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Abstract

The long-run abnormal returns following both stock repurchases and seasoned equity offerings disappear for the events in the most recent decade. The disappearance is associated with the changing market environment – increased institutional investment, decreased trading costs, improved liquidity, and enhanced regulations on corporate governance and information disclosure. In response to the changing market environment, firms become less opportunistic in stock repurchases and offerings. Recent events are motivated more for business operating reasons than to exploit mispricing. Both external market factors and internal firm factors contribute to the disappearance of the post-event abnormal returns. Our evidence on the recent events contrasts with the findings of earlier studies and sheds light on how the changing market environment affect both asset pricing and corporate behavior.

JEL classification*:* G12, G14, G32, G35

Keywords: Long-run abnormal returns, stock pricing efficiency, stock repurchases, seasoned equity offerings, feedback effect of financial markets

1. Introduction

Previous studies document that long-run stock returns are abnormally high following stock repurchases and abnormally low following stock offerings.[1] Although in principle these findings critically depend on the specification of "normal" returns, they appear fairly robust to various benchmark models of expected returns.[2] The findings are often interpreted to imply event stock mispricing and event firms' opportunistic market timing.[3] In this study we show that firms repurchasing or issuing stocks in the past decade do not incur post-event long-run abnormal returns. The disappearance of long-run abnormal performance is related to the changing market environment – more sophisticated investors, lower trading cost, better liquidity, and more transparent and credible information disclosure. The enactment of the Sarbanes-Oxley Act in 2002 strengthens corporate governance. As a result, event firms in the past decade appear to abstain from manipulating earnings and information disclosure prior to the announcement, both of which are shown in earlier studies to be associated with the long-run abnormal returns. Further evidence suggests that recent events are conducted more for business operating reasons than for market timing, in particular, repurchases to pay out cash and SEOs to invest and improve profitability. Both the external market environment and the internal firm factors contribute to the disappearance of abnormal returns following these two events.

Our sample contains 14,309 open-market stock repurchases in 1984-2012 and 6,739 seasoned equity offerings (SEOs) in 1980-2012. Previous studies that document long-run abnormal performance examine the events prior to 2002. For example, Ikenberry, Lakonishok, and Vermaelen (1995) examine repurchases in 1980-1990, Peyer and Vermaelen (2009) examine repurchases in 1991-2001, and Ritter (2003) studies SEOs in 1970-2000. We confirm their results for the events up to 2002 that long-run abnormal returns are significantly positive following repurchases and significantly negative following SEOs. For the events after 2002, in sharp contrast, we find neither outperformance following repurchases nor underperformance following SEOs. The contrasting results between the early and later periods are robust to various estimation methods of long-run abnormal returns and are not explained by the "bad model" problem since we employ the same set of models for the two time periods. The 2003-2012 sample is not small in size; it contains 4,652 stock repurchases (33% of the total sample)

[1] See Ritter (1991) for early documentation of negative long-run abnormal returns following IPOs, Loughran and Ritter (1995) and Spiess and Affleck-Graves (1995) for early documentation of negative long-run abnormal returns following seasoned equity offerings, and Ikenberry, Lakonishok, and Vermaelen (1995) for early documentation of positive long-run abnormal returns following stock repurchases.

[2] See Fama (1998) for discussion of the "bad model" problem, which focuses on measurement of expected returns. See Ritter (2003) for evidence on SEO abnormal returns and Peyer and Vermaelen (2009) for evidence on repurchase abnormal returns robust to different measurement and model specifications.

[3] There are also rational explanations for corporate stock transactions. Both the q-theory of investment and the real option theory imply lower expected returns for post-SEO stocks (Li, Livdan, and Zhang, 2009; Liu, Whited, and Zhang, 2009; Carlson, Fisher, and Giammarino, 2006). Bolton, Chen, and Wang (2013) develop a model to show that stochastic financing condition affects corporate repurchase and SEO decisions and the resulted cash position affects the firm's cost of capital.

and 1,826 SEOs (27% of the total sample).[4] Further tests invalidate lack of statistical power as a potential explanation for the disappearance of abnormal performance. Our results are also robust to excluding events or event returns during the period of 2008 financial crisis and to including the investment factor (Lyandres, Sun, and Zhang, 2008) or the investor sentiment index (Baker and Wurgler, 2006) into the Fama-French three factor model. Moreover, we find that the negative cross-sectional relation between net equity issuance and subsequent returns, documented in Daniel and Titman (2006) and Pontiff and Woodgate (2008), significantly weakens, or even disappears in some specifications, in the sample of the most recent decade.

The disappearance of long-run abnormal returns seems to be related to the changing market environment. Over the past decade, the stock market overall has experienced an unprecedented increase in institutional investment. Hedge funds proliferate and actively seek profitable opportunities. Trading costs decline and liquidity substantially improves, as a result of the decimalization in 2001 and the explosion of algorithm trading in the last decade.[5] Furthermore, regulations about information disclosure and corporate governance in the early 2000s, brought by the Regulation Fair Disclosure and the Sarbanes-Oxley Act in particular, have enhanced the transparency and credibility of corporate information to the market.[6] In other words, the stock market in the past decade features an increasing number of sophisticated arbitrageurs and a more favorable environment for arbitrage activities. In a recent study, Chordia, Roll, and Subramanyam (2011) show that there has been an explosive increase in institutional trading, information is more effectively incorporated into stock prices, and stock prices conform more to random walks. They explicitly argue that the stock market has generally become more efficient in recent years.

We investigate if the new market environment facilitates pricing efficiency of our event stocks. In particular, we examine intertemporal changes in several pricing efficiency variables of event firms and the impact of these variables on the disappearing long-run abnormal returns. They are institution ownership, hedge fund ownership, liquidity, analyst coverage, and return variance ratio. Institutional investors are known to improve stock pricing efficiency.[7] Hedge funds are more effective in eliminating mispricing than other institutional investors, due to their larger flexibility in using derivatives and short-selling (Stulz, 2007). Liquidity lowers costs of arbitrage. Financial analysts

[4] Some of the early studies that first document abnormal performance were based on event samples of similar or even smaller size. For example, Spiess and Affleck-Graves (1995) examine 1,247 SEOs in 1975-1989, Ikenberry, Lakonishok, and Vermaelen (1995) examine 1,239 repurchases in 1980-1990, Peyer and Vermaelen (2009) examine 3,481 repurchases in 1991-2001.

[5] See Bessembinder (2003), Chordia, Roll, and Subramanyam (2005; 2011), French (2008), among others, for the reduction in trading costs and improvement in liquidity. See Hendershott, Jones, and Menkveld (2011), Brogaard, Hendershott, Riordan (2014), and Boehmer, Fong, and Wu (2013) for the implications of algorithm trading on liquidity and pricing.

[6] See Heflin, Subramanyam, and Zhang (2003), Eleswarapu, Thompson, and Venkataraman (2004), Cohen, Dey, and Lys (2008), and Zolotoy (2008), among others.

[7] See, Badrinath, Kale, and Noe (1995), Sias and Starks (1997), Nagel (2003), Boehmer and Kelley (2009), and Chordia, Roll, and Subramanyam (2011), among others.

facilitate speedy information incorporation into stock prices. The ratio of return variance during trading hours to that in non-trading hours, first proposed by French and Roll (1986), measures how effectively the market incorporates information into stock prices.

We show that both institution ownership and hedge fund ownership of event stocks have been increasing over time – and more rapidly over the past decade. Since 2002 institutions persistently own over 50% of the event stocks. Event stocks held more by institutions, especially hedge funds, incur less significant abnormal returns. Similarly, we observe substantial increases in analyst coverage, liquidity, and variance ratio of event stocks from the early to the later periods. The long-run abnormal returns are significantly mitigated or even absent for event stocks that are followed by more analysts, are more liquid, or have higher variance ratios. The negative relations between these factors and long-run abnormal returns still hold after controlling for various event firm characteristics. The findings lend strong support to the impact of the market environment changes on the disappearance of long-run abnormal returns.

In addition to the external market environment, internal factors such as event firm motivation and behavior could also affect the post-event abnormal returns. Teoh, Welch, and Wong (1998) and Gong, Louis, and Sun (2008), respectively, show that firms manage earnings upward before SEOs and downward before repurchases through discretionary accounting accruals. Such manipulations are further shown to mislead investors and be responsible for the post-event long-run abnormal returns. To strengthen corporate governance, the Sarbanes-Oxley Act in 2002 promulgates the independence and oversight of audit committee and thus renders earnings manipulation under tighter scrutiny (Cohen, Dey, and Lys, 2008). We find that, in contrast to the earlier event firms, both repurchase and SEO firms after 2002 refrain from earnings management. In addition, recent repurchase firms are less involved in manipulations of information disclose prior to the event, which are found in the earlier repurchases to lower firms' repurchasing prices (Brockman, Khurana, and Martin, 2008). The reduction of such opportunistic behavior in the past decade helps to mitigate stock mispricing before the event and long-run abnormal returns after the event.

Managers learn and respond to the information from financial markets in making corporate decisions.[8] If mispricing motivates corporate market timing through stock repurchases and offerings, the recent changes in market environment and the improvement in stock pricing efficiency should dampen such incentives. More efficient pricing gives rise to fewer market-timing opportunities since mispricing is less likely to occur in the first place and, even if it still occurs, more effective arbitrage would make mispricing hard to persist. We therefore expect that fewer of the recent (occurred) events than before are motivated to time the market. Consistent with this prediction, we find that both

[8] See, for example, Luo (2005), Chen, Goldstein, Jiang (2012), Edmans, Goldstein, and Jiang (2012), Bond, Edmans, and Goldstein (2013), for the effect of financial market on corporate decisions.

repurchase and SEO firms in recent years exhibit less of the characteristics that earlier studies interpret as evidence of market timers. Specifically, compared with the earlier event firms, recent repurchase (SEO) firms have significantly lower (higher) book-to-market ratios and higher (lower) run-up returns before the announcement. In logit regressions of whether or not a firm conducts a repurchase or an SEO, the variables that are supposed to explain the decisions under the market-timing hypothesis have significantly weaker (or completely lose) explanatory power in the later sample. Our further examinations of analyst investment recommendations, insider trading around event announcements and the issuance of secondary shares in SEOs also suggest that market timing has become less likely the driving force behind recent stock repurchases and offerings.

Less motivated by mispricing and market timing, recent repurchases are more like a regular tool for mature and profitable firms to pay out cash and recent SEOs are motivated by more productive uses of the proceeds. Repurchases dominate dividends in corporate payout during recent years after increases in both frequency and dollar magnitude. Firms with certain characteristics that used to pay dividends switch to frequent repurchases in cash payout. Loughran and Ritter (1997) find a significant deterioration in operating performance after the earlier SEOs and interpret the evidence as a support for the market timing hypothesis. In contrast, we find that recent SEO firms experience a significant improvement in operating performance. Compared with the earlier SEO firms, recent issuers invest more (in capital expenditure) and save less (in cash balance) of the SEO proceeds. The changes in event motivations and decisions as a response to the changing market environment are consistent with the feedback effect of financial markets. Our examination on financing decisions complements earlier studies that examine corporate investment and acquisition decisions (Luo 2005; Chen, Goldstein, Jiang, 2012; Edmans, Goldstein, and Jiang, 2012).

To summarize, we find that the formerly robust long-run abnormal returns following stock repurchases and SEOs disappear in the recent data. The disappearance is associated with external market factors – the improvement in pricing efficiency and the enhanced regulations about corporate governance and information disclosure. Firms respond to the changing market and become less opportunistic in recent stock repurchases and SEOs – refraining from manipulating earnings and information disclosure prior to the events and from conducting the events primarily for market timing. Recent repurchases and SEOs are motivated more for business operating reasons than for exploiting mispricing. Therefore, both external market factors and internal firm factors help to understand the disappearance of the post-event long-run abnormal returns. Influenced by technology advance, regulation policies, investment knowledge, etc., investors, corporations, and the market interact and evolve over time. This dynamic interaction and evolvement exert important impact on asset pricing as well as corporate decisions.

Our study also contributes to the literature on the persistence of stock market anomalies. In his survey article, Schwert (2003) points out, "*After they are documented and analyzed in the academic*

literature, anomalies often seem to disappear, reverse, or attenuate. …many of the well-known anomalies in the finance literature do not hold up in different sample periods." (p. 939). He presents empirical evidence to illustrate that the size, value, weekend, dividend-yield, and small-firm turn-of-the-year effects are such disappearing anomalies. He further suggests that "*the activities of practitioners who implement strategies to take advantage of anomalous behavior can cause the anomalies to disappear*". In a contemporaneous study, McLean and Pontiff (2013) investigate the cross-sectional return predictability of 82 characteristics that are identified in prior academic studies, and find an average decline of 35% in return predictability after the publication of these studies. One driving force for the decline is sophisticated investors trading against the anomalies after they are known. In another recent study, Chordia, Subrahmanyam, and Tong (2014) examine a large set of cross-sectional return anomalies and find that the return predictability has decreased, both statistically and economically, or even disappeared in recent years. They attribute the attenuation of anomalies to increased liquidity and arbitrage activity. Our study on the persistence of long-run abnormal returns sheds similar light on the role of institutional investors and liquidity. Moreover, our investigation reveals that changes in corporate behavior could also play an important role in the disappearance of certain anomalies. We are the first to propose this in the literature of anomaly persistence.

2. The Sample of Stock Repurchases and Seasoned Equity Offerings

We obtain the sample of stock repurchases and SEOs from the Securities Data Company's (SDC) U.S. database. The sample firms are required to have monthly stock returns in CRSP. Our repurchase sample contains 14,309 open-market repurchases of common stocks announced from January 1984 to December 2012.[9] If a firm makes multiple announcements within a year, only the first one is selected. Our SEO sample consists of 6,739 common stock issues by industrial firms between January 1980 and December 2012. Pure secondary offerings by existing shareholders are excluded. We require the size of announced repurchase and new stock issues to be at least 1% of the event firm's existing market capitalization.

We estimate and compare abnormal returns following these two events in 2003-2012 with those in the early years. For convenience, we refer to the sample up to 2002 as "the early sample" and the sample after 2002 as "the later sample". We select 2002 as the cut point because most prior studies documenting long-run abnormal returns examine the data of repurchases and SEOs prior to 2002. For example, Ikenberry, Lakonishok, and Vermaelen (1995) examine 1,247 open-market repurchases in 1980-1990, and Peyer and Vermaelen (2009) examine 3,481 repurchases in the subsequent decade 1991-2001. Ritter (2003) examine 7,760 SEOs in 1970-2000. Our examination for the post-2002 data thus provides a meaningful out-of-sample test. Moreover, there are a number of regulatory changes concentrated in the period 2000-2003, including the enforcement of Reg FD in late 2000, the

[9] Open-market repurchases were relatively rare until the SEC adopted the safe harbor Rule 10b-18 in 1982. The SDC starts to have comprehensive data on share repurchases only since 1984.

decimalization of stock prices in 2001, and the enactment of SOX in early 2002. These regulatory changes have significant impact on SEO and repurchase firms, which we will elaborate in Section 4 and 5. This makes 2003 a natural starting point for the later sample. Nevertheless, our key results are not sensitive to the choice of using 2001 or 2003 as the alternative cut point.

3. Empirical Results of Long-Run Abnormal Returns

The estimation of long-run abnormal returns has been controversial. Various estimation methods have been offered in the literature and each has its pros and cons.[10] Given the lack of consensus on the best method, we employ three widely-used but drastically different methods to estimate long-run abnormal returns: (1) the calendar-time portfolio approach (as proposed in Mitchell and Stafford, 2000), (2) Ibbotson's (1975) returns across time and securities (IRATS), and (3) the buy-and-hold abnormal returns (BHAR) relative to control firms matched on size, book-to-market equity ratio, and return momentum (as illustrated in Barber, Lyon, and Tsai, 1999).[11]

Table 1 reports the 36-month abnormal return results, respectively for the full sample, and the early and later subsamples.[12] In the full sample, we confirm the findings of prior studies that the three-year abnormal stock returns are significantly positive following share repurchases and significantly negative following SEOs. All three estimation methods yield consistent results. For the calendar-time portfolio approach, we compute both equal- and value-weighted portfolio returns and run the test separately. The magnitude of the estimated abnormal returns is also comparable across different methods. Generally, in the three years following the announcement, repurchase firms on average realize about 5%-10% positive returns and SEO firms incur about 13%-20% negative returns relative to the expected return benchmarks.

However, a closer examination shows that the long-run abnormal returns are consistently significant only in the early sample.[13] In the 2003-2012 sample of events, we find no significant outperformance following repurchases under all three methods of abnormal return estimation. The abnormal return estimated under IRATS even turns significantly negative. The underperformance following SEOs also disappears if abnormal returns are estimated under the two calendar-time approaches (based on equal- and value-weighted portfolio returns, respectively) or using the control-firm matched BHAR. The abnormal return estimated under IRATS is still significant at the 5% level but the magnitude reduces from -20% in the early sample to -6% in the later sample. Our out-of-

[10] See Barber and Lyon (1997), Kothari and Warner (1997), Fama (1998), Barber, Lyon, and Tsai (1999) Mitchell and Stafford (2000), and Bessembinder and Zhang (2013), among others.
[11] The details of these empirical methods are described in the Appendix.
[12] We examine abnormal returns over the holding periods of 24, 36, and 48 months. Overall, the main results are consistent across different holding periods. For the sake of brevity, we only report the results for the holding period of 36 months.
[13] According to Mitchell and Stafford (2000), the calendar-time approach using value-weighted portfolio return is the least likely to detect abnormal returns. Using this method, we still find statistically significant outperformance following repurchases and underperformance following SEOs for the early sample.

sample estimation results are in sharp contrast to the earlier findings and thus cast serious doubt on the persistence of long-run abnormal returns.[14]

3.1. Is the Disappearance of Abnormal Returns Due to Statistical Power?

Since standard errors used to evaluate the statistical significance of abnormal returns generally increase with a shorter time series of data, there arises a concern that the lack of significance in the later sample might be due to the lack of statistical power for the shortened sample period. The time frame for our 2003-2012 sample is perhaps not long, but it is not short either; it includes 10 years out of a total of 29 years for repurchases and a total of 33 years for SEOs. In terms of the number of observations, the later sample consists of 4,652 repurchases (32.5% of the total repurchase sample) and 1,826 SEOs (27.1% of the total SEO sample). Nevertheless, we conduct two additional checks to address this concern.

First, we randomly pick 10 years in the early sample period and estimate the abnormal returns for these shortened subsamples. We do this for multiple times. In almost every time, we confirm the significance of the abnormal performance for both events in these early subsamples. In fact, earlier studies that first document the abnormal performance do not have very long time-series event data. Second, we compare the standard errors for the abnormal returns across the early and later periods. While the standard errors for SEOs are slightly higher in the later period (0.201 vs. 0.229 under the calendar-time value-weighted portfolio approach), those for repurchases are quite similar for both periods (0.094 vs. 0.108). More importantly, we do observe a significant reduction in the magnitude of abnormal returns, which are not affected by standard errors. Overall, the evidence does not support lack of statistical power as a potential explanation for the absence of abnormal performance in the post-2002 sample.

Our later sample period covers the 2008 financial crisis, which is known to have extremely high volatilities and low returns. To investigate if our results are driven by this "abnormal" crisis period, we conduct two robustness checks for the later sample. We use CBOE VIX to identify 09/2008 to 06/2009 as the crisis period.[15] First, we exclude from our estimation the 307 repurchase and 123 SEO events announced during this crisis period. The monthly alpha estimated under the calendar-time equal-weighted portfolio approach is 0.13% (t-stat = 1.18) for repurchases and -0.32% (t-stat = -1.26) for SEOs; neither is significant. Second, we exclude event stock returns during this period. The monthly alpha estimated under the calendar-time equal-weighted portfolio approach is 0.13% (t-stat =

[14] Using IRATS and the calendar time portfolio approach, Obernberger (2013) also shows in his working paper that the long-run abnormal returns following stock repurchases do not exist in the sample of 2004-2010. In Jay Ritter's recent update of Loughran and Ritter (1995), available on his website, he also shows that the post-SEO long-run abnormal returns attenuate substantially in the 2001-2011 sample.

[15] The average daily CBOE VIX, the implied volatility of S&P 500 index options, is 16 for the period 01/2004 – 08/2007 while it is as high as 45 during 09/2008 – 06/2009. It returns to 20 during 07/2009 – 12/2013. The VIX is over 30 in most of the days during 09/2008 – 06/2009 which is very unusual in other periods. Moreover, the value-weighted CRSP market return is -26.7% during this period.

1.59) and -0.33% (t-stat = 2.03) for the two filtered later samples, respectively. If value-weighted portfolio returns are used in estimation, none of the alphas is significantly different from zero. Similar results are obtained using the other two estimation methods. We therefore conclude that the disappearance of abnormal returns is not due to the financial crisis.

3.2. Do Investment or Investor Sentiment Explain the Disappearance of Abnormal Returns?

There are rational explanations, especially for the poor return performance following SEOs. Both the q-theory of investment and the real options theory imply a negative relation between investment and expected returns. In the q-theory, firms invest more when their marginal q is higher. Controlling for expected cash flows, a higher marginal q is associated with a lower cost of capital. This point is developed in Li, Livdan, and Zhang (2009) and Liu, Whited, and Zhang (2009) to explain poor returns following SEOs. In their real options model, Carlson, Fisher, and Giammarino (2006) argue that growth options are riskier than assets in place. Corporate investment transforms riskier growth options into less risky assets in place, thereby reducing risk and expected returns. Motivated by these theories, Lyandres, Sun, and Zhang (2008) construct an investment factor, long in low-investment stocks and short in high-investment stocks, and find that adding this factor into standard factor regressions significantly reduces the abnormal returns following SEOs.

Following Lyandres, et al. (2008), we construct the investment factor and augment the Fama-French three factors with it in the calendar time approach. The average three-year abnormal return following SEOs of the early sample indeed reduces from -16.20% to -10.51%, using value-weighted portfolio returns. But it remains statistically significant.[16] For the later SEO sample, the addition of the investment factor makes little difference. For the sample of repurchases, the addition of the investment factor has little impact on the abnormal returns of either the early or the later sample. Therefore, adding the factor does not explain the disappearance of abnormal performance from the early to the later periods.

Investor sentiment could also explain our findings. Baker and Wurgler (2006) construct an index of investor sentiment and show that it affects cross-sectional stock returns. We observe that their monthly index, updated till December 2010 and available in Jeff Wurgler's website, is less volatile in our later sample period than in the early period. It raises a question of whether the disappearance of abnormal returns in the later period is explained by the relatively "flat" investor sentiment. To address this concern, we include the investor sentiment index along with the Fama-French three factors in the calendar time portfolio approach. The regression results, however, do not support this hypothesis. We still find, in the early sample, a positive (negative) and significant alpha for the portfolio of repurchase

[16] Sullivan and Zhang (2011) show that the negative investment-return relation weakens after controlling for external financing while the negative financing-return relation remains significant after controlling for investment, and conclude that the investment-return relation does not explain the abnormally low returns after external financing.

(SEO) stocks, but insignificant alphas for both portfolios in the later sample. The change in magnitude of the alphas due to the inclusion of this sentiment index is negligible. In fact, the coefficient estimates of the sentiment index are not significant in all the regressions. We therefore conclude that investor sentiment is unlikely to explain the disappearance of abnormal returns.

3.3. Implications on the Negative Relation between Net Equity Issuance and Future Returns

Daniel and Titman (2006) and Pontiff and Woodgate (2008) show a negative and robust relation between net equity issuance and future stock returns. Their net equity issuance variables account for changes in shares due to seasoned equity offerings, share repurchases, employee stock option plans, or any other actions that trade ownership for cash or services. Stock splits and rights offerings are adjusted not to affect this variable. Interestingly, both studies end their sampling in 2003, roughly the ending point of our early sample. Since we show that, in the recent decade, abnormal returns do not exist following SEOs and repurchases, which are two major components of net equity issuance, it is interesting to examine if the negative relation between net equity issuance and future stock returns also weakens in the recent decade. We shall note, however, that although SEOs and repurchases, if they occur, would significantly affect the magnitude (but not as much the frequency) of net equity issuance, they are clearly not the same thing. Net equity issuance covers a broader range of events that change a firm's share outstanding. Moreover, ours is an event study based on a sample of event occurrences (regardless of the amount of issuance/repurchase so long as it is at least 1% of the firm's existing market capitalization, as discussed in Section 2 about our sampling), while theirs are of the cross-sectional relation between the *relative amount* of net equity issuance and subsequent returns of stocks in the universe.

We follow Pontiff and Woodgate (2008) to construct a 12-month net issuance variable (PW-ISSUE) and a 60-month composite issuance variable (DT-ISSUE) as in Daniel and Titman (2006). Next we run Fama-MacBeth cross-sectional regressions of monthly stock returns on these variables as well as the usual cross-sectional return determinants. Net equity issuance lags behind returns by six months for information of equity issuance to be revealed fully. The sample in the regressions includes all stocks traded in NYSE, AMEX, and NASDAQ in 1980-2012.

The results of both univariate and multiple regressions are reported in Table 2, respectively for the early (1980-2002) and the later (2003-2012) periods. We confirm the findings of Pontiff and Woodgate (2008) and Daniel and Titman (2006) that, in the early period, net equity issuance significantly predicts future returns in the cross-section. In the later period, however, the negative relation weakens substantially. While the Pontiff and Woodgate's 12-month share issuance still significantly predicts future returns, the magnitude reduces by two thirds. Daniel and Titman's 60-month share issuance loses its significance in predicting future returns. Since stock repurchases and SEOs are two major components of net equity issuance, the disappearance of abnormal returns following these two corporate stock transactions help to explain the reduced predictability. The return

predictability of size, book-to-market equity ratio, and momentum also reduces or disappears in the later period, which is consistent with a recent study by Chordia, Subrahmanyam, and Tong (2014).

4. The Changing Market Environment and the Disappearance of Abnormal Returns

Stock offerings and repurchases are important corporate stock transactions with many opposite features. The disappearance of abnormal performance following these two contrasting events is unlikely a coincidence. In this section, we review some significant changes in the stock market, and explore whether these changes affect our event firms and help to explain the disappearance of abnormal returns.

4.1. The Changing Market Environment

Long-run abnormal returns are often regarded as evidence of an inefficient market for these event stocks. Some further interpret the results as evidence of market timing, whereby firms issue stock when it is overpriced and repurchase stock when it is undervalued. Under this interpretation, the market not only misprices stocks at the beginning, but also fails to correct the mispricing fully at the event announcement. Post-announcement abnormal returns are then observed as information is gradually incorporated into the stock prices. The market's failure to incorporate public information quickly into stock prices could be due to two factors: (1) marginal investors are not sophisticated enough to process the information, and/or (2) high transaction costs deter effective arbitrage. Next we discuss if these two factors have changed in the last decade.

The stock market in the past decade is characterized by a higher proportion of more sophisticated institutional investors. Institutions with investment over $100 million in qualified securities are required to report their holdings in Form 13F with the SEC every quarter. We compute each stock's quarterly institutional ownership (IO) based on Thomson Financial's 13F filing. The median IO of CRSP stocks has increased steadily from less than 10% in 1980 to 60% by the end of 2012. In our event samples, as shown in Panel A of Table 3, the median IO of repurchasing stocks increases from 38.5% for the early sample to 73.7% for the later sample, and the median IO of SEO stocks increases from 27.7% for the early sample to 48.7% for the later sample. Both nearly double.

There is ubiquitous evidence in the literature that institutional investors improve price efficiency and reduce mispricing. Institutional investors are generally considered to be more effective than individual investors in accessing and processing information (e.g., Badrinath, Kale, and Noe, 1995; Sias and Starks, 1997; Boehmer and Kelley, 2009). Moreover, more institutional holding mitigates short-sale constraint – a significant limit to arbitrage (e.g., D'Avolio, 2002). Nagel (2005) shows that cross-sectional return anomalies occur less in stocks with high institutional ownership.

Hedge funds, a special type of institutional investors, are often regarded as active arbitrageurs. Stulz (2007, p.180) suggests that "hedge funds seek inefficiencies in the capital markets and attempt to

correct them, they can play a valuable role in financial markets by bringing security prices closer to fundamental values." In comparison with other institutions such as mutual funds, he further argues that less regulation and the extensive use of short-sales and derivatives allow hedge funds to eliminate mispricing more forcefully. Kokkonen and Suominen (2012) provide direct evidence that hedge fund investment reduces mispricing and improves stock market efficiency. The stock market in the last decade is marked by a proliferation of hedge funds. In his AFA presidential address, Ken French (2008) shows that total assets managed by hedge funds grow from $38.9 billion in 1991 to $1,464.5 billion in 2007. It grows further to $2,800 billion by the second quarter of 2014, according to a recent report by Hedge Fund Research.[17] We follow a recent study by Agarwal, Jiang, Tang, and Yang (2013) to classify hedge funds holding (HF) from 13F filings.[18] The median HF of CRSP stocks was nil before 1990s and has increased to above 10% in most of the past decade. In our event samples, as shown in Panel A of Table 3, the median HF from the early to the later samples has increased from 3.25% to 11.63% for repurchases, and from 2.47% to 9.98% for SEOs.[19]

As a result, relative to the early period, sophisticated institutional investors, including hedge funds, are more likely to be the marginal investors in the later period whose investment activities determine the price of our event stocks. They could improve pricing efficiency in two ways: (1) an event stock with high institutional ownership has a low chance to be mispriced in the first place, and (2) in case mispricing still occurs to the stock, institutional investors are more effective in identifying it and arbitraging it away.

In addition to the increase in the number of arbitrageurs, the market also becomes more favorable for arbitrage activities. Trading costs, a significant limit of arbitrage, have been declining during this time period.[20] In particular, the SEC ordered all U.S. stock markets to use decimalization in price quotes since April 2001. This regulatory change significantly reduces trading costs and improves market quality (Bessembinder, 2003), and institutional investors benefit most significantly (Chakravarty, Panchapagesan, and Wood, 2005). Lower trading costs imply an improvement in stock liquidity. Liquidity stimulates arbitrage activity, which, in turn, enhances pricing efficiency (Chordia, Roll, and Subramanyam, 2008).

Further, the advent of new technology has allowed institutions to execute automated algorithmic trading. Algorithmic trading, although just started in the mid-1990s, has grown to be responsible for 60-70% of the total trading volume of U.S. stocks in the recent years.[21] Recent studies suggest that algorithmic trading is important in shaping the stock market. Hendershott, Jones, and Menkveld (2011), Brogaard, Hendershott, and Riordan (2013), and Boehmer, Fong, and Wu (2013) provide

[17] See "HFR Hedge Fund Industry Reports – Second Quarter 2014". www.hedgefundresearch.com
[18] We are grateful to the authors for sharing their classification data.
[19] The time-series median IO and HF for CRSP stocks and the event stocks are available from the authors.
[20] See Chordia, Roll, and Subramanyam (2005), Brennan, Chordia, Subramanyam, and Tong (2012) for evidence of declining bid-ask spreads, price impact of transactions, Amihud's (2002) illiquidity ratio and increasing turnover ratios. French (2008) provides a comprehensive survey of stock trading costs.
[21] See "SEC runs eye over high-speed trading," *Financial Times*, July 29, 2009.

evidence that algorithmic trading substantially improves liquidity, facilitates hedging, and makes stock prices more efficient. Chordia, Roll, and Subramanyam (2011) show that, as a result of the lower cost and the improved technology, stock-trading activity explodes in recent years and the upswing is primarily contributed by institutional investors. More institutional trading makes stock pricing more efficient: intraday volatility has decreased and stock prices conform more closely to random walks. This is also confirmed in our event sample. As reported in Table 3 Panel A, liquidity, as measured by the Amihud's (2002) ratio, and the variance ratio (measured as the ratio of per hour open-to-close stock return variance to close-to-open stock return variance during the 12 months prior to the event announcement), as proposed in French and Roll (1986) to capture how effective a stock price incorporates information, both improve substantially from the early to the later samples.

Financial analysts are well known for producing information and facilitating information transfer. The number of analysts following a stock is frequently used as a measure of information transparency and an opaque and uncertain information environment deters arbitrage (e.g., Zhang, 2006). We find this metric also improves significantly for our event stocks using analyst coverage information from I/B/E/S. In the early sample, only 56% of the repurchase stocks and 40% of the SEO stocks are covered by analysts. The percentage of coverage increases to 88% in the later sample for both types of event stocks. The median number of analysts following from the early to the later samples increases from one to seven for the repurchases and from zero to four for the SEOs.

4.2. The Relation Between Market Environment and the Long-Run Abnormal Returns

In this section, we investigate whether the changing market environment for event stocks, as discussed above, plays a role in the disappearance of abnormal performance following corporate stock transactions. Specifically, we examine if the increase in institutional holding, hedge fund ownership, stock liquidity, number of analysts following, and pricing efficiency is associated with the disappearance of long-run abnormal returns for the events in the past decade.

We adopt two empirical strategies for the test. For the first one, we classify our event sample into two groups based on whether the stock's pre-event characteristics, such as institutional ownership (IO), are above or below the full sample median. By construction, half of the event stocks are in the high characteristic group and the other half in the low group. We then examine if the distribution of sample stocks in the high and low characteristic groups varies between the early and later samples, and how the long-run abnormal returns differ between the high and low characteristic groups. Taking IO as an illustration, 62% (38%) of the repurchasing stocks in the early sample have IO below (above) the full sample median; in contrast, in the later sample, 25% (75%) of the repurchasing stocks have IO below (above) the same benchmark. For the SEOs, 56% of the SEOs in the early sample have IO below the full sample median while only 34% of the later SEOs have IO below the median.

Panel B of Table 3 presents the long-run abnormal returns in a two-by-two matrix, respectively for the low- and high-IO groups, and for the early and later samples.[22] The results send a clear message: High IO mitigates abnormal performance of event stocks. The long-run abnormal returns of stocks in the high-IO group, both for the early and later samples, and both for the repurchases and SEOs, are significantly lower than those in the low-IO group. Events that incur the most significant abnormal returns are in the low-IO group of the early sample. Since 62% (56%) of the repurchasing (SEO) firms are in this group, they tend to dominate in the early sample and produce positive (negative) abnormal returns following repurchases (SEOs). In contrast, in the later sample, 75% (66%) of the repurchasing (SEO) firms have high IO and these firms incur neither outperformance nor underperformance following these two events. They dominate in the later sample and produce no long-run abnormal performance.

We perform similar analysis based on the other four characteristics. In the early sample, 64% of the repurchase stocks and 60% of the SEO stocks are in the low HF group, while in the later sample, only 21% of the repurchase stocks and 24% of the SEO stocks are in the low HF group. The long-run abnormal return results, presented in Panel B of Table 3, are similar to those based on IO. In particular, abnormal performance is absent in the high HF group of both the early and later samples, and is most significant in the low HF group of the early sample. The evidence supports that the increasing hedge fund investments in the last decade mitigate abnormal performance following corporate stock transactions.

Examinations based on the liquidity ratio, the number of analysts following, and the variance ratio yield consistent results as shown in Panel B of Table 3. The majority of the event stocks in the early sample are relatively less liquid, followed by fewer analysts, and less effective in incorporating information into prices as suggested by the low variance ratios. The abnormal returns are most significant in these stocks. In contrast, the majority of the later sample is characterized by better liquidity, more analyst following, and higher variance ratios.

Above we have shown that various factors related to pricing efficiency help to explain the disappearing long-run abnormal returns, but these factors are potentially related to firm characteristics. For example, stocks with larger market capitalization are generally more liquid and held more by institutions. In other words, these pricing efficiency factors could also capture firm characteristics that are potentially related to long-run abnormal returns. In our second empirical strategy, we address this by multiple regressions of the buy-and-hold abnormal returns (BHAR) on the variables of pricing efficiency after controlling for other firm characteristics. Due to the different nature of abnormal

[22] For brevity, we tabulate the return results based on the equal-weighted calendar-time portfolio approach only. The results (available from the authors) hold similarly across other estimation methods of long-run abnormal returns.

return estimation, we can only perform multiple regressions on BHARs (the other two abnormal return measures are estimated on the basis of calendar month portfolio or event month portfolio, hence we do not have one estimate for each individual stock to be used in regressions).

The regression results are reported in Table 4. High institutional ownership, high hedge fund ownership, better liquidity, more analysts following, and high variance ratio are shown to mitigate the post-event long-run abnormal returns even after controlling for various firm characteristics. Bessembinder and Zhang (2013) suggests that long-run BHAR could be associated with event firms' characteristics other than size and B/M, in particular, prior returns, volatility of returns, and capital investment.[23] We control for these firm characteristics in regressions. We find that factors related to better pricing efficiency are associated with significant reductions in both the positive abnormal performance following repurchases and the negative abnormal performance following SEOs. Moreover, the economic significance is substantial. For example, one standard deviation increase in institutional ownership (hedge fund ownership) is associated with a reduction of 3.56% (3.75%) BHAR for repurchases and an increase of 7.40% (5.95%) BHAR for SEOs.[24] Overall, the evidence lends support to the impact of the changes in market environment and pricing efficiency on the disappearing abnormal performance.

5. The Changing Corporate Behavior in the Changing Market

The findings of significant long-run abnormal returns have spurred much research interest in event firm behavior. As we discussed earlier, event firm market timing is proposed as a popular explanation for the post-event abnormal return performance.[25] Consistent with this view, Loughran and Ritter (1997) find significant deterioration in operating performance following SEOs. Firms issue equity before their poor operating performance gets revealed to the market and the price drops. Some studies even argue that firms' timing behavior could be more proactive – firms mislead investors by manipulating earnings and information disclosure prior to the event. In this section we investigate if event firms have changed behavior in the past decade, perhaps in response to the changing market and regulatory environment. Besides the external market factors, internal firm factors, such as event motivation and corporate behavior, could also be important in understanding the disappearance of abnormal returns.

5.1. Earnings and Information Flow Manipulation Prior to the Events

[23] Bessembinder and Zhang (2013) show that long-run abnormal returns following SEOs in the 1980 to 2005 period can be explained by controlling for differences between event and control firms in terms of characteristics such as idiosyncratic volatility, prior returns, and illiquidity. However, as they note, their study does not directly address market efficiency, since they explain event firm abnormal returns on the basis of market-wide return regularities, including momentum and the idiosyncratic volatility puzzle that are not themselves well understood.

[24] Note that, as shown in Table 1, the overall sample BHARs for repurchase and SEO stocks are 6.09% and -19.73%, respectively. Also, one standard deviation increase in stock liquidity (variance ratio) is associated with a reduction of 5.21% (4.03%) BHAR for repurchases and an increase of 5.10% (6.45%) BHAR for SEOs.

[25] See, for example, Loughran and Ritter (1995), Kim and Weisbach (2008), and Peyer and Vermaelen (2009), Bolton, Chen, and Wang (2013), among others.

Existing studies suggest that firms manage earnings to mislead investors and influence stock price before SEOs and repurchases. In particular, Teoh, Welch, and Wong (1998) show that SEO firms inflate discretionary accounting accruals to report higher earnings prior to the offering and the inflated accruals are negatively related to the post-SEO long-run abnormal returns. Gong, Louis, and Sun (2008) find that repurchase firms, in contrast, understate discretionary accruals to manage earnings downward before the event. Similar to SEO firms, the abnormal accruals before repurchases are negatively related to subsequent stock returns. Both studies conclude that the post-event abnormal returns are, at least partly, attributed to investors being misled by event firm earnings manipulation.

The SEC passed the Sarbanes-Oxley Act (SOX) in April 2002. The law promulgates the independence and oversight of audit committee and strengthens corporate governance, rendering earnings manipulation under tighter scrutiny. Cohen, Dey, and Lys (2008) find that accrual-based earnings management has generally declined after the SOX. We investigate if this is particularly true for our event firms. We measure earnings management by industry-performance-adjusted abnormal accruals, as in Gong, Louis, and Sun (2008) and detailed in the Appendix. Panel A of Table 5 presents the mean and median abnormal accruals in the two quarters before the event. We confirm Teoh, Welch, and Wong (1998) and Gong, Louis, and Sun (2008) that, in the early sample, SEO firms manage earnings upward and repurchase firms manage earnings downward prior to the event. In the later sample, however, we do not find evidence of earnings management. The only number that is statistically significant (i.e., the mean abnormal accruals of SEOs) in the later sample has the opposite sign to the earning management hypothesis. Since earnings management is shown in previous studies to be responsible for the post-event abnormal returns, firms' refraining from this old practice after the SOX contributes to the disappearance of abnormal returns.

Brockman, Khurana, and Martin (2008) find that managers increase both the frequency and the magnitude of bad news announcements in the month before repurchasing shares. Such a manipulation of information flows depresses stock price before the repurchase. We examine if this practice has changed for the recent repurchases. Following Brockman, Khurana, and Martin (2008), we examine management voluntary forecasts of annual earnings per share (EPS), obtained from First Call, in the month prior to the announcement. We classify a management forecast as good (bad) news if the three-day cumulative abnormal return, CAR(-1, 1), is positive (negative); the magnitude of CAR measures the how good (bad) the news is. The results, reported in Panel B of Table 5, suggest that repurchase firms are indeed more likely to report bad news before the event. The null for the likelihood of reporting bad news should be 50%. If we compare across the early and the later samples, this likelihood reduces, from 17% above the null to 10% above the null; the magnitude of bad news also reduces by half. The reductions are thus significant both statistically and economically. The evidence suggests that recent repurchase firms are less involved in information flow manipulation, which in turn improves the information environment and mitigates the occurrence of post-event abnormal returns.

We find weaker evidence of information flow manipulation prior to SEOs. Issuers tend to report more good news than bad news before the SEO, but the economic magnitude is not large.

5.2. Do Event Firms Time the Market Less?

Literature suggests that managers learn information from the market in making corporate investment decisions (Luo, 2005; Chen, Goldstein, and Jiang, 2007; Edmans, Goldstein, and Jiang, 2012; Bond, Edmans, and Goldstein, 2013). If stock pricing becomes more efficient, as manifested by the increased presence of sophisticated arbitragers, reduced trading costs, more analysts following, improved liquidity, and more efficient incorporation of information into prices, an interesting question is whether firms react to the changes in market environment by timing the market less.

Market timing is a popular explanation for the repurchase and SEO decisions and the subsequent long-run abnormal returns. Under the market timing hypothesis, stocks are assumed to be mispriced from time to time. Firms time the market by selling new shares when overpriced and buying back stocks when undervalued. If stock prices reflect firm fundamental value more closely and timely, the chance of mispricing diminishes, so does the opportunity to exploit mispricing. As a result, recent events might be motivated by other reasons than to exploit mispricing. The firms are expected to exhibit less of the market-timer characteristics than those in the early years.

Existing evidence to support the market-timing hypothesis includes: (1) repurchasing (SEO) firms are often under- (over-) valued at the time of announcement, as indicated by their inordinately high (low) book-to-market equity ratio (B/M); and (2) repurchasing (SEO) firms tend to have abnormally poor (superior) returns in the year before the announcement, triggering the event decisions. It is appealing to infer mispricing from B/M and prior stock return. Market value of equity being the denominator, B/M is expected to be abnormally high (low) for an undervalued (overvalued) firm. Mispricing, often regarded as "the window of opportunity", is more of a transient phenomenon. Hence, an undervalued (overvalued) firm might have incurred abnormally low (high) returns in the preceding period. Peyer and Vermaelen (2009) show that the prior-year return predicts future abnormal returns of repurchasing stocks and interpret it as evidence of market-timing. We investigate whether these two patterns, established in the prior literature, have changed in the later sample.

We compare B/M and the prior 12-month return of the event firms against their contemporaneous Fama-French industry median. Table 6 presents the average industry-adjusted characteristics respectively for the early and later subsamples. Results can be summarized as follows. In the early sample, repurchase firms on average have a significantly higher B/M ratio than their industry median before the announcement, suggesting undervaluation a possible trigger for the events. This pattern remains in the later sample for the mean B/M but not for the median. The lack of evidence for the median itself suggests that recent repurchase firms are not undervalued relative to their industry peers. If we compare the early sample with the later sample, the mean difference in the industry-adjusted B/M decreases substantially, from 0.137 to 0.063, and the drop is statistically significant at the 1%

level. The prior 12-month returns yield consistent results. In the early sample, repurchase firms incur 10% more negative return in the year before the announcement than their contemporaneous industry return, indicating potential undervaluation. In contrast, repurchase firms in the later sample achieve returns similar to their industry peers in the prior year. The overall evidence suggests that fewer repurchases in recent years than those in the early years are motivated by market timing, since they do not seem as undervalued as before in the first place.

The evidence on SEOs points to a similar conclusion: Fewer of the recent SEOs are carried out to time the market. We find that, although SEO firms generally have lower B/M ratios and higher prior returns than their industry peers, the differences reduce significantly for the recent SEOs. Compared with SEO firms in the early years, recent SEO firms have significantly higher B/M ratios and lower prior returns. Stock overvaluation and market timing might still trigger some SEOs; nevertheless, they become less important compared to the early years.

Although B/M and prior return are indicative of mispricing, they are also used as measures of firm investment opportunities. New investment opportunities increase stock price and reduce the B/M ratio. This is particularly true for SEO firms (Carlson, Fisher, and Giammarino, 2006). We take two actions to address this potential confounding effect. First, we control the investment opportunities component of the ratio. Rhodes–Kropf, Robinson, and Viswanathan (2005) propose a way to decompose a firm's log M/B equity ratio into a component of growth opportunities and another component of (firm-level and industry-wide) mispricing, $Log\left(\frac{M}{B}\right) = Log\left(\frac{M}{V}\right) + Log\left(\frac{V}{B}\right)$. *V* stands for the unobservable intrinsic value of equity. Based on the residual income model in accounting, Rhodes–Kropf, et al. assume that *V* is a linear function of the firm's book value of equity, net income, and leverage, and thus can be estimated with the fitted value in regressions. $Log\left(\frac{M}{V}\right)$, therefore, measures equity mispricing after controlling growth opportunities ($Log\left(\frac{V}{B}\right)$).

We follow Rhodes-Kropf et al. to estimate $Log\left(\frac{M}{V}\right)$ for our event stocks prior to the announcement (the empirical procedure is described in the Appendix). The estimated results are also reported in Table 6, respectively for the early and later event samples. A positive (negative) $Log\left(\frac{M}{V}\right)$ implies overvaluation (undervaluation). We find that, based on this measure, repurchase stocks in the early sample are not significantly under- or over-valued; but repurchase stocks in the later sample are significantly overpriced prior to the announcement. The evidence does not support market-timing as a primary motive for repurchases, and much less so in the later sample. The estimates for SEO stocks prior to the offering are significantly positive for both the early and the later samples, suggesting a high chance of overvaluation for SEO stocks. However, the magnitude of mispricing is significantly smaller for the later sample. We therefore argue that if market-timing is a primary motive

for SEOs in the early sample, it becomes less so in the later sample. In general, the results are qualitatively consistent with those based on the industry-median adjusted ratios.

Second, we examine the ratio of R&D expenses to Assets (RD/A). This ratio is also used to measure a firm's investment opportunities (e.g., Smith and Watts, 1992) and it does not involve stock price (so mispricing-purged). Thus, investigation on this variable helps to disentangle if our evidence on the changes in B/M and prior return reflects changes in investment opportunities or changes in mispricing for the event stocks. If the former is true, we expect to observe a consistent pattern of change in RD/A from the early to the later samples, that is, there would be an increase in RD/A for repurchase firms and a decrease in RD/A for SEO firms. The results are reported in Table 6. In general, repurchase firms tend to have a lower RD/A ratio than their industry median but SEO firms have a higher ratio than their industry median. However, if we compare between the early and later samples, the pattern of RD/A goes the opposite to those of B/M and prior return if they are meant to capture more of investment opportunities. We thus argue that the *changes* in B/M and prior return across the early and later samples reflect more of the *changes* in mispricing of the event stocks.

We further examine several other variables that are used in previous studies to suggest repurchases and SEOs as market-timing tools. First, we investigate the change in investment recommendation made by financial analysts prior to repurchase and SEO announcement. Peyer and Vermaelen (2009) find that, in a sample of repurchases before 2002, analysts are often disappointed by earnings and downgrade these firms in investment recommendation. Firms take advantage of the excess pessimism by repurchasing undervalued shares. Similarly, SEOs could be issuing firms' opportunistic reaction to analysts' over optimism. We extend the analysis into the recent sample. I/B/E/S collects analyst recommendations and maintains a standard scheme of recommendation scores (Thomson Reuters standardized 5-point scale), that is, 1 for strong buy, 2 for buy, 3 for hold, 4 for underperform, and 5 for sell. Changes in analyst recommendation are measured as changes in the average recommendation scores from the 12th month before to the month before the announcement. A positive (negative) change means downgrade (upgrade) in investment recommendation. We compare the score change between the early and the later samples and present the results in Table 6. Consistent with Peyer and Vermaelen (2009), repurchases in the early sample are often preceded by analyst downgrade. However, this pattern disappears in the later sample; no significant change is found in analyst recommendation before the announcement. Similarly, firms tend to conduct SEOs following analyst optimistic recommendation in the early period, but not any more in the recent decade. Overall, the evidence indicates that corporate stock transactions after 2002 are less likely to time analysts' pessimism or optimism than they were before.

Second, we compare insider trading prior to the SEOs in the early and later samples. Clarke, Dunbar, and Kahle (2001) find that insider selling increases prior to SEOs and it predicts the post-SEO long-run abnormal returns. They interpret the evidence as insiders exploiting market overvaluation in

the SEO decisions. If recent events are less motivated by market timing, as argued above, we expect to observe weaker evidence of insider trading in the later sample. Following Clarke, et al. (2001), we define insider net sales in the year before the SEO announcement as the monthly average sales minus purchases denominated by shares outstanding. Insiders' abnormal net sales is defined as actual net sales minus expected net sales, which is the monthly average net sales from the 48th month to the 13th month before the announcement. Insider trading data are from Thomson Reuters Insider Filings. The results reported in Table 6 suggest that insider trading behavior also changes in the recent decade. Specifically, insiders sell shares before the early SEOs but not so in the recent period. This is consistent with recent SEOs less motivated by market timing incentives. For repurchases, we find that insiders are net sellers prior to the announcement both in the early and later samples. Bonaime and Ryngaert (2013) argue that insider trading is not informative of whether repurchases are motivated by undervaluation.

We examine one additional variable that is also indicative of SEO firms' market-timing incentives. SEO firms may offer both primary and secondary shares. Unlike new primary shares, secondary shares are pre-owned often by large shareholders. Many of them are insiders or have access to insider information. If an SEO is to time the market, Kim and Weisbach (2008) argue that the fraction of secondary shares offered in the total issuance would be higher. They find that the fraction of secondary shares is positively related to the issuer's valuation. If recent SEOs are less driven by market timing, we expect to observe declines in both frequency and size (relative to the total issuance) of secondary offerings. The results presented in Table 6 confirm this hypothesis.

In addition to the univariate analysis on the event firm market-timing characteristics, we examine how firms' market-timing incentives affect their repurchase/SEO decisions in a multivariate framework analysis. In particular, we run logit regressions for all Compustat industrial firms to assess whether a firm's SEO and repurchase decisions are related to its B/M ratio, prior 12-month return, and future three-year return. The market-timing hypothesis predicts that the SEO decision is positively related to the prior excess return and negatively related to the B/M ratio and future excess return; the opposite is expected for repurchase decisions. DeAngelo, DeAngelo, and Stulz (2010) use this method to assess the market-timing motivation of SEOs. For our research purpose, we augment their method by including a post-2002 dummy and interact it with the three market-timing incentive variables in the regression. If recent repurchases/SEOs are less likely to be triggered by market-timing incentives, we expect the coefficients of these variables to decrease in magnitude. While we confirm the significance of these variables in explaining event decisions in the early sample, as the market timing hypothesis suggests, the evidence weakens or even disappears in the later sample. The interactions of these variables with the post-2002 dummy yield significant coefficient estimates with opposite signs. The results (not tabulated for brevity) confirm that market timing, as a motivation for corporate stock transactions, becomes less important in the most recent decade.

Long-run abnormal returns following repurchases and SEOs are more significant in small firms (Brav, Geczy, and Gompers, 2000; Peyer and Vermaelen, 2009). It is necessary to examine if the disappearance of long-run abnormal returns in the recent decade is a result of increasing size of event firms. Gao, Ritter, and Zhu (2013) find that the post-IPO underperformance disappears after 2000. They ascribe it to a significant change in the composition of IPO firms – small IPOs, responsible primarily for the return underperformance in the early sample, largely vanish after 2000. We compare market capitalization (ME) of the event firms against their contemporaneous industry median. ME, in logarithm, is measured as of the month end before the announcement, adjusted by the Consumer Price Index (CPI) to December 2002 dollars. As shown in Table 6, both repurchase and SEO firms in the early sample appear to be larger than their industry medians. This size dominance persists for repurchase firms in the later period but disappears for the later SEO firms, suggesting that an increasing number of small firms conduct SEOs in the recent years.[26] Since mispricing is more likely to occur in small firms, the fact that repurchase firms remain large in size and, unlike IPOs, SEO firms decrease in average size does not explain the disappearance of long-run abnormal returns.

5.3. What Else Motivates Recent Repurchases and SEOs?

If recent repurchases and SEOs are less motivated by market-timing incentives, what else could drive the decision of these events? Are the different motivations related to the disappearance of abnormal returns?

Share repurchases, together with dividends, are the two primary ways of corporate payout. Firms prefer repurchase to dividend when financial flexibility is in need (e.g., Guay and Harford, 2000; Jagannathan, Stephens, and Weisbach, 2000). The more recent literature suggests that repurchases are increasingly used in place of dividends in payout (e.g., Grullon and Michaely, 2002; Skinner, 2008).[27] To see how repurchases are used recently more often as a regular payout mode (instead of a market-timing tool), we examine the proportion of repurchase in cash distribution, the frequency of repurchases conducted by event firms in the past five years and the completion rate of the announced repurchase programs in the following two years. We also examine repurchase firms' cash flow volatility, non-operating cash flows, and interest coverage ratio prior to the event. Guay and Harford (2000) and Jagannathan, Stephens, and Weisbach (2000) suggest that repurchases, relative to dividends, are preferred by firms with high cash flow volatility and high non-operating cash flows. Bolton, Chen, and Wang (2013) also highlight the impact of financial condition on corporate repurchase decisions. If repurchases are used in recent years more as a regular method to pay out, we expect firms to conduct repurchases more frequently and have higher completion rates of their

[26] Further analysis confirms that an increasing number of small firms conduct SEOs after the 2008 financial crisis. However, excluding events or event returns during the financial crisis period (09/2008 – 06/2009) does not drive the disappearance of long-run abnormal returns.

[27] See Huang and Thakor (2013) for an explanation of share repurchases being used for strategic purpose.

announced programs. Moreover, these firms might carry features of past dividend payers such as high interest coverage ratio and are not limited to those with high cash flow volatility and high non-operating cash flows.

The results, presented in Table 7, are consistent with recent repurchases being more of a regular payout mode. In our early period, the percentage of firms using repurchases, among firms with positive payout, is 56%; this percentage increases to 72% during 2003-2012. If measured by dollar amount, the percentage of dollars paid out through repurchases is 42% in the early period and 61% in the later period. The median firm in the later sample conducts repurchases three times during the past five years, while the median firm in the early sample only conducts once over the past five years. The median firm in the later sample fully completes the announced repurchase program within two years following the announcement, while the median firm in the early sample completes less than two-thirds of the program. Relative to those in the early sample, recent repurchase firms have lower cash flow volatility, lower non-operating income, and higher interest coverage ratio. The differences in these variables are all statistically significant. Overall, repurchases are more frequently used to distribute persistent cash flows in the later sample.

Loughran and Ritter (1997) show that the operating performance of SEO firms improves prior to the offering and then deteriorates significantly after the offering, mimicking the return pattern surrounding SEOs. They interpret the evidence as consistent with the market timing hypothesis. Firms conduct SEOs at the peak of its operating performance and investors extrapolate future earnings from the past value. Besides market-timing, SEOs could be motivated to raise investment capital (Kim and Weisbach, 2008) or to solve near-term financial needs (DeAngelo, DeAngelo, and Stulz, 2010). If firms have productive operating reasons for SEOs, we expect to observe improvement, at least not deterioration, in operating performance after the offering.

Table 8 presents the operating performance from three years before to three years after the SEO, respectively for the early sample (Panel A) and the later sample (Panel B). Operating performance is measured by four variables: the ratio of operating income before depreciation to assets (OIBDP/A), the ratio of net income to assets (ROA), the ratio of operating income before depreciation to sales (OIBDP/Sales), and the ratio of net income to sales (Profit Margin), permuting two sets of numerators (OIBDP, Net Income) and two sets of denominators (Total Assets, Sales). We confirm the main findings of Loughran and Ritter (1997) in the early sample that operating performance improves before and then deteriorates subsequent to the offering. The pattern changes for the later sample. Compared with the performance measures in the year before the offering, all four measures of operating performance improve significantly in the three years following the offering. We explore two plausible uses of the proceeds – saving cash or increasing capital expenditure, and find that, for the early sample, the cash to assets ratio increases and the capital expenditure to assets ratio decreases

significantly from year -1 to +3. In contrast, for the later sample, the cash ratio decreases significantly and the capital expenditure ratio remains the same during the same time span. Note that the denominator, total assets, increases after the SEO (as shown in the last column). The evidence thus suggests that, compared with the early SEOs, recent SEOs are conducted more for investment capital than to increase cash balance. Recall in Table 6, we show that recent SEO firms also have higher RD/A – more growth opportunities – before the offering. Overall, we argue that recent SEOs are motivated for more productive uses of the proceeds, as confirmed by their improved operating performance following the SEOs.[28]

Last but not least, we examine the announcement returns of these two events. Our findings also suggest that the events in the early and later samples are motivated by different reasons. If stock pricing becomes more efficient in the later period but the event firms, similar to those in the early sample, are motivated by mispricing and market-timing, we should expect to observe announcement returns in a much larger magnitude together with the disappearance of long-run abnormal returns. In other words, investors correct the mispricing fully at the announcement (no underreaction) so that there is no long-run abnormal performance. In contrast, if recent event firms are not primarily motivated by mispricing and market-timing, we expect to observe smaller announcement returns since the signaling of mispricing is less and the events are driven by more productive operating reasons. We estimate the five-day (-2, +2) cumulative abnormal returns (CARs) around the announcement date for repurchasing and SEO firms, using the conventional market model with the CRSP value-weighted return as the market portfolio, $R_{it} = \alpha_i + \beta_i R_{Mt} + \varepsilon_t$. The parameters of the market model, alpha and beta, are estimated based on the daily returns from day -365 to day -60 relative to the announcement date. Abnormal returns are the difference between the realized return and the fitted expected return, accumulated over the announcement window. The mean CAR for repurchase stocks is 2.91% in the early sample and 1.78% in the later sample. The mean CAR for SEO stocks is -2.69% in the early sample and -1.99% in the later sample. They are all statistically significant at the 1% level. We confirm the literature that the announcement returns are significantly positive for repurchases and negative for SEOs. The magnitude of the announcement returns, however, reduces from the early to the later samples. The reductions are also statistically significant at the 1% level for both events.

To summarize, in addition to external market factors suggesting more effective arbitrage, event motivations and event firm characteristics and behavior also contribute to the disappearance of the post-event abnormal returns. Recent event firms exhibit less opportunistic behavior in stock repurchases and offerings and the events are conducted more for reasons of business operation than for

[28] We similarly examine the operating performance of repurchase firms and find significant declines in both the early and later samples. Our findings are consistent with Grullon and Michaely (2004). They interpret the evidence as a support for firms' motivation for repurchases being paying out excess cash in the anticipation of fewer growth opportunities to mitigate the agency problem of free cash flows.

exploiting mispricing. The differences in multiple aspects between the early and later event firms challenge the fundamental rationale behind the persistence of long-run abnormal returns.

6. Conclusion

Early studies document significant stock return outperformance following repurchases and underperformance following SEOs. The findings of long-run abnormal returns are often used to imply stock mispricing and event firm opportunistic market timing. We find that the long-run abnormal returns are absent for these two events in the most recent decade. The disappearance of abnormal performance is robust to the choice of asset pricing models and other methodological issues.

The disappearance is consistent with an improvement in pricing efficiency of event stocks. Compared with event stocks in the early period, recent event stocks are held and traded more by institutions and hedge funds, are followed by more financial analysts (i.e., more transparent in information), and are more liquid and less costly to trade. In addition to these external market factors, internal firm factors also contribute to the disappearance of abnormal returns. Due to enhanced regulations, recent event firms refrain from manipulating earnings and information disclosure to mislead investors. Recent events are less motivated for the purpose of market-timing; instead, they seem motivated more for business operating reasons. Repurchases are carried out as a regular corporate payout tool and SEOs are conducted to raise investment capital and to improve the issuer's operating performance.

Our study challenges the persistence of long-run abnormal returns and any static view on market efficiency. In addition, we explore the implications of pricing efficiency dynamics on corporate decisions. Investors, firms, and the market itself interact and evolve over time. The dynamics exert important influence on both asset pricing and corporate behavior.

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Table 1 Long-Run Abnormal Returns Following Stock Repurchases and SEOs

This table reports the event firm abnormal returns in 36 months following the announcement of stock repurchases (in Panel A) and seasoned equity offerings (in Panel B). Long-run abnormal returns, presented in four columns, are estimated respectively using three methods: (1) the calendar-time portfolio approach, respectively using equal-weighted and value-weighted portfolio returns; (2) Ibbotson's (1975) return across time and securities (IRATS); and (3) the buy-and-hold abnormal return (BHAR) relative to control firms matched on size, B/M, and momentum. Abnormal returns are estimated for the full sample, i.e., 1984-2012 for repurchases and 1980-2012 for SEOs, as well as separately for the early sample (ending in 2002) and the later sample (2003-2012). Statistical significance of the abnormal returns, denoted by *, **, and ***, corresponds to the significance levels of 10%, 5%, and 1%, respectively. The associated *t*-statistics are reported in parentheses. The last column reports the number (and the percentage) of event observations in each sample period.

Panel A: Long-run abnormal returns following stock repurchases

Sample Period	Calendar-Time		IRATS	BHAR	N (%)
	Equal-weighted	Value-weighted			
1984-2012	7.92%***	4.68%*	10.12%***	6.09%***	14309 (100%)
	(2.89)	(1.85)	(12.87)	(5.29)	
1984-2002	7.96%**	7.20%**	14.74%***	9.15%***	9657 (67.5%)
	(2.20)	(2.09)	(15.32)	(6.32)	
2003-2012	5.32%	-1.80%	-2.94%**	-2.52%	4652 (32.5%)
	(1.45)	(-0.43)	(-2.14)	(-1.55)	

Panel B: Long-run abnormal returns following SEOs

Sample Period	Calendar-Time		IRATS	BHAR	N (%)
	Equal-weighted	Value-weighted			
1980-2012	-17.28%***	-13.32%**	-18.09%***	-19.73%***	6739 (100%)
	(-3.64)	(-2.34)	(-13.09)	(-10.99)	
1980-2002	-20.88%***	-16.20%**	-19.82%***	-23.26%***	4913 (72.9%)
	(-3.84)	(-2.22)	(-12.00)	(-11.21)	
2003-2012	-5.04%	-0.36%	-6.15%**	-6.18%	1826 (27.1%)
	(-0.57)	(-0.02)	(-2.12)	(-1.59)	

Table 2 Net Equity Issuance and Future Stock Returns in the Cross-Section

This table reports the results from Fama-MacBeth cross-sectional regressions of monthly stock returns on net equity issuances, respectively for the early period, 1980-2002, and the later period, 2003-2012. The sample includes all stocks traded in NYSE, AMEX and NASDAQ. The empirical methods follow Pontiff and Woodgate (2008). The dependent variable is stock returns at month t. Net equity issuance is measured for two time periods: PW-ISSUE = log(Share outstanding, t-6) – log(Share outstanding, t-17); DT-ISSUE = log(Share outstanding, t-6) – log(Share outstanding, t-65). Lagging net equity issuance by six months is to allow information of issuance fully revealed to the market. DT-Dum is a dummy variable equals one if share outstanding exists at t-65 (and thus DT-ISSUE exists), and zero otherwise. The impact of stock dividends and splits on shares outstanding are adjusted as in Pontiff and Woodgate (2008) not to affect the issuance measures. Other control variables include the natural logarithm of market capitalization at t-6 (ME), the natural logarithm of the book-to-market equity ratio in the previous fiscal year (B/M), a book-to-market dummy variable (BM-Dum) that equals one if B/M is not missing and zero otherwise, and the past six-month return from t-2 to t-7 as a proxy for return momentum (MOM). The table reports the time-series average coefficient estimates from the monthly cross-sectional regressions. The associated t-statistics are reported in parentheses, evaluated based on the standard error of the time-series estimates. Statistical significance, denoted by *, **, and ***, corresponds to the significance levels of 10%, 5%, and 1%, respectively.

Sample period	PW-ISSUE	DT-ISSUE	DT-Dum	ME	B/M	BM-Dum	MOM	Avg.R^2
	-1.56***							0.26
	(-5.61)							
Early period:		-0.58***	-0.68***					0.61
1980-2002		(-4.35)	(-3.87)					
	-1.01***	-0.26***	-0.46***	-0.20***	0.16**	0.38***	0.60**	2.91
	(-5.75)	(-2.84)	(-4.87)	(-3.44)	(2.16)	(3.56)	(2.12)	
	-0.53***							0.09
	(-3.38)							
Later period:		-0.20	-0.25*					0.33
2003-2012		(-1.56)	(-1.81)					
	-0.32***	-0.15	-0.20	-0.13**	0.05	0.19	-0.23	2.50
	(-2.95)	(-1.22)	(-1.49)	(-2.11)	(0.73)	(0.87)	(-0.40)	

Table 3 Changing Market Environment and the Long-Run Abnormal Returns

Panel A presents the mean and median (in the square brackets) institutional ownership, hedge fund ownership, liquidity ratio, number of analyst following, and variance ratio of the early and later event samples. Institutional ownership is the percentage of the event firm shares held by 13F filing institutions in aggregate relative to the total number of shares outstanding in the quarter prior to the event announcement. Hedge fund ownership is the percentage of the event firm shares held by hedge funds in aggregate relative to the total number of shares outstanding in the quarter prior to the event announcement. Liquidity is computed as in Amihud (2002); it is the average of the daily absolute return divided by the daily dollar trading volume. We then compute the 12 month average prior to the event announcement. The Amihud ratio is higher for illiquid stocks. For easy illustration, we put a negative sign of the estimated illiquidity ratio, so a higher value suggests the stock is more liquid. Number of analysts following is the number of analysts who follow the event stock as of the announcement month. Variance ratio, first proposed in French and Roll (1986), is the ratio of per hour open-to-close stock return variance to close-to-open stock return variance during the 12 month prior to the event announcement. The last column reports the mean and median differences between the later and early samples. The significance of the mean differences is tested by the *t*-test, and the significance of the median differences is tested by the Wilcoxon Kruskal-Wallis test. Statistical significance, denoted by *, **, and ***, corresponds to the significance levels of 10%, 5%, and 1%, respectively.

Based on the full sample median characteristics, we divide the early and later samples further into low and high characteristic groups. Panel B presents the long-run abnormal returns, estimated under the calendar-time approach using equal-weighted portfolio returns, respectively for the low and high characteristic groups. Statistical significance of the abnormal returns, denoted by *, **, and ***, corresponds to the significance levels of 10%, 5%, and 1%, respectively. The associated *t*-statistics are reported in parentheses. The percentage distribution of the sample events between the high and low characteristic groups are reported in the square brackets.

Panel A: Mean and median event firm characteristics related to pricing efficiency

	Full sample	Early sample	Later sample	Difference (Later – Early)
Repurchases				
Institutional Ownership	48.31%	39.52%	66.38%	26.86%***
	[48.15%]	[38.54%]	[73.65%]	[35.11%***]
Hedge Fund Ownership	7.80%	5.16%	13.23%	8.07%***
	[5.43%]	[3.25%]	[11.63%]	[8.38%***]
Liquidity Ratio	-0.533	-0.644	-0.314	0.330***
	[-0.016]	[-0.043]	[-0.002]	[0.041***]
Number of Analysts Following	5.69	3.93	9.35	5.42***
	[3.00]	[1.00]	[7.00]	[6.00***]
Variance Ratio	12.84	11.87	14.31	2.44***
	[11.83]	[10.22]	[13.64]	[3.42***]
SEOs				
Institutional Ownership	37.47%	32.62%	49.77%	17.15%***
	[32.37%]	[27.65%]	[48.69%]	[21.04%***]
Hedge Fund Ownership	6.85%	4.58%	12.64%	8.06%***
	[4.09%]	[2.47%]	[9.98%]	[7.51%***]
Liquidity Ratio	-0.548	-0.595	-0.443	0.152***
	[-0.074]	[-0.112]	[-0.028]	[0.084***]
Number of Analysts Following	3.12	2.14	5.76	3.62***
	[1.00]	[0.00]	[4.00]	[4.00***]
Variance Ratio	14.72	13.24	16.82	3.58***
	[14.08]	[12.27]	[16.35]	[4.08***]

Panel B Long-run abnormal returns in the high and low characteristic groups

	Institutional Ownership		Hedge Fund Ownership		Liquidity Ratio		Num. Analysts Following		Variance Ratio	
	Low	High	Low	High	Low	High	Low	High	Low	High
Repurchases										
Early sample	0.32%***	0.07%	0.29%***	0.16%	0.28%**	0.08%	0.36%***	0.17%	0.68%***	0.13%
	(2.77)	(0.65)	(2.65)	(1.47)	(2.43)	(0.68)	3.05	1.12	(4.24)	(0.84)
	[62.12%]	[37.88%]	[64.14%]	[35.86%]	[61.59%]	[38.41%]	[65.83%]	[34.17%]	[57.35%]	[42.65%]
Later sample	0.18%	0.11%	0.18%	0.12%	0.28%*	0.06%	0.18%	0.11%	0.23%*	0.09%
	(1.17)	(1.10)	(1.13)	(1.20)	(1.98)	(0.55)	(1.38)	(0.92)	(1.81)	(0.88)
	[24.84%]	[75.16%]	[20.65%]	[79.35%]	[26.85%]	[73.15%]	[31.00%]	[69.00%]	[38.69%]	[61.31%]
SEOs										
Early sample	-0.60%***	-0.32%**	-0.52%***	-0.23%	-0.56%***	-0.36%**	-0.61%***	-0.51%**	-0.61%***	-0.52%*
	(-2.77)	(-2.21)	(-2.82)	(-1.20)	(-3.62)	(-2.31)	(-3.30)	(-2.02)	(-2.83)	(-1.77)
	[56.24%]	[43.76%]	[60.32%]	[39.68%]	[57.10%]	[42.90%]	[80.30%]	[19.70%]	[59.29%]	[40.71%]
Later sample	-0.45%	-0.24%	-0.39%	-0.29%	-0.37%	-0.27%	-0.10%	-0.27%	0.25%	-0.38%
	(-0.98)	(-1.19)	(-0.89)	(-1.28)	(-0.61)	(-1.47)	(-0.15)	(-1.24)	(0.81)	(-1.15)
	[34.04%]	[65.96%]	[23.55%]	[76.45%]	[33.72%]	[66.28%]	[21.09%]	[78.91%]	[36.86%]	[63.14%]

Table 4 Multiple Regressions of Long-Run Abnormal Returns

This table reports regression results of long-run abnormal returns. The dependent variable is the three-year buy-and-hold abnormal return (BHAR) relative to control firms matched on size and book-to-market equity ratio. The explanatory variable of interest is the proxy for market efficiency, specifically, institutional ownership, hedge fund ownership, liquidity ratio, number of analysts following, and variance ratio. Other control variables include log(ME) (the natural logarithm of CPI-adjusted market capitalization as of the prior fiscal year end), B/M (book-to-market equity ratio, in which book value is measured at the fiscal year end prior to the event announcement and market value is measured at the month end before announcement), Cash/Assets (cash and marketable securities divided by total assets as of the prior fiscal year end), Debt/Assets (long-term debt divided by total assets as of the prior fiscal year end), EBITDA/Assets (EBITDA divided by total assets as of the prior fiscal year end), Prior return (stock return for the prior 12 months), Return volatility (standard deviation of daily returns in the prior 12 months), Post-CAPX/Assets (sum of capital expenditures for the three years subsequent to event announcement divided by total assets as of the prior fiscal year end), Proceeds/ME (announced repurchase/issuance transaction value scaled by market capitalization in the month end prior to event announcement), and industry (classified as Fama-French 49 industries) and year dummies. The associated *t*-statistics are reported in parentheses below the estimated coefficients. Statistical significance, denoted by *, **, and ***, corresponds to significance levels of 10%, 5%, and 1%, respectively.

	Institutional ownership		Hedge fund ownership		Liquidity ratio		Num. analysts following		Variance ratio	
	Repo	SEO	Repo	SEO	Repo	SEO	Repo	SEO	Repo	SEO
Pricing efficiency proxy	-0.128*	0.274***	-0.514***	0.792***	-0.006**	0.039*	-0.048**	0.032	-0.006**	0.010**
	(-1.833)	(2.667)	(-2.682)	(2.752)	(-2.321)	(1.816)	(-1.971)	(0.835)	(-2.321)	(2.294)
Log(ME)	-0.003	-0.003	-0.007	0.014	-0.002	0.009	0.007	0.010	-0.002	0.050**
	(-0.250)	(-0.121)	(-0.785)	(0.712)	(-0.218)	(0.444)	(0.522)	(0.465)	(-0.218)	(2.140)
B/M	-0.053	0.097	-0.042	0.093	-0.058	0.063	-0.062	0.083	-0.058	0.113
	(-1.144)	(1.161)	(-0.950)	(1.135)	(-1.124)	(0.749)	(-1.344)	(1.013)	(-1.124)	(1.041)
Cash/Assets	0.007	-0.242	0.033	-0.245	0.033	-0.249	0.022	-0.282*	0.033	-0.413**
	(0.046)	(-1.527)	(0.236)	(-1.543)	(0.208)	(-1.605)	(0.150)	(-1.805)	(0.208)	(-2.299)
Debt/Assets	-0.005	0.038	-0.008	0.047	-0.035	0.069	-0.007	0.048	-0.035	-0.016
	(-0.048)	(0.301)	(-0.069)	(0.368)	(-0.270)	(0.532)	(-0.059)	(0.383)	(-0.270)	(-0.097)
EBITDA/Assets	-0.181	0.110	-0.281	0.099	-0.090	0.244**	-0.197	0.152	-0.090	0.074
	(-0.977)	(1.113)	(-1.557)	(1.002)	(-0.446)	(2.420)	(-1.058)	(1.527)	(-0.446)	(0.661)
Prior return	-0.029	0.047***	-0.026	0.049***	-0.035	0.055***	-0.042	0.049***	-0.035	0.035*
	(-0.684)	(2.644)	(-0.641)	(2.797)	(-0.762)	(3.016)	(-0.989)	(2.845)	(-0.762)	(1.745)
Return volatility	0.058	-0.207*	0.147	-0.259**	0.101	-0.252**	0.109	-0.187	0.101	-0.072
	(0.542)	(-1.712)	(1.442)	(-2.204)	(0.888)	(-2.108)	(1.027)	(-1.588)	(0.888)	(-0.539)
Post-CAPX/Assets	1.004***	0.334***	1.006***	0.334***	0.950***	0.325***	1.023***	0.319***	0.950***	0.352***
	(9.102)	(5.274)	(9.249)	(5.294)	(7.321)	(4.846)	(9.352)	(5.132)	(7.321)	(4.329)
Proceeds/ME	0.604**	0.032	0.609**	-0.000	0.764**	0.108	0.571**	0.081	0.764**	0.231
	(2.395)	(0.210)	(2.469)	(-0.003)	(2.450)	(0.692)	(2.277)	(0.563)	(2.450)	(1.434)
Intercept	-0.851*	-0.141	-0.849**	-0.493	-0.504	-0.275	-0.956**	-0.409	-0.504	-0.787**
	(-1.939)	(-0.350)	(-1.986)	(-1.263)	(-1.140)	(-0.781)	(-2.132)	(-1.114)	(-1.140)	(-2.035)
N	9468	4121	9423	4102	7270	3919	9,531	4,238	7270	2513
R-squared	0.035	0.046	0.038	0.047	0.034	0.050	0.035	0.043	0.034	0.061

Table 5 Earnings and Information Flow Manipulation Prior to the Events

This table reports the industry-performance-adjusted abnormal accrual in the two quarters before the event (Panel A), and the three-day (-1, 1) cumulative abnormal returns (CAR) surrounding management voluntary earnings forecast (Panel B), respectively for events in the early and later periods. The estimation of abnormal accruals follows Gong, Louis, and Sun (2008). In particular, for each calendar quarter and two-digit SIC-code industry, we estimate the following model using all Compustat firms with data available: $TA_i = \sum_{j=1}^{4} \gamma_{j-1} Q_{j,i} + \gamma_4 \Delta Sales_i + \gamma_5 PPE_i + \gamma_6 LTA_i + \gamma_7 Assets_i + \varepsilon_i$. TA is total accruals, measured as $\Delta CA - \Delta CL - \Delta CASH + \Delta STD - DEP$, where ΔCA is change in current assets, ΔCL is change in current liabilities, $\Delta CASH$ is change in cash and marketable securities, ΔSTD is change in debt in current liabilities, and DEP is depreciation and amortization expense. Q_j is a dummy variable that equals 1 for fiscal quarter j and 0 otherwise; $\Delta Sales$ is the quarterly change in sales; PPE is property, plant, and equipment at the beginning of the quarter; LTA is the lag of total accruals; Assets is total assets at the beginning of the quarter; and ε is the regression residual. All the variables are scaled by total assets at the beginning of the quarter. The top and bottom one percent of the deflated variables are deleted to mitigate the effects of outliers and data errors. Moreover, we adjust the estimated abnormal accruals (i.e., the regression residuals) for performance. Specifically, the performance-matched abnormal accruals for a sample firm are the firm-specific abnormal accruals minus the median abnormal accruals of the portfolio matched on industry and the prior ROA. The test of information flow manipulation follows Brockman, Khurana, and Martin (2008), proxied by management voluntary forecast of earnings in the month prior to the event announcement. The three-day CAR is used to measure if the forecast is good or bad news and how good/bad it is. Prop of good news is the proportion of forecasts with positive CARs. Earning forecast data are obtained from First Call. We test the significance of means and the difference in means by *t*-test, the significance of medians by Wilcoxon signed rank test and the significance of difference in medians by Kruskal-Wallis test. Statistical significance, denoted by *, **, and ***, corresponds to significance levels of 10%, 5%, and 1%, respectively.

Panel A: Earnings management

	Early sample	Later sample	Difference (Later – Early)
Repurchases			
N	5812	2504	
Mean	-0.373%***	-0.023%	0.350%***
Median	-0.235%***	-0.012%	0.223%***
SEOs			
N	3694	1265	
Mean	1.399%***	-0.896%***	-2.295%***
Median	0.756%***	-0.002%	-0.758%***

Panel B: Information flow manipulation (Market reaction to management voluntary forecast of earnings)

	Early sample	Later sample	Difference (Later – Early)
Repurchases			
N	143	504	
Prop of good news	0.329	0.401	0.072***
Mean CAR	-0.073***	-0.033***	0.040***
Median CAR	-0.027***	-0.017***	0.010**
SEOs			
N	26	112	
Prop of good news	0.558	0.571	0.013
Mean CAR	0.019	0.007	-0.012*
Median CAR	0.009	0.006	-0.003

Table 6 Market-Timing Characteristics of Repurchase and SEO Firms

This table presents the mean and median (in the square brackets) market-timing characteristics of event firms prior to the announcements. B/M is the ratio of the book value of equity in the prior fiscal year to market capitalization in the month before the event announcement. Prior return is the buy-and-hold return in the 12 months prior to the event announcement. ME is the CPI-adjusted market capitalization in the month before the announcement. Log(M/V), the log difference between the observed market value and the intrinsic value of equity, is estimated as in Rhodes–Kropf, Robinson, and Viswanathan (2005). RD/A is the ratio of research and development expenses to total assets in the fiscal year before the announcement. We adjust event firm B/M, log(ME), and RD/A by subtracting the contemporaneous industry median, and adjust the prior 12-month return by subtracting the contemporaneous buy-and-hold value-weighted industry portfolio return, where industries are classified into 49 categories as in Fama and French (1997). The change in analyst investment recommendation is constructed as the change of the average I/B/E/S standard score (1 for strong buy, 2 for buy, 3 for hold, 4 for underperform, and 5 for sell) from 12th month before to the month before the event announcement. Insider net sales are insider sales minus purchases during the 12 month prior to the announcement denominated by shares outstanding, which is adjusted by the average net sales from 48 month before to 13 month before the announcement. Freq. of secondary offerings is the proportion of SEO firms that offer both primary and secondary shares. Size of secondary offerings is the fraction of secondary shares in the total offering shares. The last column reports the difference in variables between the later and early samples. We test the significance of means and the mean differences by *t*-test, the significance of medians by Wilcoxon signed rank test and the significance of difference in medians by Kruskal-Wallis test. Differences in proportions are tested by Z-test. Statistical significance, denoted by *, **, and ***, refers to significance levels of 10%, 5%, and 1%.

	Early sample	Later sample	Difference (Later – Early)
	Repurchases		
B/M	0.137***	0.063**	-0.074***
	[0.042***]	[-0.010*]	[-0.052***]
Prior return	-0.102***	-0.003	0.099***
	[-0.133***]	[-0.017*]	[0.116***]
Log(ME)	1.091***	1.098***	0.007
	[0.877***]	[1.008***]	[0.131]
Log (M/V)	0.016	0.141***	0.126***
	[0.015]	[0.118***]	[0.103***]
RD/A	-0.002**	-0.006***	-0.004*
	[-0.000**]	[-0.000***]	[0.000]
Change in analyst	0.097***	0.009	-0.088***
recommendation	[0.001***]	[0.000]	[-0.001***]
	SEOs		
B/M	-0.161***	-0.047**	0.114***
	[-0.184***]	[-0.113***]	[0.071***]
Prior return	0.783***	0.530***	-0.253***
	[0.420***]	[0.213***]	[-0.207***]
Log(ME)	0.895***	-0.037	-0.932***
	[0.896***]	[0.000]	[-0.896***]
Log (M/V)	0.659***	0.484***	-0.176***
	[0.593***]	[0.439***]	[-0.154***]
RD/A	0.058***	0.142***	0.084***
	[0.000***]	[0.049***]	[0.049***]
Change in analyst	-0.110***	-0.038**	0.072***
recommendation	[-0.030***]	[0.000]	[0.030***]
Insider net sales	0.083***	0.008	-0.075*
	[0.033***]	[-0.001]	[-0.034***]
Freq. of secondary offerings	0.363	0.157	-0.206***
Size of secondary offerings	0.121	0.073	-0.048***

Table 7 Firm Characteristics of Repurchase Firms

This table reports the mean and median (in the square brackets) repurchase firm characteristics in the early and later samples, respectively. The last column reports the difference in characteristics from the early to the later samples. The proportion of repurchase in payout is measured both by firm number and by dollar value. By firm number it is the proportion of repurchase firms in the total number of firms that have positive payout. By dollar value it is the proportion of dollar amount used for repurchases in the total dollar amount that is paid out. Repurchase frequency is the fraction of years during the past five years in which the repurchase firm announced other repurchases. Completion rate is the ratio of the actual dollar spent in repurchases in two years following the announcement to the announced repurchase program size. Cash flow volatility is defined as the standard deviation of cash flows (denominated by total assets) during the past five years. Non-operating income is denominated by total assets in the prior fiscal year. Interest coverage ratio is cash flow divided by interest expense. We test the significance of the difference in means by *t*-test and the significance of the difference in medians by Wilcoxon Kruskal-Wallis test. Differences in proportions are tested by Z-test. Statistical significance, denoted by *, **, and ***, corresponds to significance levels of 10%, 5%, and 1%, respectively.

	Early sample	Later sample	Difference (Later – Early)
Proportion of repurchase in payout (firm number)	0.563	0.723	0.160***
Proportion of repurchase in payout (dollar value)	0.421	0.606	0.185***
Repurchase frequency	0.311	0.525	0.214***
	[0.200]	[0.600]	[0.400***]
Completion rate	0.548	0.756	0.208***
	[0.617]	[1.000]	[0.383***]
Cash flow volatility	1.482	0.718	-0.764***
	[0.038]	[0.030]	[-0.008**]
Non-operating income	0.011	0.006	-0.005***
	[0.005]	[0.002]	[-0.003***]
Interest coverage ratio	59.447	97.212	37.765***
	[9.684]	[13.822]	[4.138***]

Table 8 The Operating Performance of SEO firms

The table reports the annual median operating performance of SEO firms from three years before the offering to three years after the offering, respectively for the early sample (Panel A) and the later sample (Panel B). OIBDP/A is the ratio of operating income before depreciation to total assets, ROA is the ratio of net income to assets (ROA), OIBDP/Sales is the ratio of operating income before depreciation to sales, Profit margin is the ratio of net income to sales, Cash/A is the ratio of cash and marketable securities to assets, CAPX/A is the ratio of capital expenditure to assets, and log(A) is the log of CPI-adjusted total assets. The last row of each panel reports the difference in variables between the third year after the offering and the year immediately prior to the offering. We test the significance of the difference in medians by Kruskal-Wallis test. Statistical significance, denoted by *, **, and ***, corresponds to significance levels of 10%, 5%, and 1%, respectively.

Panel A: Early Sample

Fiscal year relative to the event	OIBDP/A	ROA	OIBDP/ Sales	Profit Margin	Cash/A	CAPX/A	log(A)
-3	0.138	0.040	0.1029	0.029	0.066	0.069	4.612
-2	0.139	0.041	0.1057	0.031	0.074	0.071	4.572
-1	0.147	0.045	0.1119	0.034	0.074	0.073	4.791
0	0.147	0.049	0.1205	0.039	0.154	0.072	5.410
1	0.122	0.033	0.1071	0.027	0.098	0.069	5.604
2	0.109	0.020	0.0968	0.017	0.082	0.056	5.717
3	0.106	0.018	0.0963	0.014	0.077	0.048	5.837
Diff(3, -1)	-0.041***	-0.027***	-0.016***	-0.019***	0.003*	-0.025***	1.046***

Panel B: Later Sample

Fiscal year relative to the event	OIBDP/A	ROA	OIBDP/ Sales	Profit Margin	Cash/A	CAPX/A	log(A)
-3	-0.038	-0.123	0.0138	-0.117	0.257	0.030	4.926
-2	-0.021	-0.106	0.0178	-0.108	0.249	0.028	4.991
-1	-0.002	-0.108	0.0300	-0.100	0.245	0.028	5.076
0	0.029	-0.069	0.0476	-0.055	0.303	0.025	5.492
1	0.033	-0.054	0.0513	-0.047	0.271	0.025	5.633
2	0.051	-0.036	0.0580	-0.031	0.220	0.027	5.852
3	0.061	-0.026	0.0742	-0.024	0.197	0.028	5.994
Diff(3, -1)	0.063***	0.082***	0.044***	0.076***	-0.047*	0.000	0.918***