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Does VIX or volume improve GARCH volatility forecasts?

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ABSTRACT

This article considers whether the inclusion of two additional variables can improve volatility forecasts over a standard GARCH-based model. We consider three alternative ways of incorporating the volatility index (VIX) and trading volume as exogenous variables within a selection of GARCH models. We are particularly interested in whether these variables have additional incremental forecast power over and above the baseline GARCH specification. Our results suggest that both the VIX and volume do provide some additional forecast power, and this is generally improved when considering both of these series jointly in the model. However, while the results may be statistically significant the gain is marginal and the coefficient values small. Moreover, in a horse race exercise VIX does not outperform the GARCH approach. In answering the question of whether VIX produces better forecasts than the GARCH model, then the

answer is no, but the informational content of VIX cannot be ignored and should be incorporated into forecast regressions.

KEYWORDS:

GARCH volatility forecasting VIX volume

JEL CLASSIFICATION:

C22 G15

Notes

[1] Based on S&P 500 data.

[2] Because its (VIX) level indicates how much market participants are willing to pay in terms of implied volatility to hedge stock portfolios with S&P 100 index put options or to belong by buying S&P 100 index call options. In addition, extreme values of VIX are seen as trading signals, for example, with very high levels of VIX indicating that markets are pessimistic whereas a very low VIX often leads to an increase in stock prices.

[3] Whaley (2009) explains that VIX should be seen the same way as a bond's yield to maturity.

[4] Which is a better known index and because futures contracts on the S&P 500 are actively traded. Furthermore, S&P 500 option contracts are European-style, making them easier to value. Hence, the VIX is implied by the current prices of the S&P 500 index options and represents expected future market volatility over the next 30 calendar days (Whaley 2009).

[5] Volume absolute returns relationship, volume is positively correlated with absolute returns and this correlation is increased by information asymmetry.

[6] Latane and Rendleman (1976) and Chiras and Manaster (1978).

[7] The main constraint was finding VIX data of sufficient length for reliable statistical analysis to be performed.

[8] The correlation coefficient matrices are also produced as part of the initial analysis. It was found that the coefficients are small, suggesting no correlation and hence multicollinearity will not be present.

[9] This is done for VIX series only.

[10] There is one exception for the UK.

[11] We choose to use a simple AR(1) model in order to keep the model parsimonious. However, several authors have considered including asymmetric terms (Giot, 2005) or allowing for long memory effects (Konstantinidi, Skiadopoulos, and Tzagkaraki 2008; Dunis, Kellard, and Snaith 2013). While in the context of option pricing, Kanniainen, Lin, and Yang (2014) advocate the use of squared VIX.

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