

DO REPURCHASING FIRMS SHAVE CAPITAL EXPENDITURES WHEN SIGNALING?

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ABSTRACT

This paper studies the extent of firm level over- and under-investment in capital projects among firms with excess cash flows. Whereas most prior research looks for either the signaling or free cash flow hypothesis, we find that the motives for share repurchases differ depending on the firm's concurrent investments in capital projects. Our initial sample contains 3,417 firm-year observations from 1998 through 2014 where we match share repurchasing firm-year observations with non-repurchasing counterparts by 8-digit GICS industry code, by fiscal year, and by size. Using two sample t-tests, we find evidence that consistent with free cash flow explanations over-investment is concentrated in repurchasing firms that face relatively lower growth opportunities, while consistent with the signaling hypothesis under-investment is concentrated in repurchasing firms that face relatively higher growth opportunities. We also find that the market reaction to share repurchases corroborates our arguments. These findings support the assertion made by others that firms shave investments in order to signal their undervalued equity with share repurchases.

Keywords: Share Repurchases, Capital Expenditures, Free Cash Flow, Signaling.

INTRODUCTION

Firms with excess cash flows may use that cash for different purposes: to pay dividends, to pay down debt, to repurchase their own shares, to make long term capital investments, or just hold it for future investment or emergency purposes. The firms may also use cash in any combination of the aforementioned ways. For example, Richardson (2006) finds that in a large sample during the period 1988-2002, the average firm with positive free cash flows over-invests 20% of its free cash flow, and that such firms retain over 40% of their free cash flow as either cash or marketable securities. Since the interests of managers and shareholders may not always be aligned, managers may squander free cash flows by pursuing dubious acquisitions (Powell, 2018). Because of the limitations of monitoring, Jensen (1986) and Stulz (1990) argue that managers in firms with excess cash may invest more than they should which is in the best interest of the managers but costly for its shareholders. Blanchard et al. (1994) provide the most direct evidence on this agency problem by documenting that eleven firms with windfall legal settlements appear to engage in wasteful expenditure.

Why firms repurchase shares has been investigated and documented for more than twenty years. Firms repurchase shares for many reasons, including signaling undervaluation, distributing excess cash, accommodating stock option plans, and recalibrating financial leverage (Dittmar, 2000; Grullon and Ikenberry, 2000). Among these different motives, the most widely accepted ones for share repurchases are signaling and free cash flow hypothesis, driven by the information asymmetry between managers and shareholders. Excess cash flows present an opportunity for

signaling the manager's private information about the future prospects of the firm (Ikenberry et al., 1995; Lie, 2005). Excess cash flows also present a problem when managers have incentives to invest in value-destroying projects (Jensen, 1986). Share repurchases can mitigate this agency problem by returning excess cash flows to shareholders (Grullon and Michaely, 2004; Richardson, 2006). While most prior research has focused on either the information signaling or the free cash flow hypothesis, this paper attempts to reconcile these two major explanations by focusing on the interactions of share repurchases with capital investment levels among firms with excess cash flows.

Others have argued that firms with changing characteristics have – over time – different incentives to repurchase shares. Liang et.al (2013) uses firms' life cycle stage to discriminate between growth firms and mature firms and argues that firms in the early stage of the life cycle face greater investment opportunities and more serious information asymmetry about the firm's future operating performance. They find that firms in the early stage of the life cycle buy back shares to signal their future performance rather than to reduce free cash flow and, conversely, they find that firms in the later stage of the life cycle buy back shares to reduce free cash flow rather than to signal their future performance. Instead of using firm age as a proxy for life cycle stage in order to capture a firm's future growth opportunities we propose a more direct ex ante measure: concurrent investments in capital projects. We expect that firms that face relatively higher (lower) growth opportunities are likely to invest in more (fewer) capital projects. Firms in the growth stage and repositioning firms are the most likely firms to increase their capital expenditures, so we decide to use the concurrent change in capital expenditures to help us understand the information content behind share repurchases.

Our motivation for adopting a similar approach is the realization that the results in Bhagwat and DeBruine (2018) where the authors find no difference in the level of or change in capital expenditures between share repurchasing firms and non-repurchasing firms – may be driven by two opposing forces. It is possible that some repurchasing firms are likely to over-invest compared to their non-repurchasing peers (in support of the free cash flow hypothesis) while other repurchasing firms are likely to under-invest compared to their non-repurchasing peers (in support of the information signaling hypothesis) yielding no net difference between repurchasing and non-repurchasing firms.

Starting with the dataset used in Bhagwat and DeBruine (2018), we separate the sample firm-year observations by the observable change in capital expenditures and examine the bifurcated sample for support of the free cash flow and the signaling hypothesis. We find that repurchasing firms facing relatively fewer growth opportunities are more likely to over-invest in capital projects while repurchasing firms with higher growth opportunities are more likely to under-invest in capital projects. Even after removing all observations where firms may have repurchased shares for the purpose of boosting their EPS we obtain similar results. We follow up with an examination of the equity book-to-market ratios and find that – relative to their peers – those signaling firms improve their repurchase-adjusted book-to-market ratios. We submit this finding as evidence in support of the signaling hypothesis and conjecture that such firms shave capital expenditures in order to signal their undervalued equity.

This study contributes to the research on the motives for share repurchases. We show that a firm's motivation for repurchases is affected by the firm's concurrent change in capital investments that reveal behavior consistent with the free cash flow hypothesis or the information signaling hypothesis. We also find that firms with a higher incentive to signal their undervalued equity to the market appear to shave their capital expenditures in order to repurchase shares.

What's more, consistent with the signaling hypothesis, repurchasing firms are able to improve their equity book-to-market values compared to their peers.

We believe that investors can be better informed about the motivation for share repurchases. First, we show that repurchasing firms with excess cash make sub-optimal investment decisions they tend to overinvest in capital projects when decreasing their capital expenditures and they tend to underinvest in capital projects when increasing their capital expenditures. In both cases share repurchases appear to carry some cost for investors. In the latter case, the potential cost of under-investment in capital projects due to the repurchase of shares is that such a decision may be value-destroying in the long run. In addition, we show that repurchasing firms with concurrent increases in capital expenditures are likely to be signaling their undervalued equity, and by knowing this relationship investors are more likely to pick up on that signal.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Prior research commonly focused on a single motive for share repurchases. For example, several studies use future growth opportunities, proxied by return on assets, in order to sort out the motivation for share repurchases. Analyzing open-market share repurchase announcements from 1984 through 2000, Grullon and Michaely (2004) hypothesize that repurchasing firms are signaling their private information to the market. They analyze the operating performance around the repurchase announcement by comparing them in the pre- and post-announcement period to similar-sized non-repurchasing firms in the same 2-digit SIC industry. They find no evidence that repurchasing firms experience an improvement in future profitability relative to their peer firms and instead show that the future growth of repurchasing firms deteriorates. However, they provide evidence to suggest that – consistent with the free cash flow hypothesis – share repurchases are authorized to mitigate the potential over-investment problem. Similarly analyzing open-market repurchase announcements from that same time period, Lie (2005) finds that firms that actually repurchase shares have improved future performance as compared to similar-sized non-repurchasing firms in the same 2-digit SIC industry. He finds that there is positive future growth after a buyback announcement and argues that the share repurchases are a signaling of the future prospects. Liang et al. (2013) point out that in both studies the authors focused on a single motivation while it is more likely that the firms' motivation for share repurchases changed as their future growth opportunities evolved. They examine the impact of life cycle stage on the motivation for share repurchases and find that the two motivations co-exist in their sample: firms in the growth stage are more likely to repurchase shares in order to signal better future performance while firms in the mature stage are more likely to repurchase shares in order to prevent investing in wasteful projects.

In their investigation of firm motivations for share repurchases, Liang et al. (2013) employ firm age to proxy for the firm's life cycle stage which in turn proxies for the firm's future growth opportunities. A more direct measure associated with future growth opportunities is the change in capital expenditures (CAPEX). Managers may increase or decrease CAPEX for various reasons. McConnell and Muscarella (1985) find that managers seek to maximize the market value of the firm when deciding their level of corporate capital expenditures. Dalbor and Jiang (2013) find that growth opportunities, free cash flow, above-average corporate earnings, and size were positive determinants of CAPEX, while the economic recession was a negative determinant of CAPEX. We expect that firms facing higher growth opportunities are more inclined to increase their investment in capital projects while firms facing lower growth

opportunities are more inclined to decrease their investment in capital projects. If a firm's motivation for share repurchases is tied to its future growth opportunities, then we expect to find that a firm's motivation for share repurchases is also tied to changes in its concurrent investment in capital projects.

Using a large sample from 1998 through 2014 matched on industry affiliation, fiscal year, size, and growth opportunities, Bhagwat and DeBruine (2018) find that repurchasing firms and their non-repurchasing counterpart make similar investments in capital expenditures. They also report that such repurchasing firms and their non-repurchasing counterparts make similar changes to their capital expenditures, and conclude that such results do not support the free cash flow hypothesis which says that firms with excess cash flows tend to over-invest in capital projects. Their measure of future growth opportunities is beginning-of-period asset market-to-book also used in prior research (e.g., Almeida et al., 2016). In light of Liang et al. (2013) who show that firms' motivations for share repurchases differ as they face different growth opportunities, and a new awareness that changes in CAPEX can proxy for future growth opportunities, we conjecture that those findings were caused by opposing forces within their sample. That is, some repurchasing firms facing lower growth opportunities are likely to over-invest compared to their peers (in support of the free cash flow hypothesis) while other repurchasing firms facing higher growth opportunities are likely to under-invest compared to their peers (in support of the information signaling hypothesis) yielding no net difference between repurchasing and non-repurchasing firms. The latter firms under-invest in CAPEX in order to repurchase shares to send signal about their future growth prospect. In light of this, we re-examine the matched sample used in Bhagwat and DeBruine (2018) and separate the sample firm-observations based on whether firms increased or decreased their level of CAPEX.

Within the CAPEX-decreasing sub-sample, we argue that repurchasing firms – using their excess cash – overinvest in CAPEX relative to their non-repurchasing counterparts. Such a result would be consistent with the free cash flow hypothesis and evidence in support of firms investing in underperforming projects as predicted by Jensen (1986) and documented by Richardson (2006) and Liang et al. (2013). As mentioned earlier, because of monitoring difficulties firm managers have an incentive to engage in wasteful spending that is in their best interest but costly to shareholders. If repurchasing firms over-invest then such firms don't reduce their CAPEX as much as their non-repurchasing counterparts do. However, if repurchasing firms distribute all their excess free cash flow then the reduction in their CAPEX should be similar to that of their non-repurchasing counterparts. This leads to our first hypothesis that is stated here in a null form:

*H1: Within the sub-sample of firms with **decreased** CAPEX, there is no difference in the decrease in CAPEX between repurchasing and non-repurchasing firms.*

where the repurchasing firm and its non-repurchasing counterpart are matched on industry affiliation, fiscal year, size, and growth opportunities.

Within the sub-sample of CAPEX-increasing firms, managers face two opposing challenges. If the manager is comfortable with the valuation of her firm's stock, she may invest in CAPEX as much as possible to either capture growth opportunities or consistent with the free cash flow hypothesis to wastefully invest in undesirable capital projects. However, signal theory states that signals are given by managers to reduce information asymmetry (Utomo et al. 2018) and if the manager believes that her firm's stock is undervalued, then she may want to balance an investment in CAPEX with share repurchases. This is consistent with the information signaling

hypothesis because such firms repurchase shares in order to signal the market about their undervalued equity. Tsetsekos et al. (1988) find in their survey that the majority of firms point to undervaluation as the primary motivation for share repurchases. Hence, if the manager believes that share repurchases are a proper tool for informing the market that their equity is undervalued then repurchasing firms may be motivated to shave capital expenditures in order to send such a signal to the market. This leads to our second hypothesis that is stated here in a null form:

*H2: Within the sub-sample of firms with **increased** CAPEX, there is no difference in the increase in CAPEX between repurchasing and non-repurchasing firms.*

Where the repurchasing firm and its non-repurchasing counterpart are matched on industry affiliation, fiscal year, size, and growth opportunities.

Next we posit that CAPEX-increasing firms (relative to CAPEX-decreasing firms) have a more compelling reason to shave their capital projects in order to signal undervaluation. Phrased differently, to the extent CAPEX-increasing firms want to send the market a signal, such firms may repurchase shares by shaving their investments in CAPEX. If successful, those repurchasing firms facing an improving investment opportunity set should see an additional bump in their market value relative to their non-repurchasing counterparts. We argue that CAPEX-increasing repurchasing firms (“signaling firms”) will experience more of a decrease or less of an increase in their equity book-to-market ratios as compared to their non-repurchasing CAPEX-increasing counterparts. We limit our test horizon to concurrent equity book-to-market changes even though previous studies suggest that the long-run return of repurchasing firms is positively correlated with the equity book-to-market ratio. For example, Ikenberry et al. (2000) and Chan et al. (2004) find that high equity book-to-market repurchasing firms experience abnormal stock returns of more than 30% in four years following the repurchase announcement date. This leads to our third hypothesis that is stated here in a null form:

*H3: Within the sub-sample of firms with **increased** CAPEX, there is no difference in the change in equity book-to-market ratios between repurchasing and non-repurchasing firms.*

where the change in the equity book-to-market ratios is adjusted for the effect of any share repurchases during the period.

SAMPLE AND DESCRIPTIVE STATISTICS

Bhagwat and DeBruine (2018) find that on average repurchasing firms make similar changes in their capital expenditures as their non-repurchasing counterparts. In this paper, we argue that their result may well be hiding the fact that some repurchasing firms may be over-investing as compared to their non-repurchasing counterparts while other repurchasing firms are under-investing as compared to their non-repurchasing counterparts. We start with a description of their sample of 3,417 firm-year matches.

The Bhagwat and DeBruine sample contains firm-year observations from the 1998-2014 period and controls for differential business cycle impacts by matching repurchasing firm-year observations with non-repurchasing counterparts by 8-digit GICS industry code, by year, and by size. Others (e.g., Grullon and Michaely, 2004; Lie, 2005) matched by 2-digit SIC code but these authors believe that using 116 different subindustries helps eliminate matches of firms that differ significantly in their operations. They use beginning-of-year total assets to match on size because size can differentiate firms on dimensions such as profitability (due to economies of scale),

growth opportunities and free cash flows (due to life cycle stage), and leverage (smaller firms are perceived to be more risky and thus have a larger proportion of equity in their capital structure). To further control the effects of size on the firm characteristics they standardize the characteristics by dividing them by the beginning-of-year total assets. Following Almeida et al. (2016) and others, they apply a 98% winsorization to cut down on spurious outliers. Table 1 presents the firm characteristics of their initial sample of 3,417 matched firm-year observations.

Initial sample	Repurchasing firm-years			Non-repurchasing firm-years		
# of observations	3,417			3,417		
# of firms	1,776			1,868		
Firm characteristics	Mean	Median	Stdev	Mean	Median	Stdev
Net repurchases _t	0.071	0.042	0.079	0.000	0.000	0.000
Capital expenditures _t (CAPEX _t)	0.060	0.033	0.076	0.061	0.033	0.081
Change in CAPEX _t	-0.003	-0.001	0.056	-0.012	-0.001	0.105
Cash plus securities _{t-1}	0.249	0.192	0.223	0.197	0.109	0.222
Available funds _{t-1}	0.359	0.322	0.237	0.217	0.165	0.256
ROA _{t-1}	0.044	0.065	0.148	-0.058	0.013	0.293
LEV _{t-1}	0.133	0.057	0.171	0.245	0.187	0.298
AMtB _{t-1}	2.101	1.675	1.389	2.019	1.393	3.681
EBtM _{t-1}	0.568	0.454	0.456	0.584	0.488	2.620

Table 1 reveals that as a proportion of total assets capital expenditures and changes therein appear very similar for the matched firms. However, repurchasing firms appear to on average have more liquid assets in Cash plus securities (25% vs. 20% of total assets) and Available funds (36% vs. 22% of total assets), where Available funds are defined as the previous period's Cash from Operations added to the beginning-of-period Cash plus securities. The repurchasing firms also show higher return on asset (ROA) values (4% vs. -6%), and lower Leverage (LEV) values (13% vs. 25% of total assets) at the beginning of their repurchasing year as compared to their similarly-sized non-repurchasing counterparts.

As mentioned before, their analysis of the full sample shows that repurchasing firms and their non-repurchasing counterparts are similar in terms of their capital expenditures and the changes therein. Table 2 illustrates how their sample separates into sets of firm-years that are matched based on changes in capital expenditures from one period to the next.

Variables	Share repurchasing sample with peers	Share repurchasing sample without peers
CAPEX decreasing	1,093	723
CAPEX increasing	768	833
Final Sample with matched peers	1,861	

Table 2 shows that of our initial 3,417 firm year observations, 1,093 firm-year observations consist of CAPEX-decreasing repurchasing firms that have matching CAPEX-decreasing non-repurchasing counterparts ("peers") and 768 firm-year observations consist of CAPEX-increasing repurchasing firms that have matching CAPEX-increasing non-repurchasing counterparts ("peers"). We dropped 723 CAPEX-increasing and 833 CAPEX-decreasing

repurchasing firm year observations from our study because we were unable to find a match for these observations.

Before comparing the repurchasing firms to their peers we compare the CAPEX-increasing to the CAPEX-decreasing repurchasing firms and analyze their differences and similarities. Table 3 shows that the CAPEX-increasing and CAPEX-decreasing repurchasing firms appear to be similar on the various characteristics deemed relevant to supporting the free cash flow hypothesis.

Change in CAPEX _t	Decreasing	Increasing	Two-sample t-tests	
# of observations	1,093	768	H ₀ : Mean difference=0	
Standardized characteristics	Mean	Mean	t-stat	p-value
CAPEX _t	0.045	0.077	-8.693	0.000
Net repurchases _t	0.070	0.068	0.433	0.665
Cash plus securities _{t-1}	0.255	0.241	1.406	0.160
Available funds _{t-1}	0.356	0.359	-0.265	0.791
ROA _{t-1}	0.039	0.044	-0.637	0.524
LEV _{t-1}	0.135	0.139	-0.502	0.616
AMtB _{t-1}	2.039	2.155	-1.734	0.083
Change in AMtB _{t-1}	-0.405	0.113	-5.558	0.000
Size _{t-1}	2.282	2.433	-4.150	0.000

By construction, the two sets of repurchasing firms in Table 3 differ significantly in the level of capital expenditures ($t=-8.693$; $p=0.000$). However, on average the two sets make similar repurchases during the period, have similar funds available at the beginning of the period, show similar returns on assets for the prior period, and are similarly leveraged at the beginning of the period. Not surprisingly, the CAPEX-increasing firms face slightly higher growth opportunities ($t=-1.734$; $p=0.083$) as proxied by their beginning-of-period asset market-to-book and experienced a significant difference in the change of their growth opportunity set ($t=-5.558$; $p=0.000$) in the prior year. Finally, CAPEX-increasing repurchasing firms are about \$75 million larger ($t=-4.150$; $p=0.000$) as proxied by the logarithm of their beginning-of-period total assets.

The next section will examine the current sample made up of 768 CAPEX-increasing matches and 1,093 CAPEX-decreasing matches. Before discussing the results it is useful to reiterate that our sample is similar to that employed in Liang et al. (2013) with the exception that we use changes in concurrent CAPEX rather than firm age to proxy for future growth opportunities. With firm age as the proxy for growth opportunities, managers are still forced into a single motivation for share repurchases for multiple years. As a result of our change in concurrent CAPEX choice, we allow firms and their managers to change their motivation for share repurchases on an annual basis. In our view this is a more realistic scenario.

RESULTS AND DISCUSSION

Table 4 present our evidence for H1 and H2. Table 4 shows that the 1,093 CAPEX-decreasing repurchasing observations do not reduce their capital expenditures as much as their peers. The difference is significant, both statistically ($t=4.705$; $p=0.000$) and economically as a percentage of total assets (-0.030 versus -0.049), and serves to reject the null hypothesis that there is no difference in the decrease in CAPEX between repurchasing firms and their non-

repurchasing peers. We take this as evidence that on average these repurchasing firms over-invest in capital projects because they have the excess funds to do so. This evidence is consistent with H1 and the free cash flow hypothesis.

Change in CAPEX_t	Decreasing		Increasing	
# of matches	1,093		768	
Repurchasing shares	Yes	No	Yes	No
Standardized characteristics	Mean	Mean	Mean	Mean
CAPEX _t	0.045	0.047	0.077	0.088
Change in CAPEX _t	-0.030	-0.049	0.027	0.039
Two-sample t-test	t-stat	p-value	t-stat	p-value
H ₀ : Mean difference=0	4.705	0.000	-3.167	0.002

The right-hand column of Table 4 comprises the repurchasing firms that in the same period increase their capital expenditures. It shows that the 768 CAPEX-increasing repurchasing observations do not increase their capital expenditures as much as their peers do. The difference is again significant, both statistically ($t=-3.167$; $p=0.002$) and economically as a percentage of total assets (0.027 versus 0.039), and serves to reject the null hypothesis that there is no difference in the increase in CAPEX between repurchasing firms and their non-repurchasing peers. We take this as evidence that on average these repurchasing firms under-invest in capital projects. This finding is consistent with our H2 and the signaling hypothesis; that is, if management believes that share repurchases are a proper tool for informing the market that their equity is undervalued then repurchasing firms may be motivated to shave capital expenditures in order to signal the market. In terms of frequency, more than 40% (768 ÷ 1861) of the repurchasing firms appear inclined to shave investments in order to repurchase shares.

The result in the right-hand column of Table 4 is also consistent with the EPS-management hypothesis that states that firms repurchase shares in order to boost their earnings per share (EPS). Oded and Michel (2008) estimate that about 16% of the EPS increase during the 2002-2006 period can be traced to share repurchases. Prior studies in earnings management has established that EPS-motivated repurchases can explain the shaving of capital expenditures and other investments (e.g., Hribar et al., 2006, Almeida et al., 2016). We use their approach to eliminate EPS-motivated repurchasing observations from the set. Accordingly, we remove all repurchasing firm-year observations (together with their peers) for which the repurchases 1) changed the EPS surprise from negative to positive in any of the four quarters 59 observations or 2) increased the reported EPS by at least one penny in any of the four quarters 135 observations.

In order to carry out that approach we use analysts' consensus EPS announcements that are available from the Institutional Brokers' Estimate System (IBES) database. Many of the smaller firms (with average beginning-of-year total assets of less than \$500 million) do not appear in the IBES database and are also dropped from the set. Table 5 illustrates that the over-investing and under-investing persists albeit slightly less significant for the reduced sets after removing all EPS-motivated repurchases.

The left-hand column in Table 5 shows that even with the EPS-motivated repurchases removed CAPEX-decreasing repurchasing firms over-invest in capital projects ($t=2.390$; $p=0.017$) as compared to their peers. The right-hand column of Table 5 shows that even with the EPS-motivated repurchases removed CAPEX-increasing repurchasing firms do not increase their capital expenditures as much as their peers ($t=-2.427$; $p=0.016$) and thus appear to

under-invest in capital projects. Hence, these results are not driven by EPS-motivated share repurchases and suggest that CAPEX-increasing repurchasing firms may shave capital expenditures in order to signal their undervalued equity to the market. In terms of frequency, more than 40% ($413 \div 946$) of the repurchasing firms appear inclined to shave investments in order to repurchase shares.

Change in CAPEX _t	Decreasing		Increasing	
# of matches	533		413	
Repurchasing shares	Yes	No	Yes	No
Standardized characteristics	Mean	Mean	Mean	Mean
CAPEX _t	0.043	0.044	0.071	0.084
Change in CAPEX _t	-0.027	-0.038	0.022	0.033
Two-sample t-test	t-stat	p-value	t-stat	p-value
H ₀ : Mean difference=0	2.390	0.017	-2.427	0.016

We now turn to the impact of this purported signaling behavior on equity valuation as measured by the change in book-to-market ratios. We prefer the book-to-market ratio to the more popular market-to-book ratio because the former behaves less volatile, especially when book values turn negative. A decrease in the book-to-market ratio reflects investors' expectation that the firm will perform better in the future, so a higher decrease can be viewed as evidence of successful signaling. Conversely, an increase in the book-to-market ratio reflects investors' expectations that the firm will perform worse in the future, so a lower increase can be viewed as evidence of successful signaling. Table 6 presents the change in repurchase-adjusted book-to-market ratios for our sets of CAPEX-decreasing and CAPEX-increasing repurchasing firms and their respective peers.

Change in CAPEX _t	Decreasing		Increasing	
# of matches	533		413	
Repurchasing shares	Yes	No	Yes	No
Standardized characteristics	Mean	Mean	Mean	Mean
EBtM _{t-1}	0.517	0.722	0.469	0.387
RepAdj-EBtM _t	0.621	0.809	0.497	0.533
Change in RepAdj-EBtM _t	0.100	0.092	0.033	0.121
Two-sample t-test	t-stat	p-value	t-stat	p-value
H ₀ : Mean difference=0	0.229	0.819	-2.525	0.012

The right-hand column of Table 6 presents our evidence for H3. We document that CAPEX-increasing repurchasing firms have significantly lower changes in equity book-to-market values during the period when compared to their peers ($t=-2.525$; $p=0.012$) which is consistent with H3. We take this finding as evidence that CAPEX-increasing repurchasing firms ("signaling firms") are successful in getting their undervalued status remedied by the market – if they indeed signal with their repurchases. The book-to-market value of their peers on average increases by 31% ($= 0.121/0.387$) compared to 7% ($= 0.033/0.469$) increase posted by the CAPEX-increasing repurchasing firms. The signaling firms start the year with on average higher book-to-market values than their peers that in turn may encourage management to repurchase

shares even if that means shaving capital expenditures. What's more, compared to their peers those repurchasing firms are able to improve their book-to-market values while at the same time under-investing in capital projects. If these firms successfully signal the market about their future good prospects with share repurchases then it is likely that this shaving behavior will continue in future years.

Finally, the left-hand column in Table 6 shows that CAPEX-decreasing repurchasing firms and their peers have similar changes in book-to-market values during the period ($t=0.229$; $p=0.819$). This may be because CAPEX-decreasing repurchasing firms facing relatively lower growth opportunities may not be successful in sending a credible signal to the market through their share repurchases. This implies that the market may not respond to share repurchases, as intended, for such CAPEX-decreasing firms.

CONCLUSION

This study analyzes firms' decisions regarding share repurchases and CAPEX. In doing so, we provide a justification as to why Bhagwat and DeBruine (2018) found no difference in capital expenditures between share repurchasing firms and non-repurchasing firms. Starting with a sample of 3,417 firm-year observations from 1998-2014 that was matched on industry affiliation, year, size, and growth opportunities, we show that some repurchasing firms are likely to over-invest their peers and other repurchasing firms are likely to under-invest their peers. We advance likely explanations from the literature for each of these actions, and go on to show that if firms shave capital expenditures in order to repurchase shares, the market appears to recognize and reward that behavior.

A caveat of our study is that we do not consider the role of conservatism in mitigating the over investment problem. Penman and Zhang (2002) find that in the presence of conservative accounting cutting investments can increase reported earnings. While Jensen (1986) identifies share repurchases as a way to mitigate agency problem, more recent studies (e.g., Louis and Urcan, 2015 and Lobo et al., 2019) identify conservatism as a mechanism to mitigate the same agency problem. Moreover, Lara et al. (2016) find that "*Conservatism, by imposing timely reporting of losses, makes such self-interested decisions apparent sooner, enabling stakeholders to discipline managers, if necessary, and deterring such conduct in the future.*" Since our test are not powerful enough to explore how conservatism would affect the extent of firm level over- and under-investment in capital projects among firms with excess cash flows, we are unable to explore the implications of conservatism in our setting. However, if conservatism serves as an alternative to share repurchases then it would more likely be used by the non-repurchasing counterparts in the sample, reducing their equity book-to-market ratios further than they would otherwise, and thereby making our reported results on the difference in changes in concurrent equity book-to-market ratios even more powerful.

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