Using REITs to Extricate the Effect of Managerial Signaling in Open Market Share Repurchase Announcements

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ABSTRACT

This paper explores the effect of stock repurchase announcements on equity returns for publicly traded real estate investment trusts. The study of share repurchases in the context of real estate investment trusts provides a novel opportunity to disentangle the impact of competing theories for the abnormal returns observed around repurchase announcements. Prior literature advances six hypotheses to explain the stock price reaction associated with repurchases. The unique institutional attributes of real estate investment trusts negate the economic logic sustaining all of the hypotheses except the managerial signaling hypothesis. Hence, we are able to focus exclusively on assessing the impact of managerial signaling. After controlling for relevant economic variables, we provide evidence for the efficacy of the managerial signaling hypothesis in the context of open market share repurchases.

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This paper explores the effect of stock repurchase announcements on equity returns for publicly traded real estate investment trusts. The study of share repurchases in the context of real estate investment trusts provides a novel opportunity to disentangle the impact of competing theories for the abnormal returns observed around repurchase announcements. Prior literature advances six hypotheses to explain the stock price reaction associated with repurchases. The unique institutional attributes of real estate investment trusts negate the economic logic sustaining all of the hypotheses except the managerial signaling hypothesis. Hence, we are able to focus exclusively on assessing the impact of managerial signaling. After controlling for relevant economic variables, we provide evidence for the efficacy of the managerial signaling hypothesis in the context of open market share repurchases.

The return of operating profits to shareholders lies at the core of corporate finance theory. As such, stock repurchases have been studied extensively. Masulis (1980), Dann (1981), Vermaelen (1981, 1984), Lakonishok and Vermaelen (1990), Comment and Jarrell (1991), and Ikenberry, Lakonishok and Vermaelen (1995, 2000) all document positive abnormal stock price performance around the announcement of stock repurchases for operating firms. The existing literature posits six hypotheses to explain abnormal returns, namely: 1) signaling (or information content) effects associated with firm undervaluation, 2) agency cost (or free cash flow) effects, 3) personal tax effects associated with differential taxation of dividends and capital gains, 4) inter-security wealth transfers stemming from leverage increases induced by repurchases, 5) corporate tax shield effects associated with debt financing of repurchases, and 6) intra-security wealth transfers between tendering and non-tendering shareholders. However, these hypothesized effects are not mutually exclusive. Given that the theories all predict the same stock price reaction to repurchase announcements, existing studies have difficulty disentangling the competing hypotheses (for example, see Nohel and Tarhan (1998)).

As an asset class, real estate investment trusts (REITs) possess several unique institutional attributes that negate the economic intuition sustaining most of the competing theories advanced to explain stock price reaction to repurchase announcements in operating companies. In particular, since REITs are required to distribute 95% of income to shareholders and are exempted from Federal income taxation, the impact of hypotheses two

through six (in the preceding paragraph) is mitigated. Hence, investigation of repurchase announcements by REITs provides a novel approach to isolating the impact of signaling effects from those of the competing hypotheses.

We are not the first to examine REITs to evaluate the efficacy of competing theories previously documented in operating companies. Allen and Sirmans (1987) study merger wealth effects and find positive abnormal returns for acquired firms, concluding that the wealth gains are due to improved management of the captured firm. Howe and Shilling (1988) examine the share price reaction of REITs to announcements of new security offerings and conclude that the positive market reaction is consistent with the managerial signaling hypothesis. Jaffe (1991) studies REITs to test capital structure theory in a tax-free environment and finds that the value of REITs is invariant to leverage changes. Our paper advances the literature using a similar platform by examining share repurchase announcements by REITs in order to extricate the effect of managerial signaling from other hypothesized effects.

The paper is organized as follows. First, we provide a succinct literature review, followed by a section containing information on the data sample and empirical methods. Next, we report the empirical results followed by a summary and conclusion section.

Managerial Signaling, Competing Hypotheses, and REITs

The managerial signaling hypothesis is based on asymmetric information between managers and shareholders. If management views the firm's shares as undervalued, the announcement of a repurchase may serve to homogenize the information sets between the two groups (Aharony and Swary (1980), Vermaelen (1984), Ofer and Thakor (1987), Healy and Palepu (1988), and Constantinides and Grundy (1989). The most frequent interpretation of the signaling hypothesis is that the announcement of a repurchase program will precipitate a

positive stock price reaction. Many authors, including Dann (1981), Vermaelen (1981), Asquith and Mullins (1986), Comment and Jarrell (1991), and Stephens and Weisbach (1998), empirically document positive stock price reactions surrounding repurchase announcements and offer interpretations consistent with the managerial signaling hypothesis. However, consensus on the efficacy of the signaling hypothesis is thwarted by the existence of competing hypothesis. By focusing on REITs, the confounding influences of the non-signaling hypotheses are avoided and, thus, a more focused assessment of the impact of signaling is obtained. The remainder of this section discusses the other hypotheses and assesses their merits with respect to REITs.

Jensen (1986) argues that firms where management has access to significant amounts of free cash flow incur greater agency costs (hypothesis 2). Under the agency cost (or free cash flow) hypothesis, managers with discretion over unencumbered cash tend to over-invest in projects with negative net present value. Hence, in studies of operating company repurchases, the reduction in agency costs associated with the cash disbursements from stock repurchases is hypothesized to result in a positive stock price reaction (Nohel and Tarhan (1998)). However, in the case of REITs, the potential impact of the free cash flow hypothesis is muted for three reasons. First, REITs are required to pay out at least 95% of net income to shareholders. Thus, opportunity to accumulate and misuse free cash flow is attenuated in REITs relative to other industries. Second, REITs are only permitted to invest in the purchase, sell, and maintenance of real property. Hence, management discretion over free cash flows is limited by the restricted nature of the possible investment opportunity set. Whereas REITs may incur agency problems by paying too much when acquiring real assets (Hardin and Wolverton [1999]), the restricted nature of the investment opportunity set limits value destroying activities such as conglomerate acquisitions. Third, REITs have an established mechanism for the distribution of free cash flows -- dividends. Operating companies attempting to reduce agency costs may prefer to distribute free cash flow through repurchases rather than dividends due to the well-documented penalties associated with future dividend reductions (Bajaj and Vijh (1990), Kaplan and Reishus (1990), and Denis, Denis, and Sarin (1994)). However, REIT dividend policies are fundamentally different from the constant

dollar dividend strategies common in many other industries (Wang, Erickson, and Gau (1993), Bradley, Capozza, and Seguin (1998), and Brau and Holmes (2000)). Hence, while we control for possible free cash flow effects in subsequent empirical tests in order to provide comparability with the existing literature, intuition affords that agency costs associated with free cash flow are muted for REITs and, thus, should not be a significant explanatory variable in our tests.

Personal tax effects (hypothesis 3), more formally referred to as dividend substitution effects (Ikenberry, Lakonishok, and Vermaelen (1995)), are frequently cited as an explanatory factor in the repurchase decision due to the differential tax rates on dividends and capital gains. However, given the 95% payout requirement, the expected dividends of REITs are large. Hence, REIT shareholders constitute a pro-dividend clientele that, presumably, have the ability to hedge the tax liability associated with cash distributions or are less sensitive to the differential tax treatment of dividends and capital gains (Pettit (1977) and Allen, Bernardo, and Welch (2000)). Further, in a recent paper examining dividends in REITs, Gentry, Kemsley, and Meyer (2000) show that current dividends do not impose incremental tax liability on shareholders. Given that REIT investors are pro-dividend, differential tax rates should not significantly impact the announcement reaction. As with free cash flow effects, our subsequent empirical tests control for potential personal tax effects to provide comparability with the existing literature. However, our intuition is that the tax effect control will be insignificant.

The preceding three hypotheses (managerial signaling, free cash flow, and personal tax effects) are the dominant theories advanced in the existing literature. The remaining three hypotheses receive less attention. However, in order to extricate the impact of managerial signaling, we must eliminate the remaining hypotheses as possible explanations for the stock price reaction to repurchase announcements. The inter-security wealth transfer hypothesis (hypothesis 4), developed by Masulis (1980), argues that increases in debt financing

4

associated with repurchases may lead to wealth transfers from bondholders to stockholders. In a sample of operating firms, Masulis (1980) finds no support for inter-security wealth transfer effects during the offer period. Further, Jaffe (1991) studies REITs and concludes that the value of REITs are invariant to leverage changes. For our REIT sample, inter-security wealth transfers are implausible for two reasons. First, REITs frequently make large cash distributions through dividends and repurchase programs. For an inter-security wealth transfer to occur, the announcement of the distribution, and the corresponding increase in leverage, must be unexpected. Given the frequency of large distributions from REITs, rational investors will anticipate the frequent disgorgement of cash and price the debt securities appropriately. Second, a large percentage of REIT bonds are secured by specific assets. To the extent that capital structure changes do not effect the value of the collateral underlying asset-backed debt, debt holders are insulated from the capital structure changes associated with a repurchase. Thus, inter-security wealth transfers should not be significant for REITs.

The last two hypotheses, corporate tax shield effects (hypothesis 5) and wealth transfers between tendering and non-tendering shareholders (hypothesis 6), can also be dismissed when considered in the context of REITs. Since REITs are not subject to corporate income tax, the corporate tax shield associated with debt financing of repurchases is obviously not pertinent. Finally, REITs usually choose open market rather than tender offer repurchases.[1] Since few REITs initiate tender offer repurchase programs (we analyze only open market transaction), wealth transfers between tendering and non-tendering shareholders are not an issue.

Data Description, Variable Construction, and Empirical Methods

Sample Selection

The sample of 240 open market repurchase announcements is taken from Security Data Company's (SDC) Merger and Acquisition database for the years 1982 through 1999. The criteria for inclusion are: 1) that the transaction is classified as an open market share repurchase by SDC, and 2) that the firm is a REIT (SIC Code

6798). Data elements collected from the SDC files include the announcement date, stock price four weeks before the announcement, annual operating income of the firm for the year immediately preceding the announcement, stock price one day before the announcement, book value of equity immediately prior to the announcement, transaction value of the repurchase announcement, total firm assets immediately preceding the announcement, and net income for the year immediately preceding the announcement.[2]

Next, from Standard and Poors' Compustat database, we obtain firm assets (data item #6), operating income before depreciation (data item #13), total income taxes (data item #16), preferred dividends (data item #19), common dividends (data item #21), market price (data item #24), common shares outstanding (data item #25), deferred taxes (data item #35), and common equity (data item #60) immediately preceding the announcement. Cash, assets, operating income, common equity, common shares outstanding, and market price are used to supplement the SDC database when SDC has missing values.

Finally, we require that the firm be listed on the University of Chicago's Center for Research in Security Prices (CRSP) database beginning six months before the event period. The CRSP returns data are needed to calculate stock price performance prior to the announcement and to conduct the event study. In all, 46 announcements are excluded from the sample due to nonmatching or missing data on CRSP, Compustat, or SDC, resulting in a final sample size of 194 announcements. Additionally, the Wilshire REIT Index historical monthly returns are obtained from Wilshire Associates and historical federal tax rate data on personal tax rates and capital gains rates are obtained from Citizens for Tax Justice.[3]

Table 1 reports the frequency of announcements. Panel A reports that over fifty percent of the announcements occur in 1998 and 1999 and Panel B reports monthly frequency. Panel C reports that the announcement distribution across days of the week is fairly constant, with the most occurring on Tuesday (43) and the least on

Friday (29).

Construction of Signaling Variables

We construct three variables to test the impact of managerial signaling. The first two signaling variables measure pre-announcement stock price performance. Stephens and Weisbach (1998) posit that managers will initiate repurchase programs to signal undervaluation "following a decline in their share price, when their stock is more likely to be undervalued." Several studies, including Dann (1981), Vermaelen (1981), Comment and Jarrell (1991), and Ikenberry, Lakonishok, and Vermaelen (1995, 2000), offer a similar interpretation of the signaling hypothesis for repurchases following periods of poor stock price performance. Two variables measure the pre-announcement stock performance of the announcing firm. First, the abnormal six month holding period return ending 10 days before the announcement defined as the cumulative daily stock return for each firm minus the cumulative return on the CRSP equally weighted index is used as a measure of past stock price performance. Second, the simple return in the stock price over the preceding four weeks is used to capture short-term price effects. While potentially subject to the influence of competing hypotheses, Comment and Jarrell (1991) and Stephens and Weisbach (1998) find that operating firms performing poorly prior to the announcement have the largest positive announcement effect and interpret this as evidence of managerial signaling.

The third signaling variable, the market-to-book equity ratio, also proxies for undervaluation of the firm. Ikenberry, Lakonishok, and Vermaelen (2000) posit that firms with relatively low market-to-book values have greater potential for undervaluation than firms with relatively high market-to-book values. We construct the measure using the SDC variables, price per share and book value per share prior to the announcement. Where SDC has missing values, we supplement with the product of Compustat's most recent closing price and common shares outstanding divided by total common equity.

7

In order for a signal to be credible, a cost must exist to prohibit mimicking and create a separating equilibrium. For repurchases, two signaling costs exist. First, the transaction costs associated with an open market repurchase are significant. Given that REITs must return 95% of operating profit in the form of dividends, the transaction costs of a repurchase are in addition to the costs of maintaining the normal dividend mechanism.[4] Second, if managers possess private information that the firm is undervalued, the initiation of a repurchase program allows the firm to acquire shares that offer superior returns with the benefits accruing proportionally to the surviving shareholders. Given the typical purchase premium associated with the repurchase announcement, firms that are fairly valued or overvalued prior to the announcement incur significant costs associated with the purchase of shares at the post-announcement price. Further, for overvalued firms the significant costs associated with mimicking accrue to the surviving shareholders, likely including management.

Construction of Control Variables

The most important control variables are for the competing hypotheses. In the existing literature, personal tax effects and agency effects are the most frequently offered and best supported alternatives to the managerial signaling hypothesis. Hence, the empirical tests presented subsequently contain proxies for the major competing hypotheses (personal tax effects and agency effects) although our expectation is that these controls will not be significant given the unique characteristics of REITs. To control for personal tax effects, the spread between the maximum personal tax rate on ordinary income and the capital gains rate at the time of the announcement (hereafter referred to as the tax spread) is included. During our sample period (1982-1999), the maximum ordinary income tax rate changed five times. The maximum capital gains tax rate also changed five times, although the changes were not synchronized.[5] Assuming that pro-dividend clienteles are insensitive to the form of cash disbursements (Pettit (1977)), the stock price reaction should not be sensitive to personal tax

effects for REIT repurchases.

To control for potential agency effects associated with free cash flow (FCF), the empirical tests include the free cash flow metric proposed by Lehn and Poulsen (1989), specifically:

FCF = Operating income before depreciation + total income taxes + change in deferred taxes + preferred dividends + common dividends. (1)

The Lehn and Poulsen (1989) FCF measure is designed to capture the cash subject to management discretion. Again, free cash flow effects should be muted in REITs due to the large payouts, the restricted investment opportunity set, and the established cash disbursement mechanism. Hence, the FCF control should not be significant in our tests.

In order to isolate potential signaling effects, we control for five additional factors. First, we control for movements in the REIT market by using the monthly return of the Wilshire REIT index for the announcement month, as well as one and two month lagged returns of the index. Given that our signaling premise is based on undervaluation of the individual REIT, controlling for movements in the REIT market is important. Second, we include the total assets of the firm to control for size effects. For example, size effects may include well-documented small firm effects (for example, Banz (1981), Fama and French (1992), and Barber and Lyon (1997)) or transparency factors (Ang and Brau (2000)). Larger firms, which are generally more transparent and therefore less subject to informational asymmetries, may react differently to repurchase announcements. Third, as noted by Ikenberry, Lakonishok, and Vermaelen (1995), the size of the repurchase program may impact the market response. We control for the size of the repurchase announcement by including the ratio of

the announced repurchase size in dollars to the market capitalization of the firm. Fourth, we control for differences in dividend policy by including the dividend payment for the preceding year. Given that REITs must pay out 95% of operating profits in the form of dividends in order to maintain their tax exempt status, substitution of repurchases for dividends is unlikely. However, for completeness, we include the dividend control in our model. Finally, as shown in Table 1, the frequency of repurchase announcements varies considerably over time and is clustered in 1998 and 1999. To control for the clustering of repurchases, we include a ratio that equals the number of announcements in a given year divided by the total number of announcements over the sample period.[6]

Table 2 reports the summary statistics for each explanatory variable. Panel A reports the three signaling variables. Both the long-term (-16%) and short-term (-4%) pre-announcement stock returns indicate significant average underperformance by the sample firms preceding the repurchase announcement. The average market-to-book ratio for the announcing firms is 1.78. Panel B reports the control variables for the primary competing hypotheses, the tax spread and the free cash flow variables. The average tax spread advantage for capital gains is 15% over the sample period and the average firm holds approximately 50 million dollars in free cash. Finally, Panel C reports the other relevant control variables used in our regression model. The average firm holds $1.2 billion in assets and announces an average repurchase of nearly $38 million. The Wilshire REIT index indicates that in the contemporaneous month, REIT stock performance is not significantly different from zero, but in each of the two months preceding the repurchase, REITs on average experience significant and negative returns. Hence, REIT managers may use repurchases to signal that their firm stands out from the industry and is undervalued relative to other REITs.

Empirical Methods

Abnormal returns surrounding the repurchase announcements are estimated using standard market model

10

event-study methodology (Brown and Warner (1980, 1985)). We use a 21-day event window surrounding the announcement and estimate beta using the daily returns of the stock for the six months prior to the beginning of the window. In our regression models, the dependent variable is the three-day cumulative abnormal return (CAR) calculated using the day before the announcement, the announcement date, and the day following the announcement. We choose a three-day window to allow for any leakage preceding the announcement and for those announcements that take place after the market closes.[7]

The model employed to explain the abnormal returns associated with a share repurchase announcement is:

$$CAR_{(-1,0,+1)i} = \ ?_i + ?X_i + ?Y_i + ?Z_i + ?_i, \tag{2}$$

where:

i denotes the ith announcement;

? is the intercept of the model;

?, ?, and ? are vectors of coefficients;

X is a vector of the three signaling variables;

Y is a vector of the two primary competing hypotheses variables;

Z is a vector of the other relevant control variables; and

? is a random error term.

Results

Describing the Announcement Reaction: Measuring Direction and Magnitude

Figure 1 graphs the daily abnormal returns. Consistent with existing studies of operating companies, the announcement of a repurchase produces a significant and positive abnormal return in our sample. The

11

abnormal return on day +1 is also positive, likely the result of announcements made after the close of the market. The abnormal return on day -1 is negligible.

Figure 2 graphs the CARs. The negative returns prior to the announcement of the repurchase followed by the positive stock price reaction on the event date is consistent with the undervaluation signals offered by Comment and Jarrell (1991) and Stephens and Weisbach (1998). Specifically, the poor stock price performance prior to the announcement may lead management to signal that the stock is undervalued. The overall trend for the 21-day window is positive.

Details of the standard 21-day event window are provided in Table 3. Of particular interest, Panel A reports that the daily abnormal returns are positive and significantly different from zero on days 0, +1, and +2. Panel B provides additional detail on the cumulative abnormal returns. The significantly negative CAR from day -10 to day -2 (-1.5%) is statistical evidence of under-performance in the period immediately prior to the repurchase announcement. The average three-day CAR used in subsequent empirical tests equals 2.3% and is significant beyond the .01 level. The 21-day CAR for the event window is significant and positive (2.07%).

The impact of repurchase announcements in our sample is similar in magnitude to prior studies. In a study not limited to REITs, Ikenberry, Lakonishok, and Vermaelen (1995) report a five day CAR (day -2 to day +2) of 3.54%. Additionally, in a more recent study, Ikenberry, Lakonishok, and Vermaelen (2000) report an average abnormal return for the announcement month of 0.93% (t=2.36) for a sample of 1,060 Toronto Stock Exchange listed firms from 1989-1997. Other studies, such as Vermaelen (1981) and Comment and Jarrell (1991), report similar results.

12

The uniqueness of REITs makes the analysis of repurchase announcement stock price effects interesting. However, the true value of investigating repurchases in the context of REITs is the opportunity to focus on the determinants of the reaction rather than just magnitude or direction.

Determinants of Announcement Reaction: Disentangling the Competing Hypotheses

Table 4 provides the Pearson correlation coefficients for the CARs with the three signaling variables as well as the control variables for personal tax and free cash flow effects. Consistent with the signaling hypothesis, we expect the six month and four week stock price performance variables to be negatively associated with the CARs. We expect the market-to-book ratio to be negatively correlated with the CARs since lower market-to-books imply greater potential for undervaluation. Additionally, if the personal tax effect and free cash flow hypotheses are not applicable in a REIT sample, then the correlations of the competing hypothesis control variables with the CARs should not be significantly different from zero. If the competing hypotheses are important, then the tax spread and the free cash flow controls should be positively correlated with the CARs. The simple correlations confirm our intuition. All three signaling variables carry the hypothesized negative sign and are significant at standard confidence levels. Additionally, the controls for personal tax effects (Tax Spread) and free cash flow are not significantly different from zero and have signs opposite of those predicted by the competing hypotheses.

Our multivariate results are presented in Table 5. We report the results of six regression models to explain the variation in the CARs.[8] Models one through three contain the five general control variables plus one of the three signaling variables. In models one and two, the six month stock return variable and the four week stock return variable are both significant and negative. Without controlling for the impact of the competing hypotheses or book-to-market, the signaling variables individually possess significant explanatory power as determinants of the CARs. The negative sign confirms the signaling hypothesis as a motivation for

13

repurchases. In model three, the market-to-book ratio is not significantly different from zero, although the coefficient does have the anticipated negative sign.

Model four contains all of the general control variables plus the tax spread control variable. Model five contains all of the general control variables plus the free cash flow control variable. We estimate models four and five to statistically test our argument that the two primary competing hypotheses are mitigated in REITs. If our intuition is correct that the competing hypotheses are not valid for REITs, then the coefficients on the control variables for the competing hypotheses should not be significantly different from zero. Indeed, Table 5 shows that neither the tax spread (model four) nor free cash flow (model five) possess significant explanatory power in the regressions. Additionally, the tax spread variable has a sign opposite to the sign predicted by the personal tax effect hypothesis. Finally, comparison of the adjusted R^2 for models one and two (.11 and .12, respectively) to models four and five (.03 and .04, respectively) and the insignificant F-tests for models four and five validate our assertion that REITs provide a signaling test which is relatively free from the confounding effects of competing hypotheses.

The Pearson correlations in Table 4 and models one through five in Table 5 support the signaling hypothesis. Moreover, Tables IV and V substantiate the value of using REITs to extricate the impact of signaling as the two major non-signaling hypotheses have no significant impact on the announcement reaction in REIT shares.

Model six reports the results of a model consisting of the full set of variables including the five general control variables as well as the three signaling variables and the two control variables for the competing hypotheses. The first two signaling variables continue to be significant, although the six month stock return is significant at a lower confidence level than in model one (10% vs. 5%). As in model three, the market-to-book ratio has the predicted sign but remains insignificant. The two control variables for the competing hypotheses continue to

14

be insignificant and have signs counter to their originating hypotheses.

As a whole, the univariate analysis reported in Table 4 and the multivariate regression analysis presented in Table 5 provide strong evidence of the efficacy of the managerial signaling argument. By eliminating the influence of the competing hypotheses, our REIT sample provides a more focused assessment of the determinants of stock price reaction to a repurchase announcement. The effect of the two major competing hypotheses have no discernable impact on the announcement reaction. Conversely, the impact of the signaling variables is significant and consistent with the managerial signaling hypothesis. Whereas the tests reported here cannot be used to discredit the efficacy of the competing hypotheses in non-REIT samples, the results do provide compelling evidence of the validity of the managerial signaling hypothesis as an explanation for the repurchase announcement stock price reaction.

Summary and Conclusions

The return of operating profits to shareholders and the accompanying corporate finance questions have been studied extensively for over 25 years. In the case of stock repurchases, previous studies have posited six competing theories to explain announcement reactions, including: 1) signaling (or information content) effects, 2) agency cost (or free cash flow) effects, 3) personal tax effects associated with differential taxation of dividends and capital gains, 4) inter-security wealth transfers stemming from leverage increases induced by repurchases, 5) corporate tax shield effects associated with debt financing of repurchases, and 6) intra-security wealth transfers between tendering and non-tendering shareholders. Attempts to disentangle the impact of the competing hypotheses have been thwarted because all six theories predict a positive repurchase announcement response.

This paper assesses the stock price reaction of REIT shares to an open market repurchase announcement.

REITs possess several unique institutional attributes that counter the economic intuition underlying five of the six theories advanced to explain the repurchase announcement reaction. Specifically, the potential impact of hypotheses two through six is mitigated in a sample of REITs. Examining repurchase announcements in the context of REITs provides a focused assessment of the impact of managerial signaling.

Whereas all six competing theories possess economic merit, the dominate themes in the existing repurchase literature surround the first three hypotheses: managerial signaling, free cash flow, and personal tax effects. We construct two variables, the six month stock return and the four week stock return, to capture managerial signaling effects. Additionally, following Ikenberry, Lakonishok, and Vermaelen (2000) we posit that low market-to-book firms have greater potential for undervaluation and, thus, include market-to-book as a third signaling variable. To ensure that our empirical tests allow for the two major non-signaling hypotheses, we include controls for personal tax and free cash flow effects.

The empirical tests confirm our theoretical predictions. In both univariate and multivariate frameworks, the signaling variables are significantly different from zero and possess the anticipated sign. The market-to-book ratio possesses the anticipated sign and is significantly correlated with the CARs in the univariate tests, but is not robust to multivariate specifications. Conversely, the controls for personal tax effects and free cash flow are unrelated to the announcement reaction in every test. The lack of significance between the competing hypotheses and the announcement reaction confirms the argument that the impact of the non-signaling hypotheses is muted for REITs. With the impact of the other potential theories mitigated, our empirical tests show that managerial signaling is a significant determinant of the stock price reaction to an open market share repurchase announcement.

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18

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Figure 1. Abnormal returns for real estate investment trusts announcing open market share repurchases from 1982-1999.

The sample is drawn from the Security Data Company's Merger and Acquisition database (SDC) and includes all real estate investment trust open market share repurchase announcements with available CRSP data from 1982-1999. The sample consists of 194 announcements. Abnormal returns are calculated using standard market model event-study methodology. A 21-day event window surrounding the announcement is used and beta is estimated using daily stock returns for the six months prior to the beginning of the window. Day 0 is the announcement day as reported by SDC. The vertical axis is the abnormal return in percent and the horizontal axis is the day relative to the announcement day.

20

Figure 2. Cumulative abnormal returns for real estate investment trusts announcing open market share repurchases from 1982-1999.

The sample is drawn from the Security Data Company's Merger and Acquisition database (SDC) and includes all real estate investment trust open market share repurchase announcements with available CRSP data from 1982-1999. The sample consists of 194 announcements. Abnormal returns are calculated using standard market model event-study methodology. A 21-day event window surrounding the announcement is used and beta is estimated using daily stock returns for the six months prior to the beginning of the window. The cumulative abnormal return is for the announcement day, the preceding day, and the following day. Day 0 is the announcement day as reported by SDC. The vertical axis is the cumulative abnormal return in percent and the horizontal axis is the day relative to the announcement day.
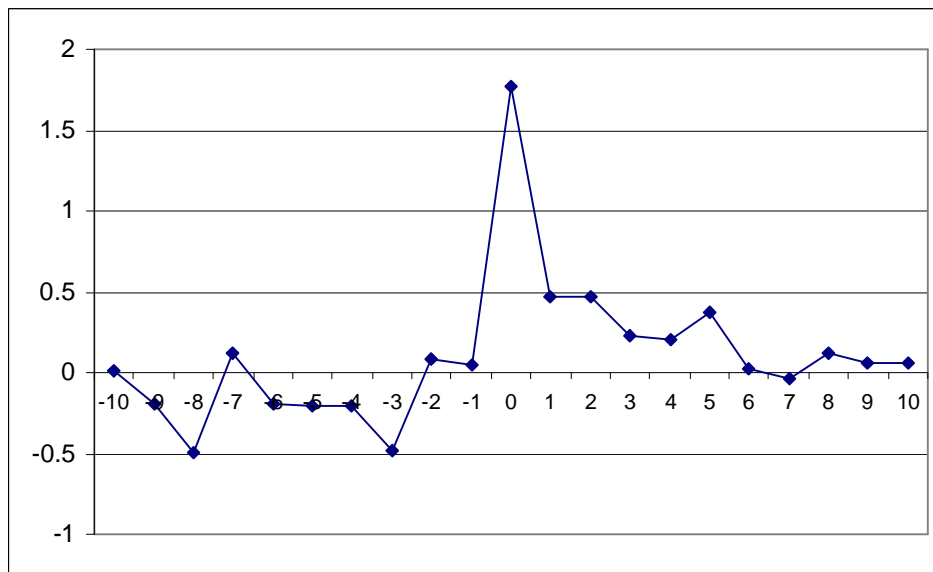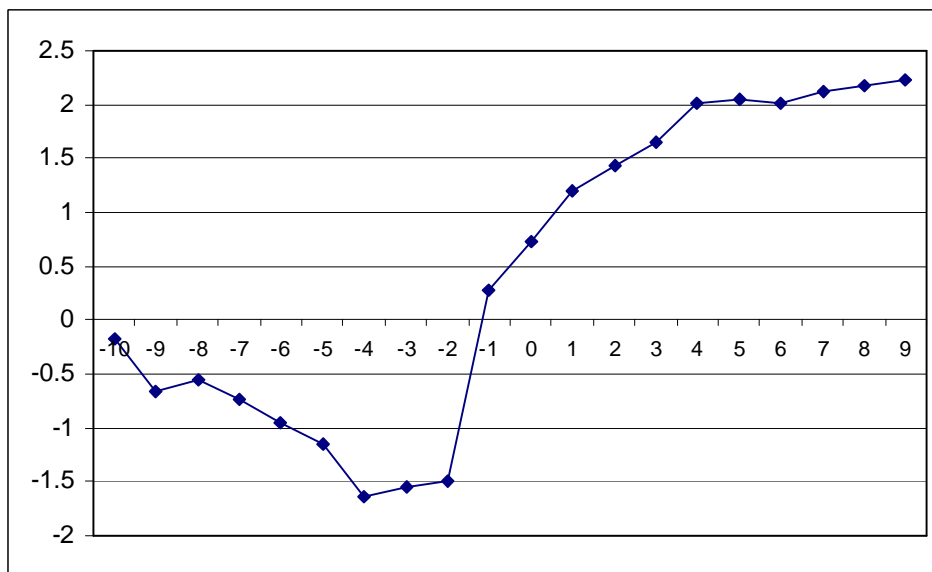
Table 1. Frequency of real estate investment trust open market share repurchase announcements from 1982–1999.

Announcement Year	Number of Announcements	Percentage	Cumulative Announcements	Cumulative Percentage
1982	1	0.52	1	0.52
1983	0	0.00	1	0.52
1984	1	0.52	2	1.03
1985	1	0.52	3	1.55
1987	8	4.12	11	5.67
1988	1	0.52	12	6.19
1989	7	3.61	19	9.79
1990	13	6.70	32	16.49
1991	6	3.09	38	19.59
1992	10	5.15	48	24.74
1993	9	4.64	57	29.38
1994	6	3.09	63	32.47
1995	11	5.67	74	38.14
1996	7	3.61	81	41.75
1997	10	5.15	91	46.91
1998	42	21.65	133	68.56
1999	61	31.44	194	100

Announcement Month	Number of Announcements	Percentage	Cumulative Announcements	Cumulative Percentage
January	6	3.09	6	3.09
February	12	6.19	18	9.28
March	21	10.82	39	20.10
April	5	2.58	44	22.68
May	8	4.12	52	26.8
June	11	5.67	63	32.47
July	14	7.22	77	39.69
August	12	6.19	89	45.88
September	29	14.95	118	60.82
October	24	12.37	142	73.2
November	21	10.82	163	84.02
December	31	15.98	194	100

Announcement Day	Number of Announcements	Percentage	Cumulative Announcements	Cumulative Percentage
Monday	42	21.65	42	21.65
Tuesday	43	22.16	85	43.81
Wednesday	41	21.13	126	64.95
Thursday	38	19.59	164	84.54
Friday	29	14.95	193	99.48
Saturday	1	0.52	194	100

The sample is drawn from the Security Data Company's Merger and Acquisition database (SDC) and includes all real estate investment trust (REIT) open market share repurchase announcements with available CRSP data. SDC contains 240 REIT open market repurchase announcements. Forty-six of these announcements are lost due to missing data.

Table 2. Summary statistics of explanatory variables for a sample of real estate investment trust open market share repurchase announcements.

Explanatory Variable	Sample Size	Mean	Standard Deviation	t-statistic	p-value
Panel A. Signaling Variables					
Six month abnormal stock return	194	-0.16	0.18	-13	<.0001
Four week stock return	194	-0.04	0.23	-2.26	0.0248
Market-to-book equity	173	1.78	1.76	13.29	<.0001
Panel B. Competing Hypotheses Control Variables					
Tax spread	194	0.15	0.08	27.45	<.0001
Free cash flow ($ million)	143	50.16	146.65	4.09	<.0001
Panel C. Other Relevant Control Variables					
Total assets ($ million)	183	1,231	1971	8.45	<.0001
Transaction value ($ million)	182	37.95	66.00	7.76	<.0001
Wilshire REIT Index monthly return (%)	194	0.16	4.67	0.48	0.6306
Wilshire REIT Index 1 month lag (%)	194	-1.29	4.57	-3.93	0.0001
Wilshire REIT Index 2 month lag (%)	194	-1.09	4.00	-3.81	0.0002
Dividend payment in prior year ($ million)	194	19.01	26.53	9.98	<.0001
Repurchase frequency ratio	194	0.16	0.12	19.49	<.0001

The sample is drawn from the Security Data Company's Merger and Acquisition database (SDC) and includes all real estate investment trust (REIT) open market share repurchase announcements with available CRSP data from 1982-1999. The six month abnormal stock return is calculated for the six months beginning two weeks before the announcement using CRSP data by subtracting the compounded CRSP equally weighted market index from the compounded firm stock return over the same period. The four week stock return is calculated using SDC data and is the percentage price change in the security over the four weeks preceding the announcement. The market-to-book equity is the ratio of the market value of the firm two weeks prior to the announcement (from CRSP) divided by the book value of firm equity immediately preceding the announcement (from SDC and supplemented with Compustat when missing). The tax spread is calculated as the difference between the maximum individual tax bracket and the capital gains tax rate. Free cash flow is calculated using the Lehn and Poulsen (1989) free cash flow metric. Total assets immediately preceding the announcement are retrieved from SDC and supplemented with Compustat data when missing. The transaction value is from SDC and relies upon the publicly announced value of the repurchase program at the time of the announcement. The Wilshire REIT index data is obtained from Wilshire Associates. The dividend payment in the prior year is obtained from Compustat. Finally, the repurchase frequency ratio equals the number of repurchases in a given year divided by the total number of repurchases over the sample period. The t-statistic and p-value are for the null hypothesis that the mean of the variable in question equals zero.

Table 3. Event study abnormal returns where Day 0 is the announcement of an open market share repurchase by a real estate investment trust.

Panel A.

Day	Sample Size	Abnormal Return	Standard Deviation	t-stat	p-value	Minimum	Maximum
-10	194	0.0082	3.47	0.03	0.9738	-13.95	32.58
-9	194	-0.1868	3.22	-0.81	0.4200	-25.73	23.37
-8	194	-0.4905	2.25	-3.03	0.0028	-10.77	6.27
-7	194	0.1229	2.48	0.69	0.4907	-7.04	15.10
-6	194	-0.1977	3.07	-0.90	0.3714	-23.23	12.25
-5	194	-0.2002	2.10	-1.33	0.1851	-12.67	7.20
-4	194	-0.2026	3.17	-0.89	0.3747	-10.57	26.80
-3	194	-0.4859	3.57	-1.90	0.0592	-27.84	12.25
-2	194	0.0834	3.07	0.38	0.7055	-9.89	31.96
-1	194	0.0518	2.77	0.26	0.7950	-16.98	10.54
0	194	1.7670	6.38	3.86	0.0002	-17.75	66.71
1	194	0.4658	3.62	1.79	0.0745	-28.29	11.90
2	193	0.4723	3.10	2.12	0.0356	-8.70	26.89
3	193	0.2320	2.93	1.10	0.2721	-15.36	18.54
4	193	0.2102	2.30	1.27	0.2063	-7.96	11.08
5	193	0.3705	2.20	2.34	0.0203	-10.33	7.42
6	193	0.0289	2.01	0.20	0.8421	-6.93	11.15
7	192	-0.0414	2.20	-0.26	0.7945	-7.60	11.28
8	192	0.1163	2.16	0.75	0.4569	-7.17	10.98
9	191	0.0549	2.33	0.33	0.7451	-13.58	13.41
10	189	0.0559	2.28	0.34	0.7361	-14.14	11.33

Panel B.

Measurement Period	Sample Size	Abnormal Return	Standard Deviation	t-stat	p-value	Minimum	Maximum
$CAR_{0,+1}$	194	2.2328	5.86	5.31	<.0001	-22.36	38.42
$CAR_{-1,0}$	194	1.8188	6.32	4.01	<.0001	-11.10	66.04
$CAR_{-1,0,+1}$	194	2.2845	5.53	5.75	<.0001	-13.53	37.75
$CAR_{-10,-2}$	194	-1.5491	7.44	-2.90	0.0042	-38.16	37.26
$CAR_{2,10}$	189	1.4414	6.10	3.25	0.0014	-25.62	26.61
$CAR_{-10,10}$	189	2.0658	11.44	2.48	0.0140	-41.43	59.66

The sample is drawn from the Security Data Company's Merger and Acquisition database (SDC) and includes all real estate investment trust (REIT) open market share repurchase announcements with available CRSP data from 1982-1999. Abnormal returns are calculated using standard market model event-study methodology. A 21-day event window surrounding the announcement is used and beta is estimated using daily stock returns for the six months prior to the beginning of the window. In Panel B, CARs are cumulative abnormal returns over the specified period. The t-statistic and p-value are for the null hypothesis that the abnormal return or CAR for the respective day(s) equals zero.

Table 4. Pearson correlations of signaling and competing hypotheses variables with 3-day cumulative abnormal return.

Explanatory Variable	Pearson Correlation	Coefficient p-value for Ho: r = 0	Number of observations
Six month stock return	-0.186***	0.0096	194
Four week stock return	-0.147**	0.0406	194
Market-to-book equity	-0.157**	0.0393	173
Tax spread	-0.067	0.3569	194
Free cash flow	-0.065	0.4409	143

The sample is drawn from the Security Data Company's Merger and Acquisition database (SDC) and includes all real estate investment trust (REIT) open market share repurchase announcements with available CRSP data from 1982-1999. The six month abnormal stock return is calculated for the six months beginning two weeks before the announcement using CRSP data by subtracting the compounded CRSP equally weighted market index from the compounded firm stock return over the same period. The four week stock return is calculated using SDC data and is the percentage price change in the security over the four weeks preceding the announcement. The market-to-book equity is the ratio of the market value of the firm two weeks prior to the announcement (from CRSP) divided by the book value of firm equity immediately preceding the announcement (from SDC and supplemented with Compustat when missing). The tax spread is calculated as the difference between the maximum individual tax bracket and the capital gains tax rate. Free cash flow is calculated using the Lehn and Poulsen (1989) free cash flow metric. The coefficient p-value is for the null hypothesis that the variable in question is not correlated with the three-day cumulative abnormal return, consisting of day -1, day 0, and day +1. *** and ** indicate statistical significance at the .01 and .05 levels respectively.

Table 5. Ordinary least squares with the dependant variable equaling the 3-day cumulative abnormal returns surrounding a repurchase announcement.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	5.51**	6.88***	6.55***	6.09**	7.75***	7.59***
	(2.4)	(3.0)	(2.6)	(2.5)	(2.7)	(2.7)
Panel A. Signaling Variables						
Six-month stock return	-10.45***					-5.95*
	(-4.0)					(-1.7)
Four-week stock return		-15.57***				-13.83***
		(-4.1)				(-3.3)
Market-to-book equity			-0.33			-0.06
			(-1.3)			(-0.2)
Panel B. Competing Hypotheses Control Variables						
Tax spread				-14.44		-2.54
				(0.1)		(-0.2)
Free cash flow					0.00	0.00
					(0.2)	(-0.1)
Panel C. Other Relevant Control Variables						
Natural logarithm of total assets	-0.56	-0.72*	-0.39	-0.22	-0.65	-0.88*
	(-1.4)	(-1.8)	(-1.0)	(-0.5)	(-1.4)	(-1.9)
Transaction value/market value	1.99	1.83	1.25	1.74	1.14	1.92
	(1.1)	(1.0)	(0.7)	(0.9)	(0.6)	(1.1)
Wilshire REIT Index monthly return	0.10	0.11	0.09	0.16	0.12	0.16
	(1.0)	(1.1)	(0.8)	(1.4)	(1.0)	(1.3)
Wilshire REIT Index 1 month lag	0.00	0.17	0.07	0.09	0.12	0.10
	(-0.0)	(1.4)	(0.6)	(0.7)	(0.9)	(0.7)
Wilshire REIT Index 2 month lag	-0.36***	-0.20	-0.25*	-0.25*	-0.30**	-0.20
	(-2.9)	(-1.6)	(-1.8)	(-1.9)	(-2.1)	(-1.4)
Dividend/Cash ratio	0.00	0.00	0.00	0.00	0.00	0.00
	(-0.8)	(-0.8)	(-0.8)	(-0.9)	(-0.8)	(-0.7)
Repurchase frequency ratio	-8.32*	-2.62	-5.12	0.06	-5.40	-3.01
	(-1.8)	(-0.6)	(-1.0)	(0.0)	(-1.0)	(-0.4)
F-stat	3.47***	3.53***	1.55	1.69	1.71	2.88***
Adjusted R^2	0.11	0.12	0.03	0.03	0.04	0.14

The sample is drawn from the Security Data Company's Merger and Acquisition database (SDC) and includes all real estate investment trust (REIT) open market share repurchases with available CRSP data from 1982-1999. The six month abnormal stock return is calculated for the six months beginning two weeks before the announcement using CRSP data by subtracting the compounded CRSP equally weighted market index from the compounded firm stock return over the same period. The four week stock return is calculated using SDC data and is the percentage price change in the security over the four weeks preceding the announcement. The market-to-book equity is the ratio of the market value of the firm two weeks prior to the announcement (from CRSP) divided by the book value of firm equity immediately preceding the announcement (from SDC and supplemented with Compustat). The tax spread is calculated as the difference between the maximum individual tax bracket and the capital gains tax rate. Free cash flow is calculated using the Lehn and Poulsen (1989) free cash flow metric. The transaction value is from SDC and relies upon the publicly announced value of the repurchase program at the time of the announcement. The Wilshire REIT index data is obtained from Wilshire Associates. The dividend-to-cash ratio for the prior year is obtained from Compustat and is standardized by the amount of cash held by the firm prior to the announcement. Finally, the repurchase frequency ratio equals the number of repurchases in a given year divided by the total number of repurchases over the sample period. Estimated coefficients are reported first, t-statistics are below in parentheses. ***, **, and * indicate statistical significance at the .01, .05, and .10 levels respectively.

Notes

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[1] SDC contains 260 REIT repurchase announcements between 1980 to 1999: 20 tender offers and 240 open market repurchases.

[2] To allow for inflation effects, all data items measured in dollars are adjusted to 1999 purchasing power using the Consumer Price Index.

[3] We thank Bob McIntyre for providing the tax data.

[4] Specifically, even after incurring the costs of the repurchase, unless net income is non-positive, the firm will incur the transactions cost of the dividend since REITs must return 95% of operating earnings as dividends.

[5] The tax legislation relevant for our study are: The Economic Recovery Tax Act or 1981, The Tax Equity and Fiscal Responsibility Act of 1982, The Deficit Reduction Act of 1984, The Tax Reform Act of 1986, the Omnibus Budget Reconciliation Acts of 1990 and 1993, and the Taxpayer Relief Act of 1997.

[6] As additional treatments for time clustering, we estimate a model with year dummies and treat for heteroskedasticity using White's (1980) correction. Our results are robust to these alternate specifications.

[7] In unreported tests, the results are robust to alternate CAR measures (two day CARs using day -1 and day 0 as well as day 0 and day +1, the one day AR for day 0, and the three day CAR for day 0, day +1, and day +2).

[8] All variance inflation factors are less than two indicating that multicollinearity is not a concern in our analysis.