# Author Answers on the

"Heejoon Han, Ali M. Kutan, and Doojin Ryu (2015). Modeling and Predicting the Market Volatility Index: The Case of VKOSPI. Economics Discussion Papers, No 2015-7, Kiel Institute for the World Economy. http://www.economics-ejournal.org/economics/discussionpapers/2015-7"

Thank you very much for your great comments. We will revise our paper based on your valuable comments.

### Comment 1

This paper employs seven versions of HAR models to exam the predictive ability of a set of exogenous variables for implied volatility index that appears very redundant exercise. I can't see the point why the authors need a variety of models which are only different from each other by having different combinations of the same set of variables. There should be a very simple alternative available to deal with the same issue instead. That is, one can firstly include all the considered variables in the model, use the stepwise procedure to remove all the insignificant variables at the second step, and at the end to analyse predictive ability just relying on the final version of the model

### Answer 1

We have already test all nested models as you suggested. After deleting insignificant or economically inconsistent coefficients, we confirm that the model "M6" is the most explanatory model. Our original intention is that, considering that stock market returns between the US and Korean markets are correlated, we tabulated various models which include Korean market variables or US market variables or both. In the revised version, we can consider the realized volatility measure as an additional explanatory variable. In the revised version, we can also fully explain the difference among the suggested models for the clarity and report untabulated tables.

# Comment 2

In contrast with the studies in US and other important markets, the authors conclude that the return of stock market does not predict the VKOSPI. This seems a bit counter-intuitive. It is worthwhile to further try stock market realized volatility instead of return to see whether the information from stock market has predictive power on implied volatility index. A simple HAR model may not be appropriate if the two volatilities are highly related. It is interesting to develop a bivariate HAR model with exogenous variables to re-exam the relationship.

### Answer 2

Based on our model estimation results, the KOSPI200 spot returns have little predictive power for the

VKOSPI after controlling macroeconomic variables and US market performance and shocks. One conjecture is that, considering the market opening hours in the US and Korea, the information from Korean stock market in day t-1 is dominated by the information from US stock market in day t-1 (US market is open overnight in Korean time.) Related to this, please note that we focus on the leading emerging market where the US market plays a dominant role in its price discovery and information spillover process during the overnight period. This is the first study which analyzes this issue using the dataset of inter-continental markets where the operating hours do not overlap, under the HAR model framework.



Further, we can consistently interpret our results based on the "risk-appetite" explanation. The VKOPSI is a fear gauge measure for the leading emerging market. For example, there are many studies on CDS market, which analyze the which factor affects the attitude of investors toward the risk and their fear, between domestic macroeconomic variables vs. global market variables (which are represented by the US market variables). In the revised version, we will explain these based on the recent articles of finance literature.

Of course, as you suggested, we will develop a bivariate model using the realized volatility measure. We believe that we can implement it. Considering the volatility persistency, we may use the unexpected component in the realized volatility in the revised version. Meanwhile, if the referee suggests a more specific alternative bivariate model, we would happily estimate it.

### Comment 3

From empirical study perspective, it is not clear to me why the author particularly focused on Korean market. Does this market significantly different from US market which needs either new model development or new empirical analysis? Therefore, it would be better to state the purpose of this study more clearly in Section 2.

# Answer 3

As we explained in Answer 2, we focus on the leading emerging market where the US market plays a

dominant role in its price discovery and information spillover process during the overnight period. This is the first study which analyzes this issue using the dataset of inter-continental markets where the operating hours do not overlap, under the HAR model framework. As you suggested, we will add more explanation why we focus on the KOSPI 200 options market and the VKOSPI in Section 2. In addition to the ample liquidity, unique investor participation rates, fast growth, there are many reasons why we analyze this market.

# Comment 4

The sample period of the data spans from 2004-2013 which undergoes the financial crisis period. It would be interesting to conduct the same analysis using subsample periods, such as pre-crisis and post-crisis periods, and see whether there is a structure break in predictive ability of these variables.

# Answer 4

As you suggested, we will carry out the additional sub-sample analysis.

# **Comment 5**

With respect to forecasting comparison, the author uses DM test that is useful to make pairwise comparison. It would be better to use SPA test of Hansen which is more suitable to rank a set of candidate models.

### Answer 4

As you suggested, we will carry out the SPA and additional tests in the revised version.