

VU Research Portal

Modeling Time Variation in Systemic Risk

Zhang, X.

2013

document version

Publisher's PDF, also known as Version of record

[Link to publication in VU Research Portal](#)

citation for published version (APA)

Zhang, X. (2013). *Modeling Time Variation in Systemic Risk*. Tinbergen Institute.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal ?

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

E-mail address:

vuresearchportal.ub@vu.nl

Contents

1	Introduction	1
1.1	Financial risk modeling	3
1.1.1	Systemic risk modeling	3
1.1.2	Sovereign risk modeling	6
1.1.3	Modeling challenges	7
1.2	Multivariate dynamic non-normal risk models	9
1.3	Outline	12
2	Modeling Dynamic Volatilities and Correlations under Skewness and Fat Tails	15
2.1	Introduction	15
2.2	The dynamic GH model	19
2.3	Model parameterizations	23
2.4	Time-varying scale matrix and an EM algorithm	26
2.5	Monte Carlo evidence	29
2.5.1	Simulation design	29
2.5.2	Simulation results	30
2.6	Empirical application	31
2.7	Conclusion	38
	Appendices to Chapter 2	40
3	Conditional Probabilities for Euro Area Sovereign Default Risk	45
3.1	Introduction	45
3.2	Conceptual framework	48
3.3	Statistical model	51

3.3.1	Generalized Autoregressive Score dynamics	51
3.3.2	Parameter estimation	54
3.4	Empirical application: Euro area sovereign risk	55
3.4.1	CDS data	55
3.4.2	Marginal and joint risk	56
3.4.3	Joint probabilities of Eurozone financial stress	62
3.4.4	Spillover measures: What if ... failed?	65
3.4.5	Event study: the May 9, 2010 rescue package and risk dependence	71
3.5	Conclusion	75
	Appendix to Chapter 3	75
4	Measuring Credit Risk in a Large Banking System: Econometric Modeling and Empirics	79
4.1	Introduction	79
4.2	A framework for simultaneous financial firm failures	82
4.3	The model	84
4.3.1	The Dynamic GH skewed- t model	84
4.3.2	Estimation and restrictions	86
4.3.3	The Block GAS-Equicorrelation model	88
4.4	The risk measures in a large system	91
4.5	Empirical application	94
4.5.1	The system of major European banks	94
4.5.2	European large financial institutions	100
4.6	What factors drive the bank equity correlation?	104
4.7	Conclusion	111
	Appendix to Chapter 4	113
5	Conclusion	117
5.1	Summary of the main conclusions	117
5.2	Direction for future research	119
	Bibliography	120
	Samenvatting (Summary in Dutch)	131