On long-run stock returns after corporate events

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JEL classification:
C10, G14 ,G32, G34, G35

Keywords:
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Abstract
This paper revisits the controversial question of whether long-run abnormal returns are associated with major corporate events. Our analyses investigate initial public offerings (IPOs), seasoned equity offerings (SEOs), mergers and acquisitions (M&As), and dividend initiations. In an attempt to resolve ambiguous empirical evidence with respect to these events, we conduct a variety of tests for abnormal long-run performance, including buy-and-hold returns (BHARS), different calendar time approaches, and a recent standardized test. Empirical tests for these different methods consistently detect significant long-run abnormal returns for all four corporate events. We conclude that long-run abnormal returns exist with respect to these major corporate actions.

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1 Introduction

Major controversy in the financial economics literature surrounds the question of whether or not long-run abnormal stock returns are associated with major corporate events. Based on buy-and-hold abnormal returns (BHARs), Ritter (1991) and Loughran and Ritter (1995)) document post-announcement underperformance for initial public offerings (IPOs). Loughran and Ritter (1995) and Spiess and Affleck-Graves (1995) similarly report underperformance for seasoned equity offerings (SEOs). Other studies by Asquith (1983), Agrawal, Jaffe, and Mandelker (2002), and Mitchell and Stafford (2000) report negative long-run abnormal returns for acquiring firms in mergers and acquisitions (M&As). And, Michaely, Thaler, and Womack (1995) find positive long-run abnormal stock returns for firms initiating dividends. A common explanation for anomalous abnormal returns is overreaction as hypothesized by behavioral decision theory (Kahneman and Tversky, 1982).[1]

Other studies report conflicting evidence. For example, Eckbo, Masulis, and Norli (2000) find significant underperformance for IPOs and SEOs using BHARs but insignificant results using calendar time portfolio alphas. Brav and Gompers (1997) obtain insignificant long-run results for IPOs after taking into account size and book-to-market ratios (see also Gompers and Lerner, 2003). Another study by Loughran and Vijh (1997) reports negative abnormal returns for M&As in general but positive returns for cash deals. Also, dividend initiation tests by Brav (2000) do not detect abnormal long-run returns after adjusting for size and book-to-market ratios, and further tests by Boehme and Sorescu (2002) yield mixed results.

A recent paper by Bessembinder and Zhang (2013) argues that long-run abnormal returns associated with these corporate events are explained by imperfect matching of

[1]See Fama (1998) for a comprehensive discussion of long-run return anomalies and potential explanations, including market efficiency and behavioral models. In this regard, studies by Mitchell and Stafford (2000), Brav, Geczy, and Gompers (2000), Eckbo and Norli (2000), Lyandres, Sun, and Zhang (2008), and How, Ngo, and Verhoeven (2011) provide different explanations for anomalous long-run stock returns after these corporate events.

event firms and control firms. Applying the calendar time approach, they propose a regression model of abnormal returns using seven systematic and unsystematic factors (i.e., beta, size, market-to-book ratio, momentum, liquidity, idiosyncratic volatility, and capital investment) computed as differences between event and control firms. Notably, to scale coefficients in the regression model for comparison purposes, these differences are normalized by taking positive (negative) values for factors and converting them to percentile ranks from 0 to 1 (-1 to 0). Based on samples drawn in the period 1980 to 2005 and monthly data collected in a 5-year post-event period, with the exception of SEOs, tests of estimated intercepts (or alphas) indicate significant long-run abnormal returns for IPOs, M&As, and dividend initiations. However, their results change dramatically with the addition of squared terms for market and firm-specific characteristics in the model, as all four corporate events' alphas become insignificant. Based on these findings, they infer that long-run abnormal returns do not exist and conclude that calendar time regression results that adjust for risk reconcile previously mixed evidence.

In this paper we contribute to the continuing controversy about the significance of long-run abnormal returns associated with major corporate events by implementing a battery of different test approaches, including Bessimbinder and Zhang calendar time regressions, well-known BHAR and three-factor calendar time regressions, and a recent standardized abnormal return (ASR) approach. Our purpose is to make inferences based on the weight of evidence from alternative tests. Upon repeating Bessembinder and Zhang's regression analyses with updated samples drawn from the period 1980 to 2007, we replicate their findings for the most part. However, our analyses show that their results are primarily driven by the normalization procedure, which affects the regression coefficients (and associated t-values), destabilizes alpha estimates, and inflates alpha standard errors. When we repeat their regression analyses using non-normalized factors that have been standardized for comparison purposes, abnormal returns are significant even including squared terms for all four corporate events under study.

Turning to other test method results, BHAR suggests significant long-run abnormal underperformance over a 5-year horizon after M&As, IPOs, and SEOs but not dividend initiations. Using an adjusted Fama-French three-factor model, calendar time abnormal returns are negative and significant for M&As even after 3-to-5 years. For these tests IPOs and SEOs did not exhibit significant long-run abnormal returns but did indicate significant overperformance over shorter horizons of 1-to-6 months. Dividend initiations are associated with significant post-event underperformance after 3 years, which disagrees with all other test methods due in all likelihood to inherent bad model problems. Finally, ASR results strongly indicate significant post-event underperformance for M&As, IPOs, and SEOs, and significant overperformance for dividend initiations. In sum, all of the different test methods consistently detect long-run abnormal performance surrounding corporate events. Despite advantages and disadvantages of different tests, the weight of the evidence corroborates significant abnormal returns over 3- and 5-year horizons for the corporate events under study. Also, for IPOs and SEOs, a common reversal pattern is evident with 1-month overperformance followed by accumulating underperformance that becomes significant after about 3 years. Graphs using monthly ASRs clearly illustrate this pattern. We conclude that evidence from available long-run event study tests consistently supports the existence of anomalous returns associated with M&A, IPO, SEO, and dividend initiations.

The next section overviews data and methodology. Section 3 gives the empirical results of alternative long-run abnormal return test approaches. Section 4 concludes.

2 Data and methodology

In this section we describe sample selection, define abnormal return metrics, and specify alternative test statistics.

2.1 Sample selection

The M&A sample consists of completed U.S. mergers and acquisitions in the Thomson ONE (SDC) database between 1986 and 2007 with transactions value $5 million or more. Our samples end in 2007 to allow for 5-year, post-event return analyses. Also, unlike the other corporate events sampled from 1980, sample data begins in 1986 due to few SDC observations from 1980 to 1985. Following Betton, Eckbo, and Thornburn (2008), we apply two filters: (1) the acquisition takes the form of a merger (M), majority interest (AM), remaining interest (AR), or partial interest (AP); and (2) the acquisition is a control bid wherein the acquirer owns at least 50% of the target after the deal. Also, we require that the relative size of the deal (viz., transaction size divided by the market value of the bidder firm before completion four weeks prior to announcement date) is greater than 5% to eliminate small deals. Altogether we have 4,294 acquisitions.

We select a control firm for each firm by matching size and book-to-market ratio (BM) characteristics on CRSP and Compustat. Following Eckbo, Masulis, and Norli (2007) and Bessembinder and Zhang (2013), for each M&A deal completion, matched firms have closest BM among firms with firm size between 70% and 130% of the bidder firm. We eliminate matching firms that are in our sample of bidders within ten years around the event date. In this case, we choose the next candidate, i.e., the next closest BM.

Firm size (market capitalization) is calculated at the end of December prior to the M&A deal completion date. BM is the ratio of the book equity to the market equity at the end of year $t-1$. Following Fama and French (1993), book equity is defined as the Compustat book value of stockholders equity, plus balance sheet deferred taxes and investment tax credits (if available), minus the book value of preferred stock. Depending on availability, the redemption, liquidation, or par value (in that order) is used to estimate the value of preferred stock.

Table 1 shows the distribution of the acquisitions in our sample period. Before 1994 the number of transactions ranged from only 19 in 1986 to 82 in 1993. Transactions peaked in the period 1996–2000 ranging from 365 to 431. Subsequently, the number of deals dropped to a low of 193 in 2002 and then climbed to 263 in 2007.

[Table 1]

The IPO sample includes all completed US initial public offerings (IPOs) in the Thomson ONE (SDC) database between 1980 and 2007, excluding Real Estate Investment Trusts, closed-end funds, and American Depository Receipts. We select matching firms among the firms having CRSP data using market capitalization. Following Loughran and Ritter (2000), for each IPO event, the matched firm has the closest but greater market capitalization at the end of December following the IPO. Matching firms must have been publicly traded for more than 5 years. If this is not the case, we choose the next candidate, i.e., the next closest (but greater) market capitalization. There are 7,454 IPO events. Table 1 shows that the number of IPOs increases in the 1990s and thereafter generally declines.

The SEO sample consists of completed US SEOs in the Thomson ONE (SDC) database between 1980 and 2007, excluding American Depository Receipts, Global Depository Receipts, and unit offerings. Financial and utility firms are excluded also. The procedure for selecting matching firms is similar to the M&A sample. There are 6,737 SEO events. Table 1 shows the distribution of the SEOs over time.

The dividend initiations (DIV) sample includes cash dividend initiations in the CRSP database between 1980 and 2007. Following Boehme and Sorescu (2002) and Bessembinder and Zhang (2013), we apply the criteria that common stocks are listed on the NYSE, NYSE MKT (AMEX), or NASDAQ (viz., share code is 10 or 11, and exchange code is 1, 2 or 3), stocks have been included in the CRSP for more than two years, dividends are ordinary cash (USD), and they are paid regularly[2]. We apply the same matching procedures as for M&A and SEO samples. There are 2,151 dividend initia-

[2]The frequency of dividends is monthly, quarterly, semiannual, annual, or unspecified. As noted by Boehme and Sorescu (2002), unspecified frequencies are mostly quarterly.

tions. Table 1 shows that the mid-1990s were peak years with around 150 initiations per year.

Note that the numbers of event firms in our paper are greater (especially in the dividend initiations sample) compared to Bessembinder and Zhang (2013) due to our process of searching for next available candidates in our matching procedures.[3] Also, the numbers of firms used in the regressions vary because of monthly data availability for the 5-year post-event period.

2.2 Abnormal return metrics

We measure long-run abnormal returns using a variety of available approaches. Buy-and-hold abnormal returns (BHARs) (Lyon, Barber, and Tsai, 1999) over the holding period $(1, h)$ are defined as:

$$\mathtt{BHAR}_i(h) = \prod_{t=1}^{h}(1 + R_{it}) - \prod_{t=1}^{h}(1 + R^c_{it}), \tag{1}$$

where R_{it} and R^c_{it} are returns on the test asset and its matching control firm, respectively.

Following Boehme and Sorescu (2002) (see also Mitchell and Stafford, 2000, Section V), calendar time abnormal returns (CTARs) are estimated from an adjusted Fama-French model in which the return difference between a test asset and its size/book-to-market matched control stock is regressed on the Fama-French factors. Given that the control stock has similar characteristics as the test asset, this approach potentially eliminates all unknown common factors from abnormal returns. We follow this practice in forming calendar time portfolios by estimating

$$(R_{\mathtt{test}} - R_{\mathtt{control}})_{pt} = \alpha_p + \beta_p(R_{mt} - R_{ft}) + s_p SMB_t + h_p HML_t + e_{pt}, \tag{2}$$

[3] For example, in the DIV sample, if the first matching firm (the closest BM) is in our sample within ten years around the dividend initiation, we match with the second closest BM. We repeat this procedure for up to 10 candidates to match our event firm. In most cases we match with the best or second-best candidate.

where α_p defines the abnormal return, $(R_{\texttt{test}} - R_{\texttt{control}})_{pt}$ is the monthly portfolio return difference (equal- or value-weighted) between the simple returns of each test asset and its matched control firm, R_{mt} is the monthly return on the value-weighted market index, R_{ft} is the monthly return on one-month Treasury bills, *SMB* is the monthly Fama-French small-minus-big size factor return, and *HML* is the monthly Fama-French high-minus-low BM factor return. Data for the Fama-French factors are downloaded from Kenneth French's online data library. In month t the portfolio return $(R_{\texttt{test}} - R_{\texttt{control}})_{pt}$ includes all stocks whose event period includes the month. Thus, the number of stocks, n_t, can vary monthly from zero to the total number of sampled stocks. The month index t runs from the earliest to the latest month among the event periods of the stocks in the sample, and months with $n_t = 0$ are discarded from the analysis.

Bessembinder and Zhang (2013) contend that BHAR's matched control procedure does not fully control for risk in estimating long-run abnormal returns. As a modification of the above calendar time approach, they point out that the continuously compounded abnormal return between an event and matched control firm, or $\texttt{CCAR}_{it} = \log(1 + R_{it}) - \log(1+R^c_{it})$, in which R_{it} and R^c_{it} are the simple returns of the event and matched control firm, respectively, corresponds to a log wealth relative as defined by Loughran and Ritter (1995). To test for long-run abnormal returns, Bessembinder and Zhang (2013) specify the following regression model:

$$\begin{aligned}\texttt{CCAR}_{it} = {} & \alpha + \beta_1 \Delta\texttt{beta}_{it} + \beta_2 \Delta\texttt{size}_{it} + \beta_3 \Delta\texttt{BM}_{it} \\ & + \beta_4 \Delta\texttt{mom}_{it} + \beta_5 \Delta\texttt{illiq}_{it} + \beta_6 \Delta\texttt{isv}_{it} + \beta_7 \Delta\texttt{inv}_{it} + u_{it},\end{aligned} \tag{3}$$

where Δ denotes the monthly difference between event firm and matching firm characteristics, `beta` for July of year t to June of year $t+1$ is estimated from the market model using monthly stock returns during years $t-5$ to $t-1$, `size` is the market equity at the end of the latest June, `BM` for July of year t to June of year $t+1$ is the book value of the common equity to the market value of common equity at the end of fiscal year $t-1$, `mom` is momentum computed using cumulative returns for months -12 to -2, `illiq` is illiquidity in July of year t to June of year $t+1$ proxied by the average ratio of daily absolute stock return to dollar trading volume from July of year $t-1$ to June of year t (see Amihud, 2002)[4], `isv` is idiosyncratic volatility as measured by the annualized standard deviation of the residuals obtained in a Fama and French three-factor regression using daily returns in month -2, and `inv` is capital investment in July of year t to June of year $t+1$ based on the annual change in gross property, plant, and equipment in fiscal year t divided by assets at the beginning of fiscal year t. In an effort to make estimated slope coefficients in regression (3) comparable, they normalize the explanatory variables via transforming in each calendar month separately negative and positive values cross-sectionally to positive and negative rank numbers and then sorting them into negative and positive percentile ranks such that the values in each month range from -1 to $+1$.

Unfortunately, serious econometric problems arise in Bessembinder and Zhang's normalization process of factors that renders estimated alphas statistically and even economically indistinguishable from zero. One problem is that cross-sectional normalization of factors in a pooled panel regression randomizes potential regression relationships, such that in each calendar month a stock's factor (explanatory variable) values become dependent on those of other stocks. Indeed, it is possible that (for example) two original values ascending by magnitude could become descending after normalization, which would weaken the regression results. Another problem is that normalization induces unnecessary nonlinearity into the regressions. Even if the original relationship of a factor is linear with dependent variable returns, nonlinearity arises from transforming the original distribution of the explanatory variables to uniform or, more precisely, a mixture

[4]Following Amihud (2002), average market illiquidity in the denominator is calculated using illiquidity of all stocks satisfying the following conditions: (1) the stock has return and volume data for more than 200 days (from July of year $t-1$ to June of year t), (2) the stock price is greater than \$5, (3) the stock has data on market capitalization available, and (4) illiquidity outliers are eliminated at the highest or lowest 1%.

of two uniform distributions.[5] This nonlinearity suggests a kind of mirrored S-shaped curve in which third or higher order terms in their regressions could be more significant than second order terms. Additionally, it is well known that regression t-values and other test statistics used for inferences are invariant with respect to scaling. Also, the regression intercept itself is invariant with respect to the scaling of explanatory variables by a constant. These invariance properties are lost in their procedure, as scaling and shifting origins of the regressors are performed within subsets of observations (i.e., cross-sectionally over contemporaneous calendar months). Because the original values of the regressors are detached from their context by subset-wise transformation to scaled rank numbers, this procedure is likely to have unpredictable outcomes. Deformation of observations according to subsets not only affects the coefficients, including the intercept, and their t-values, but affects the whole risk adjustment process. As observed by Kothari and Warner (2006, Section 4.2), even a small error in risk adjustment can cause sizable errors over long horizons. To avoid these issues we run regressions based on equation (3) without normalization. To allow comparability of estimated coefficients, rather than normalize factors, we standardize the factors by their respective standard errors. Unlike cross-sectional normalization, standardization does not affect the regression fit and change the means proportional to the scaling; hence, the intercept (abnormal return) estimates and their related statistics are unaffected.

Finally, based on extensive simulation analyses, recent work by Knif, Kolari, and Pynnonen (2014) demonstrates that standardized returns (ASRs) improve materially size, power, and robustness in long-run event study tests. Because they are standardized returns (i.e., returns divided by their standard deviation), they are weighted by their statistical precision. In turn, superior size and power of the tests statistics are

[5] For example, suppose that y and x have a bivariate normal distribution, which implies that the marginal distributions of the variables are normal and the regression of y on x is linear. A simplified (theoretical) version of Bessembinder and Zhang's transformation maps x to a uniform distribution via $z = F(x)$, where F is the cumulative normal distribution function of x. Because $z = F(x)$ is a nonlinear function of x, the original linear regression of y on x becomes nonlinear on z.

gained, which is well documented in short-run event studies (e.g., Patell, 1976; Boehmer, Musumeci, and Poulsen, 1991; Kolari and Pynnonen, 2010; and others) as well as in long-run event study tests by Knif et al. The authors further document that standardized return tests of long-run abnormal returns are much less sensitive to outliers than existing test methods, such as BHAR and CTAR. And, because returns are divided by their standard deviation, there is some degree of total risk adjustment of abnormal returns. They define abnormal standardized returns (ASRs) as follows:

$$\mathtt{ASR}_{it} = \mathtt{sr}_{it} - \mathtt{sr}^{c}_{it} \tag{4}$$

where

$$\mathtt{sr}_{it} = \frac{r_{it}}{s_{it}} \tag{5}$$

is the month t standardized return of the ith stock in terms of log-returns, $r_{it} = \log(1 + R_{it})$ with R_{it} the simple return, and s_{it} is the month t return standard deviation. We compute monthly standard deviations, s_{it}, from daily returns to capture time-varying volatilities. In the same manner, $\mathtt{sr}^{c}_{it}$ is the month t standardized return of the matched control firm.

Altogether, we utilize four different return metrics to test abnormal behavior of the events. BHAR focuses on the buy-and-hold return difference of equal-weighted portfolios, CTAR indicates per month average (simple) return difference unexplained by Fama and French factors, CCAR measures per month continuously compounded return difference unexplained by the seven risk factors, and ASR captures return difference adjusted for measurement precision.

2.3 Test statistics

The t-ratio for testing BHAR, or `BHAR-T`, is defined as follows:

$$t_{\mathtt{bhar}} = \frac{\overline{\mathtt{BHAR}}(h)\sqrt{n}}{s_{\mathtt{BHAR}}}, \tag{6}$$

where

$$\overline{\mathtt{BHAR}}(h) = \frac{1}{n}\sum_{i=1}^{n}\mathtt{BHAR}_i(h) \tag{7}$$

is the mean of $\mathtt{BHAR}_i(h)$s and

$$s_{\mathtt{BHAR}} = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(\mathtt{BHAR}_i(h) - \overline{\mathtt{BHAR}}(h))^2} \tag{8}$$

is the standard deviation of $\mathtt{BHAR}_i(h)$s.

The calendar time abnormal return (CTAR) α_p in equation (2) is tested via the estimated regression t-ratio of the intercept coefficient, or `CALENDAR-T`. In the same manner, the alpha in regression (3) is tested by its respective t-statistic, in which we utilize recent clustering techniques (e.g., Cameron, Gelbach, and Miller, 2011) to account for cross-sectional correlation due to overlapping event months.

Lastly, abnormal standardized returns (ASRs) for the holding period from h_1 to h_2 with $1 \leq h_1 \leq h_2 \leq h$ are tested by means of `ASR-T` statistics defined as follows:

$$t_{\mathtt{asr}}(h_1, h_2) = \frac{\overline{\mathtt{ASR}}(h_1, h_2)}{\mathtt{s.e}(h_1, h_2)}, \tag{9}$$

where

$$\overline{\mathtt{ASR}}(h_1, h_2) = \frac{1}{n(h_2 - h_1 + 1)}\sum_{i=1}^{n}\sum_{t=h_1}^{h_2}\mathtt{ASR}_{it} \tag{10}$$

is the holding period average $\mathtt{ASR}_{it}$ per month over the n event firms. In computing standard errors, or $\mathtt{s.e}(h_1, h_2)$, application of clustering robust standard errors (e.g., see Cameron, Gelbach, and Miller, 2011) is a straightforward approach to account for cross-sectional correlation and other issues (see Knif, Kolari, and Pynnonen, 2014).[6]

3 Empirical results

This section provides empirical results for long-run abnormal returns based on different test methods. We begin with Bessembinder and Zhang regression model tests to demonstrate econometric issues discussed in the previous section that make inferences based on normalized factors unreliable. Extending their regression approach, we standardize factors to make them comparable but keep alpha the same as for the original unstandardized factors. This alters substantially the results. To comprehensively evaluate abnormal returns, further tests using BHAR, CTAR, and ASR methods are reported.

3.1 Bessembinder and Zhang regression approach

Tables 2 and 3 report the estimated regression coefficients based on equation (3) with normalized factors. In the bottom portion of these tables, F-tests of the joint significance of the squared terms are shown, in addition to mean CCARs and their cross-sectional correlation adjusted t-values. The analyses include all stocks for which regressors and returns are available for the 60-month holding period or the month of delisting, whichever occurred first. Thus, these results reflect average monthly abnormal returns for firms surviving up to 60 months rather than the 5-year average monthly abnormal return performance. Tables 4 and 5 replicate regressions in Tables 2 and 3 with non-normalized, standardized factors. As mentioned earlier, to make magnitudes of the slope coefficients directly comparable, the factors are standardized by their standard deviations computed

[6] Clustering robust standard errors are available in modern statistical packages such as SAS and Stata. One can easily utilize these by arranging $\texttt{ASR}_{it}$ observations in the holding periods from h_1 to h_2 into a pooled panel data set. Clustering robust standard errors and associated t-statistics are computed by estimating the regression $\texttt{ASR}_{it} = \alpha + u_{it}$, i.e., a regression on the constant term using the clustering standard error option of the package. The OLS-estimate $\hat{\alpha}$ equals $\overline{\texttt{ASR}}(h_1, h_2)$, and the cluster robust standard error of $\hat{\alpha}$ gives $\texttt{s.e}(h_1, h_2)$ in equation (9).

over the pooled panel observations, such that all the factors have unit variances.

[Tables 2 and 3]

Figures 1 to 4 plot firm characteristics used in the regressions. The figures show pre- and post-event median values of the characteristics for the event and matching control firms.[7] In addition to the characteristics used in the regressions, median monthly volatilities are shown to demonstrate the dynamics of aggregate total risk during the event months.

[Figures 1, 2, 3, and 4]

Regarding M&As in Figure 1, the most obvious differences between event and matching control firms among regressor factors are investment activity around the event month and disparities in size and book-to-market values after the event month. Given the nature of the the event, these differences are expected. Focusing initially on the linear and second order models in Table 2 for M&As comparable to those reported in Bessembinder and Zhang (2013, Panel C of Table 4), it is notable that second order (i.e., squared) terms are jointly highly insignificant. Among estimated coefficients associated with squared terms, only momentum is significant at the 5% level. In Bessembinder and Zhang (2013, Panel C of Table 4), the squared term of beta is significant at the 5% level, and the squared term of the idiosyncratic volatility is borderline significant at the 10% level. In our case inclusion of these terms inflates the standard error of alpha from 0.105 to 0.253 in Table 2 or 141%. In their regression the standard error is inflated by 90%. Like their results, our regressions indicate highly significant alphas without the squared terms but insignificant alphas after including squared terms. It is true that the alpha-estimates decrease with the addition of squared terms to the linear model. However, as discussed in Section 2.2, nonlinearity caused by the normalization is very likely to call for higher order terms in order to adequately capture the implied extra nonlinearity. Indeed, enhancing the M&A regression model with third and fourth powers of the explanatory variables

[7]Since pre-event values are not available in the IPO sample, Figure 2 shows only post-event values.

reveals that third order terms become the dominate (and only significant) factors in the regression. Also, as shown by the F-test reported in the middle panel of Table 2, third power terms are the only jointly significant terms in the model. Even though alpha remains insignificant, its magnitude jumps from -0.067 to -0.316, which indicates even higher abnormal returns compared to the highly significant alpha of -0.290 for the linear model. Thus, inflated standard errors and widely varying alphas from one regression to another suggest that the estimates become highly unstable due to the weak explanatory power of these factors, such that the noise component becomes sizeable. Also, higher order terms induce other symptoms such as multicollinearity and outlier effects, both of which can substantially affect the OLS intercept term.

The IPO columns of Table 2 report regression equation (3) results for CCAR. The results differ considerably from those for M&As. All linear as well as higher order terms are jointly statistically significant. Also, unlike Bessembinder and Zhang (2013, Panel B of Table 4), alpha remains statistically significant even with the squared and higher order terms. In their study alpha is statistically significant only in the regression without the squared terms. Inclusion of squared terms inflate the standard errors by 53% in Table 2 compared to 66% in their regression results. In spite of the high significance of estimated alphas in all models, again the inflated standard errors suggest growing instability in the estimates even though the higher order terms are jointly significant. In sum, our IPO findings support those of many earlier studies that have documented material underperformance of IPOs (for example, see Betton, Eckbo, and Thornburn, 2008, among others).

The SEO columns of Table 3 provide CCAR regression results. Unlike other corporate events, estimated alphas are insignificant in both samples with or without squared terms. Again the squared terms of the normalized factors are jointly insignificant. These results for the linear and squared term regressions are consistent with those in Bessimbinder and Zhang. However, the results become less clear cut with the inclusion of third and fourth order terms. Consistent with our earlier discussion in Section 2.2, third order terms are highly significant. With these terms, the magnitude of alpha increases dramatically and becomes economically significant with an abnormal return of approximately 5.5% per year. However, due to inflated standard errors, this large alpha is only borderline significant at the 5% level. In sum, the results for SEOs are mixed.

Results for dividend initiations (DIVs) in the last three columns of Table 3 are similar to those for M&As. Estimated alpha is highly significant in the normalized factors regression without the squared or higher terms but insignificant with the inclusion of these terms. The addition of higher order terms at worst almost quadruples the standard errors of alphas rendering them insignificant even in the case of an estimate equal to 0.455, or about 5.5% per year. Like M&As, IPOs, and SEOs, third order terms are jointly significant.

Due to problems of cross-sectional normalization of explanatory variables in panel data analyses, we repeat the regression analyses using non-normalized factors that have been standardized as discussed earlier. Tables 4 and 5 show that, particularly with respect to the inclusion of squared terms, the results are quite different from those with normalized factors. Regardless of whether or not higher order terms are included, all estimated alphas are highly significant now with values deviating from zero by 2.34 standard errors or more. Notably, the standard errors of alphas remain virtually unchanged across different model choices. The only exception is the fourth order regression of DIVs in which alpha becomes insignificant and all higher order terms are jointly significant. This exception is not surprising in view of implied multicollinearity caused by the inclusion of higher order terms as well their high sensitivity to potential outliers. These empirical results confirm potential normalization problems. More importantly, they suggest long-run underperformance after M&As, IPOs, and SEOs and overperformance after dividend initiations.

[Tables 4 and 5]

3.2 BHAR, CTAR, and ASR approaches

We next report the results based on BHARs, CTARs, and ASRs for post-event return differences between event firm and matched control firms associated with M&A, IPO, SEO, and dividend initiation (DIV) events.

Merger and acquisition results for the sample period 1986 to 2007 as well as results for certain subperiods are shown in Table 6. Although not necessary for ASRs and CTARs, the analyses include only those M&As that have the full 60-month event-period return history to facilitate BHAR computations. Panels A and B, respectively, give results for the full sample of 1,838 M&As and trimmed sample of 1,828 M&As wherein 0.5% of the most extreme M&As from both ends of the 5-year return distribution were removed. Trimming drops 10 of the 1,838 M&As from the sample. In spite of the large sample size of over 1,800 observations, these 10 extreme returns influence BHAR and its test statistics over longer horizons. Typically, exclusion of the extreme cases strengthens evidence of abnormality in terms of the `BHAR-T` statistic. For example, for the full event period of 5 years, `BHAR-T` indicates no evidence of abnormality in the full sample but is highly significant ($p < 0.01$) after dropping 10 returns. In this case, if a few extreme cases are excluded, M&A firms highly underperform their reference firms with average 5-year BHARs of -22.92% (third row of Panel B), which is about the same as reported earlier by Betton, Eckbo, and Thornburn (2008). On the other hand, including the outliers gives a BHAR of -6.70%, which is close to -7.09% reported in Bessembinder and Zhang (2013, Table 3) and -6.5% reported by Loughran and Vijh (1997). We infer that trimmed BHAR results suggest long-run, post-event underperformance among M&As.

[Table 6]

CTARs and related t-tests confirm significant negative long-run stock performance over 3- and 5-year horizons in untrimmed and trimmed samples. Unlike BHAR, CTAR appears to be insensitive to outliers.

For the untrimmed sample in panel A of Table 6, ASRs and related test statistics

`ASR-T` corroborate significant negative long-run performance over 3- and 5-year periods as well as 6-month and 1-year periods. For the trimmed sample results in panel B, 3- and 5-year abnormal returns are not significant but 6-month and 1-year returns are significant, which subperiod analyses further support. An advantage of the ASR approach is that monthly standardized abnormal returns over time can be computed. The M&A graph in Figure 5 illustrates post-event ASRs, which reveal a pattern of substantive underperformance during the first year, after which the behavior appears random.

[Figure 5]

Initial public offering results are reported in Table 7. As before, though not as striking as M&As, removal of only a few outliers (Panel B) affects BHAR results. ASR and BHAR indicate highly statistically (and economically) significant abnormal 3- and 5-year underperformance. Calendar time α_p is negative but not significant over this long horizon. However, calendar time results can be difficult to interpret due to the fact that, in each post-event month, the portfolio contains stocks with different durations in the sample. Some stocks may be newly-issued IPOs and others 5 years old. Thus, heterogeneous portfolio values in different months can be expected to affect the estimation of the intercept term and particularly its standard error. The results in Panel B of Table 7 confirm the latter issue, as the 5-year alpha estimate is -0.26% per month, which translates to about -16% 5-year underperformance, but alpha is still insignificant.

[Table 7]

In the first month after the IPO month, Panels A and B show that, in terms of all abnormal return metrics, large positive and highly significant abnormal returns occur. After this first month, the IPO graph in Figure 5 shows that subsequent abnormal returns measured in terms of ASRs are almost all negative over the remainder of the 5-year holding period. Regarding BHARs, notice that the 1-month positive abnormal return affects the 2-month BHAR due to compounding. Also, because calendar time alphas measure average monthly abnormal returns, the 1-month positive abnormal returns appear to affect the average for up to 6 months after IPO events. Nonetheless, a clear reversal pattern emerges from different test approaches of short-run overperformance followed by long-run underperformance.

The seasoned equity offering results are shown in Table 8. Again, comparing results in Panels A and B, BHAR proves to be sensitive to a few outliers, especially at the longest 5-year horizon. The 5-year BHAR test statistic is weakly significant in Panel A but highly significant in Panel B. Both CTAR and ASR tests in Panels A and B indicate significant long-run underperformance of SEOs at a 3-year horizon and 3- and 5-year horizons, respectively. Significant negative 3-year calendar time α_ps for untrimmed and trimmed samples further support long-run underperformance. It should be noted that 3- and 5-year ASRs are significant despite the higher volatility profile of SEO firms relative to matching firms (see the last panel of Figure 3). We infer that event-induced volatility associated with SEOs compared to their matches did not alter the inference of long-run underperformance.

[Table 8]

Like IPOs, SEOs exhibit short-run outperformance in the 1-to-6 month event window. Calendar time and ASR tests in Panels A and B are highly significant for 1- and 3-months after IPOs. As shown by the SEO graph of ASRs in Figure 5, these findings can be attributed largely to the sizeable 1-month overperformance. The ASR graph clearly shows an unmistakable reversal from highly positive abnormal return in the first month to steadily accumulating negative long-run abnormal returns that become significant by the third year.

Table 9 reports test results for dividend initiations (DIVs). Unlike the above samples, in unreported results BHARs do not change when the sample is trimmed and therefore are not affected by outliers. To conserve space we therefore do not report trimmed results. The DIV results are quite interesting. In terms of ASRs, there is highly positive and significant 5-year overperformance among dividend initiators, which agrees with the standardized CCARs in Table 5 discussed earlier. The unscaled return metric, or BHAR, is generally positive but insignificant, except for being negative and significant at the 5% level in the 13–36 month subperiod. The calendar time approach suggests negative but normally insignificant post-event performance, except for the 3-year horizon and the 13–36 month subperiod. We further investigated the latter findings by using an unmodified (value-weighted) CTAR regression (i.e., regressing $(R_{\texttt{test}} - R_f)_{pt}$ rather than $(R_{\texttt{test}} - R_{\texttt{control}})_{pt}$ on the Fama-French factors in equation (2)), which generated positive but insignificant estimated alphas for these two horizons equal to 0.200 with t-value = 1.20 (p-value = 0.230) and 0.057 with t-value = .284 (p-value = .776), respectively. The DIV graph in Figure 5 displays monthly ASRs, which shows that the 5-year overperformance is due to persistent positive ASRs over the 60-months holding period. Referring back to the last graph in Figure 4 showing median monthly volatility, event firms' volatility dropped well below that of matching firms' volatility a few months before the event month. Hence, much of the overperformance in terms of ASRs can be attributed to the lowered total risk of dividend paying firms, which the BHAR and calendar time approaches do not take into account.

[Table 9]

4 Conclusions

This paper sought to contribute a broad set of evidence on the controversial question of whether long-run abnormal returns are associated with major corporate actions. A battery of tests is implemented, including the regression approach of Bessembinder and Zhang (2013), well-known BHAR and calendar time approaches, as well as a recent standardized abnormal return (ASR) approach. All four methods detect long-run abnormal performance for IPOs, SEOs, M&As, and dividend initiations. Upon repeating Bessembinder and Zhang seven-factor regressions, we were able to replicate their findings using factors normalized by their procedure, with the exception of significant underperformance for IPOs. However, we found that their regression model results are primarily driven by the normalization procedure, which affects the regression coefficients (and associated t-values), destabilizes alpha estimates, and inflates alpha standard errors. When the regression analyses were repeated using non-normalized factors that were standardized, abnormal returns of the factor models were significant for all four corporate events.

Further BHAR, calendar time, and ASR tests were generally consistent with the standardized seven-factor regression model results. BHAR tests yielded negative and significant long-run abnormal underperformance over a 5-year horizon after M&As, IPOs, and SEOs but not dividend initiations. Tests based on an adjusted Fama-French three-factor model suggested calendar time abnormal returns were negative and significant for M&As even after 3-to-5 years but for IPOs and SEOs. However, contrary to the other methods, these calendar time tests for dividend initiations were negative (rather than positive) and significant at a 3-year horizon, which was most likely due to inherent bad model problems. Lastly, ASR results strongly indicated negative and significant long-run abnormal returns for M&As, IPOs, and SEOs, in addition to positive and significant performance for dividend initiations. Also, for IPOs and SEOs, a common reversal pattern was 1-month overperformance followed by accumulating underperformance that becomes significant after about 3 years. Graphs using monthly ASRs clearly illustrated this pattern. Based on corroborating findings from different test methods, we conclude that anomalous long-run abnormal returns occur over different post-event horizons. Further research is recommended to better understand what explains long-run abnormal return patterns.

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Table 1: Number of M&As, IPOs, SEOs, and dividend initiations (DIV) in different years.

The M&A sample consists of completed US mergers and acquisitions in the Thomson ONE (SDC) database between 1986 and 2007 with transaction values of $5 million or more. Acquisitions must take the form of a merger (SDC deal form M), acquisition of majority interest (AM), acquisition of remaining interest (AR), or acquisition of partial interest (AP). The acquisition must be a control bid, in which the acquirer owns at leat 50% of the target after the deal. The relative size of the deal (transaction size divided by the market value of the bidder firm before the completion) must be greater than 5%. The SEO sample excludes American Depository Receipts, Global Depository Receipts, unit offerings, and financial and utility firms. The IPO sample excludes Real Estate Investment Trusts, closed-end funds, and American Depository Receipts. Lastly, the dividend initiations (DIV) sample includes common stocks listed on the NYSE, NYSE MKT (AMEX), or NASDAQ with CRSP data available for more than two years. Dividends are ordinary cash in dollars that are paid regularly.

Year	M&A	IPO	SEO	DIV
1980		83	147	48
1981		227	160	31
1982		91	165	52
1983		510	396	47
1984		240	100	55
1985		240	143	80
1986	19	487	211	69
1987	37	373	148	54
1988	31	155	74	91
1989	25	142	113	117
1990	23	133	112	58
1991	42	283	241	43
1992	69	401	222	39
1993	82	506	307	53
1994	115	423	252	129
1995	267	440	309	166
1996	366	647	401	147
1997	415	423	358	96
1998	431	261	253	94
1999	394	396	240	94
2000	365	284	315	112
2001	263	61	302	77
2002	193	57	288	50
2003	205	59	288	91
2004	246	148	386	63
2005	221	129	259	52
2006	222	123	282	63
2007	263	132	265	80
Total	4,294	7,454	6,737	2,151

Table 2: Normalized firm characteristics and long-run abnormal returns on M&As and IPOs.

The table presents OLS regressions of monthly continuously compounded abnormal returns (CCARs) of M&As and IPOs based on normalized differences of firm and market characteristics specified by Bessembinder and Zhang (2013). The length of the event period for each stock is the number of months until 60 months or the time of delisting, whichever comes first. The t-values of the regression coefficients are in parentheses, and standard errors of alphas are in brackets. The middle portion of the table reports F-statistics and their p-values separately for the joint significance of the linear, squared, and cubic terms in the regressions. The bottom portion reports mean CCARs and their t-values as well as number of clusters over which the cross-sectional correlation robust standard errors by Cameron, Gelbach, and Miller (2011) (see also Petersen, 2009) are computed. All the t-values, standard errors of alphas, and F-values in the table are based on these cross-sectional correlation robust standard error computations. The mean CCARs should be interpreted as the average monthly abnormal returns for stocks with event periods up to 60 months rather than 5-year average monthly abnormal returns. It is notable that the number of clusters (N clusters) reported in the bottom portion is the effective number of observations for inferences instead of the considerably higher number of months (N months) or number of firms (N firms) reported in the last two rows at the bottom. Superscripts represent significance levels for two-tailed t-tests as follows: $a = 0.10$, $b = 0.05$, and $c = 0.01$.

		M&A			IPO	
	Linear	2nd order	4th order	Linear	2nd order	4th order
Δbeta	−0.424	−0.404	−0.215	−0.414	−0.415	−0.280
	(−1.16)	(−1.13)	(−0.60)	(−1.55)	(−1.60)	(−0.75)
$(\Delta\text{beta})^2$		−0.309	−0.035		−0.353	−0.392
		(−1.04)	(−0.04)		(−1.22)	(−0.48)
$(\Delta\text{beta})^3$			−0.341			−0.243
			(−0.55)			(−0.46)
$(\Delta\text{beta})^4$			−0.303			0.097
			(−0.31)			(0.09)
Δsize	−0.304	−0.321	−0.157	−0.291	−0.282	−0.398
	(−1.35)	(−1.43)	(−0.30)	(−1.10)	(−1.07)	(−0.91)
$(\Delta\text{size})^2$		−0.227	0.285		0.786^{c}	3.531^{c}
		(−0.74)	(0.31)		(2.62)	(3.97)
$(\Delta\text{size})^3$			−0.403			0.129
			(−0.64)			(0.27)
$(\Delta\text{size})^4$			−0.483			-2.888^{c}
			(−0.56)			(−3.47)
ΔBM	−0.042	−0.064	−0.075	0.761^{c}	0.713^{c}	1.442^{c}
	(−0.24)	(−0.36)	(−0.23)	(3.33)	(3.05)	(3.45)
$(\Delta\text{BM})^2$		0.377	1.340		−0.231	0.809
		(1.56)	(1.60)		(−0.99)	(1.09)
$(\Delta\text{BM})^3$			0.004			-1.241^{b}
			(0.01)			(−2.33)
$(\Delta\text{BM})^4$			−1.124			−1.413
			(−1.22)			(−1.56)
Δmom	1.266^{c}	1.284^{c}	0.543	1.677^{c}	1.658^{c}	1.809^{c}
	(2.96)	(3.00)	(1.24)	(5.17)	(5.14)	(4.90)
$(\Delta\text{mom})^2$		-0.556^{b}	−1.027		−0.186	−0.648
		(−2.10)	(−1.34)		(−0.78)	(−0.82)
$(\Delta\text{mom})^3$			1.103^{a}			−0.284
			(1.80)			(−0.55)
$(\Delta\text{mom})^4$			0.527			0.450
			(0.57)			(0.52)
Δilliq	0.255	0.258	−0.538	0.728^{c}	0.693^{c}	−0.180
	(1.16)	(1.18)	(−1.14)	(3.14)	(2.97)	(−0.48)
$(\Delta\text{illiq})^2$		−0.205	0.274		0.839^{b}	2.353^{b}
		(−0.56)	(0.27)		(2.00)	(2.28)
$(\Delta\text{illiq})^3$			1.454^{b}			1.461^{c}
			(2.19)			(2.65)
$(\Delta\text{illiq})^4$			−0.370			−1.624
			(−0.33)			(−1.51)
Δisv	-1.647^{c}	-1.648^{c}	0.188	-2.259^{c}	-2.220^{c}	-1.236^{c}
	(−4.19)	(−4.22)	(0.46)	(−5.74)	(−5.77)	(−2.61)
$(\Delta\text{isv})^2$		0.218	0.067		−0.401	0.959
		(0.70)	(0.08)		(−1.11)	(1.13)
$(\Delta\text{isv})^3$			-3.158^{c}			-1.754^{c}
			(−4.62)			(−2.63)
$(\Delta\text{isv})^4$			0.264			−1.334
			(0.26)			(−1.25)
Δinv	−0.258	−0.227	0.183	−0.168	−0.129	−0.463
	(−1.21)	(−1.05)	(0.50)	(−0.80)	(−0.62)	(−1.40)
$(\Delta\text{inv})^2$		0.079	−0.035		-0.514^{a}	1.525^{b}
		(0.34)	(−0.04)		(−1.90)	(2.03)
$(\Delta\text{inv})^3$			−0.772			0.480
			(−1.48)			(1.07)
$(\Delta\text{inv})^4$			0.194			-2.380^{c}
			(0.20)			(−2.77)
$\hat{\alpha}$	-0.290^{c}	−0.067	−0.316	-0.760^{c}	-0.792^{c}	-1.714^{c}
	(−2.77)	(−0.26)	(−0.97)	(−4.27)	(−2.90)	(−5.26)
Std. Error ($\hat{\alpha}$)	[0.105]	[0.253]	[0.327]	[0.178]	[0.273]	[0.326]
Adjusted R^2	0.004	0.005	0.004	0.005	0.004	0.006
F for linear terms	5.13	5.23	0.48	14.99	14.73	5.01
p-value	0.000	0.000	0.846	0.000	0.000	0.000
F for 2nd order terms		1.14	0.62		2.51	4.60
p-value		0.335	0.741		0.016	0.000
F for 3rd order terms			5.15			3.08
p-value			0.000			0.004
F for 4th order terms			0.37			4.27
p-value			0.921			0.000
Mean(CCAR)	-0.447^{c}			-1.376^{c}		
t-value	−3.78			−5.37		
N clusters	323			377		
N months	103,218			148,632		
N firms	2,703			4,650		

Table 3: Normalized firm characteristics and long-run abnormal returns on SEOs and DIVs.

The table presents OLS regressions of monthly continuously compounded abnormal returns (CCARs) of SEOs and dividend initiations (DIVs) based on normalized differences of firm and market characteristics specified by Bessembinder and Zhang (2013). The length of the event period for each stock is the number of months until 60 months or the time of delisting, whichever comes first. The t-values of the regression coefficients are in parentheses, and standard errors of alphas are in brackets. The middle portion of the table reports F-statistics and their p-values separately for the joint significance of the linear, squared, and cubic terms in the regressions. The bottom portion reports mean CCARs and their t-values as well as number of clusters over which the cross-sectional correlation robust standard errors by Cameron, Gelbach, and Miller (2011) (see also Petersen, 2009) are computed. All the t-values, standard errors of alphas, and F-values in the table are based on these cross-sectional correlation robust standard error computations. The mean CCARs should be interpreted as the average monthly abnormal returns for stocks with event periods up to 60 months rather than 5-year average monthly abnormal returns. It is notable that the number of clusters (N clusters) reported in the bottom portion is the effective number of observations for inferences instead of the considerably higher number of months (N months) or number of firms (N firms) reported in the last two rows at the bottom. Superscripts represent significance levels for two-tailed t-tests as follows: $a = 0.10$, $b = 0.05$, and $c = 0.01$.

	SEO			DIV		
	Linear	2nd order	4th order	Linear	2nd order	4th order
Δbeta	-0.296	-0.288	0.060	-0.137	-0.106	0.044
	(-1.39)	(-1.37)	(0.24)	(-0.61)	(-0.47)	(0.11)
$(\Delta\text{beta})^2$		-0.154	0.781		0.417	-1.452
		(-0.82)	(1.30)		(1.41)	(-1.44)
$(\Delta\text{beta})^3$			-0.622^{a}			-0.309
			(-1.67)			(-0.48)
$(\Delta\text{beta})^4$			-1.027			2.156^{a}
			(-1.45)			(1.83)
Δsize	-0.447^{c}	-0.435^{c}	-0.755^{b}	-0.350^{a}	-0.329^{a}	-0.573
	(-2.83)	(-2.75)	(-2.26)	(-1.95)	(-1.83)	(-1.39)
$(\Delta\text{size})^2$		-0.180	-0.587		-0.273	-0.965
		(-0.80)	(-0.82)		(-0.81)	(-0.87)
$(\Delta\text{size})^3$			0.390			0.282
			(0.92)			(0.51)
$(\Delta\text{size})^4$			0.471			0.822
			(0.66)			(0.74)
ΔBM	-0.072	-0.083	0.424^{a}	-0.087	-0.092	0.045
	(-0.56)	(-0.64)	(1.86)	(-0.48)	(-0.51)	(0.12)
$(\Delta\text{BM})^2$		0.405^{b}	0.367		-0.412	-0.975
		(2.06)	(0.58)		(-1.31)	(-1.01)
$(\Delta\text{BM})^3$			-0.897^{b}			-0.230
			(-2.42)			(-0.42)
$(\Delta\text{BM})^4$			0.008			0.701
			(0.01)			(0.64)
Δmom	1.311^{c}	1.324^{c}	1.349^{c}	1.571^{c}	1.528^{c}	1.394^{c}
	(4.87)	(4.94)	(4.68)	(6.61)	(6.46)	(3.62)
$(\Delta\text{mom})^2$		0.177	1.292^{b}		0.245	0.090
		(0.89)	(2.18)		(0.73)	(0.09)
$(\Delta\text{mom})^3$			-0.073			0.165
			(-0.16)			(0.26)
$(\Delta\text{mom})^4$			-1.306^{a}			0.151
			(-1.90)			(0.13)
Δilliq	0.468^{c}	0.478^{c}	-0.003	0.417^{a}	0.376^{a}	-0.100
	(3.01)	(3.01)	(-0.01)	(1.86)	(1.68)	(-0.24)
$(\Delta\text{illiq})^2$		-0.183	0.046		0.588	1.290
		(-0.70)	(0.06)		(1.39)	(1.08)
$(\Delta\text{illiq})^3$			0.902^{b}			0.899
			(2.26)			(1.39)
$(\Delta\text{illiq})^4$			-0.097			-0.968
			(-0.12)			(-0.74)
Δisv	-1.674^{c}	-1.672^{c}	-0.275	-1.241^{c}	-1.195^{c}	0.263
	(-6.22)	(-6.25)	(-0.89)	(-5.60)	(-5.42)	(0.64)
$(\Delta\text{isv})^2$		-0.128	0.920		0.462	-0.512
		(-0.57)	(1.41)		(1.32)	(-0.47)
$(\Delta\text{isv})^3$			-2.433^{c}			-2.533^{c}
			(-5.53)			(-3.75)
$(\Delta\text{isv})^4$			-1.141			1.098
			(-1.37)			(0.83)
Δinv	0.024	0.034	0.272	-0.099	-0.123	-0.157
	(0.17)	(0.24)	(1.26)	(-0.61)	(-0.76)	(-0.43)
$(\Delta\text{inv})^2$		0.052	-0.261		0.097	-0.082
		(0.25)	(-0.42)		(0.32)	(-0.09)
$(\Delta\text{inv})^3$			-0.460			-0.002
			(-1.30)			(0.00)
$(\Delta\text{inv})^4$			0.405			0.208
			(0.55)			(0.20)
$\hat{\alpha}$	-0.135	-0.136	-0.458^{b}	0.337^{c}	0.011	0.455
	(-1.32)	(-0.79)	(-1.97)	(3.43)	(0.04)	(1.16)
Std. Error ($\hat{\alpha}$)	[0.102]	[0.172]	[0.232]	[0.098]	[0.263]	[0.391]
Adjusted R^2	0.003	0.004	0.003	0.004	0.004	0.005
F for linear terms	14.10	14.50	5.25	12.06	11.36	2.11
p-value	0.000	0.000	0.000	0.000	0.000	0.042
F for 2nd order terms		0.83	1.53		2.10	0.77
p-value		0.563	0.154		0.042	0.610
F for 3rd order terms			6.83			2.41
p-value			0.000			0.020
F for 4th order terms			1.26			0.81
p-value			0.268			0.582
Mean(CCAR)	-0.357^{c}			0.422^{c}		
t-value	-3.11			4.14		
N clusters	396			393		
N months	213,855			47,222		
N firms	5,556			1,170		

Table 4: Standardized firm characteristics and long-run abnormal returns on M&As and IPOs.

The table presents OLS regressions of monthly continuously compounded abnormal returns (CCARs) of M&As and IPOs, SEOs, and dividend initiations (DIVs) based on normalized differences of firm and market characteristics specified by Bessembinder and Zhang (2013). Unlike Table 2 above as well as Table 4 in Bessembinder and Zhang, original non-normalized values of the factors are used. However, we standardize the factors by means of dividing by their standard deviations computed over the pooled panel observations, such that all the factors have unit variances. Like Table 2, the length of the event period for each stock is the number of months until 60 months or the time of delisting, whichever comes first. The t-values of the regression coefficients are in parentheses, and standard errors of alphas are in brackets. The middle portion of the table reports F-statistics and their p-values for the joint significance of the squared terms in the regressions. The bottom portion reports mean CCARs and their t-values as well as number of clusters over which the cross-sectional correlation robust standard errors by Cameron, Gelbach, and Miller (2011) (see also Petersen, 2009) are computed. All the t-values, standard errors of alphas, and F-values in the table are based on these cross-sectional correlation robust standard error computations. The mean CCARs should be interpreted as the average monthly abnormal returns for stocks with event periods up to 60 months rather than 5-year average monthly abnormal returns. It is notable that the number of clusters (N clusters) reported in the bottom portion is the effective number of observations for inferences instead of the considerably higher number of months (N months) or number of firms (N firms) reported in the last two rows at the bottom. Superscripts represent significance levels for two-tailed t-tests as follows: $a = 0.10$, $b = 0.05$, and $c = 0.01$.

		M&A			IPO	
	Linear	2nd order	4th order	Linear	2nd order	4th order
Δbeta	-0.315	-0.300	-0.336	-0.314^{b}	-0.317^{b}	-0.436^{c}
	(-1.57)	(-1.50)	(-1.52)	(-2.26)	(-2.29)	(-2.96)
$(\Delta$beta$)^2$		-0.023	-0.073^{b}		0.025	-0.017
		(-1.42)	(-2.17)		(0.67)	(-0.34)
$(\Delta$beta$)^3$			0.003^{a}			0.009^{c}
			(1.94)			(3.05)
Δsize			0.000			0.001^{b}
			(1.44)			(2.26)
$(\Delta$size$)^2$	-0.081	-0.115	-0.197^{a}	0.069	0.079	0.045
	(-1.24)	(-1.37)	(-1.79)	(0.57)	(0.64)	(0.26)
$(\Delta$size$)^3$		0.003	0.012^{b}		-0.003	-0.008
		(0.91)	(2.07)		(-1.18)	(-1.48)
ΔBM			0.000			0.000
			(1.00)			(-0.11)
$(\Delta$BM$)^2$			0.000^{b}			0.000
			(-2.20)			(1.41)
$(\Delta$BM$)^3$	0.166^{a}	0.017	0.297	0.519^{c}	0.498^{c}	0.638^{c}
	(1.72)	(0.10)	(0.99)	(4.09)	(3.76)	(4.29)
Δmom		0.001	-0.054		-0.013	-0.009
		(1.01)	(-1.22)		(-0.90)	(-0.35)
$(\Delta$mom$)^2$			0.001			-0.004^{c}
			(1.09)			(-3.89)
$(\Delta$mom$)^3$			0.000			0.000
			(-1.04)			(-1.39)
Δilliq	0.462^{a}	0.477^{a}	0.656^{b}	0.496	0.520^{a}	0.793^{c}
	(1.83)	(1.84)	(2.28)	(1.63)	(1.65)	(2.75)
$(\Delta$illiq$)^2$		-0.004	-0.010		-0.014	-0.046^{c}
		(-0.69)	(-0.88)		(-1.13)	(-3.01)
$(\Delta$illiq$)^3$			-0.002^{c}			-0.003^{c}
			(-3.31)			(-3.18)
Δisv			0.000^{c}			0.000^{c}
			(3.10)			(3.83)
$(\Delta$isv$)^2$	0.563	0.875^{b}	1.663^{b}	0.254^{b}	0.309^{b}	0.368^{a}
	(1.37)	(1.97)	(2.50)	(2.17)	(2.18)	(1.72)
$(\Delta$isv$)^3$		-0.102^{a}	-0.242		0.004	0.001
		(-1.88)	(-1.23)		(1.01)	(0.11)
Δinv			-0.038^{a}			0.000
			(-1.76)			(-0.69)
$(\Delta$inv$)^2$			0.004			0.000
			(1.35)			(-0.52)
$(\Delta$inv$)^3$	-1.062^{c}	-1.068^{c}	-1.279^{c}	-1.232^{c}	-1.144^{c}	-1.714^{c}
	(-3.02)	(-3.04)	(-3.19)	(-3.50)	(-3.21)	(-4.68)
$\hat{\alpha}$	-0.332^{c}	-0.312^{c}	-0.292^{c}	-0.831^{c}	-0.775^{c}	-0.651^{c}
	(-3.34)	(-3.09)	(-2.84)	(-4.82)	(-4.48)	(-3.96)
Std. Error ($\hat{\alpha}$)	[0.099]	[0.101]	[0.103]	[0.172]	[0.173]	[0.164]
Adjusted R^2	0.003	0.004	0.003	0.004	0.004	0.006
F for linear terms	3.05	3.31	4.03	5.24	4.70	7.71
p-value	0.004	0.002	0.000	0.000	0.000	0.000
F for 2nd order terms		1.37	1.80		0.83	2.51
p-value		0.219	0.087		0.564	0.016
F for 3rd order terms			3.40			5.21
p-value			0.002			0.000
F for 4th order terms			4.17			4.04
p-value			0.000			0.000
Mean(CCAR)	-0.447^{c}			-1.376^{c}		
t-value	-3.78			-5.37		
N clusters	323			377		
N months	103,218			148,632		
N firms	2,703			4,650		

Table 5: Standardized firm characteristics and long-run abnormal returns on SEOs and DIVs.

The table presents OLS regressions of monthly continuously compounded abnormal returns (CCARs) of SEOs and dividend initiations (DIVs) based on normalized differences of firm and market characteristics specified by Bessembinder and Zhang (2013). Unlike Table 3 above as well as Table 4 in Bessembinder and Zhang, original non-normalized values of the factors are used. However, we standardize the factors by means of dividing by their standard deviations computed over the pooled panel observations, such that all the factors have unit variances. Like Table 3, the length of the event period for each stock is the number of months until 60 months or the time of delisting, whichever comes first. The t-values of the regression coefficients are in parentheses, and standard errors of alphas are in brackets. The middle portion of the table reports F-statistics and their p-values for the joint significance of the squared terms in the regressions. The bottom portion reports mean CCARs and their t-values as well as number of clusters over which the cross-sectional correlation robust standard errors by Cameron, Gelbach, and Miller (2011) (see also Petersen, 2009) are computed. All the t-values, standard errors of alphas, and F-values in the table are based on these cross-sectional correlation robust standard error computations. The mean CCARs should be interpreted as the average monthly abnormal returns for stocks with event periods up to 60 months rather than 5-year average monthly abnormal returns. It is notable that the number of clusters (N clusters) reported in the bottom portion is the effective number of observations for inferences instead of the considerably higher number of months (N months) or number of firms (N firms) reported in the last two rows at the bottom. Superscripts represent significance levels for two-tailed t-tests as follows: $a = 0.10$, $b = 0.05$, and $c = 0.01$.

	SEO			DIV		
	Linear	2nd order	4th order	Linear	2nd order	4th order
Δbeta	-0.306^b	-0.294^b	-0.273^a	-0.188	-0.101	-0.127
	(-2.37)	(-2.29)	(-1.91)	(-1.37)	(-0.75)	(-0.83)
$(\Delta\text{beta})^2$		-0.015	-0.052^a		0.085^a	0.187^c
		(-0.83)	(-1.92)		(1.74)	(2.80)
$(\Delta\text{beta})^3$			0.001			0.013
			(0.30)			(1.47)
$(\Delta\text{beta})^4$			0.000			-0.003^b
			(1.58)			(-2.29)
Δsize	-0.079	-0.092	-0.100	-0.146	-0.161	-0.197
	(-1.52)	(-1.54)	(-1.00)	(-1.28)	(-0.96)	(-1.23)
$(\Delta\text{size})^2$		0.001	0.003		0.000	0.019
		(0.67)	(1.19)		(0.01)	(0.59)
$(\Delta\text{size})^3$			0.000			0.000
			(-0.04)			(0.08)
$(\Delta\text{size})^4$			0.000			0.000
			(-0.57)			(-0.59)
ΔBM	0.079	0.053	-0.023	-0.080	-0.129	0.093
	(0.88)	(0.60)	(-0.24)	(-0.60)	(-0.89)	(0.60)
$(\Delta\text{BM})^2$		0.008	0.030^b		-0.014^a	-0.001
		(0.96)	(2.27)		(-1.66)	(-0.04)
$(\Delta\text{BM})^3$			0.001^a			-0.001
			(1.67)			(-1.42)
$(\Delta\text{BM})^4$			0.000^b			0.000
			(-2.35)			(-1.03)
Δmom	0.434^b	0.424^b	0.499^b	0.545^c	0.639^c	0.910^c
	(2.12)	(2.12)	(2.35)	(3.46)	(3.70)	(5.39)
$(\Delta\text{mom})^2$		0.008	0.000		0.033^a	0.042
		(0.60)	(0.00)		(1.76)	(1.52)
$(\Delta\text{mom})^3$			-0.001^b			-0.012^c
			(-2.12)			(-5.00)
$(\Delta\text{mom})^4$			0.000			0.000^c
			(0.40)			(-5.63)
Δilliq	0.195^b	0.540^b	0.834^c	0.069	0.482	0.527
	(2.13)	(2.22)	(2.65)	(0.36)	(1.04)	(0.81)
$(\Delta\text{illiq})^2$		0.005	0.004		0.005	-0.053
		(1.57)	(0.24)		(0.85)	(-0.51)
$(\Delta\text{illiq})^3$			-0.002^a			-0.005
			(-1.73)			(-0.30)
$(\Delta\text{illiq})^4$			0.000^a			0.000
			(-1.76)			(-0.27)
Δisv	-1.034^c	-1.066^c	-1.299^c	-0.699^c	-0.711^c	-1.001^c
	(-4.22)	(-4.32)	(-4.82)	(-3.48)	(-3.36)	(-4.38)
$(\Delta\text{isv})^2$		-0.023	0.029		-0.006	0.080
		(-0.59)	(0.60)		(-0.58)	(1.57)
$(\Delta\text{isv})^3$			0.009^b			0.027^c
			(2.12)			(3.23)
$(\Delta\text{isv})^4$			0.000			0.001^c
			(-0.98)			(2.91)
Δinv	-0.101	-0.141^a	-0.125	-0.151	-0.134	-0.240
	(-1.30)	(-1.79)	(-1.20)	(-1.41)	(-1.29)	(-1.56)
$(\Delta\text{inv})^2$		0.008	0.028^c		-0.003	-0.011
		(1.23)	(3.02)		(-0.52)	(-0.55)
$(\Delta\text{inv})^3$			0.000			0.000
			(-0.03)			(0.59)
$(\Delta\text{inv})^4$			0.000			0.000
			(-1.03)			(-0.03)
$\hat{\alpha}$	-0.274^c	-0.247^b	-0.268^c	0.315^c	0.239^b	0.061
	(-2.61)	(-2.35)	(-2.65)	(3.40)	(2.34)	(0.59)
Std. Error ($\hat{\alpha}$)	[0.105]	[0.105]	[0.101]	[0.093]	[0.102]	[0.102]
Adjusted R^2	0.003	0.002	0.003	0.003	0.004	0.005
F for linear terms	4.19	4.27	5.19	4.80	4.82	8.39
p-value	0.000	0.000	0.000	0.000	0.000	0.000
F for 2nd order terms		0.99	2.67		1.59	2.17
p-value		0.439	0.010		0.136	0.036
F for 3rd order terms			2.53			5.76
p-value			0.015			0.000
F for 4th order terms			1.95			6.66
p-value			0.061			0.000
Mean(CCAR)	-0.357^c			0.422^c		
t-value	-3.11			4.14		
N clusters	396			393		
N months	213,855			47,222		
N firms	5,556			1,170		

Table 6: Additional tests of merger and acquisition (M&A) abnormal returns.

The sample contains CRSP database M&As in the period January 1986 to December 2007 that have 60 months post-event returns available. Panel A reports results for all M&As, and Panel B excludes 1% of M&As with the most extreme post-event holding period returns (i.e., 0.5% from both tails). BHAR is the buy-and-hold abnormal return defined in equation (1), CTAR(α_p), or calendar time abnormal return, is the intercept term of the modified Fama-French three-factor model defined in equation (2) estimated using weighted least squares (WLS), and ASR is the average per month abnormal standardized return defined in equation (10). `BHAR-T` and `ASR-T` are the buy-and-hold abnormal return t-ratio and abnormal standardized return t-statistic as defined in equations (6) and (9), respectively. Superscripts represent significance levels for two-tailed t-tests as follows: $a = 0.10$, $b = 0.05$, and $c = 0.01$.

	M&A	Post-Event Periods										
								Subperiod (Months)				
	Month	1 Month	2 Months	6 Months	1 Year	3 Years	5 Years	2-6	7-12	2-12	13-36	37-60
Panel A: Post-event subperiod statistics (N = 1,838)												
BHAR(%)	0.51	−1.56	−1.22	−4.26	−6.56	−10.23	−6.70	−3.63	−2.65	−5.57	−4.06	−0.10
CTAR(α_p)	0.74	−0.18	−0.17	−0.28	−0.20	−0.58	−0.35	−0.32	−0.03	−0.24	−0.64	0.02
ASR	0.05	0.00	−0.03	−0.08	−0.10	−0.09	−0.10	−0.09	−0.06	−0.11	−0.03	−0.05
BHAR-T	1.03	-3.36^c	-2.16^b	-3.47^c	-2.96^c	-2.65^c	−0.63	-3.25^c	-2.32^b	-2.86^c	−1.03	−0.03
CALENDAR-T	1.13	−0.37	−0.44	−0.94	−0.84	-3.61^c	-2.33^b	−0.99	−0.12	−0.98	-3.54^c	0.10
ASR-T	1.49	0.04	−0.80	-2.48^b	-2.74^c	-1.94^a	-1.88^a	-2.90^c	-1.92^a	-2.96^c	−0.86	−1.28
Panel B: Post-event subperiod statistics, 1% trimmed sample (N = 1,828)												
	M&A	Post-Event Periods										
								Subperiod (Months)				
	Month	1 Month	2 Months	6 Months	1 Year	3 Years	5 Years	2-6	7-12	2-12	13-36	37-60
BHAR(%)	0.48	−1.65	−1.29	−4.44	−6.85	−11.81	−22.92	−3.74	−2.63	−5.81	−4.45	−1.83
CTAR(α_p)	0.70	−0.18	−0.17	−0.29	−0.21	−0.60	−0.44	−0.34	−0.04	−0.25	−0.66	−0.08
ASR	0.04	−0.01	−0.03	−0.08	−0.10	−0.06	−0.08	−0.09	−0.06	−0.10	0.00	−0.05
BHAR-T	0.98	-3.54^c	-2.28^b	-3.61^c	-3.09^c	-3.13^c	-4.31^c	-3.36^c	-2.31^b	-2.98^c	−1.13	−0.54
CALENDAR-T	1.07	−0.39	−0.43	−0.98	−0.87	-3.73^c	-2.89^c	−1.05	−0.13	−1.02	-3.64^c	−0.34
ASR-T	1.32	−0.46	−0.84	-2.42^b	-2.64^c	−1.27	−1.45	-2.54^b	-1.93^a	-2.70^c	0.08	−1.21

Table 7: Additional tests of initial public offering (IPO) abnormal returns.

The sample contains CRSP database IPOs in the period January 1980 to December 2007 that have 60 months post-event returns available. Panel A reports results for all IPOs, and Panel B excludes 1% of IPOs with the most extreme holding period returns (i.e., 0.5% from both tails). BHAR is the buy-and-hold abnormal return defined in equation (1), CTAR(α_p), or calendar time abnormal return, is the intercept term of the modified Fama-French three-factor model defined in equation (2) estimated using weighted least squares (WLS), and ASR is the average per month abnormal standardized return defined in equation (10). `BHAR-T` and `ASR-T` are the buy-and-hold abnormal return t-ratio and abnormal standardized return t-statistic as defined in equations (6) and (9), respectively. Superscripts represent significance levels for two-tailed t-tests as follows: $a = 0.10$, $b = 0.05$, and $c = 0.01$.

		Post-Event Periods										
	IPO							Subperiod (Months)				
	Month	1 Month	2 Months	6 Months	1 Year	3 Years	5 Years	2-6	7-12	2-12	13-36	37-60
Panel A: Post-event subperiod statistics (N = 3,077)												
BHAR(%)	0.01	1.75	3.15	1.04	−2.57	−16.75	−33.56	−1.16	−2.80	−4.86	−6.59	−0.01
CTAR(α_p)	1.08	2.95	1.88	0.63	0.25	0.16	−0.25	0.30	0.21	0.16	−0.04	−0.63
ASR	−0.03	0.06	0.03	−0.06	−0.16	−0.34	−0.43	−0.09	−0.17	−0.19	−0.30	−0.26
BHAR-T	0.03	3.58^c	4.23^c	0.71	−1.16	-3.51^c	-3.68^c	−0.95	-2.55^b	-2.38^b	-1.91^a	0.00
CALENDAR-T	1.66^a	4.52^c	3.82^c	1.75^a	0.89	0.64	−0.62	0.80	0.58	0.55	−0.15	−1.36
ASR-T	−0.76	2.00^b	0.80	−1.40	-3.10^c	-5.46^c	-6.19^c	-2.33^b	-4.08^c	-3.69^c	-5.94^c	-5.56^c
Panel B: Post-event subperiod statistics, 1% trimmed sample (N = 3,061)												
		Post-Event Periods										
	IPO							Subperiod (Months)				
	Month	1 Month	2 Months	6 Months	1 Year	3 Years	5 Years	2-6	7-12	2-12	13-36	37-60
BHAR(%)	0.03	1.77	3.17	1.08	−2.91	−19.06	−47.03	−1.13	−2.84	−5.11	−7.15	−1.26
CTAR(α_p)	1.07	2.91	1.81	0.63	0.25	0.15	−0.26	0.31	0.19	0.16	−0.05	−0.63
ASR	−0.03	0.06	0.03	−0.06	−0.16	−0.34	−0.43	−0.09	−0.16	−0.18	−0.30	−0.26
BHAR-T	0.07	3.62^c	4.24^c	0.73	−1.33	-4.28^c	-7.88^c	−0.92	-2.59^c	-2.53^b	-2.07^b	−0.41
CALENDAR-T	1.65^a	4.42^c	3.65^c	1.75^a	0.87	0.60	−0.63	0.83	0.53	0.56	−0.17	−1.36
ASR-T	−0.76	1.98^b	0.79	−1.37	-3.06^c	-5.49^c	-6.25^c	-2.29^b	-4.06^c	-3.66^c	-5.99^c	-5.62^c

Table 8: Additional tests of seasonal equity offerings (SEO) abnormal returns.

The sample contains CRSP database SEOs in the period January 1980 to December 2007 that have 60 months post-event returns available. BHAR is the buy-and-hold abnormal return defined in equation (1), CTAR(α_p), or calendar time abnormal return, is the intercept term of the modified Fama-French three-factor model defined in equation (2) estimated using weighted least squares (WLS), and ASR is the average per month abnormal standardized return defined in equation (10). `BHAR-T` and `ASR-T` are the buy-and-hold abnormal return t-ratio and abnormal standardized return t-statistic as defined in equations (6) and (9), respectively. Superscripts represent significance levels for two-tailed t-tests as follows: $a = 0.10$, $b = 0.05$, and $c = 0.01$.

		Post-Event Periods										
	SEO							Subperiod (Months)				
	Month	1 Month	2 Months	6 Months	1 Year	3 Years	5 Years	2-6	7-12	2-12	13-36	37-60
Panel A: Post-event subperiod statistics (N = 3,052)												
BHAR(%)	0.49	0.24	1.18	2.06	−0.61	−9.54	−9.91	0.48	−2.12	−2.68	−4.37	4.63
CTAR(α_p)	0.67	1.62	0.87	0.25	−0.05	−0.39	−0.34	−0.04	−0.31	−0.17	−0.49	−0.36
ASR	−0.02	0.10	0.08	0.04	−0.01	−0.12	−0.13	0.00	−0.06	−0.05	−0.14	−0.06
BHAR-T	1.25	0.61	2.33^b	2.11^b	−0.42	-3.34^c	-1.84^a	0.56	-2.20^b	-1.98^b	-1.77^a	1.87^a
CALENDAR-T	1.52	3.74^c	2.60^c	0.89	−0.21	-1.77^a	−1.35	−0.14	−1.19	−0.79	-2.27^b	−1.20
ASR-T	−0.87	4.35^c	3.18^c	1.40	−0.36	-2.58^c	-2.46^b	0.06	-2.04^b	−1.27	-3.50^c	−1.57
Panel B: Post-event subperiod statistics, 1% trimmed sample (N = 3,036)												
		Post-Event Periods										
	SEO							Subperiod (Months)				
	Month	1 Month	2 Months	6 Months	1 Year	3 Years	5 Years	2-6	7-12	2-12	13-36	37-60
BHAR(%)	0.52	0.23	1.18	2.00	−0.58	−10.67	−17.05	0.41	−2.01	−2.63	−5.10	3.57
CTAR(α_p)	0.56	1.60	0.86	0.21	−0.04	−0.42	−0.36	−0.08	−0.28	−0.17	−0.53	−0.44
ASR	−0.02	0.10	0.08	0.04	−0.01	−0.12	−0.13	0.00	−0.06	−0.05	−0.14	−0.06
BHAR-T	1.31	0.58	2.33^b	2.04^b	−0.40	-3.80^c	-4.03^c	0.48	-2.09^b	-1.94^a	-2.10^b	1.50
CALENDAR-T	1.26	3.69^c	2.57^b	0.77	−0.20	-1.88^a	−1.41	−0.26	−1.10	−0.77	-2.44^b	−1.45
ASR-T	−0.82	4.30^c	3.13^c	1.33	−0.37	-2.60^c	-2.49^b	0.00	-1.99^b	−1.26	-3.53^c	−1.59

Table 9: Additional tests of dividend initiations (DIV) abnormal returns.

The sample contains CRSP database dividend initiations (DIVs) in the period January 1980 to December 2007 that have 60 months post-event returns available ($N = 970$). BHAR is the buy-and-hold abnormal return defined in equation (1), CTAR(α_p), or calendar time abnormal return, is the intercept term of the modified Fama-French three-factor model defined in equation (2) estimated using weighted least squares (WLS), and ASR is the average per month abnormal standardized return defined in equation (10). `BHAR-T` and `ASR-T` are the buy-and-hold abnormal return t-ratio and abnormal standardized return t-statistic as defined in equations (6) and (9), respectively. Superscripts represent significance levels for two-tailed t-tests as follows: $a = 0.10$, $b = 0.05$, and $c = 0.01$.

	DIV	Post-Event Periods										
								Subperiod (Months)				
	Month	1 Month	2 Months	6 Months	1 Year	3 Years	5 Years	2-6	7-12	2-12	13-36	37-60
Panel A: Post-event subperiod statistics (N = 970)												
BHAR(%)	1.36	−0.18	0.49	0.37	0.15	−2.40	5.94	0.01	0.84	−0.10	−7.83	3.16
CTAR(α_p)	1.56	0.14	0.22	−0.25	−0.07	−0.44	−0.27	−0.29	0.08	−0.10	−0.70	0.03
ASR	0.20	0.04	0.12	0.17	0.18	0.16	0.24	0.17	0.10	0.18	0.07	0.18
BHAR-T	2.53^b	−0.31	0.61	0.25	0.06	−0.46	0.65	0.01	0.62	−0.05	-2.04^b	0.74
CALENDAR-T	2.22^b	0.18	0.35	−0.63	−0.23	-1.90^a	−1.40	−0.71	0.20	−0.32	-2.63^c	0.12
ASR-T	4.55^c	0.91	2.79^c	3.43^c	3.60^c	2.73^c	3.50^c	3.61^c	2.15^b	3.63^c	1.23	3.24^c

Figure 1: Characteristics of M&A firms and their matched control firms for 60-month event periods before and after the M&A month ($t = 0$). Following Bessembinder and Zhang, the plots report average (in terms of median or means) beta, size, BM, momentum, idiosynctratic volatility, illiquidity, and investments. The event sample consists of $n = 4{,}294$ M&As in the CRSP database from January 1986 to December 2007.

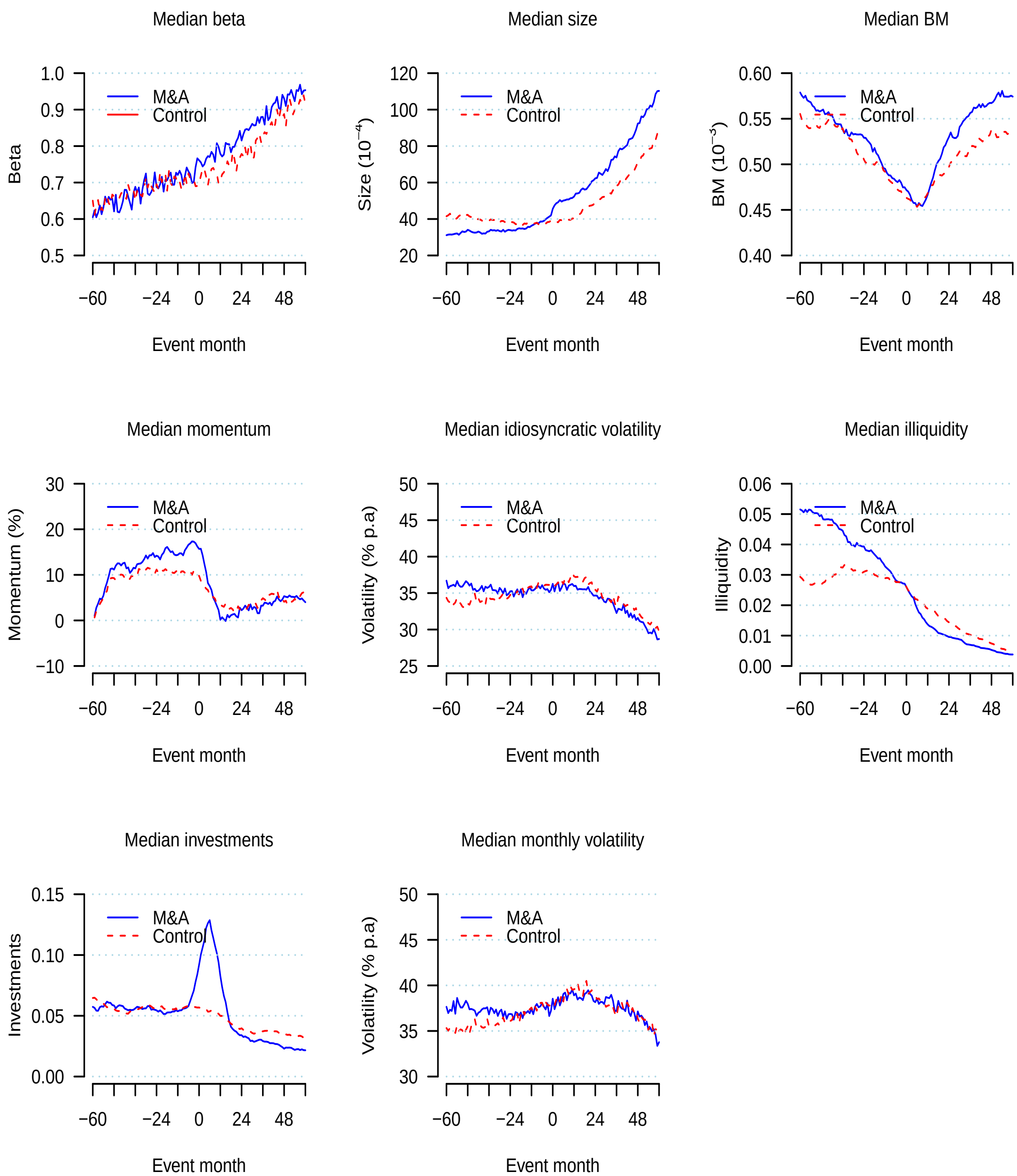

Figure 2: Characteristics of IPO firms and their matched control firms for 60-month event periods after the IPO month ($t = 0$). Following Bessembinder and Zhang, the plots report average (in terms of median or means) beta, size, BM, momentum, idiosyncratic volatility, illiquidity, and investments. The event sample consists of n = 7,454 IPOs in the CRSP database from January 1980 to December 2007.

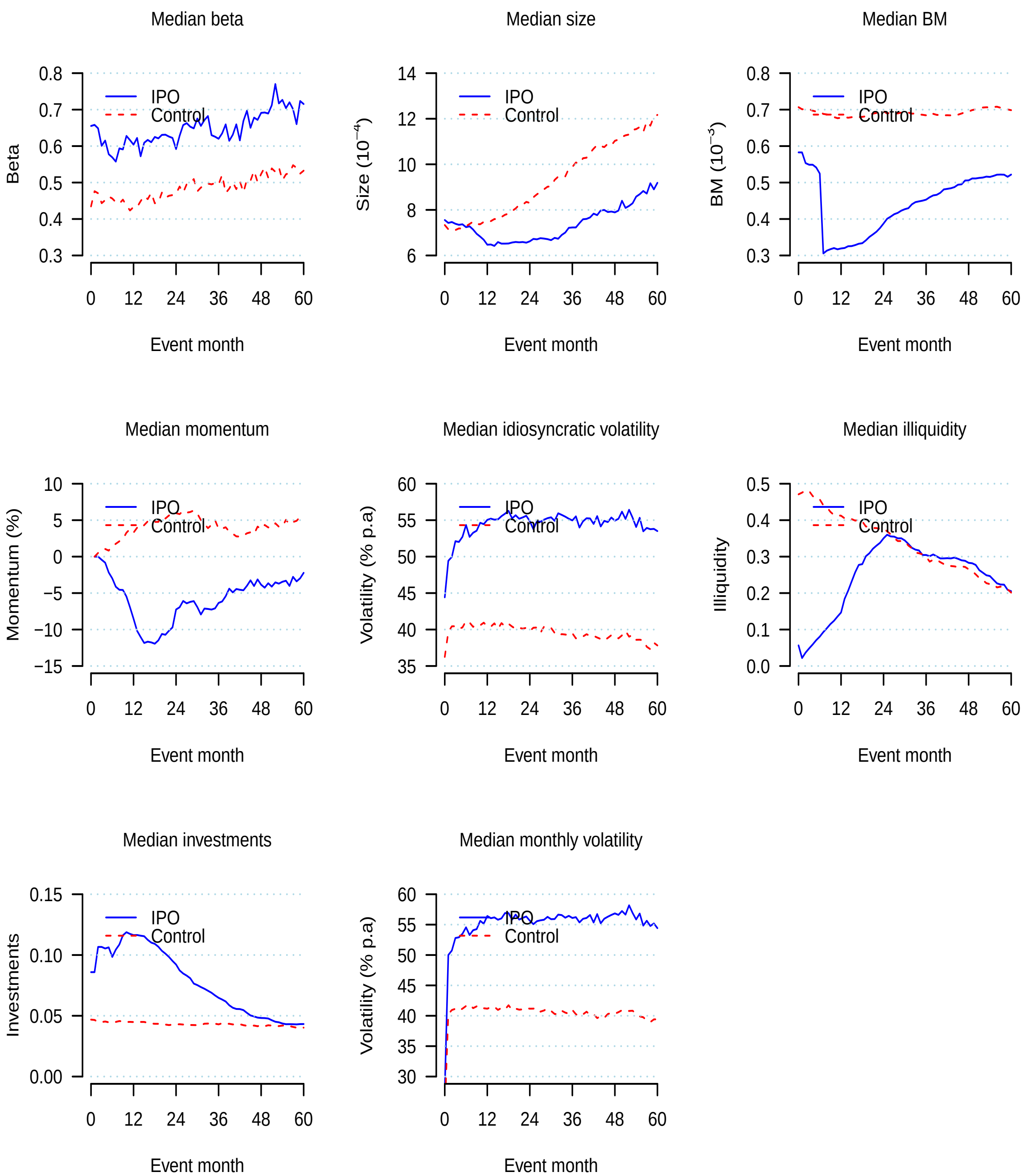

Figure 3: Characteristics of SEO firms and their matched control firms for 60-month event periods before and after the SEO month ($t = 0$). Following Bessembinder and Zhang, the plots report average (in terms of median or means) beta, size, BM, momentum, idiosyncratic volatility, illiquidity, and investments. The event sample consists of $n = 6{,}737$ SEOs in the CRSP database from from January 1980 to December 2007.

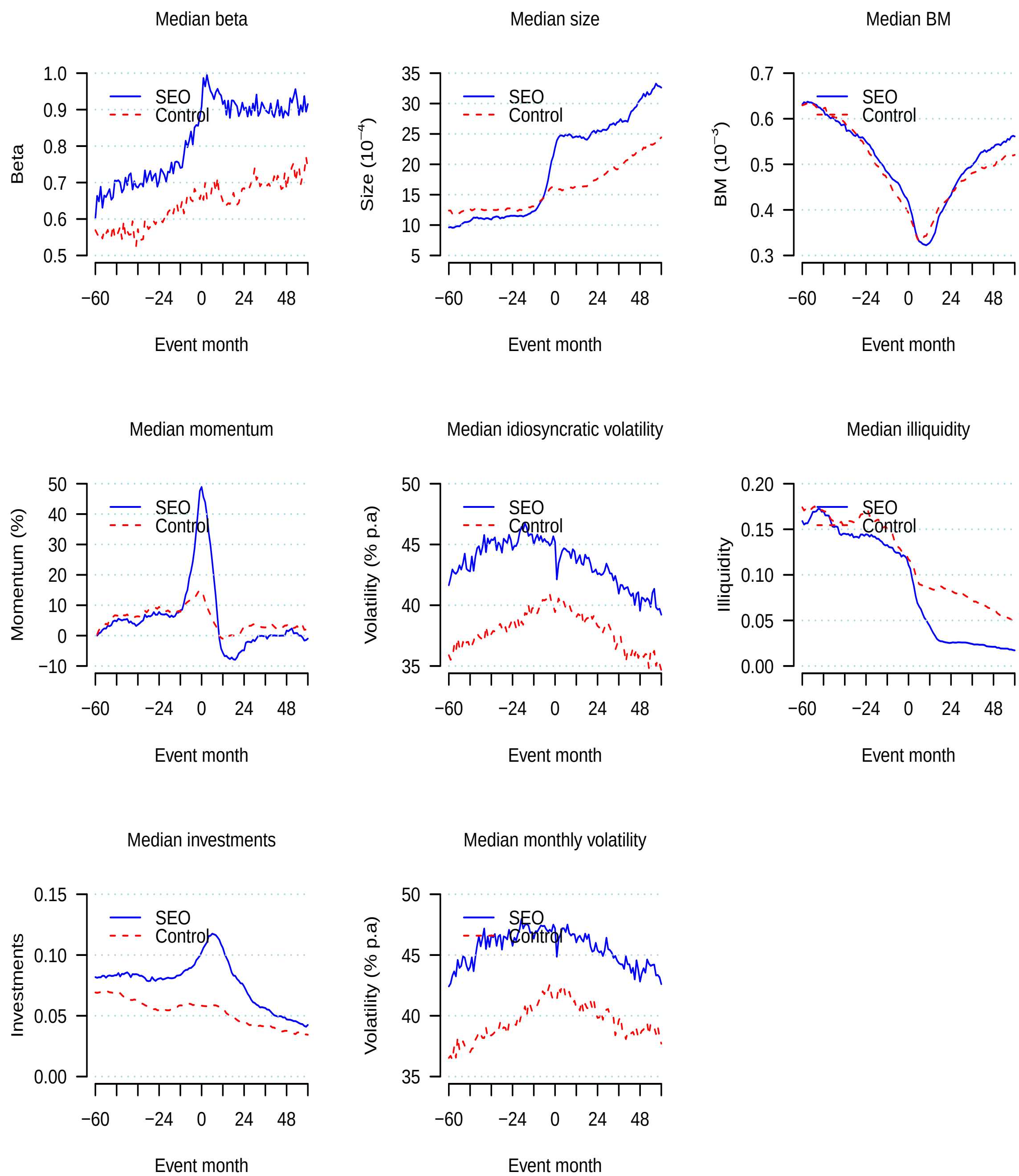

Figure 4: Characteristics of dividend initiation (DIV) firms and their matched control firms for 60-month event periods before and after the DIV month ($t = 0$). Following Bessembinder and Zhang, the plots report average (in terms of median or means) beta, size, BM, momentum, idiosynctratic volatility, illiquidity, and investments. The event sample consists of $n = 2{,}151$ dividend initiations in the CRSP database from January 1980 to December 2007.

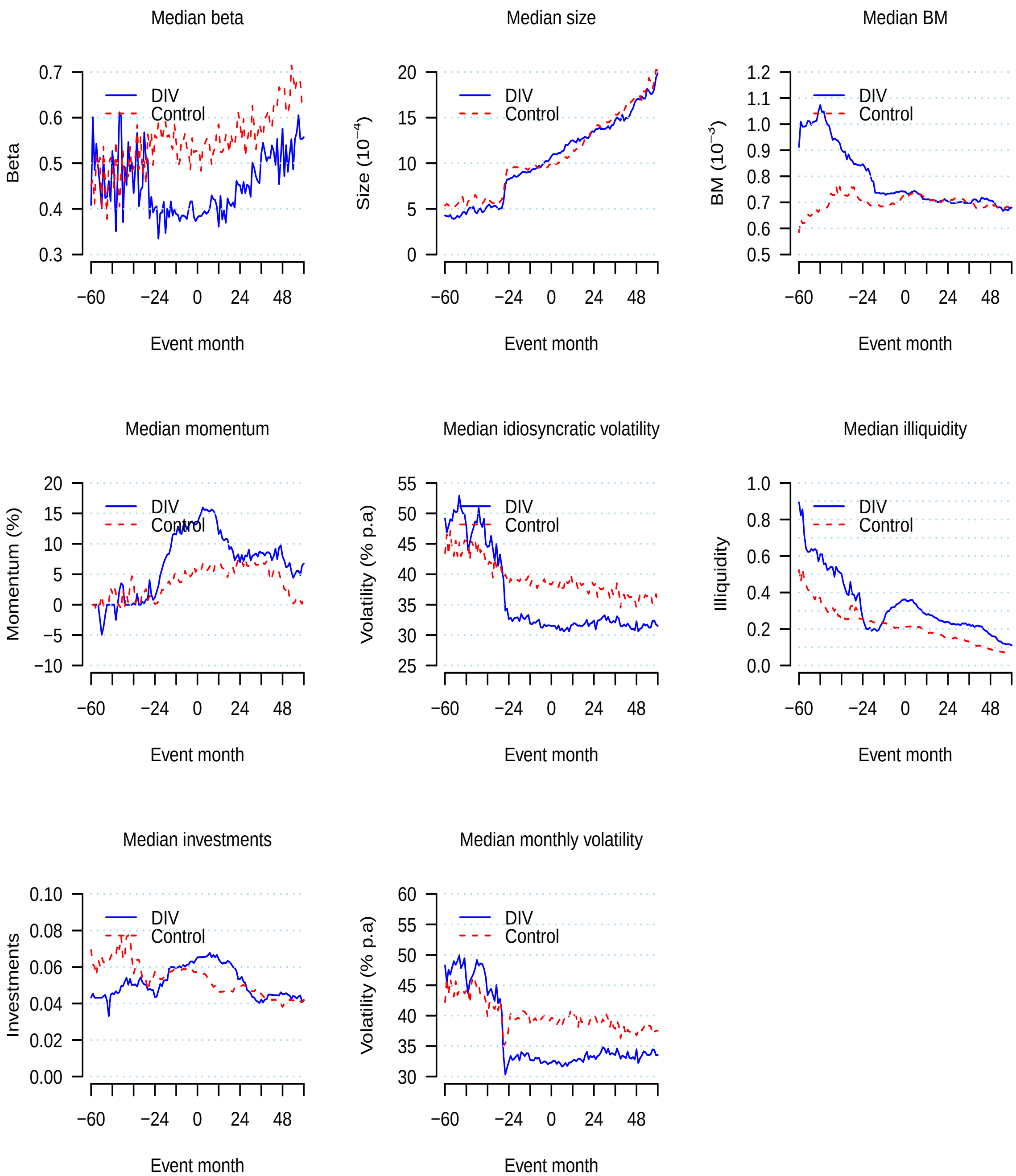

Figure 5: Monthly abnormal standardized returns (ASRs) for M&As, IPOs, SEOs, and DIVs. The plots report average monthly behavior of ASRs. Monthly standardized returns are defined as $\texttt{sr}_t = r_t/s_t$, where r_t is the month t log-return of a firm and s_t is the month t standard deviation estimated from daily log-returns in the month. Monthly ASRs are defined as $\texttt{sr}_{it} - \texttt{sr}^c_{it}$, where $\texttt{sr}^c_{it}$ is the standardized return of the size and book-to-market (BM) ratio matched control firm of the ith event firm. The event sample consists of 1,838 M&As, 3,077 IPOs, 3,052 SEOs, and 970 dividend initiations (DIVs) in the CRSP database between January 1980 (1986 for M&As) and December 2007 that have 60 months post-event return data available.