Firm Characteristics and Long-run Stock Returns after Corporate Events

Bessembinder and Zhang, 2013
Journal of Financial Economics

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March 10, 2017
Efficient Market Hypothesis → new information by an event should be immediately priced in at event/announcement date

But: Mixed empirical evidence from past studies – 2 main observations:

1. Abnormal returns can be quite large in absolute terms
2. Results heavily depend on the event study methodology – conflicting results!

**BHAR Approach**
- IPOs → negative abnormal returns (e.g. Loughran and Ritter, 1995: -50.7% five year BHAR)
- Similar for other corporate events (SEO/Bidder in M&A/Dividend Initiations)

**Calendar Time Approach**
- Small or zero abnormal returns in most studies (even when using same sample as BHAR) (e.g. Eckbo, Masulis and Norli, 2007)
Calendar Time Approach

\[ r_{p,t} - r_{f,t} = \alpha_p + \sum_k \beta_k F_{k,t} + \varepsilon_t \]

- Use portfolio of event firms (that had an event within last 60 months) → Time-series → Estimate abnormal return by using an asset pricing model

- **Advantages**
  - Portfolio variance includes cross-correlations of firms abnormal returns (Lyon et al., 1999)
  - Abnormal returns relatively well-approximated by a normal distribution (Mitchell and Stafford, 2000)

- **Disadvantages**
  - Might underestimate abnormal returns since all time periods are equally weighted and events tend to cluster in time periods → Timing decision of managers?
  - Problems associated with reference portfolio returns, e.g. rebalancing, new-listing bias (Barber and Lyon, 1997)

→ Ongoing debate about correct specification → makes sense to refine BHAR approach and try to make the empirical findings of both approaches “consistent”
Backup: Methodology 2

Buy-and-hold Abnormal Return (BHAR)

\[ BHAR_{eT} = \prod_{t=1}^{T} (1 + r_{et}) - \prod_{t=1}^{T} (1 + r_{mt}) \]

- For each event firm in sample:
  - Find a matching/control firm or portfolio (with same characteristics but no event)
  - Calculate difference in long-run compounded returns (up to T) between these two firms

- Advantages
  - Tracks actual experience of an investor
  - Potentially higher statistical power because every event observation is equally weighted

- Disadvantages
  - Positively skewed distribution for BHARs (statistical inference problems)
  - Pseudo-Timing when using event-time (Schultz, 2003)

- ‘Standard’ approach: Identify matching/control firm based on pre-event size/BM
  \[ \rightarrow \text{Crucial assumption: The only return-relevant difference between the two matched firms is the event itself!} \]
But: Strong indications that matching quality is poor (Figure 3)

1. Large differences in characteristics that have been omitted in the matching procedure
   - Market Beta, Momentum, Illiquidity, Idiosyncratic Volatility, Investment
   - Factors have been linked to differences in the cross-section of stock returns
     → Have to control for them to make firms comparable

2. Differences in characteristics are time-varying
   - Quality of initial match (based on size or BM) degrades over time
     → Have to control for time-variation in characteristics

→ Central assumption of the BHAR approach violated (comparability) → Refinement needed (methodological critique)
Hypothesis – long-run abnormal returns are zero

\[
BHAR_{eT} = \prod_{t=1}^{T} (1 + r_{et}) - \prod_{t=1}^{T} (1 + r_{mt}) = \exp \left\{ \sum_{t=1}^{T} \ln(1 + r_{et}) - \sum_{t=1}^{T} \ln(1 + r_{mt}) \right\} = 0
\]

\[\iff \text{Wealth Relative (WR)}_{eT} = \frac{\prod_{t=1}^{T} (1 + r_{et})}{\prod_{t=1}^{T} (1 + r_{mt})} = 1\]

\[\iff \text{Mean difference in log returns between event/matching firm} = 0\]

**Remember:** Intercept in regression = mean of the dependent variable conditional on outcomes of zero for each independent/control variable
Regression Model

\[ \ln(1 + r_{et}) - \ln(1 + r_{mt}) = \alpha + \beta_1 \Delta \text{Beta}_{et} + \beta_2 \Delta \text{Size}_{et} + \beta_3 \Delta \text{BM}_{et} + \beta_4 \Delta \text{Mom}_{et} + \beta_5 \Delta \text{Liquidity}_{et} + \beta_6 \Delta \text{IdioVol}_{et} + \beta_7 \Delta \text{Investment}_{et} + \epsilon_{et} \]

- Controls: Differences in characteristics between event and matching firm
- Coefficient of main interest: intercept alpha
  - Mean difference in log returns between event and matching firm (after controlling for differences in characteristics)
  - Wealth Relative = exp(\alpha \times T)
  - Cumulative long-run abnormal return = Wealth Relative – 1
  - T = 60 [months]
- Base case: Pooled OLS regression
  - Equal-weight to each monthly event observation
Main Advantages of the Refined BHAR Methodology

1. Controls for variation in firm characteristics that have not been used to match
2. Accommodates variation across time in firm characteristics (also for matching variables)
3. Potentially has more desirable statistical properties
   - Using differences in monthly log returns reduces skewness and kurtosis

<table>
<thead>
<tr>
<th>Variable</th>
<th>IPOs</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>60-month BHARs</td>
</tr>
<tr>
<td>Mean</td>
<td>-0.354</td>
</tr>
<tr>
<td>Std. dev.</td>
<td>3.834</td>
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<tr>
<td>Skewness</td>
<td>12.707</td>
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<td>Kurtosis</td>
<td>692,636</td>
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</table>
Main Results - Table 4, Panel B: IPOs (1980-2005)

<table>
<thead>
<tr>
<th>Dependent variable: Monthly difference in log return</th>
<th>OLS (1)</th>
<th>OLS (2)</th>
<th>OLS (3)</th>
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<tbody>
<tr>
<td>ΔBeta</td>
<td>-0.0027</td>
<td>-0.0026</td>
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<tr>
<td>ΔBeta²</td>
<td></td>
<td>-0.0030</td>
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<tr>
<td>ΔSize</td>
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<td>0.0011</td>
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<tr>
<td>ΔSize²</td>
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<tr>
<td>ΔBM</td>
<td>0.0072***</td>
<td>0.0070***</td>
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</tr>
<tr>
<td>ΔBM²</td>
<td></td>
<td>-0.0042*</td>
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<tr>
<td>ΔMomentum</td>
<td>0.0154***</td>
<td>0.0154***</td>
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<tr>
<td>ΔMomentum²</td>
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<tr>
<td>ΔIlliquidity</td>
<td>0.0079***</td>
<td>0.0076***</td>
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<tr>
<td>ΔIlliquidity²</td>
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<tr>
<td>ΔIdio. Volatility</td>
<td>-0.0215***</td>
<td>-0.0214***</td>
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<tr>
<td>ΔIdio. Volatility²</td>
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<td>-0.0020</td>
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<tr>
<td>ΔInvestment</td>
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<td>-0.0083***</td>
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<td>ΔInvestment²</td>
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<tr>
<td>Constant</td>
<td>-0.0115***</td>
<td>-0.0034**</td>
<td>-0.0010</td>
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</tbody>
</table>

Cluster by Date YES YES YES
Wealth Relative (WR) 0.502 0.815 0.942
Observations 447,655 152,796 152,796

***, **, and * correspond to statistical significance at the 1%, 5%, and 10% levels, respectively.

Results

- (1): Similar results as in previous BHAR studies → long-term 5 years underperformance of ~50%
- (2): Constant increased by about 2/3 and close to zero now
  - But still significant
  - Still long-term underperformance
- (3) Constant nearly 0 and insignificant
  - WR close to 1
Controlling for additional/omitted factors and time variation (nearly) eliminates long-run abnormal returns after IPOs.

Results with refined BHAR methodology are ‘consistent’ with calendar time portfolio approach (Table 4, Panel E) \( \rightarrow \) no abnormal returns.

Results for other corporate events similar
- SEO/Bidders Returns/Dividend Initiations \( \rightarrow \) abnormal returns close to zero and insignificant.

What drives the results?
- Controlling for additional/omitted factors seems to be more important than allowing for time variation in control variables (Table 5)
- Role of squared control variables/non-linear relationship?
**Important:** Results do not suggest that there are no differences in long-run returns between event and non-event firms!

- But return differences do not reflect unique effects of the event per se → claim: no event-specific explanation needed
- Instead return differences reflect known and empirically documented cross-sectional return patterns in the stock market
- However, events might be still related to these characteristics (see discussion)
Discussion

− “Bad Model” problem (Fama, 1998) – Joint hypothesis issue
  ▪ Expected returns of major importance in long-run event studies
  ▪ But no clear answer which model or which factors have to be used (e.g. Harvey et al. 2016, Fama and French, 2015, ...)
  ▪ Role of event specific factors? (e.g. quality/reputation of underwriter in IPOs (Carter et al. 1998))

− Event firms seem to systematically differ from non-event matching firms in the sample
  ▪ How are the events related to the characteristics/factors? (e.g. IPO/SEO might cause investment to increase → realize projects)
  ▪ No unique theory behind most of the factors (FF 3-factors, Idiosyncratic Volatility,...)


Backup: Sample for IPO events

- US firms / SDC database
- 1980 – 2005
- 9,035 event observations
- 8,966 matching firms
- Matching firm must be publicly traded for more than five years (no IPO event)