Discussion of “Variance Risk Premia on Stocks and Bonds”

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Introduction

- Paper’s goal: examine forecasting power of variances and variance risk premia
  - VRP: statistical minus option-implied volatility forecast
  - VRP is expected return for exposure to realized volatility (gamma)
- Uses state-of-the-art methods for calculating both parts of VRP (and to get correlations)
- My discussion:
  - VRP, why it is interesting
  - Robustness of the regressions
  - VRP vs Implied VRP
The variance risk premium

Definition:

\[ VRP_t = E_t^P [RV_{t+1}] - E_t^Q [RV_{t+1}] \]

- \( P \) expectations: statistical measure
- \( Q \) expectations: risk-neutral (market-price implied) measure
Why care about the VRP?

1. The VRP is very large, $\sim 3x$ larger than S&P 500 Sharpe ratio
2. S&P 500 VRP forecasts returns (Bollerslev, Tauchen, and Zhou)
3. VRP robust across asset numerous classes (stocks, bonds, commodities)
IV and RV do not forecast; IV minus RV does...
Implies key driver is price of risk, not quantity
- Johnson (2016): VRP is high when conditional vol. is high
- Worry about results being driven by outliers
- More efficient to weight by conditional stdev
- Forecasting result goes away
### Main SPX forecasting results

<table>
<thead>
<tr>
<th></th>
<th>VRP&lt;sub&gt;SPX&lt;/sub&gt;</th>
<th>Weighted VRP</th>
<th>Spread&lt;sub&gt;30−10&lt;/sub&gt;</th>
<th>Weighted Spread</th>
</tr>
</thead>
<tbody>
<tr>
<td>VRP&lt;sub&gt;SPX&lt;/sub&gt;</td>
<td>-0.081***</td>
<td>-0.036</td>
<td>-0.078***</td>
<td>-0.042***</td>
</tr>
<tr>
<td>Spread&lt;sub&gt;30−10&lt;/sub&gt;</td>
<td></td>
<td></td>
<td>-0.905***</td>
<td>-0.625***</td>
</tr>
</tbody>
</table>

- Weights kill univariate VRP result
- Coefficients shrink by ~half
  - That is a good thing here...
- SD ratio: 0.63
- 38% of unweighted forecasts <0, only 10% weighted
## 10-year T-bond forecasting

<table>
<thead>
<tr>
<th></th>
<th>Weighted</th>
<th>Weighted</th>
</tr>
</thead>
<tbody>
<tr>
<td>VRP(_{10y})</td>
<td>-0.10*</td>
<td>-0.12*</td>
</tr>
<tr>
<td>Spread(_{30-10})</td>
<td></td>
<td>0.17**</td>
</tr>
</tbody>
</table>

- Weighting makes no difference – spread uncorrelated with IV levels
\[ \text{spread} = \frac{VRP_{30}}{\text{std} (VRP_{30})} - \frac{VRP_{10}}{\text{std} (VRP_{10})} \]

- Definition of spread involves scaling by SDs – involves forward-looking data
- What happens if we forecast using only backward-looking scaling?

<table>
<thead>
<tr>
<th>Spread(_{30-10})</th>
<th>Baseline</th>
<th>Recursive SD</th>
</tr>
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<tr>
<td>0.17**</td>
<td>0.12**</td>
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- Further shrinks coefficients (again probably good...)

...
Main worry: persistent fluctuations

Many models: risk premia vary with business cycle

Implies cycles $\sim 5$ years

Infeasible to get accurate SEs with 22 years of data (unless extremely conservative)

Only $\sim 2$ business cycles in this sample
Extending MSVW’s results

- MSVW study variance risk premium
  - Premium on realized volatility
- Can extend to the **implied volatility** risk premium
  - What do investors pay to hedge shocks to implied volatility? (nothing!)
Premia for realized and implied volatility

Dew-Becker, Giglio, and Kelly (2017)
Conclusion

- Paper studies dynamics of equity and T-bond VRPs
- Large variation over time, both help forecast returns
- Spread between (scaled) VRPs on long- and short-term bonds forecast bond and stock returns