

# Hoang Nguyen

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## Personal Information

Nationality: Vietnam  
Date of birth: 29 Jan 1989  
Marital Status: Single

## Education

PhD. Business and Quantitative method, Universidad Carlos III de Madrid  
Thesis title: Bayesian inference for high dimensional factor copulas  
Supervisors: **Prof. M. Concepción Ausín** and **Prof. Pedro Galeano** 2015-Now  
Visiting PhD student at Ca' Foscari University of Venice,  
Invited by **Prof. Roberto Casarin**, 2017/10 - 2017/12.

MSc. Business and Quantitative method, Universidad Carlos III de Madrid  
Thesis title: Modelling Stock Dependence using Factor Copulas 2013-2015  
Dissertation Advisor: **Prof. M. Concepción Ausín**

BA, National Economics University, Vietnam (NEU).  
Degree in Banking and Finance 2007-2011

## References

**Dr. Pedro Galeano**  
Associate Professor  
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**Job market paper** **Variational Bayesian inference for high dimensional factor copulas**, with M. Concepción Ausín and Pedro Galeano (2018), (Paper - Code - Appendix - Slides - Poster)

Factor copula models have been recently proposed for describing the joint distribution of a large number of variables in terms of a few common latent factors. In this paper, we employ a Bayesian procedure to make fast inferences for multi-factor and structured factor copulas. To deal with the high dimensional structure, we apply a variational inference (VI) algorithm to estimate different specifications of factor copula models. Compared to the Markov chain Monte Carlo (MCMC) approach, the variational approximation is much faster and could handle a sizeable problem in a few seconds. Another issue of factor copula models is that the bivariate copula functions connecting the variables are unknown in high dimensions. We derive an automatic procedure to

recover the hidden dependence structure. By taking advantage of the posterior modes of the latent variables, we select the bivariate copula functions based on minimizing the Bayesian information criterion (BIC). The simulation studies in different contexts show that the procedure of bivariate copula selection could be very accurate in comparison to the true generated copula model. We illustrate our proposed procedure with two high dimensional real data sets.

## Publications

**Parallel Bayesian inference for high dimensional dynamic factor copulas**, with M. Concepción Ausín and Pedro Galeano (2018) - Journal of Financial Econometrics (forthcoming), (Paper - Code - Appendix - Slides - Poster)

To account for asymmetric dependence in extreme events, we propose a dynamic generalized hyperbolic skew Student-t factor copula where the factor loadings follow Generalized Autoregressive Score (GAS) processes. Conditioning on the latent factor, the components of the return series become independent, which allows us to run Bayesian estimation in a parallel setting. Hence, Bayesian inference on different specifications of dynamic one factor copula models can be done in a few minutes. Finally, we illustrate the performance of our proposed models on the returns of 140 companies listed in the S&P500 index. We compare the prediction power of different competing models using Value-at-Risk (VaR), and Conditional Value-at-risk (CVaR), and show how to obtain optimal portfolios in high dimensions based on minimum CVaR.

## Working paper

**What are drivers of Swedish sustainable development path? New evidence from Bayesian Dynamic Linear Models**, Proceedings XX Applied Economic Meeting, with Jesper Stage, Magnus Lindmark, Huong Nguyen (2017) - Paper

According to my knowledge, we are the first who aim to find out the dynamic relationship between genuine savings (GS) and long-term well-being represented by future consumptions (PVC). By extending the measure of GS to account for a wider range of impacts on natural resource, human capital, and technological progress, we apply the Bayesian approach to estimate Dynamic Linear Models (DLMs). We discover that there are increasing dependent trends with all explanatory GS variables and provide a new empirical evidence on the technological progress that underpins Swedish sustainable development. The dynamic model also provides a trivial framework for testing the hypothesis that their relationship approach to one as the net investment term includes more types of capital.

## Work in progress

**Leverage stochastic volatility using copulas** with Roberto Casarin, M. Concepción Ausín and Pedro Galeano (2018).

**Variational inference for Markov switch factor copula models.**

**Variational inference for dynamic GAS factor copula models.**

## Presenter at Conference & seminar

**Parallel Bayesian inference for high dimensional dynamic factor copulas**

Presenter, CFE-CMStatistics 2016

Seville 2016

Presenter, Workshop in Bayesian Econometrics, UC3M

Madrid 2016

Poster presenter, International Society for Bayesian Analysis (ISBA)

Cagliari 2016

**What are drivers of Swedish sustainable development path?**

Presenter, XX Applied Economics Meetings

Valencia 2017

**Variational Bayesian inference for high dimensional factor copulas**

Presenter, 49th Meeting of the Working Groups "Statistical Computing"

	and “Biostatistics”	Gunzburg 2017
	Presenter, University Ca’ Foscari Internal research seminar	Venice 2017
	Presenter, Workshop on Financial Econometrics	Örebro 2018
	Presenter, CFE-CMStatistics 2018	Pisa 2018
	Poster presenter, International Society for Bayesian Analysis (ISBA)	Edinburgh 2018
<b>Teaching Experience</b>	<b>Teaching Assistant</b> , Statistics Department, UC3M	
	Course: <i>Statistics for Social Sciences I</i> - Web content	2017-2018
	Course: <i>Optimization and simulation for business</i> - Web content	2018
	Course: <i>Statistics for Social Sciences III</i> - Web content	2017
	Course: <i>Statistics for Business Administration</i> - Web content	2016
	Course: <i>Statistics for Telecommunication</i> - Web content	2016
	Course: <i>Financial Risk Management</i> - Web content	2015
<b>Research Experience</b>	<b>Research Assistant</b> , Department of Business Administration, UC3M	
	Project: Eco-innovation in Madrid	
	<b>Prof. Maria Jose Alvarez</b> and <b>Prof. Maria Jose Montes</b>	Summer 2014
<b>Short courses attendance</b>	<i>Tail Risk</i> , <b>Prof. David Veredas</b> (Université libre de Bruxelles)	Madrid 2014
	<i>Empirical Distribution</i> , <b>Prof. Winfried Stute</b> (U. of Giessen)	Madrid 2014
	<i>The power of penalties</i> , <b>Prof. Paul Eilers</b> (Erasmus University)	Madrid 2015
	<i>Non-Linear Methods for Complex Systems Analysis</i> , <b>Prof. Reik Donner &amp; Marc Wiedermann</b> (PIK - Potsdam)	Cologne 2015
	<i>Bayesian Statistics and Algorithms (CIRM - Thematic month)</i>	Marseille 2016
	<i>Data Mining</i> , <b>Prof. Mykola Pechenizkiy</b> (TU Eindhoven)	Jyvaskyla 2016
	<i>Longitudinal Data Analysis</i> , <b>Prof. Molenberghs</b> (KU Leuven)	Jyvaskyla 2016
	<i>Le Cam’s Asymptotic Theory</i> , <b>Prof. Marc Hallin</b>	Madrid 2017
	<i>Quasi Monte Carlo</i> , (Summer School)	Graz 2017
	<i>Thematic Semester on Statistics for Energy Markets</i>	Paris 2018
	<i>Master class in Bayesian statistics</i>	Marseille 2018
<b>Fellowships and Awards</b>	ISBA World meeting travel grant	2018
	UC3M mobility grant	2017
	ALDE travel grant	2017
	ISBA World meeting travel grant	2016
	PhD fellowship at Universidad Carlos III de Madrid	2015-2018
	Full Master Scholarship at Universidad Carlos III de Madrid	2013-2015
	Scholarship for 3-months exchange at Saint Mary’s University (Canada)	2012
	Second prize at National Student Olympiad in Programming Contest	2009
<b>Computer Skills</b>	Languages: R, C++, Python, Matlab	
	Software: Latex, Open Office.	
	OS: Linux.	
<b>Languages</b>	Vietnamese (Native), English (Advanced); Spanish (Intermediate); German (Beginner);	
<b>Miscellaneous</b>	Representative for UC3M in Econometric game 2017 ( <b>Final round 10/30 teams</b> ); Coding Club UC3M content manager (Website: <a href="https://codingclubuc3m.github.io/">https://codingclubuc3m.github.io/</a> );	