Abstracts of Poster Presentations

Poster presentation:

Tereza Cristina **Amorelli** (Banco do Brasil)

Pricing non-traded assets using indifference pricing

Pricing contingent claims in incomplete markets arises naturally in many applications. We use an incomplete market model in discrete-time, with a nested complete market of traded assets. In this model, continuous pricing are allowed for the non-traded assets and this yields more flexibility, while keeping a simple setting. We then implement an indifference pricing algorithm for this model, with an exponential utility, and present a couple of examples.
Joint work with Max Souza.

Poster presentation:

Alejandro **Balbás** (University Carlos III of Madrid/Spain)

Golden strategies in derivative markets

We will study portfolio selection problems in derivative markets by means of the maximization of the expected wealth and the simultaneous minimization of both scalar and vector risk functions.
In particular, we will extend and integrate in a single approach some of our former findings contained in the references below.
Static (or buy and hold), discrete time and continuous time dynamic approaches will be integrated in a unified setting, and both uncertainty-free and ambiguous frameworks will be addressed.
Several mathematical results will prove that the use of derivatives may allow traders to significantly outperform the (risk, return) couple of the underlying security, and this finding will be confirmed by both some numerical/computational experiments and some empirical tests affecting very important stock/commodity international indices.

References:

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• Balbás, A., B. Balbás and R. Balbás, 2016. "Outperforming benchmarks with their derivatives: Theory and empirical evidence" Journal of Risk, 18, 4, 25-52. DOI: 10.21314/J0R.2016.328
• Balbás, A., B. Balbás and R. Balbás, 2016. "Good deals and benchmarks in robust portfolio selection". European Journal of Operational Research, 250, 666-678. DOI: 10.1016/j.ejor.2015.09.023
• Balbás, A., B. Balbás and R. Balbás, 2019. "Golden options in financial mathematics". Mathematics and Financial Economics, forthcoming. DOI: 10.1007/s11579-019-00240-2
• Balbás, A. and J.P. Charron, 2019. "VaR representation theorems in ambiguous frameworks". Applied Stochastic Models in Business and Industry, forthcoming. DOI: 10.1002/asmb.2425
• Balbás, A., J. Garrido and R. Ohkrati, 2019. "Good deal indices in asset pricing: Actuarial and financial implications". International Transactions in Operational Research, 26, 1475–1503. DOI: 10.1111/itor.12424

Poster presentation:

Erwinna **Chendra** (Parahyangan Catholic University)

Pricing employee stock options with a binomial method: case study in indonesia

Employee stock options (ESOs) are call options granted by companies to their employees on the stock of the companies. In addition to retain employees who are highly motivated and potentially, ESO also can be used as a mean to align the employees incentive with the desire of the company's shareholders and to motivate employees to work towards improvement of the company's earning and management. As one form of non-cash compensation, ESO is an efficient cost component for small companies to compete with large companies. This paper discuss the ESO with a partial average Asian

style (average over a part of the option life), which is prevailing in Indonesia. The price of the ESO with Asian style is determined by the binomial method that has been modified to meet the additional characteristics of that ESO. Numerical experiments are given to verify the robustness of the method and to analyze the sensitivity of the ESO price with respect to model parameters.
Joint work with Kuntjoro Adji Sidarto, Agus Sukmana and Chin Liem.

Poster presentation:

Ewa **Dziwok** (University of Economics in Katowice)

Fund Transfer Pricing mechanism – different approaches to the reference yield's construction

The paper investigates different approaches to the construction of a term structure of interest rates – reference rates that are the base in Fund Transfer Pricing mechanism (FTP). While many positions in the literature focus on FTP mechanism as a part of asset liability management (ALM) process without any closer look at term structure construction, we identify features that let measure the behavior of the yield curve and detect the consequences of the model's choice. The results show that the arbitrarily chosen model of the reference yield has significant consequences for risk management process of a financial institution.
The study provides a twofold contribution to the literature describing FTP mechanism. First it introduces more complex approach to the reference rate modeling inside FTP mechanism and shows the consequences of the model's choice for liquidity management. Moreover it focuses on the construction of the reference curve itself and shows two different approaches covering a parsimonious model as well as Smith-Wilson one.
Joint work with Martin Wirth.

Poster presentation:

Alireza **Fallahi** (Amirkabir University of Technology)

Sufficient nonlinear forecasting using factor models

It is well known that in the forecasting of a target variable the linear models reduce to single index models, but it is shown by Fan et al that in nonlinear forecasting models, there is a possibility to extract multiple indices from the factors. In this method, the sufficient factors are identified as the eigenvectors of the conditional covariance matrix of the factors given the target variable. The covariance matrix is estimated using slicing method. The sufficient factors are those eigenvectors which are significantly larger than zero. Several tests are proposed in order to determine the optimal number L of sufficient factors. We propose a robust method based on resampling for determining L without imposing any assumption on the distribution of the noise.
Joint work with Erfan Salavati.

Poster presentation:

Pavel V. **Gapeev** (London School of Economics)

On the Fourier-Laplace transforms of first exit times for one-dimensional diffusions and their applications to models of stochastic volatility

We obtain the maximal values of the parameters of the Fourier-Laplace transforms of the first exit times for one-dimensional diffusions for which the value of the transforms are finite depending on the values of the parameters of the model and the distance between the given stopping levels. Our results are motivated by the ones of the paper by Friz, Gerhold, Gulisashvili, and Sturm (2011): "On refined volatility smile expansion in the Heston model", Quantitative Finance, 11:8, 1151-1164. We also consider applications of the obtained to the models of stochastic volatility.

Poster presentation:

Laura **Garcia-Jorcano** (Universidad de Castilla-La Mancha)

Traffic light system for systemic stress: TALIS-cube

For the purposes of financial stability, it is important to identify financial institutions that, when in distress, could have a large adverse impact on financial markets. This paper proposes a TrAffic LIght System for Systemic Stress (TALIS-cube) that provides a comprehensive color-based classification for grouping companies according to both the stress reaction level of the system when the company is in distress and the company's level of stress. Our proposal builds on the Conditional Value-at-Risk (CoVaR) measure proposed by Girardi and Ergun (2013), extending this by introducing a Filtered Historical Simulation, preferred to the use of a specific parametric density for the innovations, and three different specifications for the evolution of conditional covariance. In addition to the DCC with a GJR-GARCH specification for the marginal conditional variances, we use two other specifications: the BEKK and the Orthogonal GARCH model. TALIS-cube provides an evaluation of each company's risk, on a time-varying basis and conditional on the most recent financial company returns. TALIS-cube first evaluates two loss functions for each company, one at the system level, set to the system CoVaR, and one at the company level, set to the squared deviations between the returns of the financial company's equity and the corresponding Value-at-Risk. The two loss functions lead to the measurement of loss magnitudes, conditional on the stress states of the market and the company. If we consider company rankings based on loss magnitudes and compare them with the rankings provided by DeltaCoVaR, we find important differences, in particular for the Insurance sector, suggesting that TALIS-cube provides some improvement in the identification of systemically important companies. When moving to TALIS-cube outcomes, we observe how our approach provides an intuitive way to identify systemically important companies, and how the risk level changes in a sensible way over time, showing a diffuse risk increase around crises and a risk decrease after stabilizing events. We also analyze the predictive power of the aggregated version of TALIS-cube, especially valuable for predicting the lower conditional quantiles of financial markets suggesting the potential of aggregate TALIS-cube to be used as an intuitive, effective and powerful early warning system for financial crises, which could be used for the monetary authorities while designing their macroprudential policy strategies to accomplish financial stability. TALIS-cube can be used to enhance the performance and robustness of the current systemic risk measures. We provide an empirical analysis of the US market and several robustness checks evaluating different underlying models and different tuning parameters on the loss functions and company rankings.
Joint work with Massimiliano Caporin and Juan-Angel Jimenez-Martin.

Poster presentation:

Ivana **Geček Tuđen** (University of Zagreb)

Ruin probability for discrete risk processes

We study the discrete time risk process modeled by the skip-free random walk and derive the results connected to the ruin probability and crossing the fixed level for this type of process. We use the method relying on the classical ballot theorems to derive the results for crossing the fixed level and compare them to the results known for the continuous time version of the risk process. Further, we generalize this model by adding the perturbation and derive similar results using the skip-free structure of the process. At the end, we also derive the famous Pollaczek-Khinchine type formula for this generalized process, using the decomposition of the supremum of the dual process at some special instants of time.

Poster presentation:

Darjus **Hosszejni** (WU Vienna)

Approaches toward the Bayesian estimation of the stochastic volatility Model with leverage

The sampling efficiency of MCMC methods in Bayesian inference for stochastic volatility (SV) models is known to highly depend on the actual parameter values, and the effectiveness of samplers based on different parameterizations varies significantly. We derive novel algorithms for the centered and the non-centered parameterizations of the practically highly relevant SV model with leverage, where the return process and innovations of the volatility process are allowed to correlate. Moreover, based on the idea of ancillarity-sufficiency interweaving (ASIS), we combine the resulting samplers in order to guarantee stable sampling efficiency irrespective of the baseline parameterization.We carry out an extensive comparison to already existing sampling methods for this model using simulated as well as real world data.
Joint work with Gregor Kastner.

Poster presentation:

Verena **Köck** (WU Wien)

Option hedging in models with jumps

For pricing and hedging contingent claims, most literature is based on the assumption that prices of the underlying assets are described by a diffusion process driven by Brownian motion. Various empirical studies show that such models are not realistic and might induce mispricing. Consequentially, it is a natural approach to model stock prices as stochastic processes with discontinuous trajectories. One of the downsides of jump models is that market completeness is not given anymore and therefore perfect hedges are not guaranteed. The consequence is that most commonly used hedging methods, like delta or delta-gamma hedges, might not provide an acceptable performance. Therefore quadratic approaches in the case where the underlying discounted price process is a local martingale are suggested by Cont, Tankov and Voltchkova (2005). Of particular interest is the question how these quadratic hedging results perform compared with in practice used methods like delta or delta-gamma strategies for different exotic options, e.g. barrier options.

Poster presentation:

Borys **Koval** (Vienna University of Economics and Business)

Estimating a time-varying parameter model with shrinkage for the Standard&Poor's 500 index.

We use time-varying parameter models (TVP) to investigate in-sample and out-of-sample predictability for monthly returns of the Standard&Poor's 500 index (S&P 500). We consider unrestricted TVP model with a discount factor for the variance process similar to the model introduced by Dangl and Halling 2012. For the restricted TVP model, we follow the approach introduced by Bitto and Frühwirth-Schnatter 2019 to automatically shrink the time-varying coefficients to static ones. In addition, we differentiate between the significant and insignificant coefficients if the model is overfitted. We achieve this by introducing shrinkage priors based on the hierarchical double gamma prior for the variance of the latent shocks driving the regression coefficients. Both models are tested using simulated data and real market data. Furthermore, we investigate the sensitivity of the estimation approach and the time span used to evaluate the model. To evaluate one-step-ahead predictive densities, Kalman mixture approximations were applied.
Joint work with Sylvia Frühwirth-Schnatter and Leopold Sögner.

Poster presentation:

Djaffar **Lessy** (Université Cote d'Azur)

Markov chain model for microcredit leading to inclusion

We will present a new such model to analyse another important feature of microcredit, namely the mechanism that allows a beneficiary of several succesive micro-loan to get access to reguler credit, and thus be "included" (in reguler banking). We consider the Markov Chain as an example has four states: A, two types of beneficiaries B^- and B^+, and inserted I (in regular banking). We explain that if the production function of a loan is an increasing concave function of the amount of the loan, there are a minimal amount k^- and a maximal amount k^+ between which the production exceeds costs and why the borrower may wish to successively be in the state A, B^- (with a loan of k^-), B^+ (with a loan of k^+), and finally, the state I where she gets a much better interest rate and thus, with a production stricly larger then her costs, and thus can generate profits. But the microfinance institution (MFI) offers a loan to an applicant only with probability γ (to avoid strategic default), a beneficiary $B^\pm$ is able to repay her loan only with probability $\beta^\pm$ (and get a new better loan) and otherwise she returns to state of applicant (with probability $1-\beta^\pm$), just as in case she does not refund her regular credit loan (with probability ε). We compute the equilibrium distribution of this Markov chain and thus gives an insight into the efficiency of microcredit as a way to insertion into regular banking. We also explain how this allows to estimate the four parameters γ, β^-, β^+, and e from the actual distribution of the clients of the MFI. Then we compute the expected total (intertemporal) profit, and how this is related to absence of strategic default.

Poster presentation:

Paul Felix **Reiter** (TU Dresden)

Feature engineering in univariate time series forecasting

Data are frequently sparse when forecasting univariate time series in economics and finance. Therefore it is mandatory to extract all information available. In this poster I will demonstrate the usefulness of feature engineering in time series forecasting. In particular, problems and possible solutions are discussed that may arise in this framework from the curse of dimensionality.

Poster presentation:

Anne **Sumpf** (Technische Universität Dresden)

Credit Risk with Credibility Theory: a distribution-free estimator for probability of default, value-at-risk and expected shortfall

Credibility theory is a distribution-free estimation technique from actuarial science. This paper shows an interpretation of the credibility theory for credit risk and connect it with Bernoulli mixture model. Thus, credibility theory is a generalization of Bernoulli mixture model. Based on credibility theory, we construct distribution-free estimators for probability of default, expected loss, Value-at-Risk and expected shortfall. In the end, the estimators are illustrated of a numerical example.