Exploiting the Cointegration between VIX and CDS in a Credit Market Timing Model

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APPENDIX B

B.1. Figures

Figure a: USIG spread and VIX over the full sample period.

Figure b: USHY spread and VIX over the full sample period.
Figure c: EUIG spread and VIX over the full sample period.

Figure d: EUHY spread and VIX over the full sample period.
Figure e: $\tilde{z}$ process underlying the discrete variable for the USIG market. Yellow stripes indicate a short signal, blue stripes a long one.

Figure f: $\tilde{z}$ process underlying the discrete variable for the USHY market. Yellow stripes indicate a short signal, blue stripes a long one.
Figure g: \( \hat{z} \) process underlying the discrete variable for the EUIG market. Yellow stripes indicate a short signal, blue stripes a long one.

Figure h: In-sample Johansen and Engle-Granger replication graphs for the USIG market.
Figure i: In-sample Johansen and Engle-Granger replication graphs for the USHY market.

Figure j: In-sample Johansen and Engle-Granger replication graphs for the EUIG market.
Figure k: In-sample Johansen and Engle-Granger replication graphs for the EUHY market.

Figure l: Discrete variable signals for the USIG market.
Figure m: Discrete variable signals for the USHY market.

Figure n: Discrete variable signals for the EUIG market.
Figure o: Continuous variable signals for the USIG market.

Figure p: Continuous variable signals for the USHY market.
Figure q: Continuous variable signals for the EUIG market.

Figure r: Continuous variable signals for the EUHY market.
Figure s: Gonzalo-Granger measure capped at ±1 for the four markets.

Figure t: Out-of-sample Johansen cointegration statistics. A statistic below the critical value indicates the rejection of the null hypothesis of no cointegration in favor of the alternative of cointegration.
B.2. Tables

Table a: Full-sample correlation between VIX Trend and the cointegration variables.

<table>
<thead>
<tr>
<th>Variable</th>
<th>USIG</th>
<th>USHY</th>
<th>EUIG</th>
<th>EUHY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cointegration VIX discrete</td>
<td>0.23</td>
<td>0.30</td>
<td>0.17</td>
<td>0.30</td>
</tr>
<tr>
<td>Cointegration VIX continuous</td>
<td>0.39</td>
<td>0.32</td>
<td>0.23</td>
<td>0.43</td>
</tr>
</tbody>
</table>

Table b: iBeta model variables in-sample z-IR.

<table>
<thead>
<tr>
<th>Var</th>
<th>IR IG</th>
<th>IR HY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Var 1</td>
<td>0.41</td>
<td>0.54</td>
</tr>
<tr>
<td>Var 2</td>
<td>0.79</td>
<td>0.73</td>
</tr>
<tr>
<td>Var 3</td>
<td>0.18</td>
<td>0.17</td>
</tr>
<tr>
<td>Var 4</td>
<td>0.4</td>
<td>0.44</td>
</tr>
<tr>
<td>Var 5</td>
<td>0.69</td>
<td>0.62</td>
</tr>
<tr>
<td>Var 6</td>
<td>0.49</td>
<td>0.76</td>
</tr>
<tr>
<td>Var 7</td>
<td>0.48</td>
<td>0.63</td>
</tr>
<tr>
<td>CV Discrete</td>
<td>0.43</td>
<td>1.18</td>
</tr>
<tr>
<td>CV Continuous</td>
<td>0.82</td>
<td>1.09</td>
</tr>
</tbody>
</table>
B.3. Cointegration variables scheme

\[ z_t^{i,D} = s_t^i - (y_0^{i,D}(t) + y_1^{i,D}(t)v(t)) \]

Discrete Variable

\[ \hat{z}_t^{i,D} = \frac{z_t^{i,D}}{\sigma_{z_t^{i,D}}(t)} \]

Continuous Variable

\[ \bar{z}_t^{i,D} = \frac{1}{5} \sum_{j=0}^{4} \hat{z}_{t-j}^{i,D} \]

\[ V_t^{i,D} = \frac{\bar{z}_t^{i,D}}{k} \]

\[ V_t^{i,D} = M \text{ (long)} \text{ when } \bar{z}_t^{i,D} > k \]
Offset when \( \bar{z}_t^{i,D} < 0 \)

\[ V_t^{i,D} = -M \text{ (short)} \text{ when } \bar{z}_t^{i,D} < -k \]
Offset when \( \bar{z}_t^{i,D} > 0 \)

\[ CV_t^{i,D} = V_t^{i,D} \cdot G G_{VIX}^{i,D}(t) \]

\[ \text{Cap} CV_t^{i,D} \]

\[ CV_t^{i,D} = 0 \text{ when there is no cointegration} \]

\[ CV^{i,D} \]