Discussion of
“Inferring Volatility Dynamics and Variance Risk Premia: An Efficient Bayesian Approach”

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Summary

• The authors propose an efficient particle-based Bayesian estimation method.

• The method is applied to S&P 500 index returns and the variance swaps to study the volatility dynamics and variance risk premium.

• The empirical results show that non-affine and self-exciting are important modeling elements for a better fit of the data.

• The authors also present some analysis on uncertainty of the estimate of variance risk premium.
• Well written! Results are very interesting. The area studied in the paper is timely and important from both empirical and methodological point of view.

• My discussion will focus more on the asset pricing implication of the empirical results.
Editorial suggestion

• 2/3 of the introduction is description of the estimation approach. It would be better to have more discussions about the empirical results and less about the estimation approach.
Non-affine feature

- We all know that the affine and non-affine mostly affect the derivative pricing. However, I find parameters $\xi$'s are not presented in the pricing formula of the variance swaps.

- I think the results of non-affine feature would be much more convincing if derivatives that are directly affected by affine/non-affine feature are included in the joint estimation.
Self-exciting jump behavior

- Self-exciting jump behavior is has important implication for asset pricing as formulated in Fulop, Li, and Yu (2014). It also has important implication for risk management. So probably the authors would look at the differences in the VaR’s resulting from the model with self-exciting vs without self-exciting.
Variance risk premium: Investors’ uncertainty or statistical insignificance

- The confidence interval of variance risk premium is a transformation of the confidence intervals of the parameter estimates. This is clearly a measure of statistical significance. It is kind of far-fetched to link the length of this interval to the investors’ uncertainty. More justifications are warranted here.
Comments related to specific details in the paper

- It is mentioned in most of the paper that the author use variance swap rates in their empirical study. However, there are also a few places where it is mentioned that VIX data are used. For example, on pages 23 and 29. But we know VIX is not variance swap rate, right?
Comments related to specific details in the paper (cont.)

- On Figure 4 in the paper, the dynamics of the two (filtered) factors: volatility and jump intensity are plotted. But their high and positive correlation contradicts to the modeling specification where these two factors are driven by independent Wiener processes. This might be indicating that the model can be refined to have just two
Comments related to specific details in the paper (cont.)

random sources instead of three.

Figure 4: Filtered Diffusion Volatility and Jump Intensity