Return Predictability and Risk Management

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Discussion by Denisa Banulescu

Objective & Results

Contribution & Results

- General way to model the process of daily returns:

$$y_t = f(\mu_{t|t-1}, \sigma_{t|t-1})$$

- "When various risk measures are computed, it is often assumed that the expected return is constant".

Is there an impact of ignoring the time-variability of μ on the computation of specific risk measures (e.g., VaR, ES)?

- Yes (there is an impact on VaR for longer horizons)
  - study the difference on the value of the VaR by assuming different DGPs (misspecified model, observable μ_t, unobservable μ_t, without / with time-varying conditional variance).

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Remarks and Suggestions

Specific Remarks and Questions

Q1: The main debate here is whether there are gains from considering a near-unit root process for conditional mean instead of supposing it fixed.

- It appears as an extension of Pàstor and Stambaugh (2012) to VaR;
- The contribution and streamline of the paper should be better emphasized.

Q2: Relaxing the hypothesis of Normality (in each case $y_{t+\tau|t}$ is assumed to be Normally distributed).

Q3: Explain more clearly the concepts of VaR ($VaR(R_{t+\tau}|Model, I_t)$) and Dollar-term VaR and the way you choose to compute them.

Specific Remarks and Questions

Q4: Calibration

- Intuition lacks in many choices made: e.g., eg. p8, $\theta = 0.999$ so as the annual counterpart is 0.78, R^2 is fixed to 0.06 (surprisingly low) in the following ...;
- Figures 16 si 17: empty;
- Spend more time on the interpretation of the calibration results $\longrightarrow$ the implication of these results (from a economic/financial point of view);
- Redundant information (most of the time the tables and their associated figures present exactly the same information);
- Too many tables summarizing the characteristics of the models considered.

Specific Remarks and Questions

Q5: Result: the VaR values are different from a specification to another...

- Visual divergence, not statistically tested. Are these differences statistically significant? (backtest procedure)
- The constancy of the mean cannot be statistically rejected $=>$ implement a test of constancy of this parameter.
- Robustness check for $\alpha = 5\%$.
- Extension to *ES* (Expected Shortfall).

Specific Remarks and Questions

Q6: The VaR results are model-dependent... use a realized measure of volatility (RV, RK).

Q7: Open question: Is it reasonable to expect a 6 month-1year ahead risk measure to perform well?

Speculative Activity and Returns Volatility of Chinese Major Agricultural Commodity Futures

Bohl M.T., Siklos P.L. & Wellenreuther C.

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Objective

Contribution

***Empirical* analysis on the impact of speculative activity on returns volatility of Chinese commodity futures markets (soybeans, soybeans meal, sugar)**

- Chinese futures markets for commodities have grown rapidly in the last years and they are believed to be highly speculative.
- Two ratios (Lucia et al., 2015):
  - a **speculation ratio**: defined as trading volume divided by open interest (to capture the relative dominance of speculative activity in China's futures markets);
  - a **hedging ratio**: defined as the ratio between the volume variation and open interest data (to capture the relative importance of the hedging behavior).
- GARCH and VAR models

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Framework & Results

- Contemporaneous relationship
  - R1 **positive** influence of the speculation ratio on volatility for all commodities examined;
  - R2 **negative** influence of the hedging ratio on returns volatility;
- Lead-lag relationship
  - R3 the two ratios Granger-cause volatility;
- The results seem to be **inconsistent** with the results of the current literature, which find a **stabilizing influence** of speculation on returns volatility.

Remarks and Suggestions

Specific Remarks and Questions

Q1: Contemporaneous relationship
AR(1)-GARCH(1,1) with exogenous covariates

$$r_t = a + b_1 r_{t-1} + \varepsilon_t \quad (1)$$
$$\sigma_t^2 = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \beta_1 \sigma_{t-1}^2 + \gamma \mathit{Ratio}_t \quad (2)$$

- Normality? ... fat tails.
- Positivity? ... knowing that $\mathit{Ratio}^{\mathit{hedge}} \in [-1, 1]$.
- Leverage? ... negative shocks have a greater impact on volatility than positive shocks.

Specific Remarks and Questions

Q1: Contemporaneous relationship
AR(1)-GARCH(1,1) with exogenous covariate (cont'd)

$$r_t = a + b_1 r_{t-1} + \varepsilon_t \quad (3)$$

$$\sigma_t^2 = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \beta_1 \sigma_{t-1}^2 + \gamma Ratio_t \quad (4)$$

- Information criteria? ... "*We apply a GARCH model of order p = 1 and q = 1,* ***since a number of researchers have frequently demonstrated the suitability of GARCH (1,1)*** *models to represent the majority of financial time series (Bera and Higgins 1993).*"

Specific Remarks and Questions

Q1: Contemporaneous relationship
AR(1)-GARCH(1,1) with exogenous covariate (cont'd)

$$r_t = a + b_1 r_{t-1} + \varepsilon_t \tag{5}$$
$$\sigma_t^2 = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \beta_1 \sigma_{t-1}^2 + \gamma \mathit{Ratio}_t \tag{6}$$

- The innovation term cannot be Normally distributed knowing that your variables are in bounded spaces.

  Suggestion:

$$\sigma_t^2 \in \mathbb{R}^+ \longrightarrow \log \sigma_t^2 \in \mathbb{R}$$
$$\mathit{Ratio}_t^{\mathit{hedge}} \in [-1, 1] \longrightarrow \textit{Fisher transformation} \ (\in \mathbb{R})$$

Specific Remarks and Questions

Q2: Lead-lag relationship
VAR model and its "tools"

$$\sigma_t^2 = a_0 + \sum_{i=1}^{k} \alpha_{1,t}\sigma_{t-i}^2 + \sum_{i=1}^{k} \beta_{1,t} Ratio_{t-i} + e_t \tag{7}$$

$$Ratio_t = a_0 + \sum_{i=1}^{k} \alpha_{1,t} Ratio_{t-i} + \sum_{i=1}^{k} \beta_{1,t}\sigma_{t-i}^2 + u_t \tag{8}$$

- Notations?

Specific Remarks and Questions

Q2: Lead-lag relationship
VAR model and its "tools" (cont'd)

$$\sigma_t^2 = a_0 + \sum_{i=1}^{k} \alpha_{1,t}\sigma_{t-i}^2 + \sum_{i=1}^{k} \beta_{1,t} Ratio_{t-i} + e_t \tag{9}$$

$$Ratio_t = a_0 + \sum_{i=1}^{k} \alpha_{1,t} Ratio_{t-i} + \sum_{i=1}^{k} \beta_{1,t}\sigma_{t-i}^2 + u_t \tag{10}$$

- Notations?

Specific Remarks and Questions

Q2: Lead-lag relationship
VAR model and its "tools" (cont'd)

$$\sigma_t^2 = a_{01} + \sum_{i=1}^{k} \alpha_{1i,t}\sigma_{t-i}^2 + \sum_{i=1}^{k} \alpha_{2i,t} Ratio_{t-i} + e_t \tag{11}$$

$$Ratio_t = a_{02} + \sum_{i=1}^{k} \beta_{1i,t} Ratio_{t-i} + \sum_{i=1}^{k} \beta_{2i,t}\sigma_{t-i}^2 + u_t \tag{12}$$

- In the VAR model σ_t^2 is rather $\hat{\sigma}_t^2 = f(\ldots, Ratio_t)$ previously estimated
  $\longrightarrow$ accumulation of estimation errors and underestimation of the causal effects;
  $\longrightarrow$ Suggestion: get an estimator of σ_t^2 that does not depend on the ratios.

Specific Remarks and Questions

Q2: Lead-lag relationship
VAR model and its "tools" (cont'd)

$$\sigma_t^2 = a_{01} + \sum_{i=1}^{k} \alpha_{1i,t}\sigma_{t-i}^2 + \sum_{i=1}^{k} \alpha_{2i,t} Ratio_{t-i} + e_t \tag{13}$$

$$Ratio_t = a_{02} + \sum_{i=1}^{k} \beta_{1i,t} Ratio_{t-i} + \sum_{i=1}^{k} \beta_{2i,t}\sigma_{t-i}^2 + u_t \tag{14}$$

- e_t and u_t are mutually independent ... Why?
  $\longrightarrow$ Cholesky decomposition ... new IRF and variance decomposition results ... new (different?) conclusion.

Specific Remarks and Questions

Q2: Lead-lag relationship
VAR model and its "tools" (cont'd)

$$\sigma_t^2 = a_{01} + \sum_{i=1}^{k} \alpha_{1i,t}\sigma_{t-i}^2 + \sum_{i=1}^{k} \alpha_{2i,t} Ratio_{t-i} + e_t \tag{15}$$

$$Ratio_t = a_{02} + \sum_{i=1}^{k} \beta_{1i,t} Ratio_{t-i} + \sum_{i=1}^{k} \beta_{2i,t}\sigma_{t-i}^2 + u_t \tag{16}$$

- Why Granger causality testing and not Geweke causality (lead-lag and contemporaneous dependences + statistical inference)?

Specific Remarks and Questions

Q3: Open questions

"a report published by Citigroup Research describes Chinese investors as perhaps prone to being **the most speculative in the world**. Furthermore, the report points out that speculative trading volume on Chinese commodity futures markets has exploded in the last years and has created high returns volatility"

- Is there an impact on the international partnerships?
- More details on the policy implications. How should the regulators act to prevent "harmful" speculation?

Specific Remarks and Questions

Suggestions

- **Avoid conditional volatility estimation** :

  Intradaily price data = > intradaily returns => volatility proxy ("*makes volatility observable*") (i.e., unbiased estimator of volatility)

  $\longmapsto$ for instance, RV (Realized Volatility), RK (Realized Kernel).

- **Contemporaneous dependence: log HAR-RV model** (Corsi, 2008) with covariates

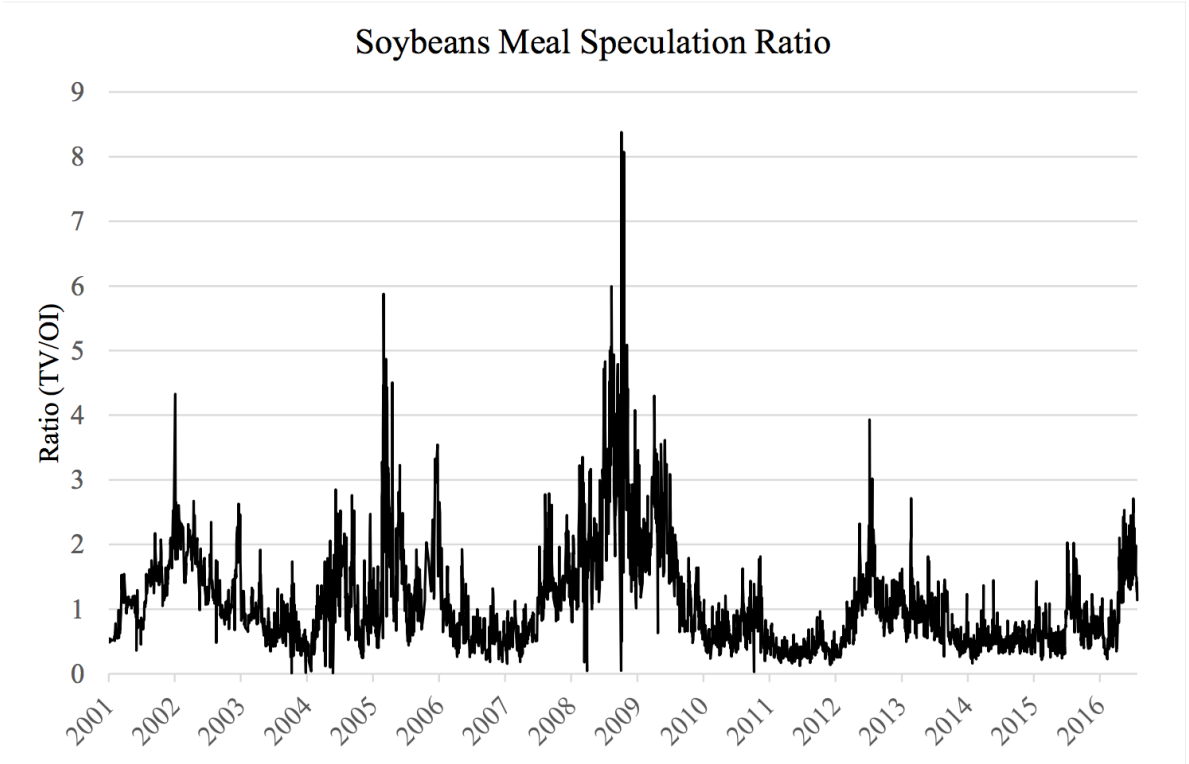
  $\longmapsto$ working with logarithmic transformations to avoid negativity issues and get approximately Normal distribution for the volatility measure.

- **Lead-lag dependence: VAR model on** $(\log RV, Ratio)'$

  $\longmapsto$ Geweke causality testing, Cholesky decomposition, IRF, variance decomposition.

Specific Remarks and Questions

Suggestions (cont'd)



- Speculators $\longrightarrow$ self-fulfilling dynamics
- Non-causal models (see Gouriéroux and Zakoïan, 2013)

General comments

- inserted in a dynamic research field
- topical issue
- insist more on the ultimate aim of the paper (i.e., financial implication, regulation, etc.)
- some typos

Thank you for your attention!