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Economic Sources of Gain in Stock Repurchases

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Abstract

Previous studies offer a mixed understanding of the economic role of stock repurchases. This paper investigates three key economic motivations—mispricing, disgorging free cash flow, and increasing leverage—by evaluating cross-sectional differences in both the initial market reaction and long-run performance. The initial reaction provides some support for the mispricing story. However, subsequent earnings-related information shocks suggest that the initial market reaction is incomplete and that long-run performance may be informative. The long-horizon return evidence is most consistent with the mispricing hypothesis and, to some degree, the free cash flow hypothesis. We find little support for the leverage hypothesis.

I. Introduction

Since 1982 when the U.S. Congress enacted SEC rule 10b-18 in 1982, stock repurchases have become pervasive.[1] Grullon and Ikenberry (2000) report that as of January 2000, roughly half of S&P 500 firms have authorized programs in place. Economic theory provides several motives as to why firms might authorize open market repurchase programs. These reasons are typically linked to helping

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[1] After several years of debate, SEC rule 10b-18 (a safe-harbor that provides corporations with guidance as to how to buy back stock by reducing fear of litigation over price manipulation) was enacted in November 1982. News articles at that time credit this rule with giving firms greater clarity on how and when repurchases should be executed.

the company extract some economic benefit. Surveys of corporate managers[2] as well as the positive reception that buyback programs generally receive in the market suggest that these transactions are economically beneficial to shareholders (e.g., Vermaelen (1981) or Comment and Jarrell (1991)).

Yet in recent years, several studies including papers on repurchases (Ikenberry, Lakonishok, and Vermaelen (1995), (2000)) find long-term return drifts following many different types of corporate transactions and suggest that the initial market reaction may be incomplete.[3] These drifts are puzzling for they suggest that the economic benefit of repurchasing stock is not immediate and that conclusions drawn from studies that focus narrowly on the short-run market reaction may not be complete. On the other hand, measuring long-horizon abnormal stock returns is difficult as the results can be sensitive to the procedures used (Barber and Lyon (1997)). Further, recent papers raise suspicion about studies that focus on long-horizon return drifts (e.g., Fama (1998) and Eckbo, Masulis, and Norli (2000)). This literature challenges the extent to which there is any economic value to buybacks beyond that recognized at the initial announcement.

Taken together, the literature provides a mixed understanding of the economic role of repurchases. In this study, we investigate three theories for buying back stock: mispricing, disgorging free cash flow, and altering capital structure. We do this by evaluating cross-sectional differences in both the initial short-run reaction as well as longer-horizon abnormal returns using a comprehensive sample of over 5,000 repurchases announced in the 1980s and in the 1990s. To the extent that the initial reaction to buyback announcements is not complete, this approach provides insight into why corporations repurchase stock and the extent to which corporate actions are consistent with theory. However, this approach suffers from an endogeneity problem if the market anticipates these repurchases. To the extent this occurs (even in part), our tests lose power if the economic benefits we are evaluating are efficiently priced in advance of the announcement. This poses an identification problem. It is difficult to explicitly control for this possibility, yet as a check we do find evidence that at least some information in buyback announcements is not fully anticipated nor is the initial response complete. Nevertheless, this endogeneity issue is difficult to fully address and thus care is needed in interpreting our results.

We first consider the initial market reaction. Consistent with prior studies, the mean market reaction to repurchase announcements is positive and suggests that shareholders generally benefit from this transaction. Yet focusing only on the initial announcement return, we find limited support for the mispricing hypothesis and no support for the free cash flow or leverage hypotheses.

We investigate the extent to which this initial reaction is not complete by considering the market reaction to earnings. After a buyback program is announced, quarterly earnings surprises tend to be positive and significant, a result consistent with the notion that the investors are not fully responding to the news of buyback announcements and that some portion of the long-horizon drift reflects real infor-

[2]For example, see a survey of CFOs published in *Institutional Investor*, July 1998, p. 30.

[3]This literature is rich and includes, for example, equity and debt offerings, dividend initiations and omissions, mergers and acquisitions, proxy fights, and stock splits.

mation. This suggests that long-run stock returns may provide some insight into theory motivating share repurchases.

Similar to previous studies of long-horizon returns, we find excess performance (inclusive of the initial market reaction) of 6.7% (p-value = 0.000) in the first year, controlling for both size and book-to-market. After four years, the abnormal compounded return is 23.6% (p-value = 0.000). While long-horizon returns are noisy to evaluate in mind, the evidence is generally consistent with two of the three hypotheses. With respect to the mispricing hypothesis, abnormal returns are higher for larger programs, albeit marginally significant. In addition, the drift appears to be contingent to some extent on actual repurchase activity; the drift is significantly higher in firms that actually repurchase shares in the year after the repurchase announcement. Further, this contingent behavior is evident in value stocks where managers actually repurchase stock.

We find limited support for the free cash flow hypothesis. Firms that announce a repurchase program tend to have above average free cash flow. Although the initial market reaction is not associated with free cash flow, the long-horizon drift is; firms with high free cash flow have higher long-run abnormal returns. This drift, however, is not contingent on actual buyback activity, a result seemingly inconsistent with the free cash flow hypothesis.

Finally, we find an increased propensity among announcing firms to have below average leverage ratios, a result consistent with the leverage hypothesis. However, the long-horizon return drift is not higher for low-leveraged firms irrespective of their actual repurchase activity. Similarly, unusually favorable long-run performance is not associated with firms that experienced a significant decline in leverage and thus might be using a repurchase to realign capital structure.

The remainder of the paper is organized as follows. Section II considers the economic motivation for repurchasing stock. In Section III, we describe our sample. We then evaluate the initial market reactions in Section IV. Section V presents methodology issues. In Section VI, we review the empirical evidence. Section VII provides some concluding remarks.

II. The Economic Motivation for Repurchasing Stock

A. Mispricing

When announcing repurchase programs, managers frequently indicate that they are doing so in response to mispricing. Numerous theoretical papers have investigated the notion that repurchases are a potential signaling mechanism (for example, Vermaelen (1981)). If managers perceive stock prices to be trading below intrinsic value, stock repurchases provide an opportunity to transfer wealth from short-term traders to long-term investors (Ikenberry and Vermaelen (1996)).

In an efficient market, we expect stock prices to respond to these public announcements in a fair, complete, and unbiased manner. This poses a paradox. If mispricing is motivating a repurchase program yet the market resolves the pricing discrepancy in the short-run, the need to continue with the repurchase program is diminished, particularly if expanding or contracting the capital base is costly. This potential price contingent behavior for repurchases is consistent with the ev-

idence regarding withdrawn equity offerings (Mikkelson and Partch (1988)).[4] In the context of a share repurchase, if prices are unusually low and trade below their full information value, one expects repurchase completion rates to be lower if markets respond efficiently compared to cases where the market is slow to respond. If prices do not fully respond to what managers perceive as mispricing, then one expects to find managers buying back shares subsequent to repurchase announcements.

An interesting question is what type of information is causing the mispricing: public or private information? Prior studies have considered mispricing on the basis of publicly available information. For example, Ikenberry, Lakonishok, and Vermaelen (1995), (2000) consider long-horizon performance conditional on book-to-market ratios and report that "value" stocks announcing buybacks have long-run return drifts. However, if managers' perceptions of mispricing are due to non-public information, one would expect this type of mispricing to occur for all types of firms and thus not be restricted to "value" firms. Therefore, when private information is a key source of the undervaluation motivating a repurchase, one does *not* expect to see differences in long-horizon performance when firms are sorted cross-sectionally on characteristics defined using publicly available information such as book-to-market.

B. Disgorging Free Cash Flow

A rich literature, starting with Jensen (1986), has developed around the notion that agency costs are imposed on firms with unnecessarily high free cash flow. If the market penalizes these firms out of concern that managers may abuse slack resources and over-invest in sub-optimal projects, managers can tax-efficiently recapture this penalty by disgorging cash through a share repurchase.

This hypothesis forecasts that firms with high free cash flow stand to benefit most from repurchasing stock. Yet many programs go unfulfilled or in some cases not even initiated (Stephens and Weisbach (1998) and Ikenberry, Lakonishok, and Vermaelen (2000)). Thus, an important aspect of this hypothesis is that firms actually buy back stock in order to disgorge cash. Further, even if the market efficiently responds to reflect the full, expected economic benefit from disgorging cash, we still expect managers to repurchase stock at full information prices given that this benefit is contingent on disgorging cash.

C. Altering Capital Structure

As companies buy back stock, the equity base contracts and debt/equity ratios increase. Repurchases, thus, are a tool for managing capital structure. There are several reasons why firms might perceive their current leverage to be below some optimal target. One common reason for such a distortion is the use of executive stock options. Options, when exercised, have the effect of increasing equity financing in the firm. Thus, it is not surprising to see repurchase activity associated with either option grants, option exercises, or an increase in stock price as

[4]Mikkelson and Partch (1988) find that returns subsequent to an equity-offering announcement tend to be lower for offerings that are withdrawn compared to those that proceed.

options move into the money (Kahle (2002) and Weisbenner (2000)). Equity dilution also occurs for other reasons including dividend re-investment plans (DRIPs) and employee stock ownership plans (ESOPs). Left unchecked, these pseudo equity-offerings have the potential to force the firm away from its optimal capital structure.

Thus, one might expect the greatest benefits from a share repurchase to accrue to low-leverage firms, such as measured in comparison to their industry peers. Alternatively, one might also expect the greatest benefits to materialize in firms whose leverage had decreased the most prior to a repurchase announcement. Unlike the response when mispricing is an issue, these benefits to leverage are not contingent on the initial market reaction to the news of a buyback. If leverage is a motivating factor, then these benefits should be contingent on actual buyback activity. Even if markets are quick to respond to these leverage benefits, we still anticipate companies to reacquire shares at full information value.

Table 1 summarizes the implications of three hypotheses regarding the sample distribution, initial market reactions, long-run abnormal returns, buyback activity, and relationship between long-run abnormal returns and actual buyback activity. An important issue, however, is the extent to which share repurchase announcements are anticipated. If the announcement is partially anticipated, abnormal returns will be small in comparison to when it is unexpected. Further, our predictions regarding long-run returns for each hypothesis rely on the notion that the initial market reaction is not complete (see Malatesta and Thompson (1985)). If the market on average efficiently anticipates or fully responds to repurchase announcements, long-run returns cannot distinguish our hypotheses. This concern leads us in Section IV to first check whether the initial market reaction is complete before evaluating the long-horizon evidence.

TABLE 1

Summary of Hypotheses and Predictions

Hypotheses	Sample Distribution	Short-Run Abnormal Return (SRAR)	Long-Run Abnormal Return (LRAR)	Buyback Activity	LRAR and Buyback
	What firms are more likely to announce?	What firms are more likely to have higher SRAR?	What firms are more likely to have higher LRAR?	Will firms buy back shares?	How would actual buyback activity be related to LRARs?
Mispricing	Value firms if mispricing is due to public information	Value firms if mispricing is due to public information Firms that announce to buyback more shares	Value firms if mispricing is due to public information Firms that announce to buyback more shares	No, if the initial market reaction is complete If the initial market reaction is not complete, firms will buyback shares. The lower the SRAR, the more shares firms actually buy.	Only those that actually buy back shares are likely to have positive LRARs since firms will buy back only if the market underreacts. This will be especially true for value stocks if mispricing is due to public information.
Free cash flow (FCF)	Firms with high FCF	Firms with high FCF	Firms with high FCF	Yes	Only those that actually buy back shares should have positive LRAR, especially among those with high FCFs.
Leverage (LEV)	Firms with low LEV Firms with large decreases in LEV	Firms with low LEV Firms with large decreases in LEV	Firms with low LEV Firms with large decreases in LEV	Yes	Only those that actually buy back shares should have positive LRAR, especially among those with low LEV or with large decreases in LEV.
For all three hypotheses		SRAR will be positive. If the announcement is partially anticipated, SRAR is small. If the announcement is unexpected, SRAR is significant.	LRAR will be zero if SRAR is complete. If SRAR is not complete, LRAR will be small if the announcement is partially anticipated, and LRAR will be significant if the announcement is unexpected.		The above predictions assume that the initial market reaction is not complete.

Table 1 summarizes the hypotheses considered in the paper. The predictions of each hypothesis regarding the sample distribution, initial returns, long-run returns, buyback activity, and interaction of long-run returns and actual buyback are presented in each cell under the conditions specified.

III. The Sample

Our sample is merged from two sources. The first is from Ikenberry, Lakonishok, and Vermaelen (1995) who evaluate U.S. open market repurchase programs reported in the *Wall Street Journal* from January 1980 to December 1990. This is supplemented with cases from Securities Data Corporation (SDC) for the full period 1980 to 1996.[5] SDC's primary information source is Reuters, which scans news items by various categories, one of which is repurchase announcements.

Our analysis requires stock return and accounting information. Thus, we restrict both the sample and eligible benchmark control firms to those where both types of information are available on the 2000 daily CRSP and Compustat tapes. To reduce problems caused by skewed returns, we further eliminate firms where the share price at the time of the repurchase announcement was below \$3 per share.

We evaluate actual buyback activity to examine the consistency of managerial behavior with economic theory. Stephens and Weisbach (1998) find that a substantial portion of buyback activity occurs in the first year of a program. Thus, we focus on actual repurchases in the first four quarters after a program announcement obtained from quarterly cash flow statements on funds used to redeem stock, adjusted for concurrent changes in preferred stock.[6]

Table 2 reports summary information about the sample. The majority of our cases occur after the 1990–1991 U.S. economic recession, when the U.S. experienced a dramatic increase in the use of repurchases. Mean program size is 6.9% of the share base; the median program (not reported here) is about 5%. Although the overall mean market-cap decile for announcing firms is roughly at the mid-point, we find that smaller firms are becoming more active repurchasers over time.

Table 2 shows some evidence consistent with each of the three hypotheses as to why firms repurchase stock. For example, although the mean book-to-market equity ratio (B/M) quintile rank is roughly balanced between value and growth and thus not favoring value stocks, we also see that repurchasing firms experience significantly negative abnormal stock returns in the year preceding the announcement.[7] Here, B/M quintile (one is the lowest) is based on the ratio of the book value at the previous fiscal year-end (given four months reporting lag) to the market value at the month-end prior to the announcement. The mean free cash flow (FCF) quintile rank is 3.6 suggesting that repurchase firms tend to have above average free cash flow adjusted for their industry norm. We measure free cash flows (FCF) using the Lehn and Paulsen (1989) method. FCF quintile is based on free cash flows divided by sales and is adjusted for industry median. The mean leverage (LEV) quintile rank is 2.6 and suggests that sample firms have below average

[5]To reduce clustering, we exclude announcements from the fourth quarter of 1987.

[6]Stephens and Weisbach (1998) evaluate different methods for estimating buyback activity. They find that while the method we use here is biased upward, it is a preferred method for deciphering actual repurchase activity. Because of limitations with this data item, we lose about 25% of our sample when we condition on this information.

[7]This contrarian-like behavior is consistent with Lakonishok and Lee (2001) who study insider-trading behavior.

TABLE 2

Summary Statistics

Year	*n*	Size Decile	B/M Quintile	FCF Quintile	LEV Quintile	% Shares Announced	Five-Day AR	REPO Prior Return	MATCH Prior Return	DIFF
80	79	6.4	3.5	3.3	2.7	5.40	4.02***	16.07	15.68	0.39
81	80	7.0	2.9	3.5	2.8	5.12	3.42***	25.35	29.72	−4.37
82	117	6.3	3.1	3.5	2.7	6.05	4.62***	−16.59	−6.95	−9.64***
83	50	7.3	3.0	3.8	2.6	5.37	3.44***	45.58	53.91	−8.33
84	216	6.0	2.7	3.7	2.6	5.69	3.29***	−10.50	−3.22	−7.28***
85	138	6.6	2.9	3.5	2.7	9.08	3.32***	16.70	20.47	−3.77
86	202	6.8	2.9	3.6	2.8	7.87	3.00***	22.56	29.12	−6.56***
87	117	7.0	3.0	3.5	3.0	8.53	2.97***	21.02	30.52	−9.50**
88	230	6.9	3.0	3.6	2.9	8.43	1.85***	−3.03	1.64	−4.67**
89	411	6.4	2.9	3.8	2.7	9.58	1.44***	16.52	23.02	−6.50***
90	628	5.7	3.1	3.7	2.5	7.17	1.82***	−13.16	−6.61	−6.55***
91	195	4.4	2.7	3.8	2.5	7.43	2.27***	9.84	20.12	−10.28***
92	319	4.4	2.7	3.8	2.4	7.05	2.42***	9.16	20.89	−11.73***
93	324	4.8	2.8	3.8	2.5	6.12	1.57***	5.58	25.27	−19.69***
94	655	4.4	3.1	3.6	2.5	6.27	1.80***	−0.59	9.07	−9.66***
95	729	4.1	3.2	3.5	2.7	6.28	1.91***	10.14	16.59	−6.45***
96	1,018	4.0	3.3	3.5	2.7	6.28	2.09***	13.13	22.12	−8.99***
80–90	2,268	6.3	3.0	3.6	2.7	7.61	2.46***	3.75	10.04	−6.29***
91–96	3,240	4.2	3.1	3.6	2.6	6.40	1.98***	8.34	18.31	−9.97***
All	5,508	5.1	3.1	3.6	2.6	6.86	2.18***	6.45	14.91	−8.46***

The sample includes all open market share repurchase announcements reported in the *Wall Street Journal* from 1980 to 1990 except the fourth quarter of 1987 and cases reported by Securities Data Corporation from 1980 to 1996, with available CRSP daily returns and book-to-market (B/M) ratios. Repurchase announcements are dropped from the sample if the stock price is less than $3.00 at the month-end prior to the announcement. *n* represents the number of announcements in each year. Size decile (1 is the smallest) of each share repurchase firm is based on the market value of equity at the month-end prior to the announcement. B/M quintile (1 is the lowest) is based on the ratio of the book value at the previous fiscal year end (given four months reporting lag) to the market value at the month-end prior to the announcement. FCF quintile uses the Lehn and Paulsen (1989) measure for free cash flows divided by sales and is adjusted for industry median. LEV quintile is based on the ratio of the total debt to total assets at the previous fiscal year-end and is adjusted for industry median. % shares announced is the percentage of announced repurchase shares relative to total outstanding shares at the month-end prior to the announcement. 5-day AR represents the announcement period abnormal return (in %), defined as the announcement-period return of the repurchase firm minus the CRSP value-weighted index return. The announcement period is a five-day period, from two days before to two days after the announcement date. REPO represents repurchasing firms and MATCH represents corresponding matching firms, matched based on market value of equity, B/M and exchange. REPO prior return and MATCH prior return are prior one year buy-and-hold returns (in %) compounded from 252 days before (or the listing date) up to the day before the announcement for repurchasing firms and matching firms, respectively. DIFF is the difference between repurchase firms' prior return and matching firms' prior return. ***, **, * denote significance levels of 1%, 5%, and 10%, respectively, using a two-tailed *t*-test.

leverage. LEV quintile is based on the ratio of the total debt to total assets at the previous fiscal year-end and is adjusted for industry median.

Table 2 also summarizes the initial market reaction to buyback announcements. Consistent with most economic stories motivating repurchases, the news of a repurchase program is received favorably by the market. For our sample, the mean abnormal announcement return is 2.2%, a result consistent with several prior studies. The mean market reaction is decreasing slightly over time. This result is consistent with the notion that because open market programs are relatively low cost to establish and are becoming more common, the market may be growingly accustomed to recurring repurchase programs, thus reducing their informative impact over time.[8]

[8] On the other hand, this result is also consistent with a tax-related story. The tax benefit of repurchasing stock relative to dividends declined over the same period (Grullon and Michaely (2002)).

IV. The Short-Horizon Evidence

A. The Initial Market Reaction

Here, we consider the initial market reaction to repurchase announcements with respect to the three hypotheses. Table 3 reports regression evidence where the abnormal announcement return is regressed on firm characteristics that relate to theory. With respect to the mispricing hypothesis, we see some mildly supportive evidence. For example, smaller firms that typically are thought to offer greater potential for mispricing show a significantly higher market reaction. Firms with low returns in the year prior to the buyback announcement (a proxy for cases where prices may have fallen below full information value) have significantly higher announcement returns. We also see that the market reacts more favorably to larger programs. This result could be interpreted as consistent with all three hypotheses, yet many would interpret this result as most consistent with signaling mispricing. A point of inconsistency, though, is the coefficient on B/M; it is negative and significant, suggesting that the initial market reaction is lower for value stocks where one might expect some opportunity for mispricing (Lakonishok, Shleifer, and Vishny (1994) and La Porta, Lakonishok, Shleifer, and Vishny (1997)).

These regressions also include actual repurchase activity in the first year of the buyback program as an independent variable. At the time of the announcement, this information is unknown to investors. If we assume some degree of foresight, we can check further as to the consistency of the initial market response with theory. The coefficient on actual buyback activity is not significant. However, when we interact a high B/M dummy indicator variable with actual repurchase activity, we do find a significantly positive relation. Thus, while markets do not seem to react favorably to value firms, they do seem to respond more favorably to value firms that, ex-post, actually acquire stock.

Turning to the free cash flow and leverage hypotheses, we see no support for either. Investors do not respond more favorably to announcements made by firms with high free cash flow. Similarly, firms with low leverage or who experience a big decrease in leverage prior to the repurchase do not have higher announcement returns. Of course, one plausible reason for the absence of a relationship might be that the market had anticipated a buyback announcement in these firms with high free cash flow and/or low leverage. Yet as indicated earlier, the economic benefits from both the free cash flow and leverage hypotheses are conditional on firms actually repurchasing stock. When we interact the low leverage dummy with actual repurchase activity, we see no evidence that buyback activity matters. The same is true when we interact high free cash flow with repurchase activity.

Finally, we consider the relation between the market's initial reaction and the four-year abnormal return to see if the initial market reaction is related to long-run abnormal performance. If the market reaction is incomplete but otherwise consistent in magnitude with the economic benefit associated with a repurchase, then we expect to see a positive relation. The evidence, however, indicates that the initial market reaction is not a good predictor of long-term abnormal performance; not

TABLE 3

Announcement Abnormal Returns

	Model				
	1	2	3	4	5
Intercept	0.0321 (5.21)	0.0327 (9.99)	0.0351 (5.35)	0.0321 (4.84)	0.0317 (4.61)
Size decile ranking	−0.0031 *(−9.61)*	−0.0030 *(−9.33)*	−0.0032 *(−9.63)*	−0.0030 *(−8.95)*	−0.0030 *(−8.95)*
BM quintile ranking	−0.0011 (−1.45)		−0.0020 *(−2.43)*	−0.0018 *(−2.14)*	−0.0018 *(−2.15)*
FCF quintile ranking	0.0012 (1.26)		0.0012 (1.13)	0.0011 (1.05)	0.0011 (1.06)
LEV quintile ranking	0.0003 (0.34)		0.0001 (0.09)	0.0001 (0.14)	0.0001 (0.14)
LEV CHANGE quintile ranking					0.0002 (0.26)
High BM dummy		0.0006 (0.21)			
High FCF dummy		0.0036 (1.66)			
Low LEV dummy		−0.0025 (−0.95)			
% shares announced	0.0394 *(2.94)*	0.0375 *(2.82)*	0.0407 *(3.04)*	0.0401 *(3.03)*	0.0400 *(3.02)*
Log (1 + % actual buy)	0.0096 (0.45)	0.0067 (0.32)	−0.0166 (−0.66)	−0.0145 (−0.58)	−0.0192 (−0.71)
Log (1 + % actual buy)∗high BM dummy			0.1068 *(3.10)*	0.1055 *(3.08)*	0.1066 *(3.07)*
Log (1 + % actual buy)∗high FCF dummy			−0.0047 (−0.12)	−0.0099 (−0.25)	−0.0117 (−0.29)
Log (1 + % actual buy)∗low LEV dummy			−0.0087 (−0.21)	−0.0053 (−0.13)	−0.0057 (−0.14)
Log (1 + % actual buy)∗low LEV CHANGE dummy					0.0146 (0.43)
Prior one-year abnormal return				−0.0093 *(−3.24)*	−0.0093 *(−3.23)*
Four-year abnormal return				0.0001 (0.16)	0.0001 (0.15)

Table 3 reports cross-sectional regression results of the initial market reaction to repurchase program announcements on various explanatory variables. The dependent variable is the difference between the compounded five-day return over days −2 to +2 relative to the announcement and the compounded return of the CRSP value-weighted index over the same period. Size decile (one being the smallest) is based on the market value of equity at the month-end prior to the repurchase announcement. B/M quintile (one being the lowest) is based on the ratio of the book equity value at the previous fiscal year-end to total market value at month-end prior to the announcement. FCF quintile uses the Lehn and Paulsen (1989) measure for industry median-adjusted free cash flows divided by sales. LEV quintile is based on the industry median-adjusted ratio of the total debt to total assets at the previous fiscal year-end. LEV CHANGE quintile is based on the change of debt to assets ratio adjusted to industry median. % shares announced is the percentage of announced repurchase shares relative to total outstanding shares at month-end prior to the announcement. % actual buy represents the percentage of shares that firms bought during the one-year period after the repurchase announcement. High BM dummy is one for the top BM quintile, and zero elsewhere. High FCF dummy is one for the top FCF quintile, and zero elsewhere. Low LEV dummy is one for the bottom LEV quintile, and zero elsewhere. Low LEV CHANGE dummy is one for the bottom LEV CHANGE quintile, and zero elsewhere. Prior one-year abnormal return is the prior one year buy-and-hold returns compounded from 252 days before (or the listing date) up to three days before the announcement for repurchasing firms minus the compounded return of the matching firms over the same period. Four-year abnormal return is the buy-and-hold returns compounded from three days after announcement date up to the fourth anniversary of the announcement date for repurchasing firms minus the compounded return of the matching firms over the same period. Year dummy variables are included, but not reported. Numbers in parentheses are White (1980) heteroskedasticity-adjusted *t*-statistics.

only does the initial response appear to be incomplete, this short-run reaction does not seem related to the long-horizon drift subsequent to buyback announcements.

In sum, if we limit our analysis to the initial market reaction, we see only mixed support for the mispricing hypothesis. We see no support for the free cash

flow or leverage hypotheses. We next investigate the extent to which initial market reaction is complete.

B. Potential Bias in the Initial Reaction and Information Events Subsequent to the Announcement

Financial economists, when evaluating economic theories about corporate behavior, frequently focus on announcement period returns not unlike what we completed in the prior section. Short-horizon return performance is straightforward to estimate and typically robust to various methodologies. Yet one hesitates to draw conclusions about economic theory from this evidence if the initial market reaction is potentially biased or incomplete, a violation of a key assumption underlying this type of analysis.

If the market is slow to respond to the economic news contained in repurchase announcements, we should see evidence of information surprises in later periods. Therefore, we examine the market response to earnings after a buyback announcement to see whether the market's initial reaction is complete. While there are many news events one might consider, we focus on earnings announcements as has been done in many papers, including recently by Denis and Sarin (2001) and Brous, Datar, and Kini (2001).

Table 4 reports summary evidence for this type of analysis where returns are measured over a three-day window surrounding the earnings announcement date recorded by Compustat. Panel A reports this evidence by year relative to the buyback announcement while panel B reports it by quarter within each event year. In the year prior to the announcement, the market on average reacts negatively to earnings announcements made by sample firms and is most disappointing just prior to the repurchase announcement. After the buyback announcement, the information flow appears to change. In the first year after the repurchase announcement, the mean response is positive and significant (although this result is primarily driven by announcements in the first quarter). In years two through four, information shocks are positive and significant. This suggests that the initial reaction to repurchase announcements is not complete and that at least some portion of the news associated with buybacks is mispriced.[9]

V. Estimation Issues in Long-Horizon Stock Performance

We estimate long-horizon return performance using annual buy-and-hold returns (BHRs), an approach Barber and Lyon (1997) and Kothari and Warner (1997) find attractive in comparison to other techniques.[10] We calculate annual

[9]Of course, these results should not be interpreted as suggesting that, for a given firm, investors are failing to learn. Similar to the drift that one can see in returns when information across firms is staggered over time, the drift we see in these information shocks is a cross-sectional average in event time. The information shocks for a given firm need not show drift.

[10]One reason is that the implied investment strategy is simplistic and representative of the returns a long-horizon investor might earn. Further, although a cumulative abnormal return (CAR) approach is straightforward to estimate, it implicitly assumes frequent rebalancing and thus high transaction costs that are not reflected in the analysis. Frequent rebalancing also introduces upward bias due to bid-ask bounce (Roll (1983) and Blume and Stambaugh (1983)). In some applications, the calendar-time portfolio approach is subject to the same concern.

TABLE 4

The Market Reaction to Earnings Announced Before and After a Stock Repurchase Program Announcement

Event		Overall		Mean		
Year	Quarter	Mean	Median	Small	Medium	Large
Panel A. Quarterly Earnings Announcement Returns by Event Years						
−1		−0.086**	−0.115***	−0.284***	−0.069	0.102*
1		0.086**	−0.007	0.027	0.095*	0.139**
2		0.273***	0.098***	0.378***	0.265***	0.168**
3		0.280***	0.081**	0.221**	0.278***	0.347***
4		0.236***	0.110***	0.264**	0.201***	0.282***
Panel B. Quarterly Earnings Announcement Returns by Event Quarters						
−1	1	0.204***	0.023	0.083	0.246**	0.239**
	2	0.071	−0.082*	0.048	0.035	0.180*
	3	−0.106	−0.143**	−0.350**	−0.231	−0.005
	4	−0.490***	−0.283***	−0.834***	−0.517***	−0.002
1	1	0.306***	0.140**	0.434***	0.261**	0.248**
	2	0.039	−0.052	−0.053	0.043	0.145
	3	−0.046	−0.090*	−0.204	0.035	−0.039
	4	0.043	−0.030	−0.077	0.039	0.200*
2	1	0.314***	0.109**	0.296*	0.336***	0.285**
	2	0.214***	0.097	0.358**	0.218**	0.036
	3	0.251***	0.031	0.560***	0.135	0.156
	4	0.312***	0.148**	0.300*	0.372***	0.194*
3	1	0.373***	0.108	0.411**	0.443***	0.175
	2	0.299***	0.136**	0.312	0.244**	0.406***
	3	0.198**	0.030	0.060	0.143	0.467***
	4	0.246***	0.040	0.089	0.278**	0.344**
4	1	0.270***	0.178*	0.359	0.238**	0.251*
	2	0.280***	0.145**	0.473**	0.221*	0.216
	3	0.240**	0.058	−0.088	0.322**	0.381***
	4	0.148	0.073	0.300	0.016	0.280**

Table 4 reports the abnormal buy-and-hold return (in %) around quarterly earnings announcements for repurchase firms in our sample. Quarterly earnings announcement dates are obtained from Compustat. The abnormal announcement return for a given firm is calculated as the compounded return from day −1 to day +1 relative to its respective earnings announcement date less the CRSP value-weighted index return compounded over the same interval. Extreme abnormal return observations above 25% or below −25% are eliminated. Mean and median abnormal returns are reported by event-year (Panel A) and by event-quarter (Panel B) from one year prior through four years after a repurchase announcement. Small and Large, respectively, refer to the mean abnormal market reaction to firms ranked in either the bottom two or top two market-cap deciles relative to the universe of all NYSE firms at the time of the announcement. Medium is the mean reaction for firms ranked in the remaining six deciles. ***, **, * denote significance levels of 1%, 5%, and 10%, respectively, using a two-tailed *t*-test for means and a signed rank test for the medians.

BHRs for sample firms for the year before and the four years following a repurchase announcement, where each year is defined as a uniform block of 252 trading days. Year +1 starts on the announcement date. By capturing the initial market reaction, we have a complete picture of the economic impact of repurchases. For each event year, equal-weighted portfolio returns are formed from the BHRs of sample firms. Longer horizon portfolio returns are obtained by compounding one-year portfolio returns across event time. This implicitly assumes annual rebalancing and reduces the possibility that a single firm can dominate the analysis in later years. If a repurchase firm is delisted in the middle of a year, the return calculation for that firm stops at that time and its partial BHR is included in the overall portfolio return for that event year.

We estimate abnormal performance using five matching-control firms.[11] Control firms are identified on the basis of size and book-to-market ratio (B/M), two important factors that explain cross-sectional stock returns during our time period (e.g., Fama and French (1992) and Lakonishok, Shleifer, and Vishny (1994)). Size and B/M cut-off points are defined monthly using all NYSE- and Amex-listed firms available on both CRSP and Compustat. We first sort stocks by their equity market-caps into deciles. Within each size decile, we define B/M quintile cut-off points. Here, B/M is calculated as the ratio of the book value of equity from the previous fiscal year-end to the market value of equity from the previous month.[12] Each month, all stocks common to both CRSP and Compustat, including Nasdaq firms are classified in one of these 50 size and B/M portfolios. For each sample firm, we identify five control firms from the same size decile with the closest B/M ratio that also trade on the same exchange. We apply the same method to calculate sample and control firm portfolio returns to avoid any rebalancing bias between groups (Canina, Michaely, Thaler, and Womack (1998)). For statistical inferencing, we use an empirical simulation or "bootstrap." Lyon, Barber, and Tsai (1999) conclude that this approach is preferable to alternative procedures such as a conventional parametric *t*-test, thus we use it here. We conduct the bootstrapping similar to the way described in Lee (1997) using size and B/M as controlling factors and running 10,000 trials.

VI. The Long-Horizon Evidence

A. Univariate Buy-and-Hold Returns

Table 5 presents long-term BHRs surrounding repurchase announcements. In the year before an announcement, sample firms experience unusually poor returns. The bootstrap *p*-value is 1.000, an extreme value indicating that none of the random bootstrap portfolios had an abnormal return this low. This result is consistent with the disappointing earnings that sample firms reported over the same period.

After the repurchase announcement, abnormal returns are positive. The year +1 abnormal return is 6.68%. This result is also extreme with an associated *p*-value of 0.000. No randomly formed portfolio with similar B/M and market-cap characteristics outperformed the repurchase portfolio. By year +4, the compounded abnormal return grows to 23.56% and *p*-value remains 0.000. This result is also consistent with our earlier analysis of positive post-announcement earnings

[11] We use five control firms, instead of a single-firm approach advocated by Barber and Lyon (1997). The single-firm approach works very well in a large sample environment and addresses the impact of positive skewness on point estimates of long-run abnormal performance. However, using only one control firm leads to noisy point estimates (Lyon, Barber, and Tsai (1999)). Thus, we use five control firms as in Lee (1997). While the skewness bias will affect our point estimates at the margin, this paper is primarily concerned with corporate finance theory. Here the noise from low power methods dominates any potential concern caused by skewness bias. Yet to reduce concern over skewness, recall that we eliminate sample and control firms in cases where share prices were below $3.

[12] In calculating B/M ratios, we take into account stocks with multiple share classes. To avoid a look-ahead bias (Banz and Breen (1986)), we assume a four-month reporting lag when applying book-equity values.

TABLE 5

Long-Run Buy-and-Hold Returns

Panel A. Full Sample

	Full Sample Period			1980–1990			1991–1996		
Event Year	*n*	DIFF	*p*-Value	*n*	DIFF	*p*-Value	*n*	DIFF	*p*-Value
−1		−8.46			−6.29			−9.97	
	5,508	(6.5, 14.9)	1.000	2,268	(3.8, 10.0)	1.000	3,240	(8.3, 18.3)	1.000
1		6.68			6.21			7.02	
	5,508	(26.2, 19.5)	0.000	2,268	(23.5, 17.3)	0.000	3,240	(28.1, 21.1)	0.000
2		10.97			7.15			13.77	
	5,382	(52.8, 41.8)	0.000	2,230	(44.0, 36.9)	0.000	3,152	(59.1, 45.3)	0.000
3		18.23			14.19			21.05	
	5,104	(85.1, 66.8)	0.000	2,159	(78.7, 64.5)	0.000	2,945	(89.3, 68.3)	0.000
4		23.56			18.70			27.07	
	4,774	(113.7, 90.2)	0.000	2,084	(102.5, 83.8)	0.000	2,690	(121.8, 94.8)	0.000

Panel B. Sorting by Factors

	Full Sample			Buy			Non-Buy		
Event Year	*n*	DIFF	*p*-Value	*n*	DIFF	*p*-Value	*n*	DIFF	*p*-Value
Low B/M									
1	1097	7.06	0.001	909	6.90	0.001	99	9.40	0.069
2	1078	12.75	0.000	894	14.91	0.000	97	4.34	0.273
3	1044	19.65	0.000	866	24.51	0.000	94	−1.54	0.390
4	996	22.92	0.000	826	30.70	0.000	90	−11.82	0.276
High B/M									
1	1256	7.01	0.001	623	4.27	0.037	83	−2.75	0.415
2	1231	10.83	0.000	615	0.93	0.100	78	−4.73	0.486
3	1127	22.22	0.000	588	12.24	0.004	75	2.97	0.332
4	1025	28.35	0.000	553	24.61	0.000	68	0.28	0.325
Low FCF									
1	167	4.15%	0.307	110	5.34%	0.328	16	10.33%	0.204
2	164	14.39%	0.042	109	22.83%	0.034	15	−1.32%	0.431
3	161	24.74%	0.018	107	41.91%	0.016	15	11.50%	0.400
4	155	32.74%	0.001	103	48.94%	0.003	14	−0.36%	0.603
High FCF									
1	1384	8.61%	0.000	1052	7.78%	0.000	112	17.55%	0.006
2	1357	13.09%	0.000	1035	13.65%	0.000	110	17.61%	0.020
3	1301	21.71%	0.000	998	24.42%	0.000	105	18.86%	0.029
4	1217	34.95%	0.000	936	37.96%	0.000	98	34.01%	0.006
Low LEV									
1	1295	7.27%	0.001	691	4.37%	0.058	64	12.37%	0.051
2	1269	14.41%	0.000	684	7.49%	0.019	63	35.66%	0.003
3	1213	18.39%	0.000	670	8.51%	0.013	58	38.09%	0.017
4	1126	21.35%	0.000	623	8.39%	0.001	57	61.11%	0.003
High LEV									
1	587	8.59%	0.007	317	8.55%	0.034	35	0.88%	0.244
2	574	19.83%	0.000	315	17.57%	0.006	32	6.99%	0.197
3	527	40.52%	0.000	302	44.30%	0.000	31	26.48%	0.058
4	477	40.27%	0.000	283	53.80%	0.000	28	−15.04%	0.372

Table 5 reports compounded long-run return performance (in %) for the total sample and for the groups sorted on the basis of book-to-market ratio (B/M), industry median-adjusted free cash flow (FCF), and industry median-adjusted leverage (LEV). FCF is determined for each repurchasing firm at the time of the announcement and normalized by sales. LEV is calculated as the total debt (current liabilities plus long-term debt) divided by total assets at month-end prior to the announcement. All accounting variables assume a four-month reporting lag. Buy refers to those repurchasing firms that repurchased at least some shares during the one-year period after the repurchase announcement. Non-buy refers to those with no repurchase over the same period. Firms without available actual repurchasing information on Compustat are classified as missing and not included in either Buy or Non-buy column. *n* represents the number of firms in each category. DIFF represents the difference in BHR returns between repurchasing and matching firms (in Panel A, the BHR of repurchasing firms is reported on the left and that of matching firms is reported on the right inside the parentheses). *p*-values are calculated separately for each sample or sub-sample via the empirical bootstrap simulation procedure. Low and High refer to sample firms respectively ranked in either the bottom or the top quintile of B/M, FCF, or LEV at the time of the repurchase announcement.

surprises. Compared to the low abnormal returns prior to a buyback announcement, the high post-announcement drift suggests that the market is surprised by new, unanticipated information subsequent to repurchase announcements. This result is not driven by cases in the 1980s. Point estimates for the drift from 1991 to 1996 are also positive and significant; the four-year abnormal return is 27.07% (p-value = 0.000).

B. Economic Theory and the Source of Gains in Repurchases

In panel B of Table 5, we investigate whether the long-horizon return drift shareholders experience occurs in ways generally consistent with the hypotheses often used to motivate buybacks. We begin by considering univariate results and later move to multivariate evidence.

Results conditional on the book-to-market ratio at the time of the repurchase announcement are reported in the first two rows in panel B. If the source of the drift could be attributed to the market slowly responding to mispricing information publicly available at the repurchase announcement, one expects to see the long-horizon drift to be prevalent in value-stocks announcing repurchases as opposed to growth firms. We focus on sample firms ranked in the tails. Specifically, firms ranked in either the bottom or top quintile on B/M after controlling for size. The four-year drift in high B/M (value) firms is positive and significant (28.35% (p-value = 0.000)). For low B/M (growth) stocks, the drift is not so dramatic, but nevertheless is also positive and significant (22.92% (p-value = 0.000)). Although not reported here, this spread between value and growth repurchase firms is more apparent for cases in the 1980s. In the 1990s, the results change. Here, growth firms announcing repurchases do well during the post-announcement period. This is consistent with what Ikenberry, Lakonishok, and Vermaelen (2000) report for Canadian growth-stocks announcing repurchases in the 1990s. This suggests a potential shift in the source of mispricing that managers may perceive away from public or market induced mispricing and more toward private, non-disclosed sources of information.

Previous studies on equity offerings suggest that managers are sensitive to pricing issues. Mikkelson and Partch (1988) and Clarke, Dunbar, and Kahle (2001) find evidence consistent with the mispricing hypothesis when considering equity offerings that were subsequently withdrawn. We see evidence with repurchases that is seemingly consistent with the managers responding to mispricing during "windows of opportunity." Although not reported here, we find that when the sample is sorted into the 30% of cases with the highest abnormal return over days 0 to +20, repurchase activity during year 1 is about 8.5% lower compared to the 30% of cases with the lowest abnormal returns over that period. We reach a similar conclusion when we consider the fraction of buyback programs that are not initiated. When market prices increase rapidly following a repurchase announcement, managers are less inclined to buy back stock. We see further traces of this conditional behavior. For both high and low B/M firms, the four-year drift is higher in cases where managers actually bought back stock. The fact that growth firms that repurchased shares also show a positive drift is consistent with the idea that some mispricing may be due to non-public information.

The next two rows of panel B consider evidence with respect to the free cash flow hypothesis. We measure free cash flow levels (FCF) according to Lehn and Poulsen (1989). We scale FCF by sales net of the median industry ratio.[13] If disgorging free cash flow is a potential source of gain, yet the market is slow to respond, the abnormal return drift should be more prevalent in firms with comparatively high levels of free cash flow. Consistent with the conclusion in Table 2, the frequency of sample firms rated in the highest FCF quintile is indeed much greater than that of firms classified in the lowest FCF quintile relative to their industry peers. Despite this, the four-year abnormal return drift for very high FCF firms (34.95% (p-value = 0.000)) is similar in scale to that of very low FCF firms (32.74% (p-value = 0.001)). Further, the free cash flow hypothesis specifically relates to firms actually disgorging cash. When we separate high free cash flow firms according to repurchase activity, we see little evidence that the drift is concentrated in firms that disgorged at least some cash. In sum, the univariate evidence is not overly supportive of the free cash flow story. However, other factors may be complicating this analysis. Later when we consider a multivariate approach, the conclusion changes slightly.

The last two rows in panel B relate to the leverage hypothesis. Here, firms are classified on the basis of total debt to total assets net of industry medians. Consistent with the leverage hypothesis, repurchasing firms have relatively low leverage. However, the long-horizon return evidence is not so supportive. Specifically, the four-year drift is greater in high-leverage firms compared to low-leverage firms, the opposite of that suggested by the leverage hypothesis. If we condition on actual buyback activity, a seemingly important aspect of the leverage hypothesis, the gains apparent in low-leverage cases are *not* attributable to cases where managers are buying stock. One possibility is that our proxy for identifying suboptimal leverage is poor. Thus, we repeated this analysis by considering cases with extreme decreases in leverage in the year prior to the buyback announcement. Yet the results (not reported here) do not change. These findings with respect to leverage are counter-intuitive and instead may relate to the mispricing hypothesis. Specifically, managers in firms with above average debt loads may be either directly or indirectly signaling mispricing through their willingness to repurchase shares, despite the potential this has of further increasing debt.

C. The Multivariate Evidence

Table 6 reports regression results of the long-horizon evidence in a multivariate setting. We consider all of the factors used up to this point in our analysis. We also consider a continuous measure of actual repurchase activity, log (1 + the fraction of shares actually repurchased during year-one relative to total shares outstanding). We interact this variable with dummy variables indicating whether stocks are ranked in the highest B/M quintile (value stocks), the highest industry-adjusted FCF quintile (high free cash flow stocks), the lowest industry-adjusted

[13] To scale this variable, we considered several approaches. A standard method is to normalize FCF by the market value of equity. While appealing, this variable is substantially redundant with book-to-market (the correlation between B/M quintile ranks and FCF/MV is about 0.4). As a compromise, we scale FCF with sales where the correlation with B/M is nearly zero. Industry groupings are based on Fama and French (1997).

leverage quintile (low leverage stocks), or the lowest industry-adjusted leverage change quintile (leverage decreasing stocks).

TABLE 6

Cross-Sectional Regressions of Long-Term Abnormal Returns

	1	2	3	4	5
Intercept	−0.5380 (−4.22)	−0.1766 (−2.61)	−0.5116 (−3.33)	−0.5156 (−3.83)	−0.5502 (−3.93)
Size decile ranking	0.0222 *(3.16)*	0.0236 *(3.36)*	0.0236 *(3.31)*	0.0220 *(3.12)*	0.0215 *(3.04)*
B/M quintile ranking	0.0021 (0.13)		0.0090 (0.44)	−0.0116 (−0.70)	−0.0123 (−0.74)
FCF quintile ranking	0.0381 *(1.98)*		0.0062 (0.22)	0.0451 *(2.12)*	0.0471 *(2.20)*
LEV quintile ranking	0.0851 *(4.75)*		0.0958 *(4.09)*	0.0877 *(4.55)*	0.0863 *(4.45)*
LEV quintile CHANGE ranking					0.0150 (0.96)
High BM dummy		−0.0128 (−0.22)	−0.0302 (−0.39)		
High FCF dummy		0.0992 *(2.16)*	0.1056 (1.53)		
Low LEV dummy		−0.1444 *(−2.68)*	0.0436 (0.62)		
% shares announced	0.4460 (1.60)	0.4583 (1.62)	0.4436 (1.60)	0.5466 *(1.96)*	0.5222 (1.87)
Log (1 + % actual buy)	0.9629 *(2.42)*	0.9974 *(2.49)*	0.9615 *(2.41)*		
Log (1 + % actual buy)*high BM dummy				1.8912 *(2.59)*	1.8514 *(2.59)*
Log (1 + % actual buy)*high FCF dummy				−0.5797 (−0.81)	−0.6901 (−0.94)
Log (1 + % actual buy)*low LEV dummy				0.5584 (0.73)	0.4901 (0.62)
Log (1 + % actual buy)*low LEV CHANGE dummy					0.3879 (0.58)
Prior one-year abnormal return	0.1043 (1.49)	0.1064 (1.53)	0.1071 (1.53)	0.1046 (1.49)	0.1039 (1.49)

Table 6 reports cross-sectional regression results of return performance on various explanatory variables. The dependent variable is the four-year abnormal return defined as the difference in buy-and-hold returns between a given sample firm and its corresponding matching firms. Size decile (one being the smallest) is based on the market value of equity at the month-end prior to the repurchase announcement relative to all stocks covered by CRSP and Compustat. B/M quintile (one being the lowest) is based on the ratio of the book equity value at the previous fiscal year-end to total market value at month-end prior to the announcement. FCF quintile uses the Lehn and Paulsen (1989) measure for free cash flows divided by sales minus the industry median. LEV quintile is based on industry median-adjusted total debt over total assets. LEV CHANGE quintile is based on the change of debt to assets ratio adjusted to industry median. % shares announced is the percentage of announced repurchase shares relative to total outstanding shares at month-end prior to the announcement. % actual buy represents the percentage of shares that firms bought during the one-year period after the repurchase announcement. High BM dummy is one for the top B/M quintile, and zero elsewhere. High FCF dummy is one for the top FCF quintile, and zero elsewhere. Low LEV dummy is one for the bottom LEV quintile, and zero elsewhere. Low LEV CHANGE dummy is one for the bottom LEV CHANGE quintile, and zero elsewhere. Prior one-year abnormal return is the prior one-year buy-and-hold return compounded from 252 days before up to the day before the announcement for repurchasing firms minus the compounded return of the matching firms over the same period. Year dummy variables are included, but not reported in this table. Numbers in parentheses are White (1980) heteroskedasticity-adjusted *t*-statistics.

Using a multivariate approach, we again see some support for the mispricing hypothesis. For example, controlling for other factors, the drift is higher in cases where managers actually repurchase shares. Furthermore, when we interact a value B/M dummy with actual repurchase activity, we find significant evidence of a drift consistent with the mispricing story. Finally, although the result is only

significant at the margin, the drift tends to increase with the size of the repurchase program.

Earlier when looking at the univariate evidence for the free cash flow hypothesis, support was mixed. Here the evidence is more consistent with the free cash flow hypothesis. Specifically, firms with higher free cash flow do show a significantly higher drift. However, as we saw earlier with the univariate evidence, when we interact a high free cash flow dummy with the level of actual repurchase activity, the coefficient is not positive.

With respect to the leverage hypothesis, the results are counter to what one expects. Low-leverage firms where the economic benefit of leverage from repurchasing shares would seemingly be high do not have a significant drift. If we instead focus on the change in leverage and where managers might be using repurchases as a tool to reshape capital structure, we see little evidence that the drift is associated with these cases. These results essentially confirm the early univariate evidence and might be interpreted as consistent with the mispricing hypothesis. Specifically, although firms with high leverage are not common in this sample, the high leverage cases appear to be indicative of a confident management that perceives its stock as mispriced.

VII. Conclusions

The 1990s saw a huge increase in the number of firms announcing open market stock repurchases. Today, stock repurchases are prevalent in the U.S. and are gaining importance around the world. Economic theory provides several reasons as to why or how repurchases might affect firm wealth. In this paper, we examine cross-sectional differences in both short- and long-run returns of share repurchasing firms to examine possible three motives for share repurchases: mispricing, disgorging free cash flow, and altering leverage.

We report evidence for more than 5,000 U.S. repurchases announced between 1980 and 1996. The short-horizon market reaction to the news of a repurchase shows only modest support for the mispricing hypothesis and no evidence consistent with the capital structure or free cash flow hypotheses.

Yet this analysis of the initial market reaction leans heavily on the notion that markets respond completely and quickly to the information contained in repurchase announcements. To evaluate whether the initial reaction is complete, we estimate unanticipated earnings-related information shocks surrounding repurchase announcements. Prior to a buyback announcement, the market receives negative information shocks in the form of negative earnings surprises. Yet over a four-year window after the announcement, earnings surprises tend to be positive and significant. This suggests that real, unanticipated information is revealed after repurchase announcements and that the initial market reaction is biased and incomplete. Moreover, it draws into question the extent to which the market efficiently anticipates repurchase announcements.

The long-horizon evidence also suggests that the market does not fully incorporate the information in buyback announcements. Controlling for both size and book-to-market effects, the mean four-year abnormal buy-and-hold return is

23.56% (p-value = 0.000). Point estimates of the drift determined from the 1990s are roughly double in scale compared to repurchases announced in the 1980s.

Although long-horizon returns are noisy, the post-share repurchase drift shows some consistency with the mispricing hypothesis. Further, there is some indication that the nature of the mispricing may have a non-public component to it. Even though the drift is more apparent in value firms, a positive and significant drift is also observed in growth firms buying back stock. The drift is increasing in the scale of actual buyback activity. This result is noted for value-stock repurchases where undervaluation would seem to be an important motive.

As for the free cash flow hypothesis, we find limited support. Repurchase firms tend to have above-average free cash flow compared to their industry peers. Moreover, the long-run drift is greater for high free cash flow firms compared to low free cash flow cases. Although these findings are consistent with theory, we find inconsistencies as well. Specifically, an important aspect of the free cash flow hypothesis is that the gains from high free cash flow firms should be linked to cases where managers actually disgorge cash. We do not find this to be the case.

The results, generally speaking, are not consistent with the leverage hypothesis. While repurchasing firms do tend to have below average leverage, these firms do not have any higher drift compared to high leverage firms. Moreover, returns do not appear to be higher in firms that had sharp declines in leverage and who might be using a repurchase to readjust their capital structure. The economic benefits that might arise from the leverage hypothesis are conditional on actual repurchase activity. Yet when we investigate this issue, we continue to find no support consistent with the leverage hypothesis.

In summary, despite the difficulty in assessing long-horizon return evidence, the return drift we observe subsequent to buyback announcements may provide some insight into the economic theory motivating repurchases. The evidence here is most consistent with the mispricing hypothesis and, to some degree, the free cash flow hypothesis. We find very little support for the leverage hypothesis. Although managers can repurchase stock for many reasons, our evidence indicates that their primary reason is to respond to mispricing in their companies' stock.

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