

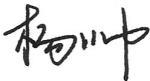
Jumps, Realized volatility and Value-at-Risk

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Submitted by Shuai Yang to the University of Exeter as a thesis for the degree of Doctor of Philosophy in Finance in May 2012.

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Acknowledgements

I would like to express my deepest appreciation to my supervisor, Professor Richard D. F. Harris, who is my role model for being a good scholar. Without his solid support, precious advice, and untiring patience, this thesis could not have been completed.

I dedicate this thesis to my wife, Zimo Zhou, and my parents. Without their continuous encouragement and strong beliefs, I could not have dreamed of pursuing the PhD in UK.

Abstract

This thesis consists of three research topics, which together study the related topics of volatility jumps, modeling volatility and forecasting Value-at-Risk (VaR).

The first topic focuses on volatility jumps based on two recently developed jumps detection methods and empirically studied six markets and the distributional features, size and intensity of jumps and cojumps. The results indicate that foreign exchange markets have higher jump intensities, while equity markets have a larger jump size. I find that index and stock markets have more interdependent cojumps across markets. I also find two recently proposed jump detection methods deliver contradictory results of jump and cojump properties. The jump detection technique based on realized outlyingness weighted variation (ROWV) delivers higher jump intensities in foreign exchange markets, whereas the bi-power variation (BV) method produces higher jump intensities in equity markets. Moreover, jumps under the ROWV method display more serial correlations than the BV method. The ROWV method detects more cojumps and higher cojumps intensities than the BV method does, particularly in foreign exchange markets.

In the second topic, the Model Confidence Set test (MCS) is used. MCS selects superior models by power in forecasting ability. The candidate models set included 9 GARCH type models and 8 realized volatility models. The dataset is based on six markets spanning more than 10 years, avoiding the so-called data snooping problem. The dataset is extended by including recent financial crisis periods. The advantage of the MCS test is that it can compare models in a group,

not only in a pair. Two loss functions that are robust to noise in volatility proxy were also implemented and the empirical results indicated that the traditional GARCH models were outperformed by realized volatility models when using intraday data. The MCS test based on MSE selected asymmetric ARFIMA models and the HAR mode as the most predictive, while the asymmetric QLike loss function revealed the leveraged HAR and leveraged HAR-CJ model based on bi-power variation as the highest performers. Moreover, results from the subsamples indicate that the asymmetric ARFIMA model performs best over turbulent periods.

The third topic focuses on evaluating a broad band of VaR forecasts. Different VaR models were compared across six markets, five volatility models, four distributions and 8 quantiles, resulting in 960 specifications. The MCS test based on regulatory favored asymmetric loss function was applied and the empirical results indicate that the proposed asymmetric ARFIMA and leveraged HAR models, coupled with generalized extreme value distribution (GEV) or generalized Pareto distribution (GPD), have the superior predictive ability on both long and short positions. The filtered extreme value methods were found to handle not only extreme quantiles but also regular ones.

The analysis conducted in this thesis is intended to aid risk management, and subsequently reduce the probability of financial distress in the sector.

Table of Contents

Chapter 1: Introduction	17
1.1 Thesis overview and relations of research topics.....	17
1.2 Jumps and Cojumps in realized volatility.....	18
1.2.1 Development of jumps detection techniques	18
1.2.2 Motivations and contributions.....	20
1.3 Evaluating the forecasting ability of volatility models	22
1.3.1 Development of volatility models.....	22
1.3.2 Motivations and contributions.....	25
1.4 Evaluating Value-at-Risk models	27
1.4.1 Development of VaR models.....	27
1.4.2 Motivations and contributions.....	30
1.5 Synopsis of thesis	32
Chapter 2: Data descriptions.....	35
2.1 Introduction	35
2.2 Daily returns computed from intraday data.....	37
2.3 Realized volatility and its stylized facts.....	40
2.4 Summary of data description	43
Chapter 3: Jumps And Cojumps In Realized Volatility.....	60
3.1 Introduction.....	60
3.2 Literature review	63
3.2.1 Basic bi-power variations	64
3.2.2 Modified bi-power variations.....	66
3.2.3 Other integrated volatility variations	67
3.3 Methodology.....	69
3.3.1 Brownian Semi-Martingale with Jumps model.....	70

3.3.2	Bi-Power Variation.....	71
3.3.3	Realized outlyingness weighted variation.....	73
3.3.4	Daily jump tests	77
3.4	Empirical Results.....	80
3.4.1	Realized jumps.....	80
3.4.2	Jumps dynamics.....	82
3.4.3	Cojumps	83
3.5	Summary	85
Chapter 4: Evaluating The Forecast Ability Of Volatility Models.....		99
4.1	Introduction	99
4.2	Literature Reviews.....	102
4.2.1	Short memory models	102
4.2.2	Long memory models	103
4.2.3	Realized volatility models.....	104
4.2.4	Summary of literature review	106
4.3	Methodology.....	106
4.3.1	GARCH family models	107
4.3.2	ARFIMA models	113
4.3.3	HAR family models.....	115
4.3.4	Loss functions.....	117
4.3.5	Test of superior predictive ability.....	118
4.3.6	Model confidence set.....	120
4.4	Empirical Results.....	123
4.4.1	In-sample Estimation results.....	123
4.4.2	Full sample comparisons.....	128
4.4.3	Dot-com bubble burst and aftermath	133
4.4.4	Calm markets.....	136

4.4.5	Financial crisis and aftermath.....	139
4.4.6	Superior predictive ability tests.....	143
4.5	Summary	145
Chapter 5: Evaluating Value-at-Risk models		183
5.1	Introduction	183
5.1.1	Concepts of Value-at-Risk (VaR).....	183
5.1.2	History of VaR.....	184
5.1.3	Early VaR models.....	184
5.1.4	Filtered VaR models.....	187
5.1.5	Extreme Value models.....	188
5.1.6	Realized volatility models.....	189
5.1.7	Contributions and chapter organization	190
5.2	Literature review	192
5.2.1	Elementary VaR models.....	192
5.2.2	Filtered VaR models.....	194
5.2.3	Extreme value models (EVT).....	197
5.2.4	Realized volatility models.....	201
5.3	Methodology.....	203
5.3.1	Value-at-Risk.....	203
5.3.2	Conventional Distributions of innovations.....	205
5.3.3	Generalized Pareto distribution.....	207
5.3.4	Generalized Extreme Value distribution	211
5.3.5	Kupiec LR test.....	214
5.3.6	Dynamic Quantile test.....	216
5.3.7	Evaluating VaR forecasts	217
5.4	Empirical results	218
5.4.1	In-sample estimation of GPD and GEV.....	218

5.4.2	Out-of-sample results	221
5.4.3	Results of MCS tests	233
5.5	Summary	235
Chapter 6:	Conclusions.....	253
6.1	Conclusions: Jumps and cojumps	253
6.2	Conclusions: Evaluating volatility models	255
6.3	Conclusions: Evaluating VaR models	258
6.4	Limitations and Future Extensions	260
Bibliography.....	274