What Drives Momentum and Reversal? Evidence from Day and Night Signals

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Momentum and reversal

• Past returns predict future returns in the cross-section
  • Short-term reversal (Jegadeesh, 1990; Lehmann, 1990), momentum (Jegadeesh and Titman, 1993), long-term reversal (De Bondt and Thaler, 1985)

• Interpretation is often challenging
  • Compensation for risk? Underreaction? Overreaction?

• This paper examines the role of private and public information for theories of momentum and reversal
  • Investors fail to learn from prices: prices underreact to private information?
  • One group of informed investors: prices overreact to private information and underreact to public news?
  • No distinction: investors overreact to past returns?
How to identify price moves induced by public news and private information?

• Must be able to identify the relevance of public news accurately

• This is challenging and will result in a limited sample due to the availability of news sources

• Public news should drive overnight returns to a larger extent than intraday returns
  • No/limited trading after hours
  • Trading of U.S. stocks listed on the Tokyo exchange is negligible and does not generate additional volatility (Barclay, Litzenberger, and Warner, 1990)
  • Intraday returns primarily reflect the impact of investors' trading (French and Roll, 1985)
  • News account for about 50% of idiosyncratic overnight volatility but for only about 12% of intraday idiosyncratic volatility (Boudoukh, Feldman, Kogan, and Richardson, 2019)
Form strategies based on past day and night returns

• Day/night return over the previous week/month

\[ 1 + r_m = \prod_d (1 + r_{ov,d}) \prod_d (1 + r_{in,d}) \]

• Day/night return over the prior 6/12 months, excluding the last month
• Day/night return over the prior 3/5 years, excluding the last year
• Equal-weighted (value-weighted) portfolio returns over the next month with NYSE breakpoints (decile)
• We do not examine when returns are realized (Lou, Polk, and Skouras, 2019; Bogousslavsky, 2021)
Data sources to compute U.S. stocks day and night returns

- Open prices from CRSP for 1926-1962 (NYSE-listed stocks only) and post 1991
- Open prices reported by Global Financial Data (GFD) for 1963-1991
  - Match about 88% of all daily CRSP observations post 1963 (Barardehi et al., 2021)
  - Matched sample has highly similar characteristics to CRSP population
- ISSM/TAQ data for 1985-2015 for robustness checks
  - Quote midpoints taken 15 minutes after the open
- Left-hand side variable: CRSP monthly return
Monthly alpha of past-return strategies, 1963-2019

NYSE breakpoints, long-short decile portfolios
Robustness (1)

- Excluding stocks in the bottom 20% of market capitalization and to dropping the 3-day windows around earning announcements
- Value-weighting:

<table>
<thead>
<tr>
<th>Signal type</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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<tbody>
<tr>
<td>24-hour</td>
<td>-1.02</td>
<td>-0.38</td>
<td>-0.2</td>
<td>-0.075</td>
<td>-0.023</td>
<td>-0.0028</td>
<td>0.016</td>
<td>0.2</td>
<td>0.16</td>
<td>0.5</td>
<td>1.52</td>
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<tr>
<td></td>
<td>[-5.83]</td>
<td>[-2.98]</td>
<td>[-1.92]</td>
<td>[-0.84]</td>
<td>[-0.35]</td>
<td>[-0.04]</td>
<td>[0.25]</td>
<td>[3.05]</td>
<td>[2.13]</td>
<td>[4.34]</td>
<td>[6.15]</td>
</tr>
<tr>
<td>Intraday</td>
<td>-0.81</td>
<td>-0.31</td>
<td>-0.099</td>
<td>-0.029</td>
<td>0.0014</td>
<td>0.031</td>
<td>0.12</td>
<td>0.19</td>
<td>0.24</td>
<td>0.26</td>
<td>1.06</td>
</tr>
<tr>
<td></td>
<td>[-5.25]</td>
<td>[-3.09]</td>
<td>[-1.3]</td>
<td>[-0.47]</td>
<td>[0.02]</td>
<td>[0.61]</td>
<td>[2.07]</td>
<td>[3.22]</td>
<td>[3.22]</td>
<td>[3.03]</td>
<td>[5.32]</td>
</tr>
<tr>
<td>Overnight</td>
<td>-0.18</td>
<td>-0.17</td>
<td>-0.12</td>
<td>0.027</td>
<td>0.054</td>
<td>-0.0073</td>
<td>0.11</td>
<td>0.0023</td>
<td>0.07</td>
<td>0.089</td>
<td>0.27</td>
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<tr>
<td></td>
<td>[-1.89]</td>
<td>[-1.96]</td>
<td>[-1.63]</td>
<td>[0.44]</td>
<td>[0.97]</td>
<td>[-0.12]</td>
<td>[1.79]</td>
<td>[0.04]</td>
<td>[1.01]</td>
<td>[0.76]</td>
<td>[1.57]</td>
</tr>
</tbody>
</table>
Robustness (2): 1985-2015 with 9:45am midquote
Robustness (3): 1929-1962 (CRSP)
Prior-week return (1963-2019)
Discussion

• Short-term reversal consistent with theories of imperfect liquidity
  • Campbell, Grossman, and Wang (1993); Nagel (2012); Hendershott and Menkveld (2014)
  • Weaker value-weighted returns also support liquidity effects

• News-based theories of momentum are hard to reconcile with the overnight signal's lack of profitability

• Momentum could be also driven by investors' continued overreaction to past price movements (reflected in intraday returns)
  • Absence of long-term reversal suggests underreaction
  • Momentum profits are realized overnight (at least post 1993)

• Underreaction to information conveyed by the trades of other investors?
  • Profits realized when public information is revealed
Additional evidence: volume-based return signal

- Momentum decreases with volume if investors learn from prices to some extent or due to the release of public information.
- Split each stock-month into below-median and above-median volume days.
- Compute past-return signals using either days with below-median volume or days with above-median volume.

\[
\begin{array}{cccccc}
&m - 1 & & (m - 12, m - 2) & & (m - 60, m - 12) \\
&low & high & low & high & low & high \\
24h & -0.36 & -1.14 & 0.93 & 0.41 & 0.087 & -0.36 \\
IN & -0.35 & -1.15 & 0.96 & 0.59 & 0.26 & -0.19 \\
OV & -0.2 & -0.3 & -0.083 & -0.052 & -0.35 & -0.43 \\
&[-2.47] & [-2.91] & [-0.68] & [-0.38] & [-3.72] & [-4.12] \\
\end{array}
\]
Sequential sorts: overnight then intraday (momentum alpha)

<table>
<thead>
<tr>
<th>Portfolios of past intraday returns (past year)</th>
<th>Low</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>High</th>
<th>H - L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>-0.46</td>
<td>-0.14</td>
<td>0.020</td>
<td>0.12</td>
<td>0.26</td>
<td>0.72</td>
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<td>[-2.67]</td>
<td>[-1.40]</td>
<td>[0.23]</td>
<td>[1.55]</td>
<td>[2.81]</td>
<td>[4.62]</td>
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<tr>
<td>2</td>
<td>-0.53</td>
<td>-0.025</td>
<td>0.026</td>
<td>0.17</td>
<td>0.37</td>
<td>0.90</td>
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<td>[-4.49]</td>
<td>[-0.32]</td>
<td>[0.39]</td>
<td>[2.53]</td>
<td>[5.74]</td>
<td>[5.82]</td>
</tr>
<tr>
<td>3</td>
<td>-0.45</td>
<td>0.028</td>
<td>0.14</td>
<td>0.25</td>
<td>0.53</td>
<td>0.98</td>
</tr>
<tr>
<td></td>
<td>[-4.08]</td>
<td>[0.35]</td>
<td>[2.29]</td>
<td>[3.62]</td>
<td>[7.67]</td>
<td>[6.72]</td>
</tr>
<tr>
<td>4</td>
<td>-0.36</td>
<td>0.030</td>
<td>0.14</td>
<td>0.24</td>
<td>0.53</td>
<td>0.89</td>
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<tr>
<td></td>
<td>[-3.03]</td>
<td>[0.43]</td>
<td>[2.08]</td>
<td>[3.82]</td>
<td>[6.36]</td>
<td>[5.26]</td>
</tr>
<tr>
<td>High</td>
<td>-0.63</td>
<td>0.056</td>
<td>0.32</td>
<td>0.35</td>
<td>0.56</td>
<td>1.19</td>
</tr>
<tr>
<td></td>
<td>[-3.12]</td>
<td>[0.56]</td>
<td>[3.75]</td>
<td>[4.16]</td>
<td>[4.87]</td>
<td>[5.30]</td>
</tr>
</tbody>
</table>
Sequential sorts: intraday then overnight (momentum alpha)

<table>
<thead>
<tr>
<th>Portfolios of past overnight returns</th>
<th>Low</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>High</th>
<th>H - L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>-0.56</td>
<td>-0.58</td>
<td>-0.37</td>
<td>-0.42</td>
<td>-0.51</td>
<td>0.045</td>
</tr>
<tr>
<td></td>
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<td>[-3.04]</td>
<td>[-3.70]</td>
<td>[-2.93]</td>
<td>[0.27]</td>
</tr>
</tbody>
</table>
Overnight public news vs intraday public news

• Type of news disclosed overnight differs from type of news disclosed intraday?

• Market participants react differently to overnight public news than to intraday public news?
  • Less attention to overnight information would go against our findings
  • Public news disclosed overnight appear more salient to investors than public news disclosed intraday?

• Less attention to information that arrives continuously in small amounts vs infrequently but in large amounts (Da, Gurun, and Warachka, 2014)
  • E.g., over a five-day period, a return of 0% on the first four days followed by a return of 5% on the last day is more “discrete” than a return of 1% on every day, which is interpreted as more “continuous"
  • Information discreteness does not explain our results
Underreaction to news

• Drift after bad news in the previous month over 1980-2000 (Chan, 2003); in line with our overnight proxy

<table>
<thead>
<tr>
<th>Signal type</th>
<th>1</th>
<th>2</th>
<th>...</th>
<th>9</th>
<th>10</th>
<th>10−1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overnight</td>
<td>−0.34</td>
<td>−0.075</td>
<td>...</td>
<td>0.16</td>
<td>0.05</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>[−3.58]</td>
<td>[−0.8]</td>
<td>...</td>
<td>[1.81]</td>
<td>[0.53]</td>
<td>[2.73]</td>
</tr>
</tbody>
</table>

• Underreaction to news over next few days (Jiang, Li, and Wang, 2021)
  • Momentum signals exclude the previous month return

• Our results do not go against underreaction/overreaction to news in general, but they suggest another important channel for momentum profits
Evidence from analyst target prices

- Investors' beliefs should respond differently to the information proxied by past day and night returns.
- How do analyst target prices incorporate information in past day and night returns?
  - Jegadeesh, Kim, Krische, and Lee (2004); Brav, Lehavy, and Michaely (2005); Palley, Steffen, and Zhang (2019); Engelberg, McLean, and Pontiff (2020)
- Compute *consensus* analyst predicted 12-month return for each stock-month (IBES): $pret$
Evidence from analyst target prices: 1999-2015 (quote midpoint at 9:45am); log returns; date fixed effects

<table>
<thead>
<tr>
<th>Dep. Variable</th>
<th>$r_{t+1:t+12}$</th>
<th>$pret_t$</th>
<th>$ferr_{i,t+1:t+12}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$r^\text{ov}_{t-12:t-1}$</td>
<td>-0.0608*</td>
<td>-0.1146***</td>
<td>0.0538</td>
</tr>
<tr>
<td></td>
<td>(-1.8182)</td>
<td>(-14.910)</td>
<td>(1.4756)</td>
</tr>
<tr>
<td>$r^\text{in}_{t-12:t-1}$</td>
<td>0.1109***</td>
<td>-0.2318***</td>
<td>0.3427***</td>
</tr>
<tr>
<td></td>
<td>(5.8508)</td>
<td>(-30.052)</td>
<td>(16.051)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.0165</td>
<td>0.1884</td>
<td>0.0650</td>
</tr>
<tr>
<td>Obs.</td>
<td>477,179</td>
<td>477,179</td>
<td>477,179</td>
</tr>
<tr>
<td>$p$-value $\Delta \text{ in/ov}$</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
</tbody>
</table>
Takeaways

• We examine the role of trading and non-trading information for reversal and momentum

• Our results support underreaction theories of momentum and suggest underreaction to information conveyed through trading
  • Response to public news differs than that to private information

• More broadly, in line with evidence that traders neglect some of the informational content of prices