An empirical index of Knightian uncertainty

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Discussion by:
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What does the paper do?

- Develops a new proxy to capture ambiguity (Knightian uncertainty).
- Computes ambiguity as the divergence between implied distributions of two consecutive days for a stock.
- Examines the impact of ambiguity on stock returns.
Key findings

- Investors receive lower returns on more “ambiguous” stocks.
- Ambiguity negatively correlated with risk and liquidity factors.
- Ambiguity provides explanatory power even in the presence of a wide range of traditional risk and asset pricing measures.
- Cross-sectional regressions (Fama and MacBeth (1973)) suggest a strong relationship between ambiguity and future returns.
What does this proxy capture?
News or ambiguity?

- Investors know or act as if they know the probabilities – EU paradigm.
- Do not know the precise probabilities – ambiguity (Knightian uncertainty).
- Ambiguity proxy: shift in risk neutral density (RND) from date t to t + 1.
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  1. Stock prices simulated from a GBM process with parameters: $S_0=1000$, $r=0.05$, $\sigma=0.25$, and $T=60$ days.
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  3. RND estimated from option prices:
     - On date $t$, $S_t=939$, $T_1=60$ days
     - On date $t + 1$, $S_{t+1}=1098$, $T_2=59$ days
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- From date $t$ to $t + 1$, RND shifts.
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RND extracted from simulated option prices
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Example: Indian general elections, 2009

- The big move of Nifty post announcement of election results.
- Shift in RND.
- Is this ambiguity?
Event: Announcement of election results, 2009
RND extracted from Nifty option prices
Other proxies for ambiguity
Volatility of volatility

- Variation in the investor’s perception of stock return volatility.
- Can be incorporated in two ways: stochastic volatility models and volatility of implied volatility.
- Is this ambiguity?
- Grient et al. (2012) use volatility of VIX as a proxy for ambiguity.
- They also find negative correlation between volatility of VIX and stock returns.
- Brenner and Izhakain (2011) measure ambiguity by the variance of probability of loss or gain.
- They find low correlation between ambiguity and volatility of VIX.
- They conclude that their measure of ambiguity is not a proxy for volatility of volatility.
Imprecision of implied volatility

- Measurement errors in the estimation of VIX render it imprecise.
- VIX – a fuzzy estimator of volatility.
- Grover and Shah (2013) propose a non-parametric methodology to capture this imprecision in VIX.
- Imprecision indicators: width of confidence band and standard deviation of bootstrapped VIX estimates.
- Uncertainty in VIX may be another way to capture ambiguity.
Imprecision in VIX around the 2009 elections
Conclusion

- The paper develops a new proxy for ambiguity.
- The proxy for ambiguity is the mean divergence of probability distributions.
- In a simple Gaussian GBM setting, shift in RND from date $t$ to $t + 1$, is just news.
- How does this proxy capture ambiguity?
- Is it just another proxy for vol of vol?