Firm Characteristics and Long-run Stock Returns after Corporate Events

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Corporate Finance
Paper Discussion on Topic IPO

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Motivation

- Efficient Market Hypothesis $\rightarrow$ share prices always incorporate and reflect all relevant information

- Empirical evidence inconsistency from previous long-term event studies: IPOs (5 years)

  $\rightarrow$ BHARs are often large in absolute value

  $\rightarrow$ Alphas are small and insignificant in calendar time portfolio approach

  $\rightarrow$ Conflicting results among different methods

- Other well-documented events with long-run abnormal returns:
  
  SEOs  Bidders M&As  Dividends Initiation

Table 1. Panel C. Bessembinder and Zhang 2013
Background

- **Standard Buy-and-hold Abnormal Return** approach

\[
BHAR_{iT} = \prod_{t=1}^{T} (R_{i,t}) - \prod_{t=1}^{T} (R_{mi,t})
\]

*Disadvantages*

→ Matching is based on limited firm characteristics (pre-event Size/BM)
  
  Assumption: except for event and matching characteristics, no patterns are return-relevant.

→ Matching quality decreases in the long run

→ Right-skewed distribution (bounded from below)

→ Pseudo market timing problem

- **Calendar Time Portfolio** approach

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

*Disadvantages*

→ Equal weight on each time period: lower power in statistics

→ Random sample needed

→ Rebalancing bias, new-listing bias

→ Existing long-run abnormal returns measurement are subject to criticism.

→ It is valuable to refine BHAR approach and to assess the consistency of results across methods.
Research Questions

- Is matching with size and book-to-market perfect?

- Do long-run abnormal returns differ significantly from zero?

- Is the market striking inefficient?
## Firm Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Definition</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idiosyncratic volatility</td>
<td>Measures the volatility of a stock relative to its own past movements</td>
<td>[Ang, Hodrick, Xing, and Zhang (2006)]</td>
</tr>
<tr>
<td>Illiquidity</td>
<td>Measures the cost of trading a stock due to its low liquidity</td>
<td>[Amihud (2002)]</td>
</tr>
<tr>
<td>Investment</td>
<td>Measures the investment in new projects by the firm</td>
<td>[Lyandres, Sun, and Zhang (2008)]</td>
</tr>
<tr>
<td>Momentum</td>
<td>Measures the past returns of a stock as a predictor of future returns</td>
<td></td>
</tr>
</tbody>
</table>

1. Size-matched IPO firms show large differences in additional characteristics → contradict to the BHAR assumption

2. Time-varying differences in characteristics

Poor matching quality weakens standard inference. To improve comparability → control for more patterns. Control for time-variation.

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**Figure 3. Bessembinder and Zhang 2013**
Methodology: Pooled OLS regression

\[ \ln(R_{i,t}) - \ln(R_{mi,t}) = \alpha + \beta_1 \Delta \text{Beta}_{it} + \beta_2 \Delta \text{Size}_{it} + \beta_3 \Delta \text{BM}_{it} + \sum_k \beta_k \Delta FC_{k,t} + \epsilon_{i,t} \]

**Hypothesis 0**: \( \alpha = 0 \)

→ meaning zero average differences in log returns between event and matching firms

Intuitively, \( \alpha = 0 \sim BHAR_{iT} = 0 \sim WR_{iT} = 1 \), where wealth relative \( WR_{iT} = \frac{\prod_{t=1}^{T} R_{i,t}}{\prod_{t=1}^{T} R_{mi,t}} = \exp(\tilde{\alpha}T) \)

\( \Delta \): normalized differences of firm characteristics between event and matching firms

that replaces raw characteristics with percentile ranks

**Advantages**

- control for more firm characteristics
- accommodates variation in characteristics over time
- better statistical properties with smaller skewness and less fat tail

<table>
<thead>
<tr>
<th>Variable</th>
<th>60-month BHARs</th>
<th>Differences in log return</th>
</tr>
</thead>
<tbody>
<tr>
<td>skewness</td>
<td>12.707</td>
<td>-0.232</td>
</tr>
<tr>
<td>kurtosis</td>
<td>692.636</td>
<td>9.337</td>
</tr>
</tbody>
</table>

*Table 3. Bessembinder and Zhang 2013*
Main Results: IPOs (1980-2005)

<table>
<thead>
<tr>
<th>Monthly difference in log returns</th>
<th>OLS (1)</th>
<th>OLS (2)</th>
<th>OLS (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΔBeta</td>
<td>-0.0027</td>
<td>-0.0026</td>
<td></td>
</tr>
<tr>
<td>ΔBeta(^2)</td>
<td></td>
<td>-0.0030</td>
<td></td>
</tr>
<tr>
<td>ΔSize</td>
<td>0.0011</td>
<td>0.0011</td>
<td></td>
</tr>
<tr>
<td>ΔSize(^2)</td>
<td></td>
<td>0.0017</td>
<td></td>
</tr>
<tr>
<td>ΔBM</td>
<td>0.0072***</td>
<td>0.0070***</td>
<td></td>
</tr>
<tr>
<td>ΔBM(^2)</td>
<td></td>
<td>-0.0042*</td>
<td></td>
</tr>
<tr>
<td>ΔMomentum</td>
<td>0.0154***</td>
<td>0.0154***</td>
<td></td>
</tr>
<tr>
<td>ΔMomentum(^2)</td>
<td></td>
<td>0.0011</td>
<td></td>
</tr>
<tr>
<td>ΔIlliquidity</td>
<td>0.0079***</td>
<td>0.0076***</td>
<td></td>
</tr>
<tr>
<td>ΔIlliquidity(^2)</td>
<td></td>
<td>0.0024</td>
<td></td>
</tr>
<tr>
<td>ΔIdio.volatility</td>
<td>-0.0215***</td>
<td>-0.0214***</td>
<td></td>
</tr>
<tr>
<td>ΔIdio.volatility(^2)</td>
<td></td>
<td>-0.0020</td>
<td></td>
</tr>
<tr>
<td>ΔInvestment</td>
<td>-0.0084***</td>
<td>-0.0083***</td>
<td></td>
</tr>
<tr>
<td>ΔInvestment(^2)</td>
<td></td>
<td>-0.0038</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-0.0115***</td>
<td>-0.0034**</td>
<td>-0.0010</td>
</tr>
<tr>
<td>Observations</td>
<td>447,655</td>
<td>152,796</td>
<td>152,796</td>
</tr>
<tr>
<td>Adjusted R(^2)</td>
<td>0.000</td>
<td>0.005</td>
<td>0.005</td>
</tr>
<tr>
<td>Wealth Relative</td>
<td>0.502</td>
<td>0.815</td>
<td>0.942</td>
</tr>
</tbody>
</table>

Table 4. Panel B. Bessembinder and Zhang 2013

(1) Standard BHAR approach: event firms underperform Similar results as in previous BHAR studies WR=50.2% vs Loughran and Ritter (1995) BHAR=-50.7%

(2) Adjusted BHAR approach: event firms underperform Controlling for more characteristics reduces the intercept in absolute value and makes abnormal returns less significant → Similar results for bidders M&As and dividend initiations

(3) Non-linear model: no abnormal return for event firms after controlling for squared firm characteristics. → Similar results for SEOs, bidders M&As and dividend initiations

Further, results are consistent with Jensen’s alpha.
Matching with size and book-to-market is not perfect. Other firm characteristics need to be considered.

The market is not striking inefficient.

→ Abnormal returns disappear after adequate matching.
→ The returns to event firms need not event-specific explanations.

Role of squared firm characteristics? Linear model/ Non-linear model

“Normalization of explanatory variables induces incremental nonlinearity and randomizes regression relation” Kolari, Pynnonen, and Tuncez(2017)

Bessembinder et al., forthcoming, Review of Financial Studies, Characteristic-based benchmark returns and corporate events.

→ a two-stage method relies on cross-sectional relations between returns and characteristics estimated for the market as a whole