

## **Effect of earnings management on firms' stock repurchases behavior**

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### **ABSTRACT**

Prior studies find that firms demonstrate a tendency to make more stock repurchases when management believes their firm's stock is undervalued (Dittmar and Field 2015). Prior research (Hribar et al. 2006) provides evidence that firms may utilize stock repurchase plans to manage their reported earnings per share (EPS). The current study examines the cost of using stock repurchase plans as a tool for earnings management. The analysis is performed utilizing tobit regression model with quarterly data from 2000 to 2010. The study provides empirical evidence that while firms, on average, tend to buy back more shares when the stock price is low relative to the intrinsic value, consideration about current stock price levels relative to the intrinsic value has no significant association with the actual repurchase transactions of firms utilizing stock repurchases as a tool for earnings management. This finding indicates that using stock repurchases as a tool for earnings management constraints firms' ability to control the timing of stock repurchases when manage perceive their stock price as low in relation to the intrinsic value and thus forces them to give up the opportunity to take advantage of temporary undervaluation of their firms' shares. The study contributes to the earnings management literature by examining one of the economic consequences of earnings management through stock repurchases.

Keywords: stock repurchases, real earnings management, intrinsic value, cost, consequence

## INTRODUCTION

The stock repurchase literature has documented that managers tend to take advantage of the inherent flexibility in open market repurchase programs to time their repurchases when management perceive their stock price as temporarily undervalued (Dittmar and Field 2015; Ben-Raphael et al. 2014).<sup>1</sup> These studies find that firms will adjust the timing and scale of actual buybacks based on management's perception of the stock's valuation level relative to the intrinsic value. They find firms are likely to make more stock repurchases when their firms' stock price is temporality depressed and decrease repurchases when their price is high following the announcements of their stock repurchase plans.

On the other side, prior research provides evidence that firms repurchase stock in an attempt to increase reported earnings per share (EPS) in order to meet or beat analysts' quarterly earnings forecasts (Hribar et al. 2006). Chan et al. (2010) show that certain firms use repurchases as a tool to mislead investors. It is possible that managers may disregard the difference between stock price and "true" value when trying to increase current quarter EPS through stock repurchases in order to avoid missing analyst forecasts. As a result, managers would need to repurchase a certain number of shares within that quarter, even though their stock is not undervalued as compared with the estimated intrinsic value. The current study investigates whether using stock repurchases to manage earnings constraints firms' ability in timing their actual repurchases when the stock price is low relative to management perceived intrinsic value.<sup>2</sup>

The test results are consistent with this hypothesis. While the difference between the stock price and intrinsic value plays a more significant role in determining actual stock repurchases for firms engaged in stock repurchases for reasons other than earnings management, no significant association was found between stock valuation levels and quantity of stock repurchases for firms that attempt to meet analyst forecasts by utilizing stock repurchase to boost their earnings per share. The findings are robust to a variety of ways to estimate intrinsic value. The results suggest that using share buybacks to manipulate earnings undermines management's ability to exploit the inherent flexibility in stock buyback programs to adjust the magnitude and timing of repurchases to take advantage of undervaluation of the stock. The results suggest that stock repurchases are a costly tool for managing earnings. When stock repurchase programs are used to manage earnings, firms forfeit the opportunity to time their repurchases when the stock price is thought to be significantly lower than the intrinsic value.

This paper makes contributions to both stock earnings management and stock repurchases literature. First, prior studies find that firms tend to time their repurchases to take advantage of the undervaluation of their firm's market value. The current study documents a scenario where firms that manipulate earnings through stock repurchases do so regardless of the relationship between the firms' market and intrinsic values. This finding contributes to the stream of research focusing on factors affecting firms' stock repurchase decisions. Second, this

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<sup>1</sup> Prior studies (Jensen 1986; Stephens and Weisbach 1998; D'Mello and Shroff 2000) documents various factors that affect stock repurchases, including distribution of excess cash, dividend policy, capital structure, and stock option exercises. Firms' desire to exploit temporary stock misvaluation remains a significant factor that affects stock repurchases, even after controlling for other factors.

<sup>2</sup> The research question does not assume or imply that firms are systematically misvalued. The current study focuses on how managers utilize their private information in stock repurchase decisions. Managers use their private insider information on future performance to evaluate their firms' "true" value and compare their estimates of intrinsic value with market price. Since managers' private information is not available to the public at that time, the current study does not violate market efficiency.

study adds to the real earnings management literature by documenting a case where earnings management via stock repurchase programs is a costly modification of business activities. Specifically, when firms manage earnings via stock repurchase program, they ignore the relationship between the firm's market and intrinsic values.

## REVIEW OF LITERATURE

### Factors Related to Stock Repurchase Decisions

More than 45% of US public companies repurchased their own shares and they spent approximately \$364 billion in 2012 on stock buyback programs (Farre-Mensa et al., 2014).<sup>3</sup> To put this in perspective, recognize that this amount is close to the annual total capital expenditure (around \$400 billion) and twice as much as the annual total R&D expenditure of all S&P 500 companies.

Although firms that intend to conduct open market stock repurchases often make public announcements of their repurchase plans in advance, they actually have plenty of flexibility in controlling the magnitude and timing of actual share buybacks.<sup>4</sup> Prior literature (Stephens and Weisbach 1998; Ben-Rephael et al. 2014) documents significant dispersions in the magnitude and timing of firms' repurchase transactions following repurchase announcements. During three year period subsequent to announcements, over half of firms buy back more shares than the originally announced amounts, while a lot of companies make no repurchases at all. Cook et al. (2004) report cases where one firm finished the announced repurchase program in one trading day, while another firm took more than a year.

Dittmar and Field (2015) provide evidence that firms exploit the flexibility inherent in open market stock repurchase programs to gain from their shares' temporary misvaluation. They find that firms tend to make repurchases when the market conditions are favorable. Ben-Raphael, et al. (2014) use newer monthly data on U.S. repurchases and show evidence of timing ability within the month of the repurchases. In other words, the timing and quantity of actual repurchases following the announcements of buyback programs is largely determined by managers' perception on the valuation of their stock.

There is substantial evidence on the relation between stock repurchases and valuation. Stock repurchases tend to follow poor stock returns and are accompanied by positive returns around the announcement (Comment and Jarrel 1991). Moreover, investors can make significant abnormal returns from buying those firms' stock after repurchase announcements (Peyer and Vermaelen 2009). The majority of firms that make tender offers to buy back stock are undervalued relative to their intrinsic value. In addition, both the tender premium and the number of excess shares repurchased are positively related to the magnitude of undervaluation (D'Mello and Shroff 2000; Dittmar and Field 2015).

Prior studies also document various other motivations for stock repurchases, including distribution of excess cash, dividend policy, capital structure, and stock option exercises (Jensen 1986; Stephens and Weisbach 1998; D'Mello and Shroff 2000). Dittmar (2000) examines how these factors interrelate and affect firms stock repurchase decisions. She finds that firms buy

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<sup>3</sup> Stock repurchases can be conducted by open market repurchases, tender offers and Dutch auctions. Among the three forms of stock repurchases, open market repurchases are the most popular, accounting for 90% of dollar amount of all announced stock repurchase programs.

<sup>4</sup> Firms that announce stock repurchase plans are not obligated to actually buy back stock as described in the plans.

shares to take advantage of undervaluation throughout the sample period. Other factors, however, affect firms' repurchase decisions only during part of the sample period.

### **Stock Repurchases as Means of Earnings Management**

Prior research distinguish accruals earnings management from real earnings management (Schipper 1989; Healy and Wahlen 1999).<sup>5</sup> When firms utilize the accounting discretion in GAAP to affect reported financial performance, they are regarded as engaging in accruals earnings management. Real earnings management refers to opportunistic manipulation of real business activities for financial reporting purposes.<sup>6</sup>

Prior research find evidence on numerous kinds of real earnings management behavior. Manipulating the magnitude and timing of research and development (R&D) expenditures, production, and lending decisions (Bushee 1998; Roychowdhury 2006; Ertan 2016) are examples of real earnings management activities. Specifically, Bens et al. (2003) document that firms make stock repurchases to counter the dilution effect of stock option exercises on earnings per share (EPS). Hribar et al. (2006) provide evidence that firms repurchase their shares to increase EPS so that they don't miss analysts' quarterly earnings forecasts.

There is plenty of management discretion in the magnitude and timing of stock repurchases combined with the low visibility of actual buyback transactions that provides opportunities for managing earnings through open market stock repurchases (Ben-Rephael et al. 2014). For example, SEC Rule 10b-18 offers a convenient safe harbor protection from risks of stock price manipulation challenges under the securities law. Based on that regulation, after a firm makes public announcement of its board authorized stock buyback plans, it does not need to provide detailed disclosure about actual stock buyback transactions in regard to the amount, timing and price.<sup>7</sup> The rule provides management with plenty of flexibility in controlling the magnitude and timing of stock repurchase transactions (Cook et al. 2003 and 2004). Therefore, firms could repurchase their stock at prices significantly lower than the market level (Ben-Rephael et al. 2014).

### **Effect of Earnings Management on Stock Price Valuation**

Prior research that investigates various scenarios where firms manage their reported earnings suggests that firms are likely to manage earnings for opportunistic incentives, such as meet or beat analysts' forecasts (Gore et al. 2007; Jong et al. 2014), boost reported earnings before IPOs and seasoned equity offerings (Teoh et al. 1998), inflate stock price prior to planned mergers and acquisitions (Erickson and Wang 1999). These findings imply that the market could not completely see through management's opportunistic behavior and the managed earnings

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<sup>5</sup> Schipper (1989, P. 92) defines earnings management as "a purposeful intervention in the external financial reporting process, with the intent of obtaining some private gain."... "A minor extension of this definition would encompass "real" earnings management, accomplished by timing investment or financing decisions to alter reported earnings or some subset of it." Healy and Wahlen (1999) provide a similar definition of earnings management.

<sup>6</sup> Ewert and Wagenhofer (2005, P. 1102) define real earnings management as adjusting the timing or structuring of real business transactions to alter earnings, implying that the change in real transactions deviates from the optimal plan of actions and thus imposes a real cost to the firm. Roychowdhury (2006, P. 337) defines real earnings management as "departures from normal operational practices, motivated by managers' desire to mislead at least some stakeholders into believing certain financial reporting goals have been met in the normal course of operations".

<sup>7</sup> Firms usually disclose only the total dollar amount of stock repurchases in their quarterly and annual reports.

affect investors' expectation about firms' future performance (Gleason and Mills 2008; Burgstahler and Eames 2010). Given that reported earnings is a key input to popular business valuation models, earnings management may likely affect the estimates of intrinsic value and market stock price (Courteau et al. 2015). There is also evidence that real earnings management that potentially induce firms to manipulate their operating activities and deviate from the optimal business strategy actually does not have any significant impact on firms' future operating performance and stock returns (Gunny 2010; Taylor and Xu 2010).

## DEVELOPMENT OF HYPOTHESES

Although the market is generally efficient and firms are generally fairly priced, stock prices may temporarily deviate from their intrinsic or "true" value. Firms are found to be more likely to make more share buybacks when their stock price is perceived to be low (Stephen and Weisbach 1998). The incentive to gain from their stock's temporary misvaluation remains a significant factor that affects stock repurchases, even after controlling for dividend policy, distribution of excess cash, capital structure, and stock option exercises (Dittmar 2000; D'Mello and Shroff 2000).

However, when managers attempt to use stock buybacks as a means to boost their quarterly EPS to avoid missing analyst forecasts, they would need to buy back a certain number of shares within that quarter, even though the stock price is not low in comparison to managers' perceived "true" value. Consequently, these companies would lose some of the flexibility in controlling the magnitude and timing of their repurchase transactions. In fact, when stock buybacks are used as a vehicle of earnings management, managers would be less concerned about whether the stock is high or low relative to its assessed intrinsic value as compared to those firms that are attempting to manage their stock repurchase programs in order to benefit from temporary undervaluation.<sup>8</sup> As a result, for firms that intend to use stock repurchases as a means of earnings management, the deviation of their stock market price from the intrinsic value will be a less significant factor in determining the amount of actual stock repurchases than it is for those firms who are engaging in stock repurchase programs to exploit temporary market undervaluation.

H<sub>a</sub>: The difference between the intrinsic and market value of the stock has a less significant association with actual amount of stock repurchases for firms that utilize stock repurchases as a means of earnings management than for firms that repurchase stock for other purposes.

## SAMPLE DATA AND RESAEARCH METHODOLOGY

### Data Information

The sample contains all publicly listed U.S firms in the 2000 to 2010 period. The sample period cuts in year 2010 due to the requirement for extra four years of financial data to estimate firms' intrinsic value. Data on firms' financial reporting and stock returns are collected from COMPUSTAT and CRSP. Analyst earnings forecasts and executive compensation are obtained

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<sup>8</sup> The current study is not arguing for or against market efficiency. Rather, it assumes firms decide to repurchase their stock based on managers' estimates of firm value that may or may not represent the true intrinsic value of the firms.

from IBES and ExecuComp. Consistent with prior studies (Bens et al. 2002; Hribar et al. 2006), all firms in the regulated industries (i.e. utilities, financial services, and transportation) are dropped out of the sample. In addition, the sample excludes large stock repurchases that involve over 20% of a firm's total market cap within a quarter. While this paper examines solely open market stock repurchases, those large scale stock repurchases are generally fixed price tender offer transactions.

### Estimation of Intrinsic Value

The subsequent empirical tests use the ratio of stock price over the estimated intrinsic value (PV) in the regression models. The residual income model is used to estimate the intrinsic value (or underlying economic value).<sup>9</sup> Following the approach in Penman and Sougiannis (1998) and D'Mello and Shroff (2000), this study uses the actual or realized earnings in the subsequent periods as proxy for firms' future operating performance as perceived by management based on their private information. The intrinsic value is calculated using the subsequent 16 quarters of reported earnings (equivalent to four years).

$$V_t = B_t + \left( \sum_{i=1}^4 NI_{t+i} - r * B_t \right) / (1+r)^1 + \left( \sum_{i=5}^8 NI_{t+i} - r * B_{t+4} \right) / (1+r)^2 + \left( \sum_{i=9}^{12} NI_{t+i} - r * B_{t+8} \right) / (1+r)^3 + \left( \sum_{i=13}^{16} NI_{t+i} - r * B_{t+12} \right) / (1+r)^4 + TV / (1+r)^4 \quad (1)$$

where,

- $B_t$  = book value of equity at the end of quarter t;
- $NI_t$  = reported earnings available for common for quarter t;
- $r$  = annual cost of equity calculated using the Capital Asset Pricing Model (CAPM) and the Fama-French Three-Factor Model; and
- $TV$  = the terminal value.

The terminal value (TV) is estimated as:

$$TV_t = \left\{ \left[ \left( \sum_{i=9}^{12} NI_{t+i} - r * B_{t+8} \right) + \left( \sum_{i=13}^{16} NI_{t+i} - r * B_{t+12} \right) \right] / 2 \right\} / r$$

The average earnings for year t + 3 and t + 4 is used to estimate TV to smooth cases of abnormally high or low earnings in year t+4. Firm-specific cost of capital is calculated using three different methods: (1) the Capital Asset Pricing Model, (2) the Fama-French three-factor Model, and (3) the Fama-French four-factor Model. The ratio of price over the intrinsic value,  $P_t/V_t$ <sup>10</sup>, serves as an intuitive measure of potential deviation of price from its intrinsic value.<sup>11</sup>

<sup>9</sup> The residual income model has been a popular approach used in a number of prior studies to estimate the intrinsic value (Frankel and Lee 1998; Gebhardt et al. 2001).

<sup>10</sup> Frankel and Lee 1998 indicates that some abnormally large or small intrinsic value estimates may be generated in the calculation, the ratio of estimated intrinsic value over stock price is truncated at top and bottom 1% levels to control for outliers.

<sup>11</sup> The estimated intrinsic value is a forward looking estimate of price. It has clear advantage over past price that is also used as indicator of potential undervaluation in finance studies (Ikenberry et al. 1995; Dittmar 2000). While past price is probably correlated with the intrinsic value to some extent, it is not a measure of intrinsic value by itself.

## Hypothesis Test Regression

The tobit regression model examines the prediction of hypothesis, i.e. whether firms that intend to use stock repurchases for a means of earnings management would be more likely to pay a higher price relative to their stock's intrinsic value than firms that repurchase stock for other purposes. The dependent variable is the dollar amount of quarterly stock repurchases deflated by beginning market value of equity. By definition, the dollar amount of stock repurchases must be a positive number. Therefore, the dependent variable has a censored distribution that ranges from 0 and upward.<sup>12</sup> The tobit regression model is used to account for the censored distribution. The tobit model controls for factors that are found to affect stock repurchases.

$$REP_{i,t} = a_0 + a_1PV_{i,t-1} + a_2EMREP_{i,t} + a_3PV_{i,t-1} * EMREP_{i,t} + a_4PE_{i,t-1} + a_5Options_{i,t-1} + a_6CF_{i,t-4} + a_7Debt_{i,t-1} + a_8DY_{i,t-1} + a_9Size_{i,t-1} + \gamma_j \sum_{j=1}^4 Qtr_{i,j} + \delta_k \sum_{k=2000}^{2010} Year_{i,k} + \varepsilon_{i,t}$$

(2)

where,	$REP_t$	= Dollar value of stock repurchases in a quarter over the beginning market value of equity;
	$PV_{t-1}$	= The ratio of average market value over the estimated intrinsic value;
	$EMREP_t$	= A binomial variable with value of 1 for firms that use stock repurchases to manage earnings and 0 for other firms;
	$PV_{t-1} * EMREP_t$	= The interaction of PV and EMREP;
	$PE_{t-1}$	= The ratio of prior quarter end stock price over earnings per share during the prior twelve month;
	$Options_{t-1}$	= The log of total net value of stock holdings and exercisable stock options for the top five executives in compensation at the beginning of the quarter;
	$CF_{t-4}$	= The ratio free cash flows (i.e. operating cash flows deducted by dividends and capital expenditures) in the same quarter of last year over total assets at the beginning of the quarter;
	$Debt_{t-1}$	= Total debt over total assets at the beginning of the quarter;

<sup>12</sup> A variable follows a censored distribution if it is partly continuous but has positive probability mass at one or more points (Wooldridge 2002 chapter 16). The dollar amount of repurchases is equal to 0 for firms that make no stock repurchases. For firms that make repurchases, the dollar amount is equal to the actual amount of cash payment. Therefore, the distribution of the dollar amount of stock repurchases starts with 0 and goes continuously upwards, which is by definition a censored distribution.

$DY_{t-1}$	=	Dividends per share over stock price at the beginning of the quarter;
$Size_{t-1}$	=	The log of total market cap at the beginning of the quarter;
Qtr	=	Quarter;
Year	=	Calendar year;
$\varepsilon$	=	The error term;

A company is identified as using stock repurchases as a means of earnings management if the firms just meet or beat analyst earnings forecasts and buy back its shares to increase its EPS in the quarter.<sup>13</sup> Firms with earnings surprises equal to 0 or 1 cent are classified as just meet or beat analyst earnings expectations. The earnings surprise is the difference between IBES actual quarterly EPS and the median of analysts most recent quarterly EPS forecasts before earnings announcement, rounded to the cents.

Following Hribar et al. (2006), the dollar amount of common stock repurchases in a quarter is calculated as purchase of stock (purchases of both common and preferred stock) minus the decrease in preferred stock or redeemable preferred stock. Because firms are more likely to make stock repurchases when their stock price is perceived to be undervalued, PV is expected to have a negative association with the dependent variable REP (D'Mello and Shroff 2000). EMREP is expected to have a positive association with REP (Hribar et al. 2006). The coefficient of the interaction variable PV\*EMREP should have a positive sign. While firms would generally make more stock repurchases when their stock price is low in comparison to the intrinsic value, firms that intend to boost EPS by making stock repurchases in order to avoid missing analyst forecasts are less concerned with price and would buy back their stock even if the price is not low relative to intrinsic value. The tobit regression model controls for factors that are found to affect stock repurchases in prior research, namely the price to earnings ratio (PE), value of exercisable stock options (Options), operating cash flows (CF), total debt (Debt), dividend yield (DY), firm size, and the calendar Year.

## TEST RESULTS

### Sample Statistics

The sample statistics is presented in table 1. The sample consists of 18,403 firm-quarters with necessary data items for subsequent empirical analyses. Each observation in the sample needs to have COMPUSTAT financial accounting data, non-negative book value of equity, IBES earnings forecasts, CRSP monthly stock returns, and ExecuComp executive compensation information. Firms in utility and financial services industries and firms with negative estimated intrinsic values are also excluded from the sample. As indicated in Table 1 (Appendix), the mean market cap and total assets of the sample is \$7,245 and \$6,638 million, respectively. The mean

<sup>13</sup> While stock repurchases decrease the number of common shares outstanding, firms forego the returns from cash paid out for their shares, which reduces current and future net income. As a result, share buybacks do not necessarily boost EPS. Share buybacks would only boost EPS when the earnings price ratio  $EPS/P$  is higher than the rate of return on cash ( $r$ ) paid for repurchases, i.e.  $(EPS/P) > r$  (Hribar et al. 2006).

PE ratio for the sample is 20. The average value of quarterly share buybacks in the sample is \$65 million.

Table 2 shows the Spearman and Pearson correlations for the test variables. As indicated in Table 2 (Appendix), Stock repurchases (REP) have significant positive correlations with executive stock options (Options) and free cash flows (CF) and significant negative correlations with PV (price over intrinsic value) and the PE ratio, implying that firms with more stock options and free cash flows are more likely to repurchase stock and that firms with high PEs and PVs are less likely to repurchase stock. The indicator variable EMREP, which identifies firms that utilize stock repurchases as a means of earnings management to avoid missing analyst earnings forecasts, has a significantly positive correlation with stock repurchases (REP) and free cash flow (CF) and a negative correlation with the PV ratio.

### Hypothesis Test Results

The hypothesis test results are presented in Table 3. The coefficient of PV is significantly negative at  $<0.01$  level across both estimates of the tobit model using the alternative measures of intrinsic value, which is consistent with prior findings that firms are likely to make more stock repurchases when management believe their stock price is undervalued.

The focus of the test is on the coefficient for the variable PV\*EMREP, which is the interaction between PV and EMREP. Econometrically, the coefficient of PV\* EMREP represents the difference between the coefficient of P/V for firms that utilize stock repurchases as a means of earnings management and the coefficient of PV for firms that buy back shares for other reasons. As shown in Table 3 (Appendix), the coefficient is significantly positive in the tobit regression. The p-value of the coefficient of PV\*EMREP is 0.06 and 0.03, respectively, when the intrinsic value measures are estimated with the CAPM and Fama-French three-factor cost of capital. The significant positive coefficient for PV\*EMREP is consistent with the hypothesis that stock undervaluation plays a less important role in the stock repurchase decisions for firms that utilize stock repurchases as a means of earnings management in comparison to firms that buy back shares for non-earnings management reasons.

The coefficient of PV for firms that utilize stock repurchases as a means of earnings management is actually the sum of the coefficient of PV,  $a_1$ , and the coefficient of PV\*EMREP,  $a_3$ . As indicated in Table 3 (Appendix), it remains insignificant when the tobit model is estimated using either measures of intrinsic value. In other words, the sum of coefficients  $a_1$  and  $a_3$  is not significantly different from 0 (with p-value of 0.91 and 0.73 for two model estimates), which suggests that stock price relative to intrinsic value is simply not a significant factor in these firms' buyback decisions.

The tobit model controls for various factors that are found to affect stock repurchases in prior research. The coefficients for the control variables are generally consistent with prior research. Namely, firms with high cash flows, high stock options, high dividend yield, and large size tend to repurchase more stock.

The above finding implies that firms that utilize stock repurchases as a means of earnings management, on average, choose to buy back stock to boost earnings regardless of whether the stock price is high or low in comparison to the intrinsic or "true" value. In comparison, firms that buy back shares for other reasons generally time their repurchases to repurchase more stock when they perceive the price as low in comparison to the intrinsic value. The above analysis suggests that firms that utilize stock repurchases as a means of earnings management may be

paying extra for their own shares than they usually would have done if they did not utilize stock repurchases as a means of manage earnings.

## CONCLUSIONS

The current study investigates how earnings management through stock buybacks affects the way firms repurchase their shares. The research finds that unlike in normal stock repurchase programs where firms are more likely to make stock repurchases when management perceive the stock price undervalued, considerations about current stock price levels relative to the intrinsic value has no impact on actual repurchases decisions of firms engaged in earnings management through stock repurchases. The results suggest that firms employ stock repurchase programs to manage earnings even though the stock price is not significantly undervalued relative to the estimated intrinsic value.

The research findings have some implications for future study. Firms that manage earnings by stock repurchases are found to be willing to give up the opportunity to buy back shares at low price. This finding provides new evidence on firms' decisions involving the trade-off between the costs of real earnings management activities and the negative consequences of missing analyst forecasts.

When managers alter the timing or structure of real business activities to manage earnings, they are likely to deviate from the optimal plan of operations. On the other hand, missing analyst earnings forecasts produces various negative consequences. On average, firms that meet analyst earnings forecasts have higher returns than firms that miss analyst forecasts (Bartov et al. 2002). Missing earnings targets negatively affects CEO's reputation and job security (An et al. 2014). Future research could explore the drivers behind the management decisions on using alternative means for earnings management.

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## APPENDIX

**Table 1**  
**Descriptive Statistics**

<b>Variables</b>	<b>Mean</b>	<b>Standard Deviation</b>	<b>25%</b>	<b>Median</b>	<b>75%</b>	<b>N</b>
<b>ME</b>	7,245	29,744	463	1,198	3,825	21,487
<b>AssetsTtl</b>	6,638	27,596	412	974	3,235	21,487
<b>PE</b>	20	34	13	18	26	21,487
<b>RepurchaseTtl</b>	65	287	0	0	19	21,487
<b>CashFlowTtl</b>	58	2834	-54	23	148	21,487
<b>OptionsTtl</b>	211	267	1	3	126	21,487
<b>Debt</b>	0.205	0.161	0.057	0.199	0.322	21,487
<b>DivYield</b>	0.012	0.013	0.000	0.006	0.019	21,487
<b>EPS</b>	0.430	0.663	0.194	0.380	0.650	21,487

**Notes:**

1. N is the sample observation number;
2. Variable definitions:
  - ME is beginning market cap in millions for the quarter;
  - TA is beginning total assets;
  - PE is the ratio of stock price over prior 12 months earnings;
  - TTLREP is value of quarterly stock repurchases in millions;
  - TTLCF is total free cash flows in millions in the same quarter of last year;
  - TTLOptions is net value of stock holdings and exercisable stock options for the top five Executives in compensation in millions;
  - Debt is the ratio of beginning total debt over total assets;
  - DY is the ratio of annual dividends per share over beginning stock price;
  - EPS is the quarterly reported earnings per share in dollars.

**Table 2**  
**Correlations between Test Variables**

	1	2	3	4	5	6
<b>1. REP</b>		0.15***	-0.13***	-0.14***	0.09***	0.14***
<b>2. EMREP</b>	0.12***		-0.03***	-0.02**	-0.01	0.03**
<b>3. PV</b>	-0.06***	-0.02*		0.21***	0.09***	-0.01
<b>4. PE</b>	-0.04***	-0.01	0.11***		0.23***	0.06***
<b>5. Options</b>	0.03**	-0.01	0.07***	0.11***		0.20***
<b>6. CF</b>	0.11***	0.03**	-0.02**	0.05***	0.24***	

**Note:**

1. Pearson and Spearman correlation coefficients are presented above and below the diagonal, respectively; \*\*\*, \*\* and \* represents the 0.01, 0.05, and 0.10 significance level.
2. Variable definitions:

REP is dollar amount of stock repurchases in a quarter over the beginning market value of equity;

EMREP is A binomial variable with value of 1 for firms that use stock repurchases to manage earnings and 0 for other firms;

PV is the ratio of average market value over the estimated intrinsic value;

PE is the ratio of prior quarter end stock price over earnings per share during the prior twelve month;

Options is the log of total net value of stock holdings and exercisable stock options for the top five executives in compensation at the beginning of the quarter; and

CF is The ratio free cash flows (i.e. operating cash flows deducted by dividends and capital expenditures) in the same quarter of last year over total assets at the beginning of the quarter.

**Table 3**  
**Impact of Earnings Management on the Relationship between Stock Valuation and Stock Repurchases**

$$REP_{i,t} = a_0 + a_1PV_{i,t-1} + a_2EMREP_{i,t} + a_3PV_{i,t-1} * EMREP_{i,t} + a_4PE_{i,t-1} + a_5Options_{i,t-1} + a_6CF_{i,t-4} + a_7Debt_{i,t-1} + a_8DY_{i,t-1} + a_9Size_{i,t-1} + \gamma_j \sum_{j=1}^4 Qtr_{i,j} + \delta_k \sum_{k=2000}^{2010} Year_{i,k} + \varepsilon_{i,t}$$

		Intrinsic Value Calculated with CAPM Cost of Capital		Intrinsic Value Calculated with Fama-French Three-Factor Cost of Capital	
	Variables	Coefficient	P-Value	Coefficient	P-Value
a <sub>0</sub>	Intercept	-0.031	<0.01	-0.028	<0.01
a <sub>1</sub>	PV	-0.001	<0.01	-0.001	<0.01
a <sub>2</sub>	EMREP	0.04	<0.01	0.033	<0.01
a <sub>3</sub>	<b>PV*EMREP</b>	<b>0.002</b>	<b>0.06</b>	<b>0.003</b>	<b>0.03</b>
a <sub>4</sub>	PE	-0.001	<0.01	-0.001	<0.01
a <sub>5</sub>	Options	0.001	0.01	0.032	0.01
a <sub>6</sub>	CF	0.031	<0.01	0.015	<0.01
a <sub>7</sub>	Debt	0.012	<0.01	0.247	<0.01
a <sub>8</sub>	DY	0.269	<0.01	0.001	<0.01
a <sub>9</sub>	Size	0.002	<0.01	0.032	<0.01
<b>a<sub>1</sub>+a<sub>3</sub></b>		<b>0.001</b>	<b>0.91</b>	<b>0.002</b>	<b>0.73</b>
	Log Likelihood of the Model		11,525		10,142

**Notes:**

## 1. Variable definitions:

- REP is dollar value of stock repurchases in a quarter over the beginning market value of equity;  
 PV is the ratio of average market value over the estimated intrinsic value;  
 EMREP is a binomial variable with value of 1 for firms that use stock repurchases to manage earnings and 0 for other firms;  
 PV\*EMREP is the interaction term of PV and EMREP;  
 PE is the ratio of prior quarter end stock price over earnings per share during the prior twelve month;  
 Options is the log of total net value of stock holdings and exercisable stock options for the top five executives in compensation at the beginning of the quarter;  
 CF is the ratio free cash flows (i.e. operating cash flows deducted by dividends and capital expenditures) in the same quarter of last year over total assets at the beginning of the quarter;  
 Debt is total debt over total assets at the beginning of the quarter;  
 DY is dividends per share over stock price at the beginning of the quarter;  
 Size is the log of total market cap at the beginning of the quarter; and  
 Qtr and Year are the quarter and year of the observation, respectively.

## 2. The estimated coefficients for Year and Quarter are omitted from the table for simplicity.