Reversals and the returns to liquidity provision

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Short-run reversals

- Recent losers outperform recent winners
  - On average
- Well documented
- Fairly weak outside microcaps
  - Modest spreads, marginal significance
  - Gotten weaker
Why are there reversals?

“The returns of short-term reversal strategies in equity markets can be interpreted as a proxy for the returns from liquidity provision”

- Nagel, JF 2012
Basic intuition

- To accommodate sellers’ demands…
  - …Liquidity providers must buy
    - While selling pushes prices down
- Liquidity providers expect compensation
  - Unwind (sell) later for more (on average)
    - As liquidity replenished and prices recover
    - I.e., as “losers” rise
Evidence (Nagel 2012)

- Trading more costly in volatile markets
  - So high vol → more profitable reversals
This paper

- **Cross-sectional** implications

- If reversals proxy for the returns to liquidity provision…
  - …Then illiquidity differences should matter!
    - Across stocks
    - How should we even measure illiquidity?

- Should obviously look at magnitudes
  - Also **persistence**!
WML spread from formation

Reversals by volatility
- Cumulative return (%)
- Days from portfolio formation

Reversals by turnover
- Cumulative return (%)
- Days from portfolio formation
Illiquidity

- Size (small stocks are less liquid)
- Volatility
  - Strongly correlated with t-costs
    - In both the cross-section and the time-series
  - Drives market maker inventory risk
- Turnover
  - Less liquidity should imply less trading
    - And longer inventory durations
Reversals facts

- Bigger for micro-caps
  - Known…but *surprisingly concentrated*

- **Strong** among high-vol. stocks
  - Which expose MMs to more inventory risk

- **Persistent** for low-TO stocks
  - Where inventory durations are longer
    - Huge variation in persistence!
      - “Business time” or “trade time”
Reversal refinement

- Reversals as a lens to study liquidity
- Theory: Price moves unrelated to news \( \rightarrow \) reversals
- Common reversals trade against news
  - Earnings announcements
    - Post-earning announcement drift (PEAD)
  - News about industries
    - Short-term industry momentum (IMOM)
Reversal decomposition

Panel A: Strategy average monthly excess return (%)

<table>
<thead>
<tr>
<th></th>
<th>REV</th>
<th>PEAD</th>
<th>IMOM</th>
<th>IRR</th>
<th>IRRX</th>
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</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.31</td>
<td>0.53</td>
<td>0.68</td>
<td>0.74</td>
<td>1.08</td>
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<tr>
<td>Median</td>
<td>0.31</td>
<td>0.53</td>
<td>0.68</td>
<td>0.74</td>
<td>1.08</td>
</tr>
</tbody>
</table>

Panel B: Results from \( \text{REV}_t = \alpha + \beta_{\text{IRRX}} \text{IRR}_t + \beta_{\text{PEAD}} \text{PEAD}_t + \beta_{\text{IMOM}} \text{IMOM}_t + \epsilon_t \)

<table>
<thead>
<tr>
<th></th>
<th>(\alpha)</th>
<th>(\beta_{\text{IRRX}})</th>
<th>(\beta_{\text{PEAD}})</th>
<th>(\beta_{\text{IMOM}})</th>
<th>Adj. (R^2) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.13</td>
<td>0.76</td>
<td>-0.54</td>
<td>-0.53</td>
<td>87.0</td>
</tr>
<tr>
<td>Median</td>
<td>0.13</td>
<td>0.76</td>
<td>-0.54</td>
<td>-0.53</td>
<td>87.0</td>
</tr>
</tbody>
</table>

- We mostly use IRRX
  - Results robust to using REV
Illiquidity and reversals

- How do reversals vary with different aspects of illiquidity?
  - Evolution over time
    - From portfolio formation
  - Use size, volatility, and turnover
    - Look at 1-, 5-, and 21-day past performance
      - Will focus mostly on 5-day
        - 1-day has clean interpretation, but noisy results
        - 21-day is least noisy, but interpretation is harder
Reversals by size

- Average WML spread from formation

  - Stronger for microcaps (~3% of the market)
  - More limited market-making
Reversals by volatility

- Average WML spread from formation

  - High vol associated w/ stronger, initially faster revs
    - More vol ➔ greater inventory risk
Reversals by turnover

- Average WML spread from formation

- Low TO $\Rightarrow$ longer-lived, more persistent reversals
  - Less turnover $\Rightarrow$ longer inventory durations
Holding all else equal

- When studying impact of illiquidity…
  - …Should control for other measures
    - Our measures are correlated
      - Volatility and turnover are positively correlated
      - Small stocks tend to be more volatile and trade less

- Use propensity-matched sorting procedure of Novy-Marx (2015)
  - Within three FF (2016) size universes
Results with controls

- Consistent (even cleaner) results
  - Though less variation in past performance
Implications

- These patterns explain several results in the literature
  - Connecting results that were seemingly unrelated…
  - …And also yield different, more nuanced interpretations
    - Some of which are very different from current common understanding
Related results I

- Medhat and Schmeling (RFS 2022)

Panel A: Coexistence of reversal and momentum in one-month returns

- Short-term momentum (Highest turnover quintile)
- Short-term reversal (All stocks)
- Short-term reversal (Lowest turnover quintile)
Days from formation

Panel B: Reversal performance from formation by turnover

- 21-day reversals from formation
- 5-day reversals from formation

Also related results of Avramov, Chordia, and Goyal (2006)
Novy-Marx and Velikov (2016)
- Strong 1-month industry-relative reversals among low-volatility stocks
  - Much stronger than in high-vol.
  - Surprising because they are more liquid, and much cheaper to trade

Kozak, Nagel, and Santosh (2020)
- Single most important anomaly for a stochastic discount factor identified by machine learning techniques
Actually stronger for high-vol.!
- Just at a higher frequency, hard to see monthly
Related results III

- Arena, Haggard, and Yan (2008)
  - Momentum stronger for high-volatility stocks

- Novy-Marx (2012)
  - Momentum primarily driven by intermediate horizon past performance
    - Stock returns over the first half of the preceding year
  - Not short-run past performance
    - Recent six months matter much less
Long run WML spreads

- Based on one month of stock performance
Figure suggests results of Novy-Marx (2012) should be concentrated in low volatility stocks

- High vol: Performance over the next six months similar to six months after
- Low vol: No momentum for six month, momentum after
  - Prediction: Disparity decreasing with volatility
## Differences by volatility

<table>
<thead>
<tr>
<th>NYSE volatility quintile</th>
<th>All</th>
<th>Low</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>High</th>
<th>H–L</th>
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</thead>
<tbody>
<tr>
<td>MOM_{12,7}</td>
<td>0.87</td>
<td>0.68</td>
<td>0.77</td>
<td>0.73</td>
<td>1.01</td>
<td>0.96</td>
<td>0.28</td>
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<tr>
<td></td>
<td>[4.57]</td>
<td>[3.54]</td>
<td>[4.01]</td>
<td>[3.68]</td>
<td>[4.32]</td>
<td>[4.59]</td>
<td>[1.16]</td>
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<tr>
<td>MOM_{6,2}</td>
<td>0.22</td>
<td>-0.30</td>
<td>-0.25</td>
<td>0.14</td>
<td>0.49</td>
<td>1.17</td>
<td>1.48</td>
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<tr>
<td></td>
<td>[1.03]</td>
<td>[-1.10]</td>
<td>[-1.18]</td>
<td>[0.57]</td>
<td>[2.01]</td>
<td>[5.07]</td>
<td>[4.66]</td>
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<tr>
<td>Diff.</td>
<td>0.65</td>
<td>0.98</td>
<td>1.02</td>
<td>0.60</td>
<td>0.53</td>
<td>-0.21</td>
<td>-1.20</td>
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<tr>
<td></td>
<td>[2.86]</td>
<td>[3.06]</td>
<td>[3.80]</td>
<td>[2.11]</td>
<td>[1.92]</td>
<td>[-0.89]</td>
<td>[-3.27]</td>
</tr>
</tbody>
</table>

- **Unconditional difference in Novy-Marx (2012)** driven by low-volatility stocks
  - Strong short-run momentum is high vol
Conclusion

- Cross-sectional implications of illiquidity on the returns to liquidity provision
  - Small → Stronger reversals
  - High volatility → Strong initial reversals
  - Low turnover → Long-lived reversals

  These three illiquidity variables also capture basically all the cross-sectional variation in Amihud’s (2002) popular illiquidity measure
Conclusion

- Accounting for predictable variation in reversal magnitudes and persistence:
  - Helps explain seemingly disparate results in the literature on reversals and momentum
  - Importance of looking at phenomena at the appropriate frequency
  - Should reduce cost of demanding liquidity, increase compensation for providing it
Conclusion

- Reversals commonly studied greatly attenuated by trading against two news-related effects: industry momentum and post-earnings-announcement drift
- Basic results all hold beyond the US