WHEN THE DUST FLIES…

How Volatility Events Affect Asset Class Performance

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Introduction

- Back in October 2017...
  Some investors are surprised by the duration of current stock market rally and, until just recently, the low level of US equity market volatility:

  "I don’t know about you, but I’m nervous, and it seems like when investors are nervous, they’re prone to being spooked," Thaler said. “Nothing seems to spook the market… We seem to be living in the riskiest moment of our lives, and yet the stock market seems to be napping. I admit to not understanding it."

  – Dr. Richard Thaler, recipient of the 2017 Nobel Memorial Prize in Economics¹

- We examine historical equity market volatility events to help investment committees prepare for a future volatility event

- We examine 27 volatility spike events, and 26 post peak events, since 1950 (a 70-year span), across a variety of market environments

- Our findings support investors who intend to “stay the course” following a volatility event and possibly rebalance to increase allocation to risky assets

Two Types of Volatility Events – Post Peak Events

“Post Peak Event”

- A VIX peak that **precedes a significant decline** in volatility

- A decline of \( \frac{1}{3} \) or greater from a VIX peak over 9m, from month \( t_0 \) to \( t_{0+9} \)

- Reflects a desire to wait until the “dust has settled”

Source: PGIM IAS. For illustrative purposes only.
Two Types of Volatility Events – Spike Events

“Spike Event”

- A **significant, sudden increase** in the VIX
- At least a 50% increase in the average VIX over 2m, from month $t_{0-2}$ to $t_0$
- Reflects a desire to take action in reaction to the sudden change in volatility

![Schematic of Volatility Spike Event](image-url)

Source: PGIM IAS. For illustrative purposes only.
27 Spike Events

- About one VIX Spike Event about every three years
**Spike Events: Market Performance – Equity**

- On average, during a Spike Event the equity market has poor performance (cumulative 2m spike period S&P 500 loss of -7.2%)
- But, recovers rather quickly, returning to its pre-spike level 7m after the spike month

Past performance is not a guarantee or a reliable indicator of future results.

Source: Barclays POINT, Datastream, FRB St. Louis (FRED), Global Financial Data, PGIM IAS.
Spike Events: Market Performance – Fixed Income

- 10y US Treasury has positive total returns (2.0%) during the 2m spike period.
- US high yield (HY) and investment grade (IG) credit exhibit cumulative 2m spike period excess returns of -8.1% and -3.0%, respectively, but both recover approximately 9m after the spike month.

Cumulative Monthly Returns – Pre- & Post-Spike Periods

Source: Barclays POINT, Datastream, FRB St. Louis (FRED), Global Financial Data, PGIM IAS. Past performance is not a guarantee or indicator of future results.
### Spike Events: What Happens to Returns?

- US Stocks (S&P 500) had stronger performance following Spike Events
- US Treasuries have similar performance before and after Spike Events
- Investment Grade (IG) and High Yield (HY) credit excess returns are very strong in the post-spike period

<table>
<thead>
<tr>
<th>Total Cumulative Returns</th>
<th>Pre-Spike (21 months)</th>
<th>Spike Period (2 months)</th>
<th>Post-Spike (21 months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S&amp;P 500 (1970)</td>
<td>20.8%</td>
<td>-7.2%</td>
<td>24.9%</td>
</tr>
<tr>
<td>DJI (1950)</td>
<td>23.1%</td>
<td>-5.6%</td>
<td>24.2%</td>
</tr>
<tr>
<td>10y Tsy (1953)</td>
<td>9.0%</td>
<td>2.0%</td>
<td>9.9%</td>
</tr>
<tr>
<td>HY ExRet (1988)</td>
<td>3.0%</td>
<td>-8.1%</td>
<td>14.1%</td>
</tr>
<tr>
<td>IG ExRet (1988)</td>
<td>1.1%</td>
<td>-3.0%</td>
<td>4.0%</td>
</tr>
</tbody>
</table>

Source: Barclays POINT, Datastream, Global Financial Data. PGIM IAS. Past performance is not a guarantee or indicator of future results.
Spike Events: What Happens to Volatility?

- All asset classes are more volatile in post-spike period compared to pre-spike period.
- For example, S&P 500 index monthly total return volatility was 13.1% in the pre-spike period, rising to 15.7% in the post-spike period.

### Volatilities

<table>
<thead>
<tr>
<th>Spike Events</th>
<th>Pre-Spike (21 months)</th>
<th>Post-Spike (21 months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S&amp;P 500 (1970)</td>
<td>13.1%</td>
<td>15.7%</td>
</tr>
<tr>
<td>DJI (1950)</td>
<td>12.4%</td>
<td>13.8%</td>
</tr>
<tr>
<td>10y Tsy (1953)</td>
<td>5.2%</td>
<td>6.1%</td>
</tr>
<tr>
<td>HY ExR (1988)</td>
<td>8.1%</td>
<td>10.7%</td>
</tr>
<tr>
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</tr>
</tbody>
</table>

Source: Barclays POINT, Datastream, Global Financial Data. PGIM IAS.
Spike Events: Equity Sector “Winners” and “Losers”

- By construction, “winners” and “losers” exhibit divergent performance before Spike Events.
- After Spike Events, much of the relative return momentum the “winners” had over the “losers” is lost, and the performance of “winners” and “losers” converges.

<table>
<thead>
<tr>
<th>Month</th>
<th>Pre-Spike</th>
<th>Post-Spike</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Winners”</td>
<td>46.0%</td>
<td>26.4%</td>
</tr>
<tr>
<td>“Losers”</td>
<td>-17.4%</td>
<td>15.7%</td>
</tr>
</tbody>
</table>

Source: Datastream, PGIM IAS.
Past performance is not a guarantee or indicator of future results.
On average, equity market displayed similar 21m cumulative performance before and after spikes.

Average S&P 500 cumulative monthly total return at the end of the pre-spike period was 20.8%, and a bit higher, at 24.9%, in the post-spike period.

August 2007 was the only spike event that had a significant negative return in the post-spike period – its post-spike period included the 2008 financial crisis.
Spike Events: Maximum S&P 500 Drawdowns

- For 15 spike events, the average S&P 500 maximum drawdown was -14.5%
- The average cumulative total returns by the ninth month following the spike month was 3.1%

Note: This figure shows the maximum drawdown for the S&P 500 (after month $t_{0.2}$) and the month of the maximum drawdown, for the 16 spike events. In addition, the figure shows the S&P 500 cumulative total returns (month $t_0$ through month $t_{0+9}$) for each event.

Source: Datastream, PGIM IAS. Past performance is not a guarantee or indicator of future results.
Large Volatility Spikes Are Not That Uncommon!
  - About once every 3-4 years

Poor Performance during Spike Events Is to Be Expected:
  - Equity and spread market performance is very poor during the Spike Event itself

Markets Recover:
  - However, these markets response relatively quickly and recover, on average, back to pre-Spike levels within 9m of the Spike Event

“Stay the Course”
  - Our findings support investors who intend to “stay the course” following a volatility event (i.e., do not de-risk) and possibly rebalance to increase allocation to risky assets
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