2008), "Why do firms pay dividends? International evidence on the determinants of dividend policy", *Journal of Financial Economics*, Vol. 89 No. 1, pp. 62-82.
- Dichev, I.D., Graham, J.R., Harvey, C.R. and Rajgopal, S. (2013), "Earnings quality: evidence from the field", *Journal of Accounting and Economics*, Vol. 56 Nos 2-3, pp. 1-33.
- Dittmar, A.K. (2000), "Why do firms repurchase stock?", *The Journal of Business*, Vol. 73 No. 3, pp. 331-355.
- Easterbrook, F.H. (1984), "Two agency-cost explanations of dividends", *The American Economic Review*, Vol. 74 No. 4, pp. 650-659.
- Farinha, J. (2003), "Dividend policy, corporate governance and the managerial entrenchment hypothesis: an empirical analysis", *Journal of Business Finance & Accounting*, Vol. 30 Nos 9-10, pp. 1173-1209.
- Fenn, G.W. and Liang, N. (2001), "Corporate payout policy and managerial stock incentives", *Journal of Financial Economics*, Vol. 60 No. 1, pp. 45-72.
- Floyd, E., Li, N. and Skinner, D.J. (2015), "Payout policy through the financial crisis: the growth of repurchases and the resilience of dividends", *Journal of Financial Economics*, Vol. 118 No. 2, pp. 299-316.
- Francis, B., Hasan, I. and Wu, Q. (2013), "The benefits of conservative accounting to shareholders: evidence from the financial crisis", *Accounting Horizons*, Vol. 27 No. 2, pp. 319-346.
- Gong, G., Louis, H. and Sun, A. (2008), "Earnings management and firm performance following open-market repurchases", *The Journal of Finance*, Vol. 63 No. 2, pp. 947-986.
- Graham, J.R., Harvey, C.R. and Rajgopal, S. (2005), "The economic implications of corporate financial reporting", *Journal of Accounting and Economics*, Vol. 40 Nos 1-3, pp. 3-73.
- Grullon, G. and Ikenberry, D. (2000), "What do we know about stock repurchases?", *Journal of Applied Corporate Finance*, Vol. 13 No. 1, pp. 31-51.
- Grullon, G. and Michaely, R. (2002), "Dividends, share repurchases, and the substitution hypothesis", *The Journal of Finance*, Vol. 57 No. 4, pp. 1649-1684.
- Guay, W. and Harford, J. (2000), "The cash-flow permanence and information content of dividend increases versus repurchases", *Journal of Financial Economics*, Vol. 57 No. 3, pp. 385-415.
- Gunny, K.A. (2010), "The relation between earnings management using real activities manipulation and future performance: evidence from meeting earnings benchmarks", *Contemporary Accounting Research*, Vol. 27 No. 3, pp. 855-888.
- Healy, P. and Palepu, K. (2001), "Information asymmetry, corporate disclosure, and the capital market: a review of empirical disclosure literature", *Journal of Accounting and Economics*, Vol. 31 Nos 1-3, pp. 405-440.
- Healy, P.M. and Wahlen, J.M. (1999), "A review of the earnings management literature and its implications for standard setting", *Accounting horizons*, Vol. 13 No. 4, pp. 365-383.
- Hribar, P., Jenkins, N.T. and Johnson, W.B. (2006), "Stock repurchases as an earnings management device", *Journal of Accounting and Economics*, Vol. 41 Nos 1-2, pp. 3-27.

- Hsieh, J. and Wang, Q. (2009), "Stock repurchases: theory and evidence, part 1", in Baker, H.K. (Ed.), *Dividends and Dividend Policy*, John Wiley & Sons, Hoboken, NJ, pp. 239-260.
- Irani, R.M. and Oesch, D. (2016), "Analyst coverage and real earnings management: quasi-experimental evidence", *Journal of Financial and Quantitative Analysis*, Vol. 51 No. 2, pp. 589-627.
- Jagannathan, M., Stephens, C.P. and Weisbach, M.S. (2000), "Financial flexibility and the choice between dividends and stock repurchases", *Journal of Financial Economics*, Vol. 57 No. 3, pp. 355-384.
- Jensen, M. and Meckling, W. (1976), "Theory of the firm: managerial behavior, agency cost, and ownership structure", *Journal of Financial Economics*, Vol. 3 No. 4, pp. 305-360.
- Jensen, M.C. (1986), "Agency costs of free cash flow, corporate finance, and takeovers", *The American Economic Review*, Vol. 76 No. 2, pp. 323-329.
- Jones, J.J. (1991), "Earnings management during import relief investigations", *Journal of Accounting Research*, Vol. 29 No. 2, pp. 193-228.
- Jung, B., Sun, K.J. and Yang, Y.S. (2012), "Do financial analysts add value by facilitating more effective monitoring of firms' activities?", *Journal of Accounting, Auditing & Finance*, Vol. 27 No. 1, pp. 61-99.
- Kahle, K.M. (2002), "When a buyback isn't a buyback: open market repurchases and employee options", *Journal of Financial Economics*, Vol. 63 No. 2, pp. 235-261.
- Kothari, S., Leone, A. and Wasley, C. (2005), "Performance matched discretionary accrual measures", *Journal of Accounting and Economics*, Vol. 39 No. 1, pp. 163-197.
- Kothari, S.P., Mizik, N. and Roychowdhury, S. (2015), "Managing for the moment: the role of earnings management via real activities versus accruals in SEO valuation", *The Accounting Review*, Vol. 91 No. 2, pp. 559-586.
- Leng, F. and Noronha, G. (2013), "Information and long-term stock performance following open-market share repurchases", *Financial Review*, Vol. 48 No. 3, pp. 461-487.
- Lie, E. (2005), "Operating performance following open market share repurchase announcements", *Journal of Accounting and Economics*, Vol. 39 No. 3, pp. 411-436.
- Matsunaga, S.R. and Park, C.W. (2001), "The effect of missing a quarterly earnings benchmark on the CEO's annual bonus", *The Accounting Review*, Vol. 76 No. 3, pp. 313-332.
- Roychowdhury, S. (2006), "Earnings management through real activities manipulation", *Journal of Accounting and Economics*, Vol. 42 No. 3, pp. 335-370.
- Skinner, D.J. (2008), "The evolving relation between earnings, dividends, and stock repurchases", *Journal of Financial Economics*, Vol. 87 No. 3, pp. 582-609.
- Stephens, C.P. and Weisbach, M.S. (1998), "Actual share reacquisitions in open-market repurchase programs", *The Journal of Finance*, Vol. 53 No. 1, pp. 313-333.
- Trombetta, M. and Imperatore, C. (2014), "The dynamic of financial crises and its non-monotonic effects on earnings quality", *Journal of Accounting and Public Policy*, Vol. 33 No. 3, pp. 205-232.
- Vorst, P. (2016), "Real earnings management and long-term operating performance: the role of reversals in discretionary investment cuts", *The Accounting Review*, Vol. 91 No. 4, pp. 1219-1256.

<i>REPUR</i>	Open-market repurchases, = dollar value of open-market repurchases divided by market value of equity at the beginning of the year
<i>CFO</i>	Cash flow from operations
<i>FCF</i>	Free cash flow, = <i>CFO</i> minus capital expenditures and cash dividends scaled by beginning assets
<i>ACFO</i>	Abnormal cash flow from operations, = Residual from the following regression for each two-digit SIC industry per year: $CFO_{i,t}/Assets_{i,t-1} = \alpha_0(1/Assets_{i,t-1}) + \alpha_1(Sales_{i,t}/Assets_{i,t-1}) + \alpha_2(\Delta Sales_{i,t}/Assets_{i,t-1}) + e_{i,t}$
<i>Pre_FCF</i>	Pre-managed free cash flow, = $FCF - ACFO$
<i>TA</i>	Total accruals, = income before extraordinary items
<i>PPE</i>	Property, plant and equipment
<i>ROA</i>	Return on assets
<i>ATA</i>	Lagged value of discretionary accruals, where discretionary accruals = residual from the following regression for each two-digit SIC industry per year: $TA_{i,t}/Assets_{i,t-1} = \alpha_0(1/Assets_{i,t-1}) + \alpha_1(\Delta Sales_{i,t}/Assets_{i,t-1}) + \alpha_2(PPE_{i,t}/Assets_{i,t-1}) + \alpha_3ROA_{i,t} + e_{i,t}$
<i>RET</i>	Average stock returns, = the average of percentage change in closing stock price of the current year and prior year
<i>EPSDUM</i>	Earnings per share dummy variable, = 1 if <i>EPS</i> is $\geq 0$ , and 0 otherwise
<i>SHR</i>	Lagged value of shareholdings, = management shareholdings scaled by shares outstanding
<i>OPTN</i>	Lagged value of option holdings, = management option holdings scaled by shares outstanding
<i>SIZE</i>	Lagged value of natural logarithm of market value
<i>GRWTH</i>	Lagged value of changes in the natural logarithm of sales
<i>LEV</i>	Lagged value of total debt over total assets
<i>StdROA</i>	Standard deviation of operating income over total assets in the past three fiscal years (excluding the current year)
<i>CAPEX</i>	Lagged value of capital expenditures scaled by total assets
<i>RETAIN</i>	Lagged value of retained earnings over book value of equity
<i>COVRG</i>	The natural logarithm of analyst coverage
<i>Crisis</i>	Financial crisis dummy variable, = 1 if in years 2008, 2009 or 2010, and 0 otherwise
<i>ROACH0</i>	The percentage changes of <i>ROA</i> in year <i>t</i> relative to year <i>t</i> -1
<i>ROACH1</i>	The percentage changes of <i>ROA</i> in year <i>t</i> +1 relative to year <i>t</i> -1
<i>MTB</i>	Lagged value of market to book value
<i>CASH</i>	Lagged value of cash holding scaled by total assets

**Table A1.**  
Variable definition

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