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Discussion on

Measuring Interest Rate Risk Management by Financial Institutions

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Overview

This paper



- New method to measure the time-varying residual interest rate risk exposure of financial intermediaries using high-frequency financial market data
- “Realized Gamma”: daily estimate of the sensitivity of a firm’s stock price returns to realized changes in interest rates
- Idea: high-frequency data provide a consistent estimate of time-varying interest rate risk, even when changes in financial institutions’ exposure are slow moving
- Statistical inference on realized gamma estimates by calculating asymptotically valid confidence intervals using subsampling and dealing with simultaneity
- Application to life insurance industry using a dynamic model of life insurance firms with endogenous interest rate risk management

- Testable prediction: when a life insurer can hedge interest rate risk with an optimal asset portfolio and capital structure, the correlation between the life insurer's stock returns and changes in long-term interest rates is zero
- Empirical analysis for US life insurance firms from 2007 to 2023
- Main findings:
 - life insurers stock prices are generally uncorrelated with long-term Treasury interest rates, in contrast to existing literature
 - there is more variation within each life insurer over time than across life insurers
 - in some states of the world, realized gamma is statistically significant, i.e., life insurers remain exposed to changes in long-term interest rates

Main results (cont.)



- realized gamma is generally statistically significant in periods when the term premium (long-term compensation) is lower, the corporate bond spread (credit risk compensation) is lower, and life insurers' average cost of funding is higher
- effective interest rate risk management (zero realized gamma) is not related to low interest rate volatility

Comments

Microstructure noise and resampling



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- By working on intraday data it is necessary to deal with a microstructure noise. Resampling over 5min is considered but to filter out the microstructure noise the residuals from an AR(1) are considered, opening the possibility to filter out more than the relevant autocorrelation
- It would be of interest to consider a Kalman Filter, thus specifying the relationship between unobserved true price and microstructure noise
- Or considering a resampling over 15min (instead of 5min), see for example

Tim Bollerslev, Andrew J. Patton, Rogier Quaadvlieg, *Realized semibetas: Disentangling “good” and “bad” downside risks*, Journal of Financial Economics, Volume 144, Issue 1, 2022, Pages 227-246,

Zero Realized Gamma



- Two-variable regression model

$$r_{ijt} = \alpha_t + \beta_t r_{mjt} + \gamma_t r_{yjt} + \epsilon_{ijt}$$

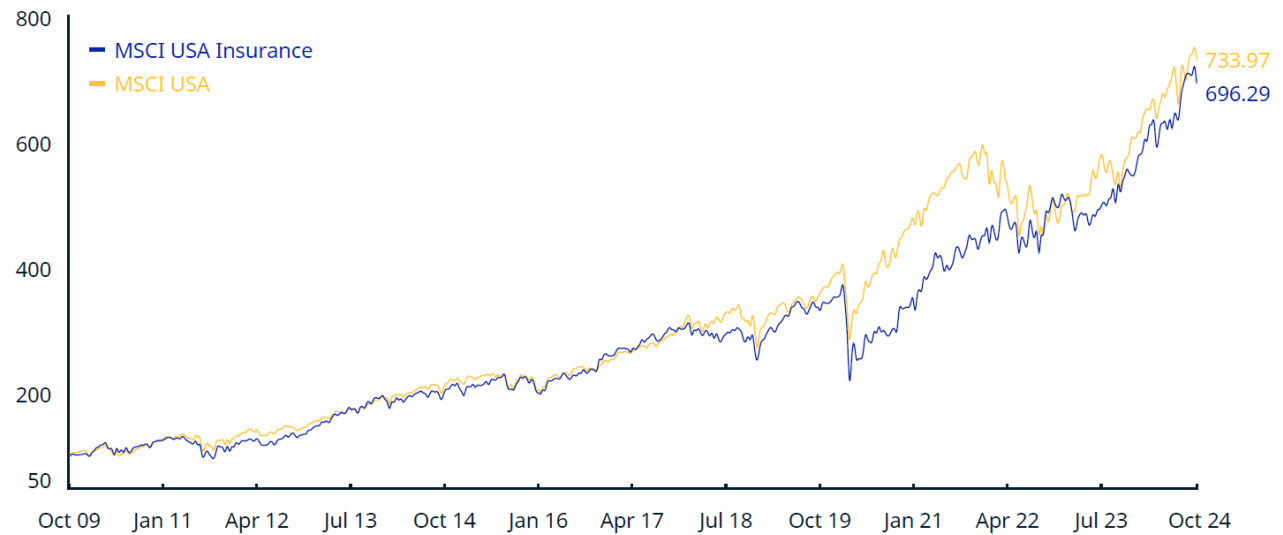
- Does $\gamma = 0$ in this regression actually imply that insurers are hedged against interest rate risk or just that, for most of the time under consideration, stock prices moved independently of changes in interest rates?

Insurance Sector Stock Returns



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CUMULATIVE INDEX PERFORMANCE – GROSS RETURNS (USD) (OCT 2009 – OCT 2024)



INDEX PERFORMANCE – GROSS RETURNS (%)

	ANNUALIZED		SHARPE RATIO ^{2,3}	
	5 Yr	10 Yr	5 Yr	10 Yr
MSCI USA Insurance	15.54	12.88	0.71	0.71
MSCI USA	15.27	12.95	0.74	0.76

Zero Realized Gamma

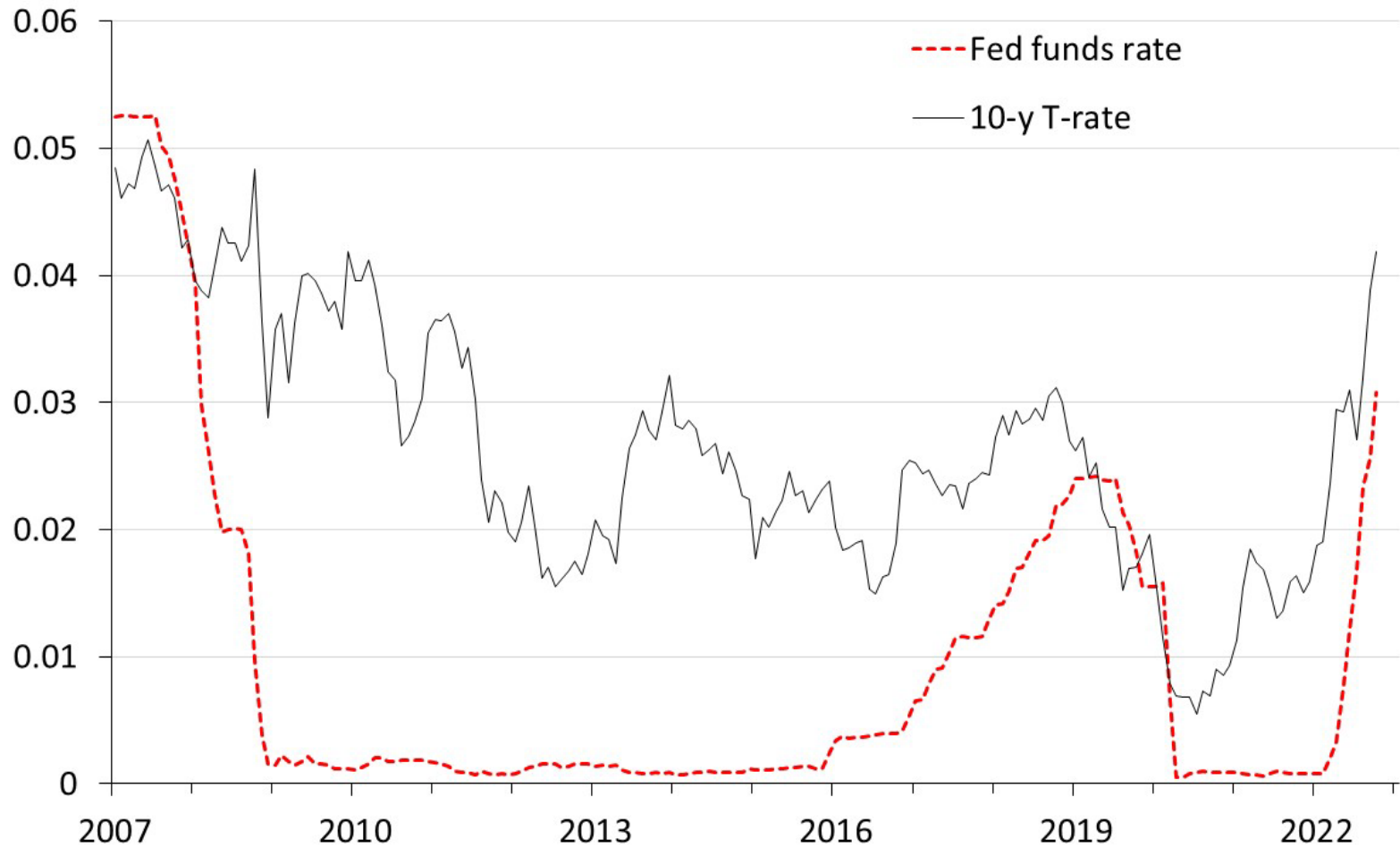


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- Can the empirical evidence on zero realized gamma be affected by the observed negative trend in the 10-year Treasury rate (from 5% in 2007 to 0.5% in mid-2020) or the near-zero Fed funds rate observed for most of the period under consideration?

Interest Rates



- Two-variable regression model

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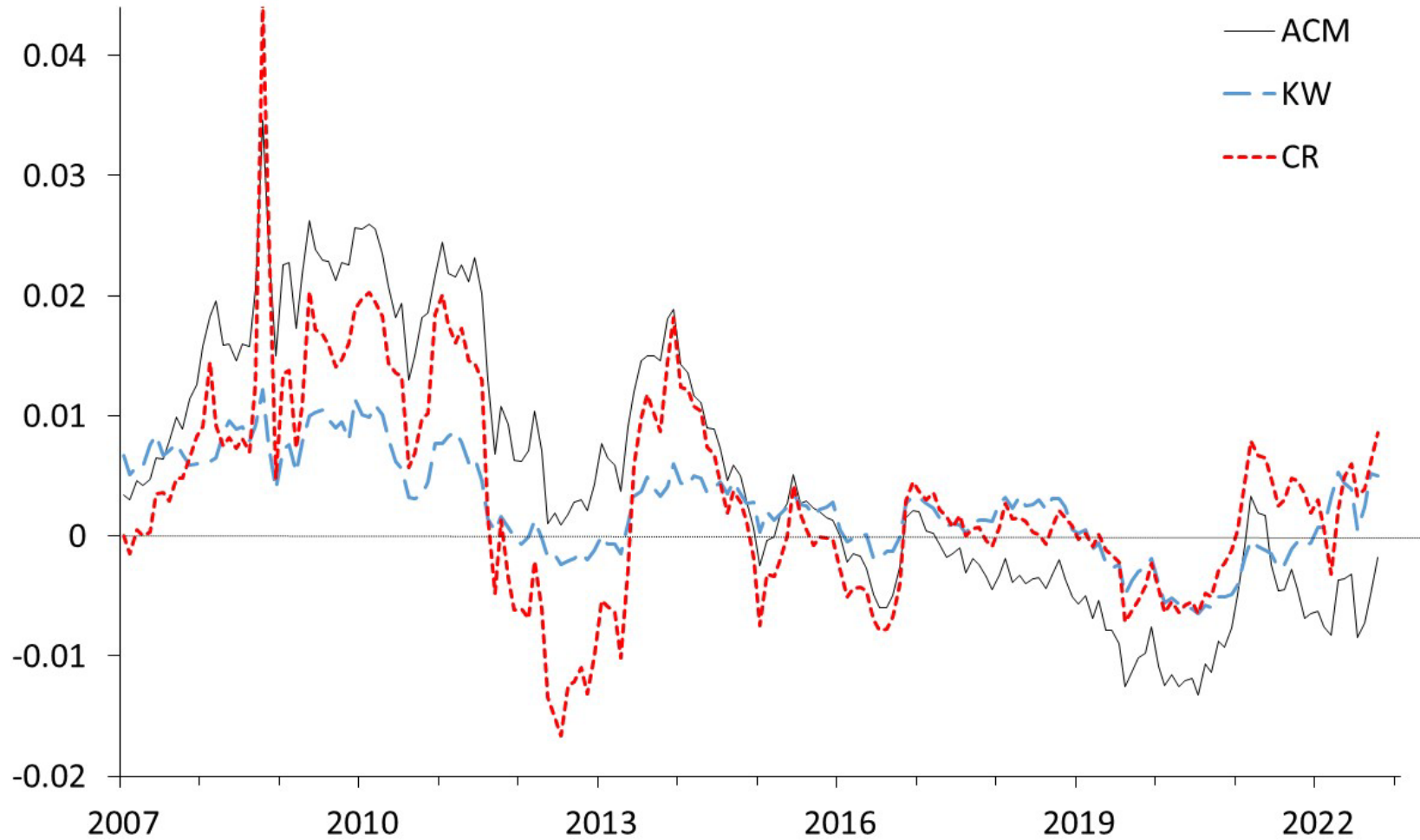
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- How robust is the evidence if realized gamma is measured at different (lower) frequencies?

- To investigate why realized gamma is significant in certain periods, some macro factors are proposed as possible explanatory variables
- Among these, the term premium (long-term compensation) and a corporate bond spread (credit risk compensation) are used as measures of the return on life insurers' long-term bonds
- Estimates based on the ACM model (Fed New York) are used as proxy for the term premium and the Moody's Baa-Aaa seasoned corporate bond spread as a proxy for the credit risk component
- However, these are both estimated values and it would be interesting to see whether the results are robust with respect to different proxies, such as, for example, term premia from KW (Fed Reserve) or CR (Fed San Francisco) models and credit spreads from CDS-based market values

Term Premium



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- An excellent paper, which provides an important empirical contribution on applying high-frequency market data for measuring the residual interest rate risk in financial institutions
- Smart theoretical model with several interesting implications for interest rate risk management
- It could be beneficial a deeper robustness analysis with respect to the determinants of zero (or, non-zero) realized gamma, a key point in the paper
- Looking forward to reading the next version
- Thank you!