REIT Open-Market Stock Repurchases and Profitability

Gow-Cheng Huang Department of Accounting and Finance Alabama State University Montgomery, AL 36101 Phone: 334-229-6920 E-mail: ghuang@alasu.edu

Kartono Liano Department of Finance and Economics Mississippi State University Mississippi State, MS 39762 Phone: 662-325-1981 E-mail: kliano@cobilan.msstate.edu

Ming-Shiun Pan Department of Finance and Information Management & Analysis Shippensburg University Shippensburg, PA 17257 Phone: 717-477-1683 E-mail: mspan@ship.edu

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Abstract

This study examines whether the announcement of REIT open-market stock repurchase programs contain information content about future operating performance. We find no evidence that REIT stock buybacks are positively related to any measures of operating performance. In fact, the operating performances of our sample REIT firms deteriorate in the years following the share repurchase announcement. Nevertheless, the repurchasing REITs show higher levels of post-repurchase operating performance when compared to those of the pre-repurchase period. Additionally, our regression analysis shows that changes in future operating performance can explain the positive announcement effect.

Keywords: REITs, stock repurchases, profitability

JEL Classification: G14, G35

The finance literature has documented significantly positive market reactions to stock repurchases announcements. A number of explanations have been proposed to explain why a firm would buy back its shares as well as the presence of positive excess returns following the announcement. The most commonly mentioned motives include the free cash flow hypothesis (Jensen (1986)), the signaling (or undervaluation) hypothesis (e.g., Dann (1981) and Comment and Jarrell (1991)), the target leverage ratio hypothesis (Bagwell and Shoven (1988)), and the takeover defense hypothesis (Bagwell (1991)), among others.

While each of the proposed arguments can possibly explain why a firm initiates a stock repurchase program, they are not necessarily mutually exclusive. Indeed, Dittmar (2000) find that firm's repurchasing decision tends to be influenced by multiple motives. In most periods, repurchases are made to take advantage of stock undervaluation. In some certain periods, repurchases are made to distribute excess cash flows, to alter financial leverage, and to end takeover attempts.

In this study, we focus on the signaling explanation for open-market stock repurchases announced by real estate investment trusts (REITs). REITs have several unique attributes and hence some competing theories for stock repurchases are less likely to hold for REITs. For instance, REITs are required to pay out 95% of net income as dividends to shareholders to avoid income taxes.¹ Moreover, REITs can distribute free cash flow beyond net income as tax-free return of capital to shareholders. Thus, the free cash flow effect is less important for REIT repurchases.

There are two interpretations about the signaling hypothesis of stock repurchase. The first interpretation is that managers may use buybacks to signal that the market has mispriced the stock based on publicly available information. The second interpretation is that share repurchases are a signal to reflect managers' private information about their firm's future prospects. This interpretation suggests that stocks could be fairly priced based on publicly available information but mispriced based on management's private information about the firm's prospects. Studies that examine the signaling hypothesis tend to focus on the cause of misvaluation, rather than on whether the repurchase

¹ The REIT Modernization Act of 1999 reduces the pay-out ratio to 90%.

announcement contains a signal about a firm's future prospects.² Instead, we examine operating performance four years after a stock repurchase announcement to see whether these repurchase announcements convey information about a REIT firm's future profitability.

We examine 126 REITs that announced open-market share repurchase programs over the period 1990 to 2001. Consistent with prior studies, these REIT firms display positive excess returns over a fiveday announcement period. We find that these REIT firms' profitability increases over the four years prior to repurchase announcement, peaks at the year when the announcement is made or the year following the announcement, and then declines in the four years subsequent to the announcement. Although the operating performances decline following the repurchase, they appear to be greater than those prior to the announcement. We find no evidence that these REITs exhibit higher future operating performance relative to their peers. Thus, our finding suggests that if share repurchase contains any information, it is about improved operating performance when compared to pre-repurchase years rather than when compared to peers.

Using a regression analysis, we do not find a significant positive relation between the size of repurchase program and operating performance in the fours years following repurchase announcements. Indeed, our results reveal that the magnitude of the repurchase program is mostly negatively related to changes in various performance measures during the four-year period following the repurchase, albeit insignificant. Nevertheless, we find that changes in future operating performances can significantly explain the excess return over a five-day announcement period. Our results imply that the market reacts to buyback announcements favorably because of the information content contained in the repurchase program.

The rest of the paper is organized as follows. Section I provides a brief review on why a firm might buyback its shares. Section II describes the data and presents some summary statistics of the sample firms' financial performances. In Section III, we report operating performance for repurchasing

² Giambona, Giaccotto, and Sirmans (2005) find both short-term and long-run abnormal stock returns following the announcement of REIT open-market stock repurchases.

and matched non-repurchasing REIT firms. In Section IV, we report empirical results of the relation between repurchases and future operating performance. Section V concludes the paper.

I. Related Research

One prominent explanation of stock repurchases is the signaling hypothesis (see Dann (1981) and Vermaelen (1981)). The signaling hypothesis suggests that stock buybacks are associated with positive announcement excess returns because managers use stock buybacks to convey favorable private information about their firms' future prospects. In other words, management uses stock buybacks to signal that the stock price is undervalued. Consistent with this view, Ikenberry, Lakonishok, and Vermaelen (1995) find positive abnormal returns around repurchase announcements and positive abnormal returns one year, two years, and three years following the announcements. However, Grullon and Michaely (2004) do not find any evidence that repurchasing firms' profitability increases in the years after the repurchase. Rather than signaling improved operating performance, Oded (2005) suggests that open-market repurchase programs are a nondissipative signaling tool. In his model, share repurchases are used by good firms to signal their value.

With respect to REIT share repurchases, Giambona, Giaccotto, and Sirmans (2005) find excess returns over a 24-month period following REIT share repurchase programs. They also find that the post-announcement operating performance can explain the long-horizon abnormal return. Brau and Holmes (2006) use six-month stock return and four-week stock return to capture management's private information and find that they are significantly correlated with the three-day abnormal return surrounding the share repurchase announcement. Giambona, Golec, and Giaccotto (2006) find that REIT repurchases contain information about the firms' stock and operating performance in three to nine months.

Another explanation for a firm to buy back its shares is the free cash flow hypothesis (Jensen (1986)). To mitigate agency problems, a firm that has sizeable cash but is unable to identify profitable investment opportunities may distribute the excess cash to shareholders through share repurchases or dividend payments. Share repurchases are usually preferred because unlike dividend payments,

shareholders likely will not treat repurchases as a commitment for a firm and to be done on a regular basis.³ Consistent with this conjecture, Jagannathan, Stephens, and Weisbach (2000) and Guay and Harford (2000) find that dividends are used to distribute permanent cash flow while repurchases are used to distribute temporary cash flow. Or, firms could repurchase shares rather than pay dividends because firms do not want to commit to a regular dividend payment or because repurchases are associated with less tax burden for shareholders. Only the realized capital gain portion of repurchases is taxed and capital gain tax rate is less than that of dividends. However, the agency effect of the free cash flow hypothesis is less likely to hold for REITs because they are required to pay out at least 90% of net income as dividends to shareholders.

Share repurchases could also be used as a vehicle to deter takeovers (Bagwell (1991)). Bagwell argues that takeover-target firms can maintain corporate control by repurchasing stock, particularly when there is an upward-sloping supply curve of stock shares.

Still, a firm may repurchase shares to increase its leverage ratio. The finance literature suggests that firms may follow a target capital structure to minimize their costs of capital. When a firm has excess cash and its leverage ratio is below the target ratio, the firm may repurchase its shares to increase the leverage ratio (Bagwell and Shoven (1988)). According to this hypothesis, repurchase decisions are affected by a firm's capital structure.

II. Data and Descriptive Statistics

The initial sample of all open-market common stock repurchase programs announced by REITs is obtained from Security Data Company's (SDC) Merger and Acquisition database for the years 1982 to 2005. Since open-market repurchases are by far the most common and account for 90% of all share repurchases (see Comment and Jarrell (1991)), Dutch auction and fixed-price tender offers are excluded from our sample. Furthermore, firms that do not specify the amount of share buyback either in the dollar amount or in the number of shares are excluded. In addition, the repurchasing firms' stock prices 250

³ Oded (2005) considers the open-market repurchase program as an option that a firm grants to itself.

days before and 5 days before the buyback announcements, stock returns 2 days before to 2 days after the announcements must be available from the CRSP daily returns file. Also, to remain in the final sample, the COMPUSTAT annual files contain information on the firm's operating income, assets, and equity for the nine years around the split announcement year (year –4 through year +4). Following Loughran and Ritter (1997), in which they examine multiyear operating performance of firms that conduct seasoned equity offerings, we require a REIT firm to wait for four years before it can reenter the final sample to avoid dependence in overlapping data. The final sample contains 126 open-market stock repurchase announcements from 1990 to 2001.

Table 1 reports raw and cumulative abnormal returns during day -2 to day +2 surrounding the repurchase announcement.⁴ Consistent with prior studies, the market reacts favorably to the REIT repurchase announcements. The mean (median) cumulative abnormal return is 3.03% (1.33%), which is highly significant. The positive announcement return result implies that REIT share repurchases may contain some sort of information content in signaling, undervaluation, or both. Table 1 also shows that the mean (median) proportion of shares outstanding sought for repurchase at the time of the announcement is 8.40% (7.50%).

III. Operating Performance Surrounding Repurchases

A. Levels of Operating Performance for Repurchasing and Matched Non-Repurchasing REIT Firms

If repurchases convey positive information to the market, then operating performance should improve in the years after the announcement. We measure operating performance as earnings before interest and taxes (EBIT) scaled by the book value of total assets (COMPUSTAT item #6).⁵ Panel A of Table 2

⁴ Cumulative abnormal return is the difference between daily raw returns and those of an equally-weighted REIT portfolio. All REITs (the SIC code is 6798 or share codes are 18 (ordinary common shares, REITs) or 48 (shares of beneficial interest, REITs)) with return data available in the CRSP dataset are included in the equally-weighted REIT portfolio.

⁵ We also attempted to using funds from operations (FFO) as a measure of operating performance for REITs. However, there are too many missing observations when the FFO is calculated using the data in COMPUSTAT or retrieved from the SNL DataSource. Thus, we decided not to use FFO in the current study.

reports the mean and median returns on assets for years –4 through +4, where year 0 is the repurchase announcement year, for the sample REIT firms. The results show that the return on assets increases consistently over the preceding four years and the announcement year, peaks at the year following the announcement, and then declines monotonically over the three years following the announcement. Specifically, the median (mean) return on assets increases from 5.45 percent (4.81 percent) in year –4 to 6.50 percent (6.34 percent) in year 0. In year +1, the median (mean) return on assets is 6.85 percent (6.54 percent). However, the median (mean) falls to 6.65 percent (6.25 percent) in year +2, 5.45 percent (5.18 percent) in year +3, and 5.45 percent (4.76 percent) in year +4. Similar patterns are also observed in two additional measures of operating performance, the return on equity (ROE) and the earnings growth. The declining operating performance following the announcement implies that repurchase contain little information about improved *long-term* future operating performance. However, it is noteworthy that the post-repurchase operating performances are greater than those during the pre-repurchase period, especially years 0, +1, and +2. Thus, our results also show that REITs' operating performance improves when compared to the pre-repurchase performance.

To evaluate whether or not repurchasing REIT firms' operating performance is abnormal, we compare them with the average of a matching REIT portfolio. The matching REIT portfolio is constructed with REITs that do not announce a share repurchase program in a give year. The operating performances for the matching REIT portfolio are reported in Panel B of Table 2. The result shows that the matching REIT portfolio has a very stable median ROA over the nine-year period, ranging from 6.40% to 6.90%. However, ROE and earnings growth exhibit a more erratic pattern.

In Panel C, we report the median and mean difference of the three operating performance measures between the sample REITs and the matching REIT portfolio. We test statistical significance of the median and mean difference using a Wilcoxon matched-pair signed-rank *z*-statistic and a *t*-statistic, respectively. Compared to the REIT portfolio, the repurchasing REIT firms show poor operating performance for the nine-year period. However, it seems that this poor performance relative to their peers is more pronounced in the pre-repurchase years. This finding may suggest that, rather than signaling a better future operating performance than their peers, the sample REITs may repurchase shares to convey their "improved" performance.

B. Changes in Operating Performance for Repurchasing and Matched Non-Repurchasing Firms

Concerning about how to estimate abnormal performance, Barber and Lyon (1996) find that test statistics using changes in operating performance are more powerful than the ones using levels. We therefore also conduct the analysis using the changes in operating performance. Table 3, Panel A reports changes in operating performance of repurchasing REITs. Although the operating performance measures, especially ROA, continue to increase during the four years until the end of the announcement year, they show a significant decline in each of the four years following the announcement. For instance, over the four-year pre-repurchase period, the return on assets shows a median (mean) increase of 1.35 percent (1.53 percent). In contrast to the pre-repurchase period, the median (mean) return on assets declines significantly by 1.45 percent (1.58 percent) over the four-year period following the announcement. This finding indicates that repurchases signal the past rather than the future.

Table 3, Panel B reports the changes in return on asset of the repurchasing REITs relative to the matched non-repurchase REIT portfolio. The return on assets of the sample REITs is significantly higher than that of the non-repurchase REIT portfolio in the year right before the announcement (year -2 to year -1) and the announcement year. However, the sample firms underperform their peers in all the four years after the announcement, although most of the underperformances are insignificant. If we examine the entire four-year post-repurchase period, the repurchasing REITs significantly underperform their peers in all three operating performance measures.

C. Size of Repurchasing Programs and Future Performance

If the signaling hypothesis holds, it is expected that better future operating performance is associated with larger repurchase programs. To investigate this relation, we regress future operating performance on the magnitude of the repurchase program and various control variables. If the signaling hypothesis holds, the repurchase size will be positively related to future operating performance and will add some explanatory power to predicting future profitability. Following Fama and French (2000), we use a nonlinear partial-adjustment model to control for the nonlinear mean reversion in profitability documented in the literature. The regression model is the following:

$$OP_{t} - OP_{t-1} = a_0 + a_1 PSOUGHT + (b_1 + b_2 NDOPD_{-1} + b_3 NDOPD_{-1} \times DOP_{-1} + b_4 PDOPD_{-1} \times DOP_{-1}) \times DOP_{-1} + (c_1 + c_2 NCOPD_{-1} + c_3 NCOPD_{-1} \times COP_{-1} + c_4 PCOPD_{-1} \times COP_{-1}) \times COP_{-1} + e_t$$
(1)

for t = 1, 2, 3, and 4, where OP_t is operating performance (ROA, ROE, and earnings growth) in year *t*. PSOUGHT is the percentage of share outstanding sought for repurchase at the time of the announcement. DOP₋₁ is operating performance in year -1 minus the expected value of operating performance in year -1. The expected value of operating performance is the fitted value from the cross-sectional regression of operating performance in year -1 on the log of total assets in year -1, the market-to-book ratio of equity (calculated as market value of equity (price (item #24) times shares outstanding (item #25)) over book value of equity (item #60)) in year -1, and operating performance in year -2. Year 0 is the stock split announcement year. NDOPD₋₁ is a dummy variable that is 1.0 if DOP₋₁ is negative, and zero otherwise. PDOPD₋₁ is a dummy variable that is 1.0 if DOP₋₁ is positive, and zero otherwise. and zero otherwise. PCOPD₋₁ is a dummy variable that is 1.0 if COP₋₁ is positive, and zero otherwise. The coefficient b_1 measures mean reversion in operating performance. The coefficients b_2 , b_3 , and b_4 are to measure nonlinear mean reversion in operating performance, meaning that the reversals are stronger for large changes of either sign. The coefficient c_1 measures partial adjustment effect. The coefficients c_2 , c_3 , and c_4 measure stronger nonlinear mean reversion in operating performance for negative changes. The results reported in Table 4, Panel A show that larger repurchase programs have a larger improved ROA in year +1 but not in other years. For the other two performance measures (see Panels B and C), there is no evidence of a positive relation between the size of repurchase program and improved future performance.

IV. Announcement Period Excess Returns and Changes in Operating Performances

Prior studies have linked excess returns surrounding the repurchase announcement with management's optimism about the future. If the signaling hypothesis holds, the excess returns should be positively related to changes in profitability. To examine these relations, we regress excess return surrounding the announcement on changes in profitability, changes in trading liquidity, unexpected information revealed by split, and various control variables. The regression model is:

$$EHR_{t} = \beta_{0} + \beta_{1}\Delta OP_{-2 \text{ to} -1} + \beta_{2}\Delta OP_{0 \text{ to} + \text{year}} + \beta_{3}PSOUGT + \beta_{4}M/B_{-1} + \beta_{5}PAYOUT_{-1} + \beta_{6}LEVERAGE_{-1} + \beta_{7}OPTIONS_{-1} + \beta_{8}SIZE_{-1} + \varepsilon_{t}.$$
(2)

EHR is the excess holding return as reported in Table 1. $\Delta OP_{2 \text{ to } -1}$ is the change in operating performance from year -2 to year -1. $\Delta OP_{0 \text{ to } + \text{year}}$ is the change in operating performance from year 0 to year +1, from year 0 to year +2, or from year 0 to year +4. We use all three measures of operating performance in the regression analysis. A positive and significant coefficient for $\Delta OP_{0 \text{ to } + \text{year}}$ would indicate that the announcement effect reflects improved future operating performance.

We also include the size of the repurchase program (PSOUGHT), the market-to-book ratio (M/B), the dividend payout ratio (PAYOUT), the financial leverage ratio (LEVERAGE), the ratio of treasury shares to shares outstanding (OPTIONS), and the market value of the firm (SIZE) as the control variables. The market-to-book ratio, a proxy for the investment opportunities of a firm, is included to control for free cash flow hypothesis that suggests firms would distribute cash flow in excess of investment opportunities. M/B is the market-to-book ratio of equity. The dividend payout ratio, which is

total dividends paid (COMPUSTAT item #21) divided by net income, is also used as a proxy for the amount of free cash flow since firms may pay out more dividends if managers do not invest in negative NPV projects. LEVERAGE is used to control for the optimal capital structure hypothesis, which suggests that firms repurchase shares when their leverage ratios are below the target ratio. LEVERAGE is total debt (long-term debt, item #9 plus short-term debt, item #34) divided by the total assets (item #6) minus the average of LEVERAGE from year -4 to year -2. The variable OPTIONS, which is the ratio of treasury shares (item #87) to shares outstanding, is included to control for the management incentive hypothesis. This hypothesis suggests that to distribute cash, managers prefer stock repurchases over dividends because repurchases do not dilute the value of equity and because dividend payments will make stock options held by managers to become less valuable. The natural logarithm of market value of a firm (SIZE) is included to capture the undervaluation effect. Financial analysts tend to provide less coverage for smaller firms are mispriced more frequently than larger firms.

Table 5 reports the regression estimates of equation (2). REIT firms that experience better performance in the period [-2, -1] do not yield higher abnormal returns when they announce the repurchase. However, there is evidence that the announcement-period abnormal return increases for REITs that experience better post-repurchase ROA. For instance, the post-repurchase increase in ROA over [0, +4] is positively associated with the excess returns. The results also show a strong relation between abnormal return and the other two performance measures, particularly ROE.

Table 5 also shows a strong relation between abnormal return and size of repurchase program when we use change in operating performance in the [0, +4] period to measure post-repurchase performance. Most of the coefficients for M/B are negative but not significant. REITs that have lower payout ratios exhibit higher abnormal returns, indicating that repurchases do replace dividends. REITs seem not to use repurchases to adjust their leverage as most coefficients for LEVERAGE are insignificant. The coefficients for OPTIONS are positive and significant, particularly for the models that use changes in ROA and in EBIT. This finding is consistent with the conjecture that the use of stock options leads a firm to preferring repurchases over dividends because repurchases do not dilute the value

of the stock. We do not find information asymmetric effect as none of the coefficients for SIZE is significant.

V. Conclusions

In this study, we examine whether open-market stock repurchase programs announced by REITs convey information content about future operating performance. The market reacts favorably to the buyback announcements over a five-day period. However, our results show little evidence of improved long-term operating performance following the repurchase. Indeed, the performance tends to peak at the year immediately following the repurchase announcement and then deteriorates over the subsequent three years. Moreover, the repurchasing REIT firms do not show better performance when compared to their peers.

Nevertheless, our results indicate that the levels of post-repurchase operating performance are mostly larger than those of the pre-repurchase periods. Thus, the information content contained in repurchase programs may mean "improved" performance from the pre-repurchase period, rather than better performance from one year to another year. Our regression analysis also shows some support for the signaling hypothesis—i.e., a positive relation between the announcement period abnormal return and future operating performance.

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Table 1 Descriptive Statistics of REIT Open-Market Share Repurchase Firms

This table reports some descriptive statistics for 126 REIT firms that announced open-market share repurchase programs over the period 1990 to 2001. *R* is the five-day announcement holding period (-2, -1, 0, 1, 2) return of a sample firm. *EHR* is the difference between the five-day announcement holding period return of a sample firm and that of an equally-weighted REIT portfolio. *PSOUGHT* is the percentage of shares outstanding sought for repurchase at the time of the announcement. Significance levels are based on a *t*-test for the means and the Wilcoxon signed rank test for the medians. *** denotes significant at the 1 percent level.

	Mean	10%	25%	Median	75%	90%
<i>R</i> (%)	3.11***	-2.86	-0.92	1.56***	4.70	10.73
<i>EHR</i> (%)	3.03***	-2.43	-0.83	1.33***	4.86	9.35
PSOUGHT (%)	8.40	3.00	4.72	7.50	10.10	14.31

Table 2 Measures of Operating Performance for the REIT Open-Market Share Repurchase Firms and the Matching REIT Portfolio, 1991-2001

This table reports three measures of operating performance for the 126 REIT firms that announced open-market share repurchase over the period 1991 to 2001 and a matching non-repurchase REIT portfolio. The ROA (return on assets) is equal to earnings before interest and taxes (EBIT) scaled by the book value of total assets (COMPUSTAT item #6). The ROE (return on equity) is equal to net income (item #172) scaled by the book value of equity (item #60). Earnings growth is measured as the percent change in EBIT from one year to another year. The matching non-repurchase REIT portfolio is constructed with REIT firms that do not announce share repurchase programs in a given year. Panel C reports mean and median differences between the sample repurchasing REITs and the matching REIT portfolio. The means and medians are calculated using observations of ROA, ROE, and earning growth that have been Winsorized at the fifth and the 95th percentiles. Significance levels are based on a *t*-test for the means and the Wilcoxon signed rank test for the medians. ***, **, and * denote significant at the 1 percent, 5 percent, and 10 percent levels, respectively. All the numbers are in percentage.

	ROA	A	ROE		Earnings Growth					
Year	Mean	Median	Mean	Median	Mean	Median				
	Panel A: Share repurchase REIT firms									
-4	4.81	5.45	0.01	3.95	-1.88	5.61				
-3	4.82	5.40	0.48	4.70	32.96	18.82				
-2	5.28	5.85	4.54	5.55	40.09	21.29				
-1	5.78	5.85	5.30	6.35	49.34	27.32				
0	6.34	6.50	6.78	7.55	30.14	19.70				
+1	6.54	6.85	5.68	9.25	10.31	10.18				
+2	6.25	6.65	5.29	6.90	0.69	3.46				
+3	5.18	5.45	3.82	7.40	-5.67	-7.12				
+4	4.76	5.45	2.48	6.80	-11.26	-8.28				
		Panel B: Mate	hing non-repurchas	e REIT portfoli	0					
-4	6.14	6.70	-0.72	3.00	40.61	46.08				
-3	6.41	6.70	3.79	9.30	45.88	59.11				
-2	6.59	6.90	7.56	6.80	65.38	63.02				
-1	6.57	6.70	5.61	3.90	94.19	68.94				
0	6.63	6.75	7.52	8.05	76.37	46.60				
+1	6.88	6.80	10.18	10.50	36.71	24.35				
+2	6.64	6.80	8.63	6.80	84.48	84.48				
+3	5.89	6.40	5.45	6.30	45.20	48.48				
+4	6.02	6.75	5.70	3.30	53.31	44.27				
	Panel C: Difference	e between the sh	nare repurchase REI	T firms and ma	tching REIT portfo	lio				
-4	-1.33***	-1.15***	0.73	-1.90*	-42.48***	-44.91***				
-3	-1.59***	-0.95***	-3.30*	-4.20***	-12.93*	-33.41***				
-2	-1.31***	-1.05^{***}	-3.02***	-1.40***	-25.29***	-43.10***				
-1	-0.79***	-0.70***	-0.30	1.30	-44.86***	-52.43***				
0	-0.28*	-0.20*	-0.74	-1.10	-46.23***	-34.52***				
+1	-0.35*	0.00	-4.51***	-2.25***	-26.40***	-12.83***				
+2	-0.39**	-0.10	-3.34***	-1.25***	-83.79***	-81.02***				
+3	-0.71***	-0.40***	-1.63	1.30	-50.87***	-47.95***				
+4	-1.26***	-1.10^{***}	-3.22**	0.10*	-64.57***	-65.11***				

Table 3 Changes in Measures of Operating Performance, 1991-2001

This table reports the mean and median changes in three measures of operating performance for the 126 REIT firms that announced open market share repurchase over the period 1991 to 2001 and a matching non-repurchase REIT portfolio. The ROA (return on assets) is equal to earnings before interest and taxes (EBIT) scaled by the book value of total assets (COMPUSTAT item #6). The ROE (return on equity) is equal to net income (item #172) scaled by the book value of equity (item #60). Earnings growth is measured as the percent change in EBIT from one year to another year. The matching performance-adjusted change is equal to unadjusted change minus the change in performance of a matching non-repurchase REIT portfolio. The matching REIT portfolio is constructed with REIT firms that do not announce share repurchase programs in a given year. Panel C reports mean and median differences between the sample split firms and the REIT portfolio. The means and medians are calculated using observations of ROA, ROE, and earning growth that have been Winsorized at the fifth and the 95th percentiles. Significance levels are based on a *t*-test for the means and the Wilcoxon signed rank test for the medians. ***, **, and * denote significant at the 1 percent, 5 percent, and 10 percent levels, respectively. All the numbers are in percentage.

	ROA	A	ROE		Earnings Growth						
Year	Mean	Median	Mean	Median	Mean	Median					
	Panel A: Unadjusted Changes										
-4 to -3	0.01	-0.20	0.47	-0.55	34.83***	29.88***					
-3 to -2	0.46*	0.40**	4.05***	1.25***	7.13	5.93**					
-2 to -1	0.50***	0.40***	0.77	0.55*	9.25	9.46**					
-1 to 0	0.57***	0.60***	1.48***	1.20***	-19.20***	-17.82^{***}					
0 to +1	0.19	0.40**	-1.11	0.60	-19.83***	-12.89***					
+1 to +2	-0.28	0.25	-0.39	0.45	-9.62***	-9.71***					
+2 to +3	-1.08***	-0.60***	-1.47*	-0.45**	-6.36***	-6.76***					
+3 to +4	-0.41**	-0.70***	-1.34	-0.50 * *	-5.58**	-7.40 * * *					
-4 to 0	1.53***	1.35***	6.77***	4.15***	32.01***	36.29***					
0 to +4	-1.58***	-1.45***	-4.30***	-0.90**	-41.39***	-34.15***					
		Panel B: Matchi	ing Performance-A	Adjusted Changes	5						
-4 to -3	-0.25	-0.50**	-4.03	-2.75**	29.56***	21.26***					
-3 to -2	0.27	0.20	0.28	4.00***	-12.36	-10.96***					
-2 to -1	0.52***	0.55***	2.72***	3.55***	-19.57**	-12.89***					
-1 to 0	0.51***	0.40***	-0.44	-1.95	-1.38	-2.06					
0 to +1	-0.06	0.00	-3.76***	-3.00***	19.84***	-2.27*					
+1 to +2	-0.04	0.20	1.17	1.65*	-57.39***	-71.17***					
+2 to +3	-0.32	0.25	1.71*	3.25***	32.92***	41.49***					
+3 to +4	-0.55 **	0.00	-1.59	-0.60	-13.69***	-28.29***					
-4 to 0	1.05***	1.05***	-1.47	2.20**	-3.75	7.97					
0 to +4	-0.98***	-0.80***	-2.48*	-0.20	-18.33**	-35.17**					

Table 4 The Size of Share Repurchase Programs and Changes in Operating Performance

This table reports the regression coefficients from regressing operating performance on the size of share repurchase programs and various control variables. The ROA (return on assets) is equal to earnings before interest and taxes (EBIT) scaled by the book value of total assets (COMPUSTAT item #6). The ROE (return on equity) is equal to net income (item #172) scaled by the book value of equity (item #60). Earnings change is measured as the change in EBIT from one year to another year. *PSOUGHT* is the percentage of shares outstanding sought for repurchase at the time of the announcement. DOP₋₁ is operating performance in year -1 minus the expected value of operating performance in year -1. The expected value of operating performance is the fitted value from the cross-sectional regression of operating performance in year -1 on the log of total assets in year -1, the market-to-book ratio of equity (calculated as market value of equity (price (item #24) times shares outstanding (item #25)) over book value of equity (item #60)) in year -1, and operating performance in year -2. Year 0 is the stock split announcement year. NDOPD₋₁ is a dummy variable that is 1.0 if DOP₋₁ is negative, and zero otherwise. PDOPD₋₁ is a dummy variable that is 1.0 if DOP₋₁ is positive, and zero otherwise. COP is the change in operating performance in year -1. NCOPD₋₁ is a dummy variable that is 1.0 if COP₋₁ is positive, and zero otherwise. B₋₁ is the book value of equity at the end of year -1. Inside the parentheses are *t*-statistics computed using White's (1980) heteroskedasticity consistent standard errors. ***, **, and * denote significant at the 1 percent, 5 percent, and 10 percent levels, respectively.

Year	a_0	a_1	b_1	b_2	b_3	b_4	c_1	<i>c</i> ₂	<i>c</i> ₃	c_4	Adjusted R^2
					Pa	nel A					
		$ROA_t - RC$	$\mathbf{D}\mathbf{A}_{t-1} = a_0 + a_1$	$PSOUGHT_0 +$	$(b_1 + b_2 \text{NDOPI})$	$D_{-1} + b_3 NDO$	$PD_{-1} \times DOP_{-1}$	$a_1 + b_4 PDOPD$	$_{-1} \times \text{DOP}_{-1}) \times \text{DOP}_{-1}$	OP_{-1}	
			$+(c_{1} +$	$-c_2 \text{NCOPD}_{-1}$	$+ c_3 \text{NCOPD}_{-1} \times$	$COP_{-1} + c_4P$	$\text{COPD}_{-1} \times \text{COPD}_{-1}$	$OP_{-1}) \times COP_{-1}$	$+e_t$		
<i>t</i> = 1	-0.014*	0.002*	5.482*	-6.909*	-10.600	-84.678*	-4.060	5.137	10.025	56.666	18.52%
	(-1.94)	(1.84)	(1.73)	(-1.88)	(-0.86)	(-1.73)	(-1.57)	(1.59)	(0.71)	(1.51)	
<i>t</i> = 2	0.005	-0.000	0.685	-0.879	-19.215**	-27.251	-1.175	1.895	20.872**	29.064	3.69%
	(0.78)	(-0.61)	(0.41)	(-0.43)	(-2.31)	(-0.97)	(-0.86)	(1.05)	(2.14)	(1.32)	
<i>t</i> = 3	0.001	-0.000	-0.756	2.063	24.286***	-5.083	0.373	-1.774*	-23.749**	4.639	17.60%
	(0.09)	(-0.89)	(-0.86)	(1.64)	(2.67)	(-0.48)	(0.59)	(-1.69)	(-2.41)	(0.52)	
<i>t</i> = 4	-0.013*	0.001	3.097*	-2.538	-8.478	-22.200	-1.542	0.883	6.433	4.372	33.50%
	(-1.70)	(0.73)	(1.82)	(-1.23)	(-1.08)	(-0.87)	(-1.23)	(0.51)	(0.68)	(0.23)	

Year	a_0	a_1	b_1	b_2	b_3	b_4	c_1	c_2	<i>C</i> ₃	c_4 .	Adjusted R^2
					Pa	nel B					
		$ROE_t - ROE_t$	$E_{t-1} = a_0 + a_1 P$	$SOUGHT_0 + ($	$b_1 + b_2$ NDOPE	$D_{-1} + b_3 \text{NDOP}$	$D_{-1} \times DOP_{-1}$	$+ b_4 PDOPD$	$_{1} \times \text{DOP}_{-1}) \times \text{DOP}_{-1}$	OP_{-1}	
			$+(c_1+a_1)$	$c_2 \text{NCOPD}_{-1} +$	$c_3 \text{NCOPD}_{-1} \times 0$	$COP_{-1} + c_4PC$	$COPD_{-1} \times COP$	$P_{-1}) \times COP_{-1}$	$+ e_t$		
<i>t</i> = 1	-0.001	-0.003	1.095	-2.565**	-7.941**	-9.266	-0.033	0.630	6.083**	0.211	35.86%
	(-0.03)	(-0.77)	(1.20)	(-2.05)	(-2.28)	(-1.16)	(-0.09)	(0.98)	(2.22)	(0.53)	
<i>t</i> = 2	-0.057	0.006	-1.019	-0.144	-3.291	15.438	-0.538	1.713	2.746	0.176	9.68%
	(-1.16)	(1.40)	(-0.76)	(-0.09)	(-0.97)	(1.09)	(-0.76)	(1.14)	(0.84)	(0.26)	
<i>t</i> = 3	-0.006	-0.005**	1.054	-0.952	3.365*	-4.580	-0.305	-0.961	-3.478*	0.601*	8.81%
	(-0.25)	(-2.09)	(1.02)	(-0.80)	(1.82)	(-0.56)	(-0.88)	(-1.20)	(-1.93)	(1.71)	
<i>t</i> = 4	0.021	-0.005	-1.221	0.228	-4.369**	8.114*	0.119	0.794	3.574**	0.159	6.14%
	(0.69)	(-1.14)	(-1.61)	(0.23)	(-2.56)	(1.80)	(0.27)	(1.03)	(2.34)	(0.35)	
					Pa	nel C					
		$(E_t - E_{t-1})/B$	$-1 = a_0 + a_1 PS$	$OUGHT_0 + (b$	$b_1 + b_2 \text{NDOPD}_{-}$	$+b_3$ NDOPI	$D_{-1} \times DOP_{-1} +$	b_4 PDOPD ₋₁	\times DOP ₋₁) \times DO	P_{-1}	
			$+(c_1+c_2)$	2NCOPD ₋₁ + c	$_{3}$ NCOPD ₋₁ × C	$COP_{-1} + c_4 PCO$	$OPD_{-1} \times COP$	$_{-1}) \times \text{COP}_{-1} +$	$-e_t$		
<i>t</i> = 1	0.044**	-0.002	-1.161	1.063	0.442	7.356	0.526	-1.327	-2.492	-1.744**	29.79%
	(2.13)	(-1.33)	(-1.14)	(0.80)	(0.68)	(0.85)	(1.50)	(-0.75)	(-0.73)	(-2.30)	
<i>t</i> = 2	0.045	-0.001	3.118*	-4.345**	0.540	-24.960*	-1.918**	3.763	-0.823	3.444**	54.39%
	(1.32)	(-0.31)	(1.91)	(-2.06)	(0.47)	(-1.92)	(-2.02)	(1.13)	(-0.13)	(2.31)	
<i>t</i> = 3	-0.011	0.001	4.732**	-5.024**	0.728	-36.210**	-0.714	-0.379	-3.524	1.909	16.23%
	(-0.35)	(0.41)	(2.24)	(-2.13)	(1.18)	(-2.33)	(-0.97)	(-0.22)	(-1.08)	(1.45)	
<i>t</i> = 4	-0.000	-0.003	-0.452	0.477	-1.935***	7.159	1.452**	0.061	6.242**	-3.911***	* 65.74%
	(-0.00)	(-1.36)	(-0.45)	(0.42)	(-3.88)	(0.91)	(2.28)	(0.04)	(2.18)	(-4.06)	

 Table 5

 Announcement Excess Returns and Changes in Operating Performances

This table reports the regression coefficients from regressing EHR (excess holding return) on change in operating performance, size of share repurchase programs, and various control variables. EHR is the difference between the five-day announcement holding period (-2, -1, 0, 1, 2) return and that of the CRSP value-weighted index. Δ ROA is the change in ROA. Δ ROE is the change in ROE. Δ EBIT is the change in EBIT. PSOUGHT is percentage of shares outstanding sought for repurchase at the time of the announcement. M/B is the market-to-book ratio of equity in year -1. PAYOUT is the ratio of total dividends paid to net income available to shareholders. LEVERAGE is total debt divided by the total assets minus the average of LEVERAGE from year -4 to year -2. OPTIONS is the ratio of treasury shares to share outstanding in year -1. SIZE is the natural logarithm of market value in year -1. Year 0 is the stock split announcement year. Inside the parentheses are *t*-statistics computed using White's (1980) heteroskedasticity consistent standard errors. ***, ** and * denote significant at the 1 percent, 5 percent, and 10 percent levels, respectively.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Intercept	-0.018	-0.034	-0.063	-0.012	-0.065*	-0.041	-0.027	-0.042	-0.026
	(-0.50)	(-1.08)	(-1.57)	(-0.34)	(-1.70)	(-1.08)	(-0.78)	(-0.090)	(-0.60)
$\Delta ROA (-2 \text{ to } -1)$	0.226	0.014	0.043						
	(0.82)	(0.06)	(0.19)						
$\Delta ROA (0 \text{ to } +1)$	1.498***								
	(9.03)								
$\Delta ROA (0 \text{ to } +2)$		1.071***							
		(13.51)							
$\Delta ROA (0 \text{ to } +4)$			0.842***						
			(11.38)						
$\Delta \text{ROE} (-2 \text{ to } -1)$				0.010	-0.050	-0.056			
, , , , , , , , , , , , , , , , , , ,				(0.23)	(-0.91)	(-1.17)			
$\triangle \text{ROE} (0 \text{ to } +1)$				0.344***					
. ,				(2.90)					
$\triangle \text{ROE} (0 \text{ to } +2)$					0.252**				
					(2.27)				
$\Delta \text{ROE} (0 \text{ to } +4)$						0.213***			
						(2.85)			
Δ EBIT (-2 to -1)							0.012	-0.008	-0.004
							(0.60)	(-0.25)	(-0.10)
$\Delta \text{EBIT} (0 \text{ to } +1)$							0.459***	× ,	× ,
							(3.58)		
$\Delta \text{EBIT} (0 \text{ to } +2)$							~ /	0.089	
								(1.14)	
$\Delta \text{EBIT} (0 \text{ to } +4)$								× /	0.052
(* *** * *)									(0.93)
									(

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PSOUGHT	-0.001	0.001	0.005***	0.003*	0.002	0.007***	0.005**	0.004	0.008**
	(-0.34)	(1.00)	(2.84)	(1.83)	(0.79)	(2.82)	(2.47)	(1.32)	(2.24)
M/B	-0.004	0.001	-0.000	-0.009	0.002	-0.002	-0.020	-0.028	-0.024
	(-0.41)	(0.11)	(-0.03)	(-0.56)	(0.15)	(-0.12)	(-1.33)	(-1.28)	(-1.15)
PAYOUT	-0.001***	-0.001^{***}	-0.001***	-0.001 **	-0.001***	-0.002^{***}	-0.001*	-0.000	-0.000
	(-6.88)	(-7.86)	(-3.51)	(-2.32)	(-4.66)	(-3.43)	(-1.90)	(-0.52)	(-0.09)
LEVERAGE	0.266	0.030	0.068**	0.099*	0.049	0.032	0.089*	0.131	0.129
	(0.78)	(0.98)	(2.08)	(1.73)	(0.89)	(0.68)	(1.68)	(1.46)	(1.52)
OPTIONS	0.445***	0.284**	0.237*	0.001	0.472**	0.198	0.886***	0.509**	0.452*
	(3.46)	(2.30)	(1.95)	(0.00)	(2.36)	(1.08)	(3.58)	(2.21)	(1.74)
SIZE	0.014	0.013	0.011	-0.006	0.020	0.003	-0.003	0.006	-0.012
	(0.95)	(1.01)	(0.73)	(-0.44)	(1.43)	(0.26)	(-0.24)	(0.37)	(-0.69)
Ν	72	68	59	72	68	59	72	68	59
Adjusted R^2 (%)	66.83	73.65	76.96	51.91	48.16	59.78	59.72	21.39	29.42