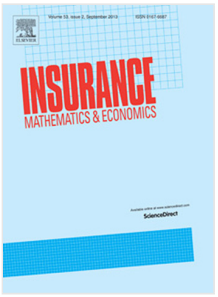
Accepted Manuscript



On a bivariate copula with both upper and lower full-range tail dependence

Lei Hua

PII: S0167-6687(16)30426-7
DOI: http://dx.doi.org/10.1016/j.insmatheco.2017.01.003
Reference: INSUMA 2315

To appear in: *Insurance: Mathematics and Economics*

Received date: October 2016
Revised date: January 2017
Accepted date: 5 January 2017

Please cite this article as: Hua, L., On a bivariate copula with both upper and lower full-range tail dependence. *Insurance: Mathematics and Economics* (2017), http://dx.doi.org/10.1016/j.insmatheco.2017.01.003

On a bivariate copula with both upper and lower full-range tail dependence

Lei Hua*

February 4, 2017

Abstract. Copula functions can be useful in accounting for various dependence patterns appearing in joint tails of data. We propose a new two-parameter bivariate copula family that possesses the following features. First, both upper and lower tails are able to explain full-range tail dependence. That is, the dependence in each tail can range among quadrant tail independence, intermediate tail dependence, and usual tail dependence. Second, it can capture upper and lower tail dependence patterns that are either the same or different. We first prove the full-range tail dependence property, and then we obtain the corresponding extreme value copula. There are two applications based on the proposed copula. The first one is modeling pairwise dependence between financial markets. The second one is modeling dynamic tail dependence patterns that appear in upper and lower tails of a loss-and-expense data.

Key words: Hypergeometric functions; tail order; intermediate tail dependence; quadrant tail independence; usual tail dependence; Beta prime scale mixtures.

1 Introduction

Dependence modeling with copulas can be useful in modeling datasets that have various dependence patterns. In particular, where asymmetric dependence patterns and dependence in the tails are concerned,

*Email: Lhua@niu.edu, Division of Statistics, Northern Illinois University, DeKalb, IL, 60115, United States.