UNIVERSITY OF DUISBURG-ESSEN - FACULTY OF BUSINESS ADMINISTRATION AND ECONOMICS



ANNUAL REPORT 2014 – 2015

CHAIR FOR ENERGY TRADING AND FINANCE

PROFESSOR DR. RÜDIGER KIESEL



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Essen, April 2015

During the current reporting year we successfully enhanced our research cooperations. Rüdiger Kiesel was appointed a visiting research fellow at the Centre for Advanced Study (CAS) at the Norwegian Academy of Science and Letters which deepened our already excellent research cooperation with the Energy Markets research group of the University of Oslo. We have also started a DAAD funded research collaboration with the University of Mysore, India, with the focus on German-Indian renewable energy projects. As in previous years Rüdiger Kiesel was one of the main organizers of the Energy & Finance conference, which this year took place in Erice, Italy. Together with the organizing group of the conference he is also preparing several major grant applications on European level. As in the past years the members of the chair attended various international conferences and delivered invited and contributed talks.

The students of our Energy & Finance master programme have continued to benefit from the ongoing support of RWE Supply & Trading. Besides various guest lectures, in which students were engaged in practical aspects of the energy markets, several master theses were written in close cooperation with RWEST. In addition, data retrieved from our Bloomberg terminals made various data-driven student and research projects at the Chair possible.



Now enjoy reading our annual report 2014/15 and feel free to provide feedback or suggestions. I am looking forward to continuing our fruitful cooperation during the coming years.



Duidig hier

Professor Dr. Rüdiger Kiesel

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CHAIR FOR ENERGY TRADING AND FINANCE

ANNUAL REPORT 2014/15

TEAM

CHAIRHOLDER



PROFESSOR DR. RÜDIGER KIESEL

Professor Dr. Rüdiger Kiesel heads the chair for "Energy Trading and Finance" sponsored by RWE Supply & Trading at the University of Duisburg-Essen. Previously, he was Director and Full Professor at the Institute for Mathematical Finance at the University of Ulm, Reader in Financial Mathematics and Actuarial Science at the London School of Economics and Lecturer at Birkbeck College, University of London. He is a Visiting Professor at the Centre of Mathematics for Applications, University of Oslo, and a visiting researcher at the Centre for Advanced Studies (CAS) at the Norwegian Academy of Sciences. He is a member of the board of the "Deutsche Ge-

sellschaft der Versicherungs- und Finanzmathematik (DGVFM)". The research areas of Professor Kiesel include the development, analysis and risk management of energy, interest rate and credit risk models, valuation and hedging of derivatives, the analysis of emission markets, methods of risk transfer and risk structuring as well as an analysis of model risk.

SECRETARY



Kirsten van der Koelen

Kirsten van der Koelen has been secretary of the department since December 2009. Previously, she worked as a bilingual secretary at an international law firm in Düsseldorf. Ms. van der Koelen studied translation services in Spanish and English at the University of Applied Sciences, Cologne.

ACADEMIC STAFF

Currently eight PhD students are employed at the chair and two external PhD students are associated with it. Furthermore, Professor Kiesel supervises a PhD student at the University of Ulm.

ACADEMIC STAFF

The following staff members are employed as research assistants at the chair:



Michael Kustermann joined the chair in January 2010. Mr. Kustermann studied applied Mathematics at the Florida Institute of Technology and graduated with a Master of Science. Furthermore, he studied Business Mathematics in Ulm. Mr. Kustermann is supervising the trading room and is in charge of the "Trading Room Seminar". Mr. Kustermann established the training courses for RWE Supply and Trading together with Prof.

Kiesel and Richard Biegler-König. He received the Assenagon Thesis Award 2010 for his diploma thesis.



Ya Wen graduated from the University of Heidelberg with a degree in Mathematics. He joined the chair as an academic staff member for the BMBF project "Analytics and Empirics of Emission Trading (AEET)" in December 2011 and began his PhD with the research topic "linking emission trading schemes". Mr. Wen is also an actuarial candidate of the Society of Actuaries (SOA). He is in charge of the lectures "Options, Futures

and other Derivatives" (SS 15) and "Risk Management" (WS 14/15).



Christian Kellermann joined the chair as an academic staff member in November 2012. He studied at the Ruhr-Universität Bochum and graduated with a M.Sc. in Mathematics. Mr. Kellermann is working for the BMBF project "Stochastic Methods for Management and Valuation of Centralized and Decentralized Energy Storages in the Context of the Future German Energy System". He is in charge of the lecture "Introduction

for the Master Energy and Finance" (SS15).



Sascha Kollenberg graduated from the University of Bonn with a Diploma in Mathematics. He joined the chair in November 2012 in the framework of the BMBF project "Analytics and Empirics of Emission Trading". Mr. Kollenberg works with Dr. Luca Taschini, London School of Economics, on policy design for emission permits markets and responsiveness mechanisms for the EU ETS where he focuses on the development of sto-

chastic equilibrium models. Mr. Kollenberg is in charge of the lectures "Quantitative Climate Finance" (SS 15) and "Financial Mathematics" (WS 14/15).



Andrea von Avenarius graduated from the RWTH Aachen (B.Sc. in Business Administration) and the University of Duisburg-Essen (M.Sc. in Energy and Finance). She joined the chair in December 2012 and worked on the external project "Financing the German Energiewende" in collaboration with RWE AG. Currently, she is focusing on green finance, as she takes part in a research project with the University of Mysore. Here, she

is concerned with an empirical comparison of mandatory and voluntary carbon credit projects. Ms. von Avenarius is in charge of the lecture "Structuring and Valuation" (WS 14/15). She is also responsible for administrative issues of our Master Programme "Energy & Finance"



Silke Glas graduated from Ulm University with a degree in Business Mathematics. Ms. Glas joined the chair in 2012. She works on the DFG-program 1324 "Extracting quantifiable information from complex systems". Her project in the framework of that program is titled "Efficient and reliable numerical methods for energy markets".



Stephan Prell studied Economics (B.Sc.) at the University of Münster and Energy and Finance (M.Sc.) at the University of Duisburg-Essen. He completed his Master Thesis in cooperation with RWE Supply and Trading in October 2014 and joined the chair in January 2015. During the summer term (SS15) Mr. Prell is in charge of the lecture "Energy Trading".



Audun Sviland Sætherø graduated from the University of Oslo with a master's degree in the field of modelling and data analysis, where he focused on mathematical finance and stochastic analysis. He joined the chair in April 2014 and focuses his work on Hourly Price Forward Curves (HPFC) with the aim to analyse the risk uncertainty especially due to the input of renewable energies.

External PhD students:



Wolfgang Raabe. After a degree in Physics (WWU Münster) and an internship with dfine Wolfgang Raabe went to work for RWE. There, he was first employed in risk areas of RWE Supply & Trading and in different functions throughout the RWE Group. Currently Wolfgang works for RWE Supply & Trading in London as Head of Risk Controlling Trading, Gas and Oil.



Jinsong Zheng. After graduation from Ulm University with a master degree in Finance focusing on financial mathematics Jinsong Zheng started to work at the department of group risk management of the Talanx AG in 2010. Currently he works in the Quantitative Methods team and is responsible for modeling biometric risks and validation of replicating portfolio for life entities.

Former staff members:



Christian Langkamp holds a MMath from the University of Oxford and an MBA from the RWTH Aachen. Mr. Langkamp works as a Senior Specialist Credit Risk in the Treasury department of BASF. He finished his Thesis on "Corporate Credit Risk Management" in December 2013.



Anna Nazarova studied Financial Mathematics at the University of Ulm and graduated with a Master of Science in Financial Mathematics. She also holds a diploma in "Mathematical Methods in Economics" from the University of St. Petersburg. Ms. Nazarova started her PhD at the University of Oslo (in cooperation with Professor Dr. Fred Espen Benth) and has worked at the chair in Essen since December 2009. She super-

vised the trading room together with the "Trading Room Seminar", Einführungsveranstaltung Master Energy and Finance and the course "Financial Mathematics". She recently joined the Chair of Applied Stochastics and Statistics at the University of Duisburg Essen.



Robin Rühlicke started to work at the chair in June 2009. Mr. Rühlicke graduated with a degree in Business Mathematics (University of Ulm) and a M.Sc. in Mathematics (University of Wisconsin Milwaukee). His doctorate deals with the topic of risk management in insurance. He finished his thesis on "Risk Management in Life Insurance" in May 2013.



Richard Biegler-König graduated from the Universities of London (B.Sc. Mathematics and Computer Science) and Ulm (M.Sc. in Financial Mathematics). He began his PhD in Ulm (promoted by the Carl-Zeiss Stiftung through a scholarship) and has worked for the chair as an academic staff member since December 2010. He finished his thesis on "The Information Premium in Electricity Markets" in May 2013.



Stephan Ebbeler graduated with a degree in Business Mathematics (University of Ulm) and a M.Sc. in Mathematics (State University of New York). Since his graduation, Mr. Ebbeler has been working as a consultant for Bain & Company. He has recently finished his PhD project titled "Indifference Pricing of Weather Derivatives based on Electricity Futures".



Markus Hess has been an external PhD student at the chair since November 2010. Following his studies of Applied Mathematics at the University of Trier at the end of 2008, he worked as a research assistant at the Fraunhofer-Gesellschaft (FKIE) in Wachtberg-Werthhoven near Bonn. The title of his PhD project is "Pricing Energy, Weather and Emission Derivatives under Future Information". Currently Markus has a

PostDoc position at the Université Libre de Bruxelles.

Georg Grüll moved from the University of Ulm to the University of Duisburg-Essen together with Professor Rüdiger Kiesel. Mr. Grüll holds a degree in Business Mathematics (University of Ulm) and an MPhil in Statistical Science (University of Cambridge). He conducted research in the field of modelling of CO₂ certificate prices and obtained his PhD in 2010.

COOPERATIONS AND THIRD PARTY FUNDS

The following cooperations between the chair and industry partners exist. Partially, those cooperations generate third party funds.

Federal Ministry of Education and Research



Federal Ministry of Education and Research

The Federal Ministry of Education and Research (BMBF) is sponsoring the research project "Analytics and Empirics of Emission Trading". For this project Mr. Ya and Mr. Kollenberg study different aspects of emission trading schemes. The BMBF is funding two full staff positions.

PROJECT DESCRIPTION ANALYTICS AND EMPIRICS OF EMISSION TRADING

Emission trading schemes (ETS) have evolved in the academic discussion as one of the favorite political measures to achieve emission targets in an efficient way. Up to date, most of the theoretical analysis of these schemes has been based on qualitative considerations. With the introduction of the European emission trading scheme (EU ETS) market data on permit prices (and also permit-derivative prices) have become available. However, a thorough quantitative and empirical analysis of the effects of the structural properties of an ETS on market prices has yet to be done. With our project we will establish a framework for such an analysis based on stochastic equilibrium models. Within this framework we focus on the proper design of emission trading systems and the effects of the linking of such schemes in terms of market prices. Different policy measures will be taken into consideration.

German Research Foundation





DFG Research Grant within the priority program SPP 1324

"Mathematische Methoden zur Extraktion quantifizierbarer Information aus komplexen Systemen"

TOPIC: EFFICIENT AND RELIABLE NUMERICAL METHODS FOR ENERGY MARKETS

Within the last few years the markets for commodities, in particular energy-related commodities and electricity, have changed substantially. Due to deregulation, energy companies are now allowed to trade not only the commodity electricity, but also various derivatives on electricity on several energy exchanges such as the EEX. In addition, the introduction of a European Union wide emissions trading scheme (the EU-ETS) has introduced carbon related products.

Within our project we will address two problems unique to the electricity market. Firstly, we will analyze swing options (which are unique to the energy-related markets): we will develop and analyze Reduced Basis Methods (RBM) to obtain efficient hedging portfolios in terms of forward contracts, which are actually traded on the market. Secondly, we will analyze CO2-permit prices for a multiperiod trading scheme which allows banking of permits. Our modeling approach will lead to systems of PDEs which can be treated with the methodology developed in phase one of the current grant scheme.

This is a joint project with Professor Karsten Urban (Institute for Numerical Mathematics, Ulm University). The grant funds a scientific assistant position in each Ulm and Essen.

Stochastic Methods for Management and Valuation of Centralized and Decentralized Energy Storages in the Context of the Future German Energy System (StoBeS)

ENERGIESPEICHER

Forschungsinitiative der Bundesregierung

As infeed of electricity from fluctuating renewable energy sources increases, the balance between supply and demand in the current market is becoming increasingly difficult to establish. Here, an important

role is attributed to storages, which store power in times of great oversupply and release it in times of high demand. Disregarding issues of natural sciences and engineering the question of economic profitability of such storages will be discussed in the context of this project. For this purpose, we first model adequately the stochastic nature of the fluctuating infeed of wind and solar energy in particular with regard to time and spatial correlation patterns. Then, we want to link modelling approaches of financial mathematics and energy economics to obtain various applicable methods for the determination of optimal storage management, depending on economic restrictions such as available network or generation capacity.

This is a joint project with the chair of Energy Economics (Professor Christoph Weber).

ADVISORY BOARD STOBES

As a part of our project "StoBeS" we set up an advisory board consisting of practitioners with representatives from the big electricity generators E.ON, EnBW, RWE and Vattenfall as well as with representatives from STEAG and from Stadtwerke Duisburg to ensure the practical relevance of our project. On 5 November 2014 the advisory board met for the third time to discuss the current state of the research project and its practical relevance. Christian Kellermann presented a valuation algorithm for battery storages taking into account the capacity fade of electrochemical batteries. The presentation was well received and the subsequent discussion generated valuable suggestions for the further progress of the project. Two more meetings have been agreed upon for 2015.

DAAD

DAAD

In the framework "Projektbezogener Personenaustausch (PPP)" we were able to secure a grant for a cooperation with Professor Devaraja from the University of Mysore, India. Our project is titled "An Economic Evalu-

ation of Multi Commodity Exchange (MCX) in Marketing of Carbon Credit in the framework of UN-FCCC - India to Germany". The project analyses carbon trading in India and Germany and investigates possible linking of the price systems. In particular, we evaluate the sources of demand & supply of emerging carbon credit markets in India and Germany in order to understand the policy implications of risks associated with carbon credits between India and Germany.



Professor Devaraja visited Essen two times in 2014 for four weeks in total. Professor Kiesel spent one week at the University of Mysore in June 2014 and met with industry professionals. In addition, Andrea von Avenarius and Sascha Kollenberg visited the University of Mysore for one week in December 2014 in order to meet industry professionals and associated researchers. Furthermore, Ms von Avenarius gave a lecture to the faculty's students on the German energy market. Currently, Professor Devaraja, Professor Kiesel and Andrea von Avenarius are writing a working paper on the empirical comparison of CDM and VCC projects.

Talanx



With Talanx a research project exists in the field of risk management in the insurance industry. Half of one staff position was funded by Talanx in order to finance this research project during the years 2011-2013. Cur-

rently, an external PhD project is conducted in cooperation with Talanx.

Energy Trading Simulations



In the framework of the "Trading Room" seminar there are several energy trading simulation games offered to the students. The simulations range from investment planning situations and cross border trading situations to dispatching issues and short term optimization simulations. The trading simulations are provided by ITEM and Lilac

Energy Software Solutions via Energy Brainpool.

Platinion



With Platinion a cooperation on seminar papers as well as bachelor and master theses has been established. In every term topics suggested by Platinion will be presented in our seminars, which can then be studied with the assistance of Platinion. Furthermore, an exchange on current practical issues and research takes place on a regular basis.

THE BOSTON CONSULTING GROUP

INTERNATIONAL COOPERATIONS

The efforts of our chair are aimed at maintaining vivid relationships with other academics in order to promote common research interests. International cooperations exist with the following academics:

- Prof. Dr. Fred Espen Benth (University of Oslo)
- Prof. Dr. Alvaro Cartea (University College London)
- Prof. Dr. René Carmona (University of Princeton)
- Prof. Dr. Florentina Paraschev (University St. Gallen)
- Dr. Luca Taschini (London School of Economics)
- Prof. Dr. Thattekere Setty Devaraja, (University of Mysore, India)

In addition to the research related cooperations, Professor Dr. Kiesel also maintains educational cooperations by holding lectures at the following universities:

Birkbeck College, University of London

At Birkbeck College Professor Kiesel is responsible for parts of the course unit "Pricing II". His lectures discuss the various aspects of model risk in equity, fixed-income and energy markets. The course also features the derivation of the mathematical toolbox needed for modeling various financial markets.

University of Oslo

Professor Kiesel is a member of the Centre of Mathematics for Application (CMA) of the University of Oslo. In October 2014 he gave a short course on "Fundamental Challenges in the European Electricity Markets".

RESEARCH ACTIVITIES

During the last years, scientific staff of the chair was able to publish several papers in international scientific journals and compile a substantial number of working papers which were handed in for publication. Thanks to the generous funding of the chair by RWE Supply & Trading, members of the chair could attend international conferences and Summer Schools and present their promising works there. Furthermore, Professor Kiesel is editor for several international journals and acts as external adviser for several research foundations.

PAPERS

The following papers of the scientific staff of the chair were published by international journals or accepted for publication respectively:

R. KIESEL AND YA WEN, 2015

Pricing Options on EU ETS Certificates with a Time-Varying Market Price of Risk Model, CAS SEFE Proceedings.

K. NEUHOFF, W. ACWORTH, R. BETZ, D. BURTRAW, J. CLUDIUS, H. FELL, C. HEPBURN, C. HOLT, F. JOT-ZO, S. KOLLENBERG, F. LANDIS, S. SALANT, A. SCHOPP, W. SHOBE, L. TASCHINI AND R. TROTIGNON, 2015

Is a Market Stability Reserve likely to improve the functioning of the EU ETS?, The EU 2030 Framework for Climate and Energy Policies.

S. GLAS; K. URBAN, 2015

Numerical Investigations of an Error Bound for Reduced Basis Approximations of Noncoercice Variational Inequalities Mathematical Modelling

8th Vienna International Conference on Mathematical Modelling, 721-726.

F.E. BENTH, R. BIEGLER-KÖNIG AND R. KIESEL, 2014 **Electricity options and additional information**, In Benth, Kholodnyi, Laurence (Eds.), WPI Energy Workshop Proceedings, Springer, 2013.

ALYSSA GILBERT, LONG LAM, CATHRINE SACHWEH, MATTHEW SMITH (ECOFYS), DR. LUCA TASCHINI AND SASCHA KOLLENBERG, 2014

Assessing design options for a market stability reserve in the EU ETS, Ecofys 2014 by order of: Department of Energy and Climate Change.

S. EBBELER, F. E. BENTH AND R. KIESEL, 2014

Indifference pricing of weather derivatives based on electricity futures, In: Energy Pricing Models: Recent Advances, Methods, and Tools.

R. KIESEL AND F. RAHE, 2014

Option pricing under time-varying risk aversion with applications to risk forecasting, Journal of Banking and Finance, under revision.

S. GLAS; K. URBAN, 2014 **Reduced Basis Approximation of Noncoercive Variational Inequalities** Mathematisches Forschungsinstitut Oberwolfach, Report No. 2/2015, 33-35.

S. GLAS; K. URBAN, 2014 On Noncoercive Variational Inequalities SIAM J. Numer. Anal., 52(5), 2250–227.

STAHL, G., J. ZHENG, R. KIESEL AND R. RÜHLICKE, 2014 **Conceptionalizing robustness in risk management**, Insurance: Economics and Mathematics under revision.

C. Duffy, S. Kollenberg, L. Taschini, 2014 System responsiveness and the European Union Emissions Trading System, Policy Paper, London School of Economics.

R. KIESEL, A. RUPP AND K. URBAN, 2013 Valuation of structured financial products by adaptive multilevel methods in high dimensions, SPP 1324 Paper Collection.

K. BANNÖR, R. KIESEL, A. NAZAROVA, M. SCHERER, 2013 Model Risk for Energy Markets, Under revision for Energy Economics.

F.E. BENTH, R. BIEGLER-KÖNIG AND R. KIESEL, 2013 An empirical study of the information premium in electricity markets, Energy Economics 36, 55-77, March 2013.

F.E. BENTH, R. BIEGLER-KÖNIG AND R. KIESEL, 2013
Electricity options and additional information,
Forthcoming in Benth, Kholodnyi, Laurence (Eds.), WPI Energy Workshop Proceedings, Springer, 2013.

R. KIESEL AND K. METKA, 2013 A Multivariate Commodity Analysis with Time-Dependent Volatility: Evidence from the German Energy Market, Zeitschrift für Energiewirtschaft, DOI: 10.1007/s12398-012-0102-4.

F. E. BENTH, R. KIESEL AND A. NAZAROVA, 2013 A critical empirical study of three electricity spot price models, Energy Economics, 34, (5), 1589-1616.

R. KIESEL 2012,

Klimapolitik: Stevern, Fördern und Emissionshandel,

Gesellschaftliche Relevanz von Wissenschaft und Forschung. Ein interdisziplinärer Diskurs, Festschrift Stipendienwerk der Hanns-Seidel Stiftung. GEORG GRÜLL AND RÜDIGER KIESEL, 2012 **Pricing CO2 Permits Using Approximation Approaches**, Zeitschrift für Energiewirtschaft, 36, (2) ,101-111.

D. BAUER, F. E. BENTH AND R. KIESEL, 2012 **Modelling the forward surface of mortality**, Siam Journal of Financial Mathematics, 3, 639-666.

R. KIESEL AND M. LUTZ, 2011
Efficient pricing of CMS spread options in a stochastic volatility LMM,
J. Comp. Finance, 14(3), 37-72.

S. KASSBERGER AND T. LIEBMANN, 2011 Minimal q-entropy martingale measures for exponential time-changed Lévy processes, Finance and Stochastics 15, no. 1, 117–140, DOI: 10.1007/s00780-010-0133-9.

S. KASSBERGER AND T. LIEBMANN, 2011 When are path-dependent payoffs suboptimal? Journal of Banking and Finance, DOI: 10.1016/j.jbankfin.2011.11.017.

GEORG GRÜLL AND LUCA TASCHINI, 2011 **Cap-and-Trade Properties Under Different Scheme Designs**, Journal of Environmental Economics and Management, 61, 107-118.

J. GERNHARD, R. KIESEL AND S.-O. STOLL, 2010 Valuation of Commodity-based Swing Options, Journal of Energy Markets, 3, 3, 91-112.

R. KIESEL AND M. SCHERER, 2010 Structural default risk models, Encyclopedia of Quantitative Finance.

R. KIESEL AND P. SCHERER, 2010 **The Freight Market and its Derivatives**, Kiesel et al eds.: Alternative Assets and Strategies, World Scientific, 71-90.

D. BAUER, D. BERGMANN AND R. KIESEL, 2010 On the risk-neutral valuation of life insurance contracts with numerical methods in view, Austin Bulletin, 40, 65-95.

R. KIESEL, 2010 Martingales, Lovric, M. ed.: International Encyclopedia of Statistical Science, Springer.

R. BÖRGER, R. KIESEL AND G. SCHINDLMAYR, 2009 A two-factor model for the electricity forward market, Quantitative Finance, 9 (3), 279-287. R. BÖRGER, A. CARTEA, R. KIESEL AND G. SCHINDLMAYR, 2009 A multivariate commodity analysis and applications to risk management, Journal of Futures Markets, 29 (3), 197-217.

WORKING PAPERS

The following papers were compiled by scientific staff of the chair and will be submitted in for publication in international journals in the near future:

R.KIESEL AND A. MAHAYNI, 2014 Optimality and robustness of "rule-based" trigger strategies, Working paper.

R.KIESEL AND M. KUSTERMANN, 2014 Structural models for coupled electricity markets, Working paper.

R. BIEGLER-KÖNIG, 2014 ENlargement of filtration and a broader class of utility functions, Working paper.

F. E. BENTH, R. KIESEL AND A. NAZAROVA, 2013 On the delayed reflection at the boundary, Working paper.

C. LANGKAMP 2011 Counterparty Credit Risk Management in Industrial Corporates, Working paper.

C. LANGKAMP 2011

Customer Credit Risk Management in Industrial Corporates, Working paper.

M. HESS 2011 **Pricing Temperature Derivatives under Future Weather Information,** Working paper.

M. HESS 2010 A Forward-Looking Multi-Factor Ornstein-Uhlenbeck Model for Pricing Electricity Risk, Working paper.

G. GRÜLL AND L. TASCHINI 2010 Linking Emissions Trading Schemes, Preprint. GEORG GRÜLL AND LUCA TASCHINI 2009

A Comparison of Reduced-Form Permit Price Models and Their Empirical Performances, MIT CEEPR Working Paper Series 2009-018.

BOOKS

Professor Dr. Kiesel, together with Professor Dr. Zagst and Professor Dr. Matthias Scherer from the TU München, was an editor of the book:

Editors: R. Kiesel, M. Scherer and R. Zagst, 2010, Alternative Investments and Strategies World Scientific Publishing Co. Pte. Ltd.

The following book was a joint work of Professor Dr. Kiesel and Professor Dr. Bingham:

N.H. Bingham, and R. Kiesel, 2004, **Risk-neutral valuation: Pricing and hedging of financial derivatives** (Springer-Verlag London Ltd. London) second edn.

PRESENTATIONS AT CONFERENCES AND RESEARCH EVENTS

Prof. Dr. Rüdiger Kiesel

4th Energy Finance Christmas Workshop on Commodity Economics and Finance, St. Gallen, December 2014, on the topic: "Information Risk Premia in Energy Markets".

CAS – Stochastics and Risk for the Energy Markets, Oslo, October 2014, lecture on: "Fundamental Challenges in the European Electricity Markets".

Energy Finance Conference, Erice, September 2014, plenary talk on the topic: "Risk Measure, Model Risk and Energy Markets".

3rd European Business Research Conference, Rome, September 2014, on the topic: "Optimality and robustness of "rule-based" trigger strategies".

Conference "Quantitative methods in finance", Sydney, December 2013, on the topic: "Model Risk for Energy Markets".

3rd Energy Finance Christmas Workshop on Commodity Economics and Finance, Oslo, December 2013, on the topic: "Model Risk for Energy Markets".

Conference "Risk Management Reloaded", TU München, September 2013, on the topic: "Model Risk for Energy Markets".

Platinion Energy-Meeting, Berlin, September 2013, on the topic: "Energy and Risk".

Focus Program on Commodities, Energy and Environmental Finance, Toronto, August 2013, on the topic: "Model Risk for Energy Markets".

Workshop on Energy Finance and Natural Resource Management, at the Center for Mathematical Modelling, Universidad de Chile, Santiago, March 2013, on the topic: "Model Risk for Energy Markets".

Workshop on Electricity Price Modelling with EDF Research & Development, Paris, December 2012, on the topic: "Model Risk in Power Plant Valuation".

Vienna Energy Finance Conference, September 2012, on the topic: "Model Risk for Energy Markets".

Press workshop on the occasion of the inauguration of KPMG's Center of Excellence in Risk Management at the TU München, September 2012, on the topic: "Energie und Klima – Welche Risiken nehmen wir wahr?" (Energy and Climate – Which Risks do we Perceive?).

Electricity Price Models Seminar, Katholieke Universiteit Leuven, March 2012, on the topic: "Electricity Price Models, Risk and Information Premia in Electricity Markets".

Seminar Stochastic Analysis and Stochastics of Financial Markets, Humboldt Universität Berlin, January 2012, on the topic: "Market Risk Premium in Power Markets".

Southern Africa Mathematical Science Association on "The role of mathematical science in sustainable development", Livingstone, December 2011, on the topic: "Market Risk Premium in Power Markets".

Optimization and Applications Seminar, ETH Zürich, November 2011, on the topic: "Electricity Forward Markets".

Fraunhofer ITWM Kaiserslautern "Energy Prices: Modelling and Applications", November 2011, on the topic: "Market Risk Premium in Electricity Markets: An Equilibrium Approach".

Oslo Stochastic Analysis Seminar, October 2011, on the topic: "Market Risk Premium in Power Markets".

Vienna Energy Finance Conference, Wolfgang Pauli Institute, July 2011, on the topic: "Market Risk Premium in Power Markets".

Trondheim Summer Energy Workshop, June 2011, on the topic: "Market Risk Premium in Power Markets".

Oxford Man Institute Conference "The New Commodity Markets", June 2011, on the topic: "Market Risk Premium in Power Markets".

E-World Essen, February 2011, on the topic: "Optionstheorie zur Bewertung von Assets".

Winter School in Lunteren, Januar 2011, short Course on the topic: "Energy Markets".

"Summer School in Stochastic Finance 2010", Ulm, September 2010, on the topic: "Introduction to energy markets".

"Euro 2010 24th European Conference on Operational Research", Lissabon, July 2010 on the topic: "Pricing CO2 permits using approximation approaches".

"5th General Conference in Advanced Mathematical Methods in Finance" (AMaMeF Research Program in Bled, Slovenia), May 2010, on the topic: "Pricing CO2 permits using approximation approaches". "Portfolio Models in Quantitative Risk Management", April 2010, on the topic: "Mathematical challenges in modelling energy markets". This conference was organised by Deutsche Bank and Frankfurt School of Finance and Management.

Presentation at BMBF China-Germany Conference "Mathematics and Industry", Beijing, March 2010, on the topic: "Pricing CO2 Permits Using Approximation Approaches".

Michael Kustermann

International Ruhr Energy Conference 2015 (INREC 2015), Essen, March 2015, on the topic: "A Structural Model for Coupled Electricity Markets with Application to the French-German Market."

4th Energy Finance Christmas Workshop on Commodity Economics and Finance, St. Gallen, December 2014, on the topic: "A Structural Model for Coupled Electricity Markets applied to the French-German Markets."

CAS – Stochastics and Risk for the Energy Markets, Oslo, October 2014, on the topic: "Application of a Structural Model for Coupled Electricity Markets to the French-German Markets."

Energy Finance Conference, Erice, September 2014, on the topic: "A Structural Model for Interconnected Electricity Markets".

E-World energy & water 2014, Essen, February 2014, in the session: "Strommärkte im Umbruch", on the topic: "A Structural Model for Coupled Electricity Markets".

9th Energy & Finance and 4th INREC Conference, Essen, October 2013, on the topic: "A Structural Model for Interconnected Electricity Markets".

Focus Program on Commodities, Energy and Environmental Finance, Toronto, August 2013, on the topic: "A Structural Model for Interconnected Electricity Markets".

Energy Finance Workshop 2013 / Workshop Weather and Energy, Stolberg, April 2013, on the topic: "Volume Sensitivities in the Day-Ahead Market".

Workshop on Energy Finance and Natural Resource Management, at the Center for Mathematical Modelling, Universidad de Chile, Santiago, March 2013, on the topic: "Volume Sensitivities in Day-Ahead Markets ".

Workshop on Electricity Price Modelling with EDF Research & Development, Paris, December 2012, on the topic: "Volume Sensitivities in Day-Ahead Markets"

Sascha Kollenberg

International Ruhr Energy Conference 2015 (INREC 2015), Essen, March 2015, on the topic: "The Market Stability Reserve in the EU ETS: Stochastic Equilibrium Modelling and Policy Optimization".

Energy Finance Workshop, Stolberg, May 2014, on the topic: "An equilibrium approach to the assessment of reform options for the EU ETS".

Energy Finance Conference, Erice, September 2014, on the topic: "Assessing Design Options for a Market Stability Reserve in the EU ETS – Stochastic Equilibrium Modelling and Application."

9th Energy & Finance and 4th INREC Conference, Essen, October 2013, on the topic: "Governmental interventions on carbon markets".

Energy Finance Workshop 2013 / Workshop Weather and Energy, Stolberg, April 2013, on the topic: "Modelling price containment mechanisms in carbon markets".

Ya Wen

Energy Finance 2014 Conference, Erice, September 2014, on the topic: "European Emission Allowance Option Pricing under Dynamic Market Price of Risk".

Energy Finance Workshop 2013 / Workshop Weather and Energy, Stolberg, April 2013, on the topic: "A Bivariate Pricing Model of EUA and the Market Price of Risk".

Silke Glas

SIAM CSE Salt Lake City, March 2015, on the topic: "Reduced Basis Methods for Variational Inequalities".

MATHMOD 2015 Wien, February 2015, on the topic: "Numerical Investigations of an Error Bound for Reduced Basis Approximations of Noncoercice Variational Inequalities".

Oberwolfach Workshop "New Discretization Methods for the Numerical Approximation of PDEs" in Oberwolfach, January 2015, on the topic: "Reduced Basis Approximation of Noncoercive Variational Inequalities".

GAMM-Workshop on Computational Optimization with PDEs, Dortmund, September 2014, on the topic: "Reduced Basis Approximation of Non-Coercive Variational Inequalities".

Final Conference of SPP 1324, Marburg, November 2014, on the topic: "Reduced Basis Approximation of Non-Coercive Variational Inequalities".

Reduced Basis Summer School, Münster, August 2014, on the topic: "Reduced Basis Methods for Variational Inequalities".

Anna Nazarova

3rd Energy Finance Christmas Workshop on Commodity Economics and Finance, Oslo, December 2013, on the topic: "A new approach to storage modeling".

9th Energy & Finance and 4th INREC Conference, Essen, October 2013, on the topic: "Model Risk in Energy Markets".

Energy Finance Workshop 2013 / Workshop Weather and Energy, Stolberg, April 2013, on the topic: "Model risk and power plant valuation".

Building Bridges: Probability, Statistics and Applications Conference, Braunschweig, August 2013, on the topic: "Transition probability density for a bounded diffusion".

The 51st Meeting of the Euro Working Group on Commodities and Financial Modelling (EWGCFM) and 1st Conference of the Research Centre for Energy Management (RCEM) & the International Cen-

tre for Shipping, Trade and Finance (ICSTF), London, May 2013, on the topic: "Model risk and power plant valuation".

Energy and Finance Conference, Rotterdam, October 2011, on the topic: "Empirical Study of three electricity spot price models".

34th Conference on Stochastic Processes and Their Applications, Osaka, September 2010, on the topic: "A new approach to modelling of EUA futures".

Third SMAI European Summer School in Financial Mathematics, Paris, August 2010, on the topic: "On modelling of electricity spot price".

Richard Biegler-König

Energy Finance 2014 Conference, Erice, September 2014 on the topic: "Enlargement of Filtrations and a Broader Class of Utility Functions".

Energy Finance conference, NTNU (Norwegian University of Science and Technology) in Trondheim, October 2012, on the topic: "Electricity Options and Additional Information".

9th BIEE Academic Conference: European Energy in a Challenging World: the impact of merging markets, St. John's College, Oxford University, September 2012, on the topic: "The Information Premium and the German Atom Moratorium".

Conference INREC 2012, Essen, March 2012, on the topic: "The Information Premium and the German Atom Moratorium".

Energy Finance Workshop 2012, Stolberg (Harz), January 2012, on the topic: "Weather Derivatives and Additional Information".

12th Symposium on Finance, Banking, and Insurance (FBI), Karlsruhe, December 2011, on the topic: "The Information Premium on Electricity Markets".

Workshop "Energy Prices – Modelling and Applications" of the Workshop-Series "Moderne Finanzmathematik in der Praxis", Kaiserslautern, November 2011, on the topic: "The Information Premium on Electricity Markets".

Conference Energy Finance / INREC 2010, Essen, October 2010, on the topic: "The Information Premium in Electricity Markets - Empirical Study".

Stephan Ebbeler

Energy Finance Workshop 2012, Stolberg (Harz), January 2012, on the topic: "Weather Derivatives and Additional Information".

Conference in Energy Finance, Vienna, July 2011, on the topic: "Energy and Commodity Risk Management and hedging of Commodity Derivatives".

Robin Rühlicke

7th World Congress of the Bachelier Finance Society 2010 in Sydney, June 2012, on the topic: "Conceptualizing Robustness in Risk Management".

Marcus Eriksson

Conference INREC 2012, Essen, March 2012, on the topic: "Swing options in commodity markets: A model with multidimensional jump diffusions".

Thomas Liebmann

58th World Statistics Congress of the International Statistical Institute ISI 2011, Dublin, August 2011, on the topic: "An importance sampling technique for time-changed Lévy processes".

Sixth Bachelier Finance Society World Congress, Toronto, June 2010, on the topic: "When are pathdependent payoffs suboptimal?"

Georg Grüll

6th World Congress of the Bachelier Finance Society 2010, Toronto, August 2010, on the topic: "Pricing CO₂ Permits Using Approximation Approaches".

Fourth World Congress of Environmental and Resource Economists 2010, Montreal, July 2010, on the topic: "Cap and Trade Properties under different Scheme Designs".

ACADEMIC ADVISORY, CONSULTATION AND EDITORING



Since November 2011 Professor Kiesel has been a member of the board at "Deutsche Gesellschaft für Versicherungs- und Finanzmathematik" (DGVFM). As part of his activities he is head of the committee "Communications and Contacts". He is responsible for the positioning of

the DGVFM in the public and for the dialogue with other associations and financial institutes. Furthermore, he is on the selection board which awards the "Gauß-Preis" of the DAV.



Professor Kiesel is a member of the board of academic advisors for the Portfolio Institutional Awards. The awards offer investors the best opportunity to share their successful strategies and structures through an independent and impartial jury review. Professor Kiesel is Associate Editor for the following journals: : Low Carbon Economy (since 2014), Journal of Energy Markets (since 2009), Financial Markets and Portfolio Management (since 2009), Advances in Statistical Analysis (since 2007).

Professor Kiesel works as an academic counsel for the Deutsche Forschungsgemeinschaft (DFG); Expert Commitee Mathematics for the MINT-Subject Rating of the federal state of Hessen directed by the Min-istry of Science and Art (HMWK); European Science Foundation; Research Grants Council, Hong Kong (RGC); Exzellenzförderprogramm des Landes Mecklenburg-Vorpommern (ESF) and for K. U. Leuven. Besides, he works as a referee for Energy Economics, Energy Journal, Finance & Stochastics, Mathematical Finance, Resource and Energy Economics, Siam Journal of Mathematical Finance.

ACADEMIC APPOINTMENTS AND PRICES

Rüdiger Kiesel has been appointed for one year as a visiting research fellow of the research group Stochastics in Environmental and Financial Economics (SEFE) at the Centre for Advanced Study (CAS) at the Norwegian Academy of Science and Letters (<u>http://www.cas.uio.no</u>). Group leaders are Professors Fred Espen Benth and Giulia Di Nunno, University of Oslo.

Research Visit London School of Economics and Political Science (LSE)

Mr Kollenberg worked with Dr Luca Taschini, Grantham Research Institute, on the quantitative assessment of different policy design options in the context of the EU ETS reform. In particular, they conducted a study commissioned by the Department of Energy and Climate Change (DECC, UK) and participated in a joint collaboration effort, coordinated by the German Institute for Economic Research (DIW Berlin), involving a number of modelling teams worldwide. The results produced in this context will be presented during a policy session on EAERE 2015. The Faculty of Economics, University of Duisburg-Essen, has granted Mr Kollenberg financial support for his visit to the Grantham Research Institute, from Nov. 13th – Dec. 1st 2014.

PREVIOUS PRICES



Florentin Rahe was awarded the Gauss Prize of the "Deutsche Gesellschaft für Versicherungs- und Finanzmathematik" (DGVFM) for his PhD thesis "Option pricing under time-varying risk aversion" written under the supervision of Professor Kiesel.

During the Dies Academicus 2014 Richard Biegler-König was awarded the "Outstanding PhD Prize" of the University of Duisburg-Essen for his PhD Thesis "The Information Premium on Energy Futures Mar-

kets" written under the supervision of Professor Kiesel.

DISSERTATIONS

The following dissertations are written or have been written at the chair:

MICHAEL KUSTERMANN Hybrid Models for Electricity Prices

Electrical energy is generated by converting a primary energy source. Because of this, it is clear that electricity prices are structurally related to the prices of these input fuels. In addition, supply has to match demand exactly at all times, because electricity cannot be stored. A model in which market participants price electricity derivatives should take these special features into account in order to be arbitrage free. The aim of the work is to create such a model and to use it for pricing electricity derivatives. As electricity markets are interconnected, multiple markets have to be modelled together, leading to endogenously given interconnector usage. Possibilities and limitations of hedging in such a model will be considered.

YA WEN Linking emission trading schemes and their price effects (BMBF project)

Politicians and market regulators are discussing a system of linked emission trading schemes, so that a more efficient global trading mechanism can be achieved for the following compliance periods. My research focuses on a stochastic model approach, which allows us to obtain price dynamics for permits in different linking scheme design (e.g. unilateral or bilateral). Possible quantitative models will be built to study the price convergence condition in different linking schemes. Price dynamics in terms of volatility and correlation will be investigated and sensitivities of price convergence will be analysed. Then models will be extended to cover multi-period trading including banking and borrowing. Consequences for risk management and regulatory requirements and the robustness of results regarding risk management for firms and policy implications are to be investigated.

CHRISTIAN KELLERMANN Valuation of electricity storage facilities

Because of the recent decisions in German energy policy, a further expansion of the market share of renewable energy sources such as wind power and solar power can be expected. This has the consequence that the actual electricity supply greatly depends on the fluctuation of wind and sunshine. The simple idea is to store electricity (for example, power-to-gas) in the case of a surplus and to release it again in situations such as calm periods. In financial mathematics, the aim is to develop a valuation method for a power storage system in terms of its optimal management under uncertainty in the context of restrictions. From the energy-economic perspective this method is then used to discuss the value of such storage in future energy systems.

ANDREA VON AVENARIUS Empirical Comparison of CDM and VCs projects

One of the carbon emission mechanisms established in the frame of the Kyoto Protocol is the Clean Development Mechanism (CDM). Companies from Annex 1 countries have the opportunity to compensate for emissions in their country of residence with regard to the emissions policies in force there by establishing greenhouse gas emissions mechanisms in developing countries predefined by the Kyoto Protocol. For every avoided ton of CO2 equivalent a tradable Certified Emission Reduction (CER) is issued. However, as the price for emission certificates within the European Emission Trading Scheme (EU-ETS) declined rapidly in recent years, the value of CERs remained at a low level. Thus, CDM projects became very unattractive for companies and investors and the market came to a standstill.

Companies wishing to signal ecological and social responsibility increasingly turned to Verified Carbon Standard (VCS) projects to generate Verified Carbon Units (VCU) in a voluntary carbon market, which verifies their greenhouse gas emissions volumes. This VCS projects face fewer and softer administrative barriers and due to that lower investment cost. The aim of this empirical comparison is to shed light on the determinants of successful carbon credit projects as well as the carbon markets dynamics from an investor's or policy maker's point of view.

SASCHA KOLLENBERG

Policy design and assessment in stochastic equilibrium frameworks

Mr. Kollenberg is working with Dr. Luca Taschini, London School of Economics (LSE), on optimal policy design in the context of the current debate regarding the reform of the EU ETS. By means of a stochastic equilibrium approach, an integrated framework to assess different design options with respect to target dimensions such as economic welfare, system responsiveness, abatement activity etc. has been constructed and is being continuously extended. In a joint project for the ministerial Department for Energy and Climate Change (DECC), UK, the team tests a variety of design options for pending reforms by means of a recent version of their model, using an extensive dataset kindly provided by DECC and other sources. While Mr. Kollenberg recently focused on model design and solution, more fundamentally oriented extensions to understand the mechanics behind non-responsiveness and impending market failure are under way.

Mr. Kollenberg worked as an active member of the working group "Economics and Climate Change", chaired by Dr. Taschini, in preparation for the Dahrendorf Symposium 2013 in Berlin.

During an extended research visit to the LSE, the collaboration amounted to a working paper to enter the proceedings to the Symposium. It was later extended to a LSE policy paper, published in January 2014.

AUDUN SVILAND SÆTHERØ Estimation, Prediction, Valuation and Risk Management based on Hourly Price Forward Curves

The project takes aim at constructing Hourly Price Forward Curves (HPFC) for electricity prices, which give a forecast for the expected price of electricity for each hour over a certain time period (ranging from one to several years). The project will especially look at how the in-feed of renewable energy will effect the prices, and how to deal with the uncertainty that is resulting from this.

In a second step we will look at a stochastic model for forward prices, where the HPFC will be considered as a mean, and we will add some stochastic element, in the form of mean reverting stochastic processes. Then we will look at how to price typical derivatives, and how the prices will be affected by changes in the parameters of our stochastic process (volatility, mean reverting and jump-size risk).

SILKE GLAS

Efficient and Reliable Numerical Methods for Energy Markets

We consider parabolic variational inequalities with different trial and test spaces and a possibly non-coercive bilinear form. Fine discretizations that are needed for such problems resolve in high dimensional problems and in long computing times. To reduce the dimensionality of these problems, we use the Reduced Basis Method. Error estimators could be obtained by combining Reduced Basis Methods with a space-time formulation of the variational inequality. We provide numerical results for a heat inequality model.

JINSONG ZHENG Stochastic Methods in Risk Management

Under Solvency II framework, the life insurance company needs to calculate the market consistent embedded value (MCEV) and solvency capital requirement (SCR). This thesis describes how to perform market consistent valuation for MCEV calculation and how to calculate the SCR in an efficient way through replicating portfolio. A general strategy is proposed to construct a good replicating portfolio by fulfilling certain criterion such as quality of cash flows matching, robustness, offsetting effects and estimation error of SCR etc. After construction of an asset pool and calibration scenarios, the weighted least square optimization, subset selection techniques and shrinkage method (e.g. Lasso) are used to perform the calibration procedure of replicating portfolio by considering the predefined criterion. Finally, a benchmark portfolio is used to illustrate how to perform the market consistent valuation and how to construct a good replicating portfolio for the calculation of SCR.

Completed dissertations:

ANNA NAZAROVA Stochastic modelling of energy-related markets (May 2014)

In this thesis we develop new methods and procedures to complement and improve current modelling frameworks and to provide a deeper and better understanding of energy markets. We investigate various aspects of stochastic modelling of energy markets: analyse statistical properties of power markets, study pricing methods for different financial energy-related instruments, design a new storage model and examine of a model risk.

In doing so we apply a wide range of methods from different branches of applied mathematics ranging from statistical and econometric techniques to a partial differential equations based approach and algorithms from numerical analysis. We modify and extend these methods to make them applicable to our problem setting.

The study reveals results of both theoretical and practical importance.

MARCUS KARL VIREN ERIKSSON Swing options in the electricity market (October 2014)

In this project we study swing options, which are contracts sold on the commodity market, in particular we focus on the electricity market. Due to the nonstorability and abrupt fluctuations in generation and demand in the electricity market, swing options can be used to hedge against such risks. We formulate the problem as a stochastic control problem where the electricity price follows a particular Levy process. Furthermore, the problem is considered under a maximum and a minimum total volume constraint. That is, we have an upper and lower limit of swing rights. The aim is to analyse the optimal exercise policies.

CHRISTIAN LANGKAMP

Corporate credit risk management (December 2013)

Aside from financial institutions and asset managers also industrial corporates are subject to significant credit exposures via trade credit, cash or derivatives positions. However, whereas for banks or general bond positions a wealth of literature exists regarding the quality of both single-obligor models to determine single-name probabilities of default as well as portfolio models to calculate an estimation of the portfolio risk, little has been written on how to design such a framework for an industrial corporate. The project is thus set to analyse the risks of the typical individual positions of a corporate trade credit portfolio, the requirements for the ERP system to effectively measure the exposures, the suitability of available single-obligor credit rating methods (theoretic + data availability) the applicability of available portfolio models best practices in managing the credit risk of a trade credit portfolio and a cash and derivatives position.

RICHARD BIEGLER-KÖNIG The information premium in electricity markets (May 2013)

The topic of the research project is the information premium on electricity markets. The traditional spot-forward-relationship says that the value of the forward is calculated as the expected value of the spot under the historical filtration. Due to the non-storability property of the underlying this relationship is unclear for electricity markets. Motivated by anticipating forward prices before the introduction of the second phase of CO2-certificates we enlarge the filtration by explicit future information. Thus, we define the information premium as the difference between forward prices under the enlarged and the historical filtration. We were able to show the existence of the information premium empirically by means of a newly developed method. Furthermore, we calculated forward prices under the larger filtration and with delivery period. We also examined the influence of the information premium when pricing options.

ROBIN RÜHLICKE Risk management in life insurance (May 2013)

In the course of the introduction of Solvency II, risk management gets more and more important for insurance companies. In this context, the robustness of the applied methods and processes used for calculations play a central role. In our research we investigate how the risk management process can

consistently be adapted to robustness requirements established by the regulator and other stakeholder. Especially the calculation of the "Solvency Capital Requirements", which require the calculation of the portfolio value distribution of an insurance company, is of great importance. Due to the long contract period, the embedded options and guarantees and profit sharing policies, the calculation of its distribution is a complex task which in practice is solved using simulations. In this project, we want to answer the following questions in cooperation with Talanx:

- How can the distribution of portfolio values be computed in a way that is feasible in practice?
- How can a replicating portfolio be determined that helps with this task?
- What is a robust way to measure risks given model uncertainty?

FLORENTIN RAHE Forward looking density estimation of asset returns (March 2012)

Option prices contain forward looking information, which can be used for forecasting purposes. Well-known examples for this approach are Black-Scholes implied volatilities. Several empirical studies suggest that Black-Scholes implied volatilities do have a superior forecasting performance in contrast to volatility estimates based on historical return data. Motivated by these results this dissertation researches and develops methodologies to estimate the distribution of returns based on option price data. In particular, we developed an estimation method for the Heston (1993) model based on the Unscented Kalman Filter to jointly estimate implied return distribution under the risk-neutral and statistical measure. Furthermore, this methodology allows us to infer the risk aversion of market participants.

STEPHAN EBBELER Indifference pricing of weather derivatives (December 2012)

The market of weather derivatives has gained an increasing interest in the last years. Most market participants use weather derivatives as a hedging instrument to cover the weather risks of their business (e.g. utility companies). In this thesis we use the indifference pricing approach to derive prices for temperature derivatives (e.g. CAT) based on electricity future contracts. In order to derive closed form solutions for the temperature derivatives we use a simple Ornstein-Uhlenbeck process to model the dynamics of the spot price and a continuous version of an autoregressive model for the temperature dynamics. In an empirical study we verify the strong correlation between the spot prices traded at the EEX and the temperatures in Germany used for the indifference pricing approach. Additionally, we analyse the empirically obtained derivative prices and compare these to the derivative prices obtained at the Chicago Mercantile Exchange (CME) to identify potential risk premiums in the market.

MARKUS HESS Pricing and hedging energy and weather derivatives under future information (December 2012)

The aim of this thesis consists in the computation of risk-neutral option prices for energy (in particular electricity) and weather derivatives, whereas we take forward-looking information which is availa-

ble to traders into account via enlargements of filtrations. In this regard, we exemplarily correlate the electricity spot price with temperature and treat a related pricing problem under temperature forecasts. In our insider trading context, we derive explicit expressions for different types of temperature futures and provide the corresponding pricing formulas for options. Additionally, we construct optimal positions in a temperature futures portfolio under forecasted weather information to hedge against both temporal and spatial temperature risk. We discuss the information premium associated to our specific framework and invent nonlinear double-jump stochastic filtering techniques for generalised Lévy-type processes in order to calibrate the underlying models.

KATRIN JENSEN Optimal investment strategies for utility companies (February 2012)

This work consists mainly of two parts. In the first part a bivariate model for the comovement of electricity and gas spot prices is discussed. The specific underlying observation price processes are driven by a Markov chain to reflect the main features observed in historical electricity and gas spot prices. This work then deals with the calibration of such a so-called regime-switching model to historical price data.

In the second part a stochastic dynamic model for the valuation of a (gas-fired) power plant is introduced. In such a framework the following question is discussed: How much of its capacity should the plant contract in the forward market and how much should it keep for bidding in the spot market? Such an allocation problem is discussed in general and by specifying different underlying price dynamics. Then an optimal policy is derived.

KEVIN METKA Multicommodity models of energy derivatives (March 2011)

Statistical properties of energy markets and the impact on risk management applications will be examined. This is daily business for a utility company, and thereby a major research field. We extend recent studies and show how to describe the markets more accurately. We raise a question closely linked to the risk management issue from before. It examines how a multivariate portfolio can be liquidated optimally under various constraints and market setups. By focusing on the spread, this can be formulated as a single-asset liquidation problem with the advantage that the underlying dynamics can explicitly be described by Gaussian models, since negative spread prices are possible. Hereafter we take another party into consideration. There are firms and individuals outside the energy sector, which interact with these markets as well. We mean predominantly the heavy industry and private households, which consume electricity for their daily business/life. We show how to price electricity delivery contracts as this has not yet been addressed in the academic literature.

GEORG GRÜLL Modelling CO2 permit prices (August 2010)

The thesis provides a theoretical explanation of permit price characteristics in an ordinary scheme and analyses whether the proposed hybrid schemes are able to avoid the two characteristics jumpy behavior and convergence of the spot price to zero at the end of the compliance period. It investigates deterministic equilibrium models and two classes of models that have been developed recently, namely stochastic equilibrium models and reduced-form models. Special attention is paid to stochastic equilibrium models as permit price dynamics cannot be captured by deterministic models.

CONFERENCES & RESEACH EVENTS

During the last year employees of the chair attended several conferences and workshops. As in the previous years, the research seminar for PhD-students was organised together with the chair of Professor Zagst and Professor Scherer from the TU München. Moreover, with the research seminar "Energy & Finance", the chair could bring together academics and professionals of the energy sector.

Limit Theorems in Probability

LONDON, MARCH 23-26, 2015

In celebration of the 70th birthday of N. H. (Nick) Bingham, the Department of Mathematics at Imperial College hosted a conference, open to all, on Limit Theorems in Probability.

Speakers interpreted the conference title in an appropriately wide-ranging sense, ranging over into statistics and mathematical finance, and reflecting the breadth of Nick Bingham's own contributions to the whole area. They included P. Embrechts (ETH), J. Jacod (Paris VI), C. Klüppelberg (TU Munich), T.J. Lyons (Oxford), T. Mikosch (Copenhagen), A.J. Ostaszewski (LSE).

The conference was organised under the auspices of the Imperial Probability Centre by C.M. Goldie (Sussex), Rüdiger Kiesel (Duisburg-Essen) and A. Mijatovi\'c (Imperial).

Workshop Financial Mathematics 2015

HIRSCHEGG, KLEINWALSERTAL, MARCH 9-13, 2015

This year Professor Rüdiger Kiesel, Professor Matthias Scherer from the TU Munich and Professor Ralf Werner from the University of Augsburg have jointly organized the eleventh Financial Mathematics Workshop in Hirschegg. Professor Kathrin Glau and PD. Aleksey Min have also attended the workshop. The main topics this year were energy trading and risk management as well as various topics on investment strategies and asset pricing theory. Besides the current research of the PhD students, Professor Glau also gave a talk on the topic of option pricing via Fourier transform. As in previous years, the program was complemented by joint skiing, sledging, hiking, dinner, etc.



4th Energy Finance Christmas Workshop (Efc14)

ST. GALLEN, DECEMBER 11-12, 2014

The workshop was organized by the University of St. Gallen, School of Finance, Institute for Operations Research and Computational Finance. During the workshop, Professor Kiesel held a talk on "Information Risk Premia in Energy Markets".

Also, Michael Kustermann gave a talk on "A Structural Model for Coupled Electricity Markets applied to the French-German Markets."

CAS – Stochastics And Risk For The Energy Markets

OSLO, OCTOBER 27-28, 2014



The conference was organized by the Center of Advanced Studies (CAS), Stochastics of Environmental and Financial Economics.

Professor Kiesel delivered a lecture series on "Fundamental Challenges in the European Electricity Markets". Topics included the intraday market and market coupling.

During the workshop, Michael Kustermann held a talk on the topic: "Application of a Structural Model for Coupled Elec-

tricity Markets to the French-German Markets."

BÖRSENRECHTSTAG

LEIPZIG, OCTOBER 17, 2014

Due to the financial crises, prices at exchanges and their regulatory framework were in the focus of this meeting. Practitioners, researchers as well as lawyers contributed with talks and discussions regarding the role and functioning of the exchange supervisory authority, clearing, investment principles and structural problems of the stock market. Andrea von Avenarius joined the Börsenrechtstag at the University of Leipzig.

Energy Finance Conference 2014

ERICE (ITALY), SEPTEMBER 24-26, 2014

The participants of this year's Energy Finance conference were rewarded with an exceptional location and stunning scenery. Located on top of mount Erice, the conference was held at the Ettore Majorana Centre for Scientific Culture, which provided a unique and welcoming venue in the heart of the historic town centre.



The conference was jointly organized with the Ettore Majorana Foundation for Scientific Culture, based in Erice. Professor Kiesel held a plenary talk on the topic "Risk Measures and Model Risk with Applications to Energy Markets". Furthermore, several members of the chair held contributing talks on their recent research: Michael Kustermann presented his work on "A Structural Model for Coupled Electricity Markets" and Ya Wen contributed with a talk on "EUA Op-

tion Pricing under Dynamic Market Price of Risk". Furthermore, Sascha Kollenberg gave a presentation on "Assessing Design Options for a Market Stability Reserve in the EU ETS – Stochastic Equilibrium Modelling and Application". Additionally, our former chair member, Richard Biegler-König, held a talk on: "Enlargement of Filtrations and a Broader Class of Utility Functions".

The main events were accompanied by an energy trading/long term investment competition through a simulated energy trading desk (ITEM game). The competition was held in collaboration with ISEL (Instituto Superior de Engenharia de Lisboa), Lisbon. The Journal of Energy Markets agreed to dedicate a special issue to the conference.

The event was rounded off on Saturday 27 with social excursions to the temple area of Segesta and a local beach. The conference was held at (and jointly organized with) the E. Majorana Foundation and Center for Scientific Culture in Erice.

Keynote invited speakers:

René Aïd (EDF, FIME Lab): 'What can we learn from stochastic control models on investment dynamic in electricity generation?'.

Álvaro Cartea (University College London): 'Model Uncertainty in Commodities'.

Rita D'Ecclesia (University of Rome La Sapienza): 'Time Varying Correlation among Markets'. Abstract.

Rüdiger Kiesel (University of Duisburg-Essen): 'Risk Measures and Model Risk with Applications to Energy Markets'.

Andrea Roncoroni (ESSEC Business School): 'Static Hedging of Multiplicative Risk'.

Glen Swindle (Scoville Risk Partners): 'Too Many Prices?'.

Rafał Weron (Wrocław University of Technology): 'Electricity Price Forecasting - A Review of the State-of-the-Art with a Look into the Future'.

ABSTRACTS – TALKS OF OUR CHAIR MEMBERS:

Rüdiger Kiesel - "Risk Measure, Model Risk and Energy Markets."

The fact that model and parameter risks are an important source of uncertainty in option pricing models and for risk management procedures has recently been recognised for financial markets, see Cont (2006); Morini (2011); Bannör and Scherer (2013). In the context of energy markets, investment decisions are often based on valuation of fossil power plants as real options, - depending on various underlying processes such as the power-, carbon emission certicate-, and gas prices. To capture parametric model risk inherent in the valuation procedure of fossil power plants, we use a methodology recently established in Bannör and Scherer (2013). We also discuss various aspects of the robustness of risk measures and the implications for the risk management process. As gas-red power plants are seen as flexible and low-carbon sources of electricity, which are important building blocks in terms of the switch to a low-carbon energy generation, we consider the model risk in this asset class in detail. Our findings reveal that spike risk is by far the most important source of parametric model risk.

Michael Kustermann - "A Structural Model for Coupled Electricity Markets"

Structural or hybrid models for electricity prices are models, in which supply and demand of electricity are modelled explicitly. The electricity price is then (as in classical microeconomic theory) given as the intersection of supply and demand. These models have become very popular for electricity spot prices due to the fact that the risk factors driving supply and demand are better understood and easier observable than in most other markets. However, one very important risk factor - import and export - could not be modeled endogenously in such a model. We propose a multi-market extension of the class of Structural models which is able to capture the subtle interplay between separated but coupled electricity markets. Electricity markets are said to be coupled, if they are interconnected and the interconnector capacity is used such that market price differences are minimized. Our model leads to closed form formulae for futures and option prices. Interestingly, it turns out that futures prices in coupled markets might be lower than the lowest corresponding futures price in the same markets without interconnector capacity.

Ya Wen - "EUA Option Pricing under Dynamic Market Price of Risk"

To price options on emission certificates reduced-form models have proved to be useful. We empirically analyze the performance of the model proposed in Carmona et al and Hinz. As we find evidence for a time-varying market price of risk, we extend the Carmona-Hinz framework by introducing a bivariate pricing model. We show that the extended model is able to extract this hidden information and evaluate its impact on the EUA options.

Sascha Kollenberg - "Assessing Design Options for a Market Stability Reserve in the EU ETS – Stochastic Equilibrium Modelling and Application"

The current state of the European Union Emissions Trading System (EU ETS) is marked by persistently low prices and the perception of a significant oversupply of emissions permits. The European Commission proposed an array of structural measures to tackle the resulting issues such as a lack of credibility with respect to the system, economic inefficiency and ecological ineffectiveness. Among the proposed measures is the introduction of a Market Stability Reserve (MSR), marking a hot topic in the current European debate (see EC 2014). The MSR is supposed to address issues arising from a lack of system responsiveness towards economic shocks. As such its role is to withdraw permits from the market and to place them in a reserve if the amount of permits in circulation exceeds a certain threshold. Likewise, permits shall be released from the reserve if that number drops below a certain liquidity requirement. The proposal spawns a number of open questions regarding both the impact assessment of such a mechanism and the calibration of thresholds. We present an approach based on a stochastic equilibrium framework which yields closed form solutions for both the price process and abatement strategies. The model was first presented in a policy paper by the authors (Taschini, Kollenberg, Duffy 2014) and subsequently fed with BAU emissions projections and other market data to produce an impact assessment, commissioned by the Department of Energy and Climate Change (DECC), UK (see Gilbert et al. 2014). The model in its recent form is subject to a number of extensions. Most notably we present the introduction of means to quantify the role and extend of myopia on behalf of market participants. A notion that allows us to go beyond classical arguments and model myopia as a cause for inefficiency in a concise and quantitative manner. This allows for the calibration of an MSR to be such that the impact of myopia on economic efficiency may be minimized. Furthermore, we exploit the stochastic nature of the model to incorporate policy uncertainty and assess its impact on abatement activity and prices. This approach has significant benefits when calibrating thresholds for an MSR: Thresholds can be used to contain risks in the context of system responsiveness and the approach sheds light on threshold calibration from a new and promising angle.

Richard Biegler-König – "Enlargement of Filtrations and a Broader Class of Utility Functions"

In Financial Mathematics, the theory of enlargement of filtrations has mainly been applied in two fields: the context of modelling insider trading on stock markets on the one hand and in the context of modelling informational asymmetry in electricity markets on the other hand. The insider trading branch of the literature is well established and features a great number of publications. Here, the initiating paper is Pikovsky and Karatzas (1996) with the famous 'toy example'. The main idea is the following: one distinguishes two types of traders on a stock market, honest traders and insider traders. The latter have access to extra information that is incorporated mathematically as a filtration larger than the usual historical filtration. Authors then calculate the additional utility of the insider versus that of the honest trader. The other branch of the literature on enlargement of filtrations has been presented recently in a number of publications such as Benth and Meyer-Brandis (2009) or Benth, Biegler-König, and Kiesel (2013b). Here, authors realise that the usual approach of setting up buy-and-hold strategies is not valid when dealing with a non-storable underlying such as electricity.

Thus, also the traditional spotforward relationship breaks down. In other words, publicly known future information need not affect spot prices observed today - no arbitrage is possible. Mathematically, the theory of enlargement of filtration is required to model this informational asymmetry. The general approach in both cases is to set up a stochastic model for the price of the underlying, may it be stocks or the electricity spot. The theory of enlargement of filtrations is then utilised to find the decomposition under the larger filtration of the stochastic processes involved. For simple models, a broad class of driving processes and not overly complicated future information it is possible to derive closed-form results for simple derivatives such as forwards. The results will feature terms from the traditional (Brownian) world and additional expressions in terms of the future information. Things become more complicated in case we want to calculate the utility of market agents in the presence of additional future information. Although this combination has never been considered in the electricity markets scenario it is the prototypical example for the modelling of insiders. Still, while authors have proposed ever more complicated scenarios and types of information one aspect yet untouched is the combination of a geometric Brownian motion and a log-utility function. Obviously, the reason for this is that all non-linear functions cancel. Then, the theory of enlargement of filtration can be straightforwardly applied and expectations are easily derived. In this paper we will present a new methodology that, for the first time, allows to use different combinations of underlyings and utility functions that do not necessarily cancel. The main idea of this method is to regard the expressions stemming from the application of the theory of enlargement of filtrations not so much as a decomposition but as linear stochastic differential equations. Together with the insight that the Brownian bridge is a Gaussian under its own filtration we can then deduce distributional properties of prices under the enlarged filtration and thus apply the well-known machinery from the theory of Brownian motion (such as the formula for the expectation of a geometric Brownian motion). We will apply this new technique to two cases: firstly, we will review the classical insider scenario, again with a geometric stock but with a more general HARA utility function. We will derive the socalled toy example of Pikovsky and Karatzas (1996) as a limit of our more general result. Secondly, we will consider a topic from energy finance and present an extension of the paper Benth, Cartea, and Kiesel (2008). In this paper, the market power of different agents (may they be producers or retailers) is deduced from their respective indifference prices of electricity forwards (i.e. the price that makes the investor indifferent between the utility of possessing the derivative and not possessing it). We extend this paper by incorporating the more realistic spot-forward relationship (which takes informational asymmetry into consideration) as proposed in Benth, Biegler-König, and Kiesel (2013b). This relationship allows for relevant future information such as plant outages or extreme weather events to be taken into consideration by not only featuring a risk-neutral measure but also an enlarged (market) filtration assumed to be known to market traders. Mathematically, the second part of this paper will feature an application of our new method to an arithmetic underlying and an exponential utility function. We illustrate our examples by suitable stylised graphical and computational examples.

3rd European Business Research Conference

ROME, SEPTEMBER 4-5, 2014

Professor Dr. Kiesel held a talk on the topic: "Optimality and robustness of "rule-based" trigger strategies".

Abstract

The focus of the paper is on the performance of proportional insurance (PPI) strategies under transaction costs which impede continuous time trading. Instead of deriving optimal trade and no trade regions, we restrict ourselves to tractable rule based trigger strategies. A meaningful objective which triggers the portfolio rebalancing allows then the derivation of the growth optimal strategy in quasiclosed form, i.e. in a Black and Scholes model setup and proportional transaction costs. We consider finite and infinite investment horizons and compare the performance of the growth optimal "rulebased" trigger strategy with the one of the overall optimal strategy.

In addition, we consider deviations from the Black and Scholes model setup. In particular, we give robustness results for stochastic volatility but also account of gap risk, i.e. the risk that the guarantee is not honored.

10th ISS on Risk Measurement and Control

ROME, JUNE 16-21, 2014

The summer school on risk management and control covers the three topics regulation and transparency of financial markets, commodity markets and risk and macroeconomic challenges in sovereign markets. Well-known speakers addressed both practitioners and academics from various angles and provided a differentiated view on relevant and much discussed subjects. Andrea von Avenarius attended this summer school.

8th World Congress of the Bachelier Finance Society

BRUSSELS, JUNE 2-6, 2014

The Bachelier Finance Society held its 8th World Congress in Brussels. Michael Kustermann talked in the "Energy Finance" Session about "A Structural Model for Coupled Electricity Markets". Rüdiger Kiesel acted as a member of the scientific committee of the Congress. In addition, he presented a talk on "Optimality and robustness of "rule-based" trigger strategies" which was based on joint work with Professor Antje Mahanyi, Mercator School of Business, University of Duisburg-Essen, Campus Duisburg. Invited talks were given by Eckehard Platen, Paul Embrechts, Ioannis Krartzas, Paul Glasserman, Darrell Duffie, Helyette Geman, David Hobson, Steven Shreve, Rama Cont, Peter Carr and Ernst Eberlein.

Energy Finance Workshop STOLBERG, MAY 7-9, 2014

The chair held a workshop together with the Chair of Statistics, Humboldt University in Berlin, with the topic Energy Finance, in the town of Stolberg. Both chairs presented current research activities during the day which led to fruitful discussions and enabled an insight into new topics for all participants. In the evenings we had social gatherings with dinner, further discussions and networking. During the stay in Stolberg the DEUTSCHES SPORTABZEICHEN was also done which was a great pleasure to all participants.

Workshop Financial Mathematics 2014

HIRSCHEGG, KLEINWALSERTAL, MARCH 10-14, 2014,



For ten years now the chairs of Professor Kiesel and Professor Zagst from the TU München have jointly organised this workshop in Hirschegg. Beside Professor Zagst, Professor Scherer (TU München) we could also welcome Professor R. Werner (University of Augsburg) and Professor R. Brummelhuis (Birkbeck, University of London) as external guests. The main topics this year were the energy trading and risk management as well as various topics in the areas of portfolio modelling

and analysis, investment strategies and life insurance. Besides their current research the PhD students also presented open questions, which led to lively discussions.

E-World energy & water 2014

ESSEN, FEBRUARY 11-13, 2014

Michael Kustermann held a talk during the session: "Strommärkte im Umbruch", based on a joint work with Rüdiger Kiesel on the topic: "A Structural Model for Coupled Electricity Markets".

9TH ENERGY & FINANCE AND 4TH INREC CONFERENCE

ESSEN, OCTOBER 9-11, 2013

Energy markets and related products are developing in many directions and for various reasons. In recent years we have witnessed the emergence of new global marketplaces for electricity, gas, weather derivatives and emissions. The development of some of these markets is a consequence of changes in regulation – for instance the increase of the market share in renewables – and others due to the emergence of energy products as an important asset class. The aim of the conference was to contribute to the ongoing international dialogue among academics, practitioners, policy-makers, and energy companies.

The three-day conference featured invited speakers and contributed talks and took place in the "Haus der Technik", Essen. Only the generous funding by RWEST enabled the chair to organise a conference of this size. We are also grateful to conference sponsorship by Platinion, dfine and DEVnet.

SELECTED TALKS AND SPEACHES:

Conference opening address: Peter Terium (CEO, RWE AG)

Conference dinner and RWEST best paper award ceremony with Stefan Judisch (CEO, RWEST)

Thomas Pieper, RWE Supply & Trading Challenges of Power Price Forecasting

Frank Lehrbass, RWE Supply & Trading Coping with the Clearing Obligation - from the Perspective of an Industrial Corporate with a Focus on Commodity Markets

René Carmona, Princeton University Financialization of the Commodity Markets: what does it all mean for energy finance?

Wolfgang Härdle, Humboldt-Universität zu Berlin Pricing Chinese Rain

Fred Espen Benth, University Oslo A note on cointegration in commodity markets

Sebastian Jaimungal, University of Toronto Risk and Ambiguity in Real Option Cash-Flows.

Sjur Westgaard, Norwegian University of Science and Technology Value at Risk modelling using Exponential Weighted Moving Average Volatility with Quantile Regression -An analysis of ICE, ICE-ENDEX, EEX, and Nasdaq OMX Energy Futures Markets

David G. Stack, Agrimax Ireland Natural Gas and Crude Oil in Europe: Have they decoupled?

Luca Taschini, London School of Economics Pollution permits, Strategic Trading and Dynamic Technology Adoption

SELECTED PICTURES OF THE CONFERENCE:





QUANTITATIVE METHODS IN FINANCE

SYDNEY, DECEMBER 17-20, 2013

The conference now in its 21 rst edition is one of the main conferences on quantitative finance worldwide. It features a wide area of topics such as Stochastic Volatility, Interest Rate Term Structure, Credit Risk, Pensions, Insurance, Portfolio Optimisation and Commodity and Emissions Trading.

Plenary talk by Rüdiger Kiesel on the topic: "Model Risk for Energy Markets".

Abstract: Recently, model risk, in particular parameter uncertainty, has been addressed for financial derivatives. During this talk we will review these concepts and apply the methods to energy markets. In particular, we will discuss parameter uncertainty for spread options and implications for fossil power plant valuation. To capture model risk we use a methodology recently established in a series of papers by Bannör and Scherer. As gas-fired power plants are seen as flexible and low-carbon sources of electricity which are important building blocks in terms of the switch to a low-carbon energy generation, we consider the model risk in this asset class in detail. Our findings reveal that spike risk is by far the most important source of model risk.

This talk is based on joint work with Karl Bannör, Anna Nazarova and Matthias Scherer.

3RD ENERGY FINANCE CHRISTMAS WORKSHOP COMMODITY ECONOMICS AND FINANCE

OSLO, DECEMBER 9-11, 2013

Talk by Anna Nazarova: "A new approach to storage modelling" and Rüdiger Kiesel: "Model Risk for Energy Markets".

Abstract (A new approach to storage modelling): We offer a simple and useful approach to compute the value of a hydro- and gas-driven storage facilities. Instead of implementing a standard stochastic optimal control method to identify an optimal injection/withdrawal strategy, we assume that we are already given with an optimal policy induced by a bounded diffusion process. With this at hand we study various payoffs that help a power producer/storage owner to hedge the market position and to compute the value of a power plant.

DAHRENDORF SYMPOSIUM "CHANGING THE EUROPEAN DEBATE: FOCUS ON CLIMATE CHANGE"

BERLIN, NOVEMBER 14-15, 2013

Rüdiger Kiesel, Ya Wen and Sascha Kollenberg were part of the working group on 'Economics and Climate Change' in preparation for the symposium.

Prof. Kiesel and Mr. Wen contributed to the discussion with their research on linking of emissions trading systems and the market price of risk. Sascha Kollenberg, in cooperation with Dr. Luca Taschini of the Grantham Research Institute at the London School of Economics (LSE), established an analysis of long-term reforms to improve system responsiveness in the European Union Emissions Trading System (EU ETS). Summaries of both papers are available at http://www.dahrendorf-symposium.eu/index.php?id=papers_2013.

The respective results added to the discussions held at the symposium and shed light on the mechanics behind emissions trading systems and the impact of political reforms.

BIEE CONFERENCE "EUROPEAN ENERGY IN A CHALLENGING WORLD"

ST. JOHN'S COLLEGE, OXFORD, ENGLAND, SEPTEMBER 18-20, 2013

The annual conference of the British Institute of Energy Economics took place at the St. John's College in Oxford from 18 to 20 September. From the chair Mr. Biegler-König gave a talk on the paper "An Empirical Study of the Information Premium on Electricity Markets", which was written in collaboration with Professor Kiesel and Professor Benth (CMA, Oslo) as well as on the changes of the German energy Market due to the nuclear moratorium.

Abstract: In this talk we provide frameworks to explain the market risk premium, defined as the difference between forward prices and spot forecasts. We show how it depends on the risk preferences of market players and what impact information differences may have.

Our focus will be on an empirical investigation of the so-called information premium, which is defined as the influence of future information not incorporated in spot prices but taken into consideration when pricing forwards. We test for the existence of the premium using data from the German EEX at beginning of 2008 when CO2 certificates were introduced and in 2011 when several nuclear power plants were switched off. Additionally, we will provide an estimate of the value and an analysis of the properties of the information premium.

This talk is based on a joint work with Fred Espen Benth.

FOCUS PROGRAM ON COMMODITIES, ENERGY AND ENVIRONMENTAL FINANCE

TORONTO, AUGUST 30, 2013

In the year of his 20th anniversary the Fields Institute for Research in Mathematical Sciences hosted a Focus Program on Commodities, Energy and Environmental Finance, which was organized by Mike Ludkovski (UC Santa Barbara) and Ronnie Sircar (Princeton University). At the first workshop "On Electricity, Energy and Commodities Risk Management" Prof. Kiesel gave an invited talk about "Model Risk for Energy Markets" and Michael Kustermann presented "A Structural Model for Interconnected Electricity Markets". The second workshop addressed the recent developments in stochastic games and the applications to energy and commodities markets.

Apart from this our PhD students took part in the Summer School, consisting of three different minicourses. Fred E. Benth (University of Oslo) gave a course on "Stochastic Models of Electricity Markets" with respect to weather constraints and different derivatives. The course of René Carmona (Princeton University) was divided in two parts, one concerning the "Financialization of the Commodity Markets" and the other about "Mean Field Games". Glen Swindle (Scoville Risk Partners) spoke in his course about "Valuing and Trading Correlation Structures in Commodities".

BUILDING BRIDGES: PROBABILITY, STATISTICS AND APPLICATIONS CON-FERENCE

BRAUNSCHWEIG, AUGUST 13-16, 2013 Poster session: by Anna Nazarova: "Transition probability density for a bounded diffusion".

BMBF STATUS CONFERENCE

BONN, JUNE 18-19, 2013

The first status conference of the research focus "Economics of Climate Change" was held in Bonn, Germany, from June 18th to19th. The conference was hosted by the German Federal Ministry of Education and Research (BMBF) and aimed at the coordination and open debate among the various research groups funded by the BMBF initiative "Economics of Climate Change". The Chair for Energy Trading and Finance presented within the poster session its project "Analytics and Empirics of Emission Trading". Professor Kiesel, Ya Wen and Sascha Kollenberg took part in two workshops titled "Design and Impact of Climate Policies and Instruments" and "Energy Resources and Climate Friendly Energy Supply" respectively and contributed to the lively debate on crucial questions of climate policy research.

EWGCFM MEETING

LONDON, MAY 16-18, 2013

The 51st Meeting of the Euro Working Group on Commodities and Financial Modelling (EWGCFM) and 1st Conference of the Research Centre for Energy Management (RCEM) & the International Centre for Shipping, Trade and Finance (ICSTF) took place at the ESCP Europe London campus from 16th to 18th of May, 2013. This meeting had a special focus on commodities modelling and regulation within the framework of the workshop "Recent Developments on Energy Modelling and Regulation". The Conference covered a wide range of topics related to financial modelling, risk management, asset pricing, commodities modelling and regulation. Professor Rüdiger Kiesel and Anna Nazarova attended the conference. Anna Nazarova gave a presentation on Model Risk and Power Plant Valuation, which was well received by the participants.

ENERGY FINANCE WORKSHOP 2013 / WORKSHOP WEATHER AND ENERGY

STOLBERG (HARZ), APRIL 17-19, 2013

In the second consecutive year this workshop was organised in cooperation with the Ladislaus von Bortkiewicz Chair of Statistics at the Humboldt-Universität zu Berlin (HU Berlin) in Stolberg/Harz. Additionally, there were participants of the department of Agricultural Economics (HU Berlin) Topics covered were: emission trading, European electricity markets and weather risk management. Common leisure activities (such as participating in the German Sports Badge test) were conducted as well.

Talks given included:

- M. Kustermann: Volume Sensitivities in the Day-Ahead Market
- Y. Wen: A Bivariate Pricing Model of EUA and the Market Price of Risk
- S. Kollenberg: Modelling Price Containment Mechanisms in Carbon Markets
- A. Nazarova: Model Risk and Power Plant Valuation

ENERGY FINANCE AND NATURAL RESOURCE MANAGEMENT

SANTIAGO, MARCH 18-20, 2013

In the framework of the workshop "Energy Finance and Natural Resource Management" at the Center for Mathematical Modeling (CMM) of the Universidad Chile Professor Kiesel gave a short course in Energy & Finance. Topics included characteristics of the European energy market, basic energy derivatives and the structure of the European emission trading scheme.

DAHRENDORF WORKSHOP

BRUSSELS, FEBRUARY 21, 2013

The working group on "Economics and Climate Change" of the Dahrendorf Symposium 2013 held a kick-off meeting at the Centre for European Poli-cy Studies (CEPS) in Brussels on February 21st. During the event the working group members were given the opportunity to present their respective research projects and highlight some initial results. Luca Taschini from the Grantham Research Institute, London School of Economics, and Sascha Kollenberg, LEF, are currently investigating possible mechanisms for price regulation and intervention within the emission trading system EU ETS, which Luca Taschini presented. Professor Rüdiger Kiesel and Ya Wen (LEF) also contributed to the Dahrendorf Symposium 2013 with a research project on an empirical investigation of the market price of risk on emissions markets.

Peter Zapfel, European Commission, and Andrei Marcu, CEPS, provided input from the political point of view. The workshop constituted a seminal exchange of ideas and findings between both academic research and international politics.

WORKSHOP EMISSIONS TRADING

ESSEN, JANUARY 10, 2013

The workshop opened up the dialog with practitioners, mainly from RWE Supply & Trading and academic research concerning emission trading. Besides talks introducing their current reseach from Ya Wen, LEF, and Luca Taschini, London School of Economics, participants engaged in inspiring discussions.

ENERGY & FINANCE CONFERENCE 2012

TRONDHEIM, NORWAY, OCTOBER 4-5, 2012

From 4 to 5 October 2012 the Energy Finance Conference 2012, which was co-organized by our chair, took place in the Rica Hotel, Trondheim, in Norway. Professor Sjur Westgaard and Professor



Norway. Professor Sjur Westgaard and Professor Stein-Erik Fleten (both of Trondheim Norwegian University of Science and Technology) hosted this conference. Research works from different fields of energy economics and financial mathematics were presented. Like in the past years, there was the opportunity to discuss research projects and to socialize with new colleagues. From the chair Mr. Biegler-König gave a talk on the paper "Electricity Options and Additional Information", which was written in collaboration with Professor Kiesel and

Professor Benth (CMA, Oslo). Moreover, the Best Paper Award of RWEST was given to Mr. Yoichi Otsubo (University of Luxembourg) for his work "The Market Microstructure of the European Climate Exchange". Within the framework of the seminar series Energy & Finance Mr. Otsubo gave a talk in Essen on 16 January 2013.

ESSEN ENERGY FORUM 2012

ESSEN, MAY 31- JUNE 1, 2012

On May 31 and June 1, 2012, the Essen Energy Forum took place for the first time in the Glaspavillon of the University of Duisburg-Essen on the Essen campus. With the Essen Energy Forum the Essen Energy Club (a group of students of the Master's Degree Program Energy & Finance) has established a new symposium at the University of Duisburg-Essen taking place once a year. It addresses both students and professionals with energy management/energy economics background and accordingly deals with current energy management/energy economics issues. Thus, a platform for the exchange of energy economics, policy and trading is being provided, at which current research and practical knowledge amalgamates. Please see the following link for further information on the Energy Forum: http://www.essenerenergieforum.de

ATTENDED RESEARCH EVENTS

Research Visit to the London School of Economics (LSE)

LONDON, OCTOBER 14 - NOVEMBER 13, 2013

Sascha Kollenberg joined the Grantham Research Institute at the London School of Economics for an extended research visit to work with Dr. Luca Taschini on quantitative modelling and analysis in the context of the EU ETS reform. The time window was chosen in accordance with an intense cooperation during the preparation of the Dahrendorf Symposium, held in Berlin, 14-15 November.

The joint work during the visit resulted in a working paper, which entered the proceedings of the symposium. The modelling results were later extended to a more comprehensive policy paper, avail-

able at: <u>http://www.lse.ac.uk/GranthamInstitute/publication/the-reform-of-the-eu-ets-a-responsiveness-mechanism-2/</u>.

It features a discussion of alternative policy designs to help tackle a lack of responsiveness in the EU ETS, supported by a closed form stochastic equilibrium model to help understand the mechanics behind non-responsive market behavior and deriving policy implications.

Princeton summer school in financial mathematics

PRINCETON, JUNDE 17-28, 2013

The two-weeks Summer School in Financial Mathematics was held at Princeton University from June 17 to 28, 2013. This summer school covered modern and developing topics in Financial Mathematics, specifically Commodities & Energy Markets, Systemic Risk, High-Frequency Trading & Limit Order Books and Portfolio Optimization & Dynamic Games. Anna Nazarova was one of the participants.

The 8th Conference on Energy Economics and Technology

DRESDEN, APRIL19, 2013



This conference was organized by D. Möst of the chair energy economy and took place at the Dresden University of Technology. It provides a

common platform for presenting new advances and results in the field of Energy Economics and Technology and for discussing with international representatives from science, industry and politics. Ya Wen attended the conference.

Green Finance Konferenz

FRANKFURT AM MAIN, FEBRUARY 27, 2013

The conference dealt with the topics commercializing and financing of innovations concerning climate protection, demand and availability of capital for the green economy/ "Energiewende" as well as status and perspectives regarding risk management and the development of climate-information-services. Basis was the Sustainable Business Institute's (SBI) research project "CFI – Climate Change, Financial Markets and Innovation" supported by the BMBF and the experience of banks, insurances and saving banks.

Andrea von Avenarius attended this conference.

Swissquote Conference 2012 on Liquidity and Systemic Risk

LAUSANNE, NOVEMBER 8-9, 2012

The conference, which took place at the Ecole Polytechnique Fédérale de Lausanne, was organised by Damir Filipovic. Invited talks covered systemic as well as liquidity risk. Martin Hellwig (Max Planck Institute for Research on Collective Goods, Bonn) delivered the keynote address. Robin Rühlicke attended the conference.

Ecole CEA-EDF-Inria "Systemic Risk and Quantitative Risk management"

PARIS - ROCQUENCOURT, OCTOBER 15-17, 2012

The autumn school took place at the Rocquencourt campus of INRIA and was organized by Benjamin Jourdain (Ecole des Ponts ParisTech) and Agnès Sulem (Inria Paris-Rocquencourt). Apart from talks with a focus on systemic risk, Rama Cont ("Modeling Systemic Risk") and Marco Fritelli ("Risk measures and performance measures") gave extended tutorials. Robin Rühlicke attended the autumn school.

ISAM-TopMath Summer School on "Dependence Modeling"

MUNICH, JULY 30 - AUGUST 3, 2012



The Summer School took place at the TU München and was organised by C. Czado, M. Scherer and R. Zagst. The topic of the Summer School was "Depedence Modeling". There were lectures by M. Hofert (ETH Zürich), D. Kurowicka (TU Delft) and J. Kallsen (Christian-Albrecht-Universität zu Kiel). As a social event the group went on a hiking trip in the area of Tergernsee. From the chair of Energy Trading and Finance Michael Kustermann was one of the participants.

Sommerschool "Energiewirtschaft heute"

NOVOSIBIRSK, AUGUST 19 - SEPTEMBER 2, 2012

The summer school took place at the Novosibirsk State University. German as well as Russian researchers discussed the topics energy efficiency and energy security. Furthermore, a Russian language course was part of the summer school program. Andrea von Avenarius participated in this summer school.

SIAM Annual Meeting (AN12) and SIAM Conference on Financial Mathematics & Engineering (FM12)

MINNEAPOLIS, JULY 9-13, 2012

SIAM's Annual Meeting provides a broad view of applications in mathematics, computational science through invited presentations, prize lectures, minisymposia, and contributed papers and posters. The Conference on Financial Mathematics and Engineering focuses on research and practice in financial mathematics, computation, and engineering. Its goal is to promote cooperation among mathematical scientists, statisticians, computer scientists, computational scientists, and researchers and practitioners in finance and economics, and to foster collaborations in the use of mathematical and computational tools in quantitative finance in the public and private sector. Ya Wen and Lina Wedrich participated in this conference.

12th Symposium on Finance, Banking and Insurance

KARLSRUHE, DECEMBER 15-16, 2011

The conference took place at the Karlsruhe Institute of Technology. The main objective of the Symposium was to support research in the areas of finance, banking and insurance, and to strengthen the cooperation between academia and practice. The academic keynote speaker was Prof. Milton Harris (Professor of Economics and Finance at the University of Chicago Booth School of Business) and the practitioners' keynote speaker Dr. Thomas Mayer (Chief Economist and Head of Research at Deutsche Bank AG). Altogether 78 papers were presented at the conference.

Fourth European Summer School in Financial Mathematics

ZURICH, SEPTEMBER 5-9, 2011

The SMAI European Summer School in Financial Mathematics aims at putting together the most talented young researchers in the field, starting from the very beginning PhD students. The Scientific Committee consists of European leaders and representatives in financial mathematics. The Summer School is centred on two advanced courses provided by worldwide recognised experts. The courses are chosen by the organising committee and are meant to be changed every year. The ambition is also to put the foundations for a more visible European network at the doctoral level in the field of financial mathematics. Anna Nazarova and Michael Kustermann participated in this summer school.

RESEARCH SEMINAR "ENERGY & FINANCE"

This research seminar provides the basis for an exchange of ideas between academics and practitioners and greatly enriches the range of presentations at the university. With the financial support of RWE Supply & Trading this presentation series held by internationally renowned academics could be implemented. The seminar series is well accepted by master students, PhDs and professors as well as practitioners.

Talks in the last two terms:

11 FEBRUARY 2015: "Switching Options in Peak Power Plants: Structural Estimation" Prof. Stein-Erik Fleten NTNU Trondheim

Abstract: We introduce a method for structural estimation based on a nonparametric representation of the dynamics of the exogenous state variable. The method is illustrated in the context of switching options. Our goal is to uncover economic primitives associated with the irreversible cost of switching. Our approach extends recent contributions in structural estimation, combining nonparametric statistics with nonlinear programming. Our case study is that of mothballing, starting up, and abandoning peak power plants. We arrive at economically meaningful estimates of maintenance costs and switching costs.

21 JANUARY 2015: **"Managing temperature driven volume risks."** Pascal Heider EON

Abstract: Natural gas demand in Western Europe depends strongly on temperature. The analysis of historical gas spot prices and temperatures shows a dependency between day ahead prices and temperature, especially in time periods of low temperatures. Typically natural gas consumption peaks during the cold winter months. We propose a stochastic model for coupled natural gas spot prices and temperature. The dynamics of price and temperature are modelled by two factor processes calibrated to implied data and historical realizations. As an application of the model we present the evaluation of an energy quanto swap.

3 DECEMBER 2014: **"The general structure of optimal investment and consumption with small transaction costs."** Johannes Muhle-Karbe ETH Zürich

Abstract: We investigate the general structure of optimal investment and consumption with small proportional transaction costs. For a safe asset and a risky asset with general continuous dynamics, traded with random and time-varying but small transaction costs, we derive simple formal asymptotics for the optimal policy and welfare. These reveal the roles of the investors' preferences as well as the market and cost dynamics, and also lead to a fully dynamic model for the implied trading volume. In frictionless models that can be solved in closed form, explicit formulas for the leading-order corrections due to small transaction costs obtain.

12 NOVEMBER 2014: **"A spot-forward model for electricity prices with regime shifts."** Florentina Paraschiv University of St. Gallen

Abstract: We propose a novel regime-switching approach for electricity prices in which simulated and forecasted prices are consistent with currently observed forward prices. Additionally, the model is able to reproduce spikes and negative prices. We distinguish between a base regime as well as upper and lower spike regimes. We derive hourly price forward curves for EEX Phelix, and together with historical hourly spot prices, historical hourly price forward curves are the basis for model calibration. The model can be used for simulation and forecasting of electricity spot prices over shortand medium-term horizons. Tests imply that it shows a better performance than classical time series approaches.

22 OCTOBER 2014: **"Leveraging options-based bidding strategies and flexible loads to optimize intraday effects on the market value of renewable energy."** Manuel Ernesto Garnier RTWH Aachen

Abstract: The non-dispatchability and limited predictability of production from PV and wind power systems complicates their integration into wholesale power markets. A particular challenge from the viewpoint of wind (or PV) power operators are balancing efforts necessitated by production forecast errors, i.e. deviations between forecasted and actual production. Small-to mid-scale wind (or PV) power operators, who have little or no access to conventional back-up resources, are exposed to intraday market and production forecast error dynamics when conducting balancing trades for any particular delivery slot. This dependency implies two dimensions of uncertainty. First, the forecasted production error is merely a projection which behaves stochastically over time. Accuracy increases only gradually when coming closer to the actual time of production. Second, the intraday market is fairly illiquid and volatile, especially in regimes with continuous trading (e.g., Germany). The availability of resources for balancing trades is limited and decreases further when approaching delivery, since an increasing amount of resources is already blocked, while others become unavailable due to longer ramp-up times. As a result, the market tightens when approaching trade closure, implying higher price premiums and price uncertainty as well as a risk of not finding a trade partner for balancing trades at all. This research addresses balancing operations of wind (or PV) power operators in the intraday market. Two potential mitigation measures to minimize the costs when balancing forecast errors in intraday markets are proposed and developed in detail: (1) an options-based bidding strategy and (2) an uncertainty-sensitive operations model for demand response (DR) resources during intraday operations. 2 Regarding (1), a bidding strategy is derived to determine the optimal timing and volume of balancing trades in a continuous-trade intraday market based on options valuation methodology with dynamic programming. At the core of the strategy, a valuation logic for immediate balancing trades is formulated. It trades off the costs and risks avoided by trading immediately against the costs and risks related to excessive or insufficient immediate trading due to premature forecasts. It accounts for changes in price, bid-ask spreads (and other transaction costs) as well as trade partner risks. In order to include both price and forecast error uncertainty, the valuation logic is placed into a stochastic setting by means of options valuation methodology. A multidimensional binomial tree is created, modeling price uncertainty as a Geometric Brownian Motion and forecast error uncertainty as an Arithmetic Brownian Motion (ABM) with the assumption of correlation between both processes. At any node of the tree, the optimal trade volume and resulting value are determined through dynamic programming: the aforementioned immediate-trade valuation logic is applied to the probability-weighted range of possible price-forecast-error combinations that may evolve throughout the remaining trading period to identify the trade volume that maximizes value under uncertainty. This value is then compared to the discounted value of waiting for one more period before trading. The higher of both values is chosen and translated into a bidding decision. In an extended setting, the bidding strategy in (1) is complimented by a DR activation model (2), which shifts loads to alter trade volumes prior to trade execution. At an abstract level, the model suggests a valuation logic for the shift of any unit of flexible load between short and/or long positions intraday (that have been caused by production forecast errors on the supply side). The goal is to further minimize balancing trade costs by reallocating loads with regards to price and transaction cost spreads between different (neighbored) delivery slots. Uncertainty is accounted for, by anticipating price drifts and volatility when inferring price spreads, and by postponing shift executions for as long as possible. In a generic simulation, it is found that both the bidding strategy (1) and the DR model (2) help to reduce costs significantly (about one percent and 20 percent, respectively). The value contribution of the bidding strategy increases further with higher volatility assumed for the underlying processes, while the value contribution of the DR model depends on the price spreads between delivery slots and the flexibility and cost parameters of the flexible loads. In an ultimate step (currently work in progress), the bidding strategy and the DR model are applied as an integrated approach to a set of real-world supply, load and German intraday market data to test the potential impact of the research in a realistic setting.

24 JUNE 2014 **"Electricity price forecasting: A review of the state-of-the-art with a look into the future"** RAFAL WERON Wroclaw University of Technology

Abstract: A variety of methods and ideas have been tried for electricity price forecasting (EPF) over the last 15 years, with varying degrees of success. This review article aims at explaining the complexity of available solutions, their strengths and weaknesses, and the opportunities and treats that the forecasting tools offer or that may be encountered. The paper also looks ahead and speculates on the directions EPF will or should take in the next decade or so. In particular, it postulates the need for objective comparative EPF studies involving (i) the same datasets, (ii) the same robust error evaluation procedures and (iii) statistical testing of the significance of the outperformance of one model by another.

12 JUNE 2014 **"Dislocations in North American Energy Markets - Implications for Valuation and Portfolio Management"** GLEN SWINDLE Scoville Risk Partners, New York

Abstract: Energy markets in North America, and the U.S. in particular, have sustained several major perturbations in recent years. Changes in the regulatory landscape have resulted in reduced dealer coverage and substantially degraded liquidity. Shale production has yielded macro changes in price level, inventory behavior and basis dynamics. The recent polar vortex stressed supply infrastructure and caused exceptional price dynamics. In the presence of these changes the risks sustained by generators and load serving entities are increasingly difficult to manage. In this talk we will examine some of the challenges and peculiarities that arise in the analysis of generation and load portfolios in this new environment, and conclude with some thoughts on the implications for asset financing and the viability of current market structure.

27 MAY 2014 "**Model Uncertainty in Commodities**" ALVARO CARTEA UCL London

Abstract: There is no such concept as the "correct" model and one way in which agents can address this risk is to acknowledge that the model they use to price instruments and make investment decisions is misspecified. In this talk we discuss how agents consider alternative models when pricing derivative instruments. In particular agents recognise that they do not exactly know the probability laws of the stochastic processes required to price instruments, such as forward contracts, so they must consider other models when calculating prices at which they are willing to buy or sell instruments. In our framework we assume that agents are ambiguity averse. They start by writing down the model which in their view captures the main elements that they require to price forward electricity contracts but allow the calculation of the forward price to consider alternative models to the reference model they start with. If the agent is extremely confident about her model then any deviations from her reference model are penalised. On the other hand, if the agent is extremely ambiguous about her reference model she will be willing to explore many other models which give her a more conservative price, higher if selling or lower if buying.

Our preliminary results show that if the agent writes the usual arithmetic model where spot prices follow a mean reverting jump diffusion, then forward contracts over a delivery period will be priced under a probability law where the jumps and drift of the process of the reference model are altered as follows. If the agent is selling forward contracts then she will use an alternative model which, compared to the reference model, includes a positive drift in the diffusion component, and assumes that the intensity of arrival of jumps up is higher and the average size of the positive jumps is also higher. If the agent is a buyer he will alter the reference model in a similar way, introduce a negative drift and over-emphasise the negative jumps.

14 MAY 2014 **"An efficient European Intraday market can secure grid stability"** BO PALMGREN Danske Commodities, Aarhus

Abstract: In recent years especially the German Power grid is facing more and more stress due to an increased share of renewable energy. The presenter will give a brief overview of the European vision for the Intraday Power market and the progress so far. The presentation will outline the challenge of increasing the share of renewables without compromising the grid stability and the problems faced by conventional power plants, when the subsidizing of renewables erodes their profit by lowering the wholesale prices. Securing an efficient European Intraday market, would solve a lot of these problems. If it's possible for producers to trade their flexibility close to delivery, it would lower the impact on the tertiary reserves, thereby helping the TSO's keeping the grid in balance. A market for flexibilities could be a very valuable source of income for conventional power producers (or consumers).

16 APRIL 2014 "Life after Life Support: how can the EU ETS be central to European climate and energy policy?" RICHARD FOLLAND JP Morgan, London

Abstract: The EU ETS has had a dreadful couple of years: prices at an all-time; its credibility and future under scrutiny; haunted by the tortuous backloading legislative process. Thankfully, backloading is now happening and we can look forward. The European Commission published a proposal for a market stability reserve in January. The debate on the overall 2030 climate and energy framework is now on. This is therefore a good time to take stock and consider the future of the ETS and what measures may be necessary if it is to play the central role which policymakers say they envisage for it. This talk considers the domestic European implications and also places the development of the ETS within the global context of climate change and carbon markets.

Previous Talks:

28 JANUARY 2014: "Natural Gas and Crude Oil in Europe: New evidences" RITA LAURA D'ECCLESIA, University of Rome "Sapienza"

22 JANUARY 2014: **"Pricing of swing contracts"** ALEXANDER KULIKOV, Moscow Institute of Physics and Technology, Gazprom Export - Risk Management Directorate

15 JANUARY 2014: **"A Model for Solar Renewable Energy Certificates: shining some light on price dynamics and optimal market design."** MICHAEL COULON, University of Sussex

4 DECEMBER 2013: **"Risk premia in energy markets."** ALMUT VERAART, Imperial College London

20 NOVEMBER 2013: **"Market Completion with Derivative Securities"** DANIEL SCHWARZ, Carnegie Mellon University (Pittsburgh)

6 NOVEMBER 2013: **"Performance of Utility Based Hedges"** JIM HANLY, Dublin Institute of Technology

17 JULY 2013: **"Capital Projection for Counterparty Credit Risk"** RALF WERNER, University Augsburg

10 JULY 2013: **"A Stochastic Volatility Co-integration Model"** KAY F. PILZ, Rivacon

3 JULY 2013: **"Paradigm Shifts in power markets"** STEFAN GÖBEL, Statkraft Markets

22 MAY 2013: **"Real Options in Energy Finance"** MATT DAVISON, University of London, Ontario

24 APRIL 2013: "A general approach to pricing in energy and weather markets" FRED ESPEN BENTH, University of Oslo

23 JANUARY 2013: **"Analysis and Forecasting of Electricity Price Risks with Quantile Factor Models**" SJUR WESTGAARD, NTNU Trondheim

16 JANUARY 2013:"The Market Microstructure of the European Climate Exchange"YOICHI OTSUBO,University du Luxembourg; winner of the 2012 RWE ST best paper prize

12 DECEMBER 2012: "Reverse Stress Testing - Objectives and practical approaches for energy & commodity markets" MAGNUS WOBBEN, d-fine

21 NOVEMBER 2012: "Two striking graphs from the gas world" ALEXANDER BOOGERT, Energyquants

7 NOVEMBER 2012: **"Hedging forward positions: basis risk versus liquidity costs"** STEFAN ANKIRCHNER, Universität Bonn

24 OCTOBER 2012: **"Pollution permits, Strategic Trading and Dynamic Technology Adoption"** LUCA TASCHINI, London School of Economics

18 JULY 2012: **"Quantile based spectral analysis"** HOLGER DETTE, Ruhr-Universität Bochum

4 JULY 2012: "Implications of Spot Price Models on the Valuation of gas storages" SVEN-OLAF STOLL, EnBW

20 JUNE 2012: **"The Real Options to Shutdown, Startup, and Abandon: Empirical Evidence"** CARL J. ULLRICH, Virgina Tech

23 MAY 2012: **"MODELING AND VALUING MAKE-UP CLAUSES IN GAS SWING CONTRACTS"** TIZIANO VARGIOLU, Universita di Padova 9 MAY 2012: **"On the pricing of emission allowances"** UMUT CETIN, London School of Economics

25 APRIL 2012: **"Putting a price tag on uncertain parameters in complex stochastic models"** PROF. DR. MATTHIAS SCHERER, TU München

1 FEBRUARY 2012: **"The Influence of Spatial Effects on Wind Power Revenues – An Analysis of Direct Marketing Rules in Germany's Renewable Energy Sources Act**" FELIX MÜSGENS, TU Cottbus

18 JANUARY 2012: **"Deterministic and Stochastic Continuous Time Models for Storage Problems**" RAYMOND BRUMMELHUIS, University of London, Birkbeck College

11 JANUARY 2012:
"Equilibria in An Oligopolistic Electricity Pool with Stepwise Offer Curves" ANTONIO J. CONEJO,
University of Castilla – La Mancha

7 DECEMBER 2011: "Liquidity Risk Meets Economic Capital and RAROC" KOLJA LOEBNITZ, University of Twente

16 NOVEMBER 2011: "Structure Modelling of Electricity and Emission Markets" DANIEL SCHWARZ, Oxford University

13 JULY 2011: **"Investitionen in Erneuerbare Energie - Globale Trends und Finanzierungsinstrumente"** PROF. DR. ULF MOSLENER, Frankfurt School - UNEP Collaborating Centre for Climate & Sustainable Energy Finance, KfW

21 JUNE 2011: **"Commodity Hedging and Hedge Accounting along the Industrial Supply Chain"** DR. TILMAN HUHNE, d-fine

8 JUNE 2011: "**Modellrisiko & Stresstests**" DR. GERHARD STAHL, Talanx

1 JUNE 2011: "A Structural Risk-neutral Model for Pricing and Hedging Power Derivatives" DR. RENÉ AÏD, EDF

18 MAY 2011: **"Localising Temperature Risk"** PROF. DR. WOLFGANG HÄRDLE, Humboldt University of Berlin

2 FEBRUARY 2011: "Integrated EUA and CER price modelling and application for spread option pricing" MAX FEHR, London School of Economics

27 JANUARY 2011: "Deutsche Bank – Career opportunities in the financial industry" DR. ROLAND FOLZ, CFO, Deutsche Bank Privat und Geschäftskunden AG

19 JANUARY 2011: **"Risk Management: Linking portfolio risk, real options and market fundamentals"** TOBIAS SPERR, Vattenfall Europe AG

15 DECEMBER 2010: **"Supply intermittence and spot market dynamics"** AUGUSTO RUPÉREZ MICOLA, Universitat Pompeu Fabra

1 DECEMBER 2010: **"New dual methods for single and multiple exercise options"** JOHN SCHOENMAKERS, Weierstrass Institute for Applied Analysis and Stochastics

17 NOVEMBER 2010: **"Risk-Neutral Models for Emission Allowance Prices and Option Valuation"** JURI HINZ, Züricher Hochschule für Angewandte Wissenschaften und National University of Singapore

7 JULY 2010: **"The Electricity Bid Stack: Linking the dynamics of fuel, power and carbon prices"** MICHAEL COULON, Princeton University

23 JUNE 2010: **"Back- and Side- Testing of Price Simulation Models**" HENRIK SPECHT, Vattenfall Europe

17 JUNE 2010: **"Secure Jobs for Economists in the Current Financial Crisis"** VASSILIOS PAPPAS, Founder, Assenagon Asset Management S.A 26 MAY 2010: **"On the Calculation of the Solvency Capital Requirement based on Internal Models"** DANIEL BAUER, Georgia State University

11 MAY 2010: **"Flexibility Premium in Marketable Permits"** LUCA TASCHINI, Grantham Research Institute, London School of Economics

28 APRIL 2010: **"HOW AND WHERE IS THE VALUE IN ELECTRICITY INTERCONNECTORS"** ÁLVARO CARTEA, Universidad Carlos III, Madrid

5 FEBRUARY 2010: **"Valuation Challenges in Energy Markets - Theory meets Practice"** OLEG ZAKHAROV, Head of Structuring & Valuation, RWE Supply & Trading

5 FEBRUARY 2010: **"Mathematical Challenges of the Emissions Markets"** PROF. RENÉ CARMONA, Princeton University

27 JANUARY 2010: "Levy Processes in Credit Risk - An overview" PROF. WIM SCHOUTENS, Department of Mathematics, Catholic University of Leuven

20 JANUARY 2010: "Modelling the effects of climate policy risk on power investment" PROF. DEREK W. BUNN, London Business School

13 JANUARY 2010:
"Examples for applying Lévy processes to financial problems"
DR. JÖRG KIENITZ,
Head of Quantitative Analysis, Treasury TR OB, Deutsche Postbank AG

2 DECEMBER 2009: **"Pricing of Hourly Exercisable Electricity Swing Options Using Different Price Processes"** DR. GUIDO HIRSCH, Marktrisiken & Bewertungsmodelle; EnBW Trading, Karlsruhe

25 NOVEMBER 2009: **"Performance measurement and mean-variance hedging"** PROF. ALES CERNY, Faculty of Finance, Cass Business School, City University London

18 NOVEMBER 2009: **"Stochastic volatility modeling in power markets"** PROF. FRED ESPEN BENTH, Centre of Mathematics for Applications, Department of Mathematics, University of Oslo

11 NOVEMBER 2009:

"Understanding the Price Dynamics of Emission Permits: A Model for Multiple Trading Periods" PROF. MARLIESE UHRIG-HOMBURG,

Karlsruher Institut für Technologie (KIT), Institut für Finanzwirtschaft, Banken und Versicherungen (FBV)

STUDY PROGRAM

Besides the large offer of quantitative lectures and tutorials, the chair also offers seminars. More and more students take the chance to write their master's theses at our chair. In addition to our program at University Duisburg-Essen, the chair offers advanced training which is regularly asked for by practitioners.

TALENT TABLE AT RWEST

A number of selected students were invited by RWEST on 9 April 2014 to learn from representatives of different business divisions about current developments in energy markets. James Hall (US Power Desk) and Ingmar Schaaff (CAO Gas) summarised and presented the functions of their respective divisions.

ESSEN ENERGY CLUB

The Essen Energy Club hosted the first "Campus meets Company" meeting, which took place in cooperation with RWE Supply & Trading, on 23 August 2012. The event addressed students of the degree program "Energiewirtschaft und Finanzwirtschaft" (*Energy Economics and Finance*), who wanted to gain an insight into the work of RWE ST.

During that meeting, Dr. Matthias Heveling, an analyst for Continental Europe at RWEST, gave the students a sound insight into the current developments of the European energy market. In his talk Dr. Heveling presented the state-of-the-art results of his work. Subsequent to his presentation the attendees were able to exchange views on the energy market in general and RWE ST in particular in a relaxed atmosphere.

HOUSE OF ENERGY MARKETS AND FINANCE E.V

Former students of the Master Program have founded the "Verein der Ehemaligen und Freunde des House of Energy Markets and Finance e.V." ("Alumni Association and Friends of the House of Energy Markets and Finance e.V."). The purpose of the Association is to promote research and teaching in the energy and finance sector at the University of Duisburg-Essen. Moreover, the interchange between active students and alumni shall be fostered. Beyond this, the Association will organize events with respect to energy- and finance-related topics. Chairman of the Association is Sebastian Pack, Caroline Deilen is deputy, and Michael Kustermann chief financial officer. New members can join the Association as soon as it has been registered, it has opened an account and established a member administration.

STUDY TRIP TO LEIPZIG



Our chair carried out a study trip to Leipzig from May 11 to 12, 2012. The program comprised the visit of the EEX on the one hand and a visit of a gas-steam power plant with distant heating of the municipal utility of Leipzig on the other hand. The main emphasis regarding the visit of the EEX lay on the market supervision as well as the market control. Having introduced the miscellaneous products dealt on the EEX the students had the chance to track the market control with respect to its day-to-day business. The structure of the order books as well as the time when what trader will obtain which information

were intensely discussed. It was impressive to the students to learn that the whole trading operations are being executed almost fully automatically.

LECTURES AND SEMINARS AT UNIVERSITY OF DUISBURG-ESSEN

Re-accreditation of the master program "Business Administration - Energy and Finance"

The master program Business Administration - Energy and Finance is, after six years of successful implementation, undergoing a re-accreditation process until 2015 where the structure and concept of the program is reviewed. As a main change, the program will be bilingual with at least 25% and up to 75% of English examinations starting from 2015. Setting a focus on energy and capital markets, a major objective of the program is to convey expert knowledge in business management together with specialized knowledge in energy and finance topics but also in accounting.

Lectures of the Chair for Energy Trading and Finance

The lectures given by the chair are mainly tailored towards students of the Master's Degree Program "Energiewirtschaft und Finanzwirtschaft" ("Energy and Finance"). Until recently the degree program comprised only few quantitative elements. This gap has now been closed by the choice of lectures offered by members of the chair. Typically 20 to 30 students attend our lectures and exercise classes. All offered lectures and seminars are listed below:

Energy Trading (yearly in summer term)

DESCRIPTION:

Discussion and analysis of the most widely used valuation models and risk management for energy derivatives.

EDUCATIONAL OBJECTIVES:

Students will learn about current issues arising in trading energy and its derivatives. They should be able to understand and apply complex quantitative techniques. In particular, the students should

work on basic practical issues of the evaluation of energy derivatives and risk management in energy companies.

Quantitative Climate Finance (yearly in summer term)

DESCRIPTION:

Discussion and analysis of financial instruments concerning the economics of climate change. Introduction of emission trading schemes, pricing and hedging methods of emission certificates as well as derivatives on certificates.

EDUCATIONAL OBJECTIVES:

The students will investigate current issues in the economics of climate change where the main focus lies on quantitative modeling. They will understand stochastic pricing models for financial contracts and be able to apply them. Furthermore, they should be able to question models critically, interpret results and further develop models.

Trading Room (every term)

DESCRIPTION:

Methods of portfolio theory and risk management will be examined by using historical data from the Bloomberg system. The models are implemented to be utilised for empirical investigation.

EDUCATIONAL OBJECTIVES:

Students are able to use the Bloomberg software for data research and know how to implement financial models in Excel, R and other software packages.

Structuring & Valuation (yearly in winter term)

DESCRIPTION:

Models and methods used for valuation of complex instruments in energy markets will be analysed in depth.

EDUCATIONAL OBJECTIVES:

Students will get to know current issues in energy trading. They should understand complex quantitative techniques and be able to apply them to specific practical issues arising in the risk management of energy corporate.

Risk Management I (yearly in winter term)

DESCRIPTION:

This lecture provides the students with the most important definitions of risk and risk management. Besides general capital market theory the students will get into touch with valuation models in its general form. Moreover, valuation of derivatives will be explained focusing on the principle of replication.

EDUCATIONAL OBJECTIVES:

Students should be able to formulate their views and to defend them in discussions with staff and other students. Moreover, students should learn to lead discussions and form leadership skills.

Introduction to the Master Energy & Finance (every term)

DESCRIPTION:

This lecture gives an overview of the fields of mathematics which are needed to successfully study in our Master's program. Besides theory, the methods will be implemented in Excel and other software packages, including Matlab.

EDUCATIONAL OBJECTIVES:

The students should be in a position to follow the lectures in the master program. The event aims to refresh the mathematical skills of all students and equalise their level of mathematical knowledge.

Options, Futures and other Derivatives (yearly in summer term)

DESCRIPTION:

This lecture course for students in the Bachelor of Business Administration presents and discusses the use of futures, options and derivatives on capital markets and energy markets. Models and valuation methods are presented on an introductory level.

EDUCATIONAL OBJECTIVES:

Students learn about derivatives and understand how they work. Basic model-free connections as the put-call parity can be derived. They understand simple valuation models and are able to apply them.

Financial Mathematics (yearly in winter term)

DESCRIPTION:

The lecture introduces the main principles of discrete-time financial mathematics. In particular, techniques for pricing and hedging of derivatives are discussed. Martingale techniques are introduced.

EDUCATIONAL OBJECTIVES:

The students should understand the basic techniques in financial mathematics and should be able to apply them independently.

Selected Topics in Risk Management (every term)

DESCRIPTION:

This seminar is on varying topics in the area of risk management. The seminar gives students the opportunity to theoretically work and discuss specific topics in small groups and to write a scientific paper.

EDUCATIONAL OBJECTIVES:

Students independently solve specific problems in the area of risk management and are able to apply this knowledge to solve real world problems. They discuss and present main aspects of scientific papers on these topics.

SUPERVISION OF THESES

Professor Kiesel supervised 24 diploma, bachelor and master's theses during the last year.

Selection of supervised theses:

Sebastian Heimes: MiFID, EMIR, REMIT Auswirkungen der neuen Regelungen auf den Energiehandel (2014)

Stephan Prell (Thesis written in cooperation with RWE Supply & Trading): Extrinsic hedge with weather derivatives (2014)

Michael Schwarzer (Thesis written in cooperation with RWE Supply & Trading): Development of financial derivatives for the hedge of products along the petrochemical value chain (2014)

Ibrahim Topluca (Thesis written in cooperation with RWE Supply & Trading): Power price development: Cross-border transmission flows: Influence on German / Austrian power prices (2014)

Some previously supervised theses:

Linda Miethe (Assenagon Thesis Award in Finance): "Valuation of derivatives on energy taking into account credit risk and refinancing costs." (2013)

Annika Buß: "Analyzing price convergence in power between Germany and France using a hybrid model." (2013)

Hendrik Brockmeyer: "The German intraday power market since the implementation of EEG 2012." (2013)

Marius Hofmann: "Valuation of Investments in power plants." (2013)

Christine Kantelhardt: "Trading Strategy in the Tertiary Reserve Market under Technical Restrictions." (2013)

Maximilian Thies: "Optimierung der strukturierten Strombeschaffung für risikoaverse Energieversorgungsunternehmen – Lookback Optionen als Alternative zu Trendfolgesystemen." (2013)

Björn Schulz: "Gasspeicherbewertung-Vergleich von Spot- und Forwardbewertungsansatz" (2013)

Horn, Michael: "Liquified Natural Gas (LNG) Arbitrage im Atlantischen Ozean." (2013)

Montino, Felix: "Modeling Residual Demand in Germany." (2013)

Erege, Emeka: "Finanzspekulation auf Ölmärkten und dessen Einfluss auf den Ölpreis." (2013)

Miethe, Linda: "Bewertung von Energiederivaten unter Berücksichtigung von Kontrahentenrisiko und Refinanzierungskosten." (2013)

Goldkamp, Philip: "Regime Switches in Natural Gas - Model Design and Implications for the Value of Storage." (2013)

von Avenarius, Andrea: "Optimal Production and Hedging Decisions in the Electricity Market with Limited Market Liquidity." (2012)

Lavanova, Marina: "European Gas Balancing: Incremental Earnings Opportunity on the Dutch Balancing Market." (2012)

Schmid, Thomas: "Anwendung der technischen Analyse auf die Vermarktung von Kraftwerken." (2012)

Aufmuth, Vanessa: "Zukünftige Anforderungen an die Flexibilität von konventionellen Kraftwerken in einem von Erneuerbaren Energien und volatilen Strompreisen geprägten Erzeugungsumfeld." (2012)

Peuckert, Maresa: "Einsatz und Potential von Mikro-KWK-Anlagen im deutschen Strom- und Wärmemarkt." (2012)

Panek, Björn: "Modellierung zukünftiger Preise der Spot- und Regelenergiemärkte unter Berücksichtigung verschiedener Energie-Szenarien." (2012)

Kampen, Felix: "Estimating Firm Value Processes Applying The Heston Model." (2012)

Schreiber, Tim: "Hedging von Preisrisiken im Energiemarkt unter Berücksichtigung von Basisrisiken und Liquiditätsaspekten am Beispiel eines Gasportfolios." (2012)

Wehrheim, Lino: "Moral in der Finanzkrise - eine Untersuchung sog. Sin Stocks und deren Performance." (2012)

Meise, Anna Lena: "Ansätze zur Bewertung von Kraftwerksprojekten unter Berücksichtigung der Folgen der Energiewende." (2012)

Kue Tagne, Alain Junior: "Konstruktion und Nutzbarkeit einer Daily Price Forward Curve für Gaspreise: Abbildung von Preiserwartungen und Preisrisiken." (2012)

Keke Sun: "Der Einfluss von Smart Grid Entwicklungen auf Handelsaktivitäten im Sektor der regenerativen Energien." (2012)

Suvad Kapic: "Physische Lieferung von Strom und Gas - Ein Portfolio-Ansatz." (2012)

Alexander Meißner: "Portfoliomanagement im Bereich erneuerbarer Energien." (2012)

Carina Degelmann: "Alternative Investments - eine Antwort für Lebensversicherer auf die aktuelle Niedrigzinsphase." (2012)

Kristof Salwiczek: "Linking von Emissionshandelssystemen bei unterschiedlichen Preiskontrollmechanismen - Fallstudie Australien." (2012)

Muzaffer Yildiz: "Das Allfinanzkonzept – Genese – Chancen und Risiken" (2012)

Oberscheid, Hendrik: "Risikomanagement / Regulierung." (2012)

Karagöz, Volkan: "Wirtschaftlichkeitsanalyse der Windenergienutzung in der Türkei und deren Umsetzungsmöglichkeiten." (2012)

Bouzid, Salima: "Islamic Banking." (2012)

Michel, Alexander: "Integration Erneuerbarer Energien und Netzausbau – Perspektiven für 2020

unter besonderer Berücksichtigung der Versorgungssicherheit." (2012)

Liu, Jingrong: "Ausschreibung und Vergabe von Regelleistung in Deutschland: Eine empirische Untersuchung." (2012)

Simon, Manuel: "Strombörsen im Vergleich: Liquidität und Preise im Spothandel." (2012)

Özdemir, Salih: "Die Verwendung von Frühaufklärungssystemen zur rechtzeitigen Erkennung von Risiken und Chancen." (2012)

Dyschuk, Ksenija: "Meteorologische und ökonomische Modellierung von Photovoltaik- und Parabolrinnenkraftwerken." (2012)

Schmäing, Michael: "Volatilitätsindizes – Aufbau und Hedgingmöglichkeiten am Beispiel des VIX." (2012)

Anna Lena Meise: "Ansätze zur Bewertung von Kraftwerken unter Berücksichtigung der Folgen der Energiewende." (2012)

Erdogan, Gülay: "Finanzierung von Investitionsobjekten in erneuerbare Energien." (2012)

Lino Wehrheim: "Moral in der Finanzkrise - eine Untersuchung sog. Sin Stocks und deren Performance." (2012)

Katharina Schartner: "Bewertung von korrelationsabhängigen Kreditderivaten mit strukturellen Modellen." (2011)

Derya Baghistani: "Bewertung eines Kraftwerks in einem stochastischen hybriden Modell." (2011)

Marcel Karp: "Empirische Untersuchung des EEX-Spotmarktes - Funktionale Zusammenhänge zwischen Einflussfaktoren und Preisen." (2011)

Christian Becker: "Quantifizierung von Risiken im Vertrieb von Strom - angewandt bei den Stadtwerken Krefeld." (2011)

Ryan Bernard: "Pricing & Hedging of Variance Swaps on Energy Spreads." (2011)

Carina Götzen: "Abhängigkeiten in internen Risikomodellen in der Schaden- und Unfallversicherung." (2011)

Mustafa El Moussati: "Die strukturierte Strombeschaffung." (2011)

Hendrik Brockmeyer: "Bewertung von flexiblen Gaslieferverträgen." (2011)

Tobias Hufschmidt: "Optimale Energiebeschaffungsstrategien für Industrieunternehmen." (2011)

Kathrin Kass: "Linking von Emissionshandelssystemen." (2010)

Florian Kuhfuß: "Monte-Carlo Methoden zur Bewertung von Swing Optionen" (2010)

Michel Schäfer: "Volatilitätsschätzer für Energie-Derivate." (2010)

Benedikt Kramps: "Real Option Based Valuation of Power Plants by Utility Indifferences." (2010)

Michael Kustermann: "Weighted Monte Carlo in Financial Engineering." (2010)

PROFESSIONAL TRAINING

Management Certificate Course on Energy Trading & Risk Management

This course takes place in cooperation of the University of Duisburg-Essen represented by the Chairs Energy Trading and Energy Economics and the Euroforum Verlag. The program was launched for the first time in January 2012. Successful participants obtained a certificate of the University of Duisburg-Essen in September 2012. Currently, the second installment of the course is close to finishing and a third will start in autumn 2013. The study program gives a substantiated overview of the different facets of today's energy economics including upcoming changes. Up-to-date questions of risk management and energy trading are being raised, analyzed and discussed. Apart from Professor Weber and Professor Kiesel the group of authors for the 16 lectures comprises well-known experts from the energy commerce, consulting firms and public authorities. During four in-class lectures the essential topics regarding the energy market and trading, regulation, risk management and business management will be repeated and deepened. Apart from the certificate course Professor Kiesel is heading three written training courses of Euroforum, i. e. "Versicherungswirtschaft aktuell: Risikomanagement und Solvency II" ("Insurance Business of Today: Risk Management and Solvency II"), "Risikomanagement in der Energiewirtschaft" ("Risk Management in Energy Economy") and "Portfoliomanagement in der Energiewirtschaft" ("Portfolio Mangement in Energy Economy"). Moreover, he compiled three lectures together with the research assistants of the Chair and compiled one further lecture for the training course Financial Mathematics.

Earlier Events

Professor Kiesel held a two-day seminar on the topic "Bewertung von Energiederivaten" ("Evaluation of Energy Derivates") in Düsseldorf (February 2010). This seminar belongs to a joint seminar series of the University of Oslo and the firm Energyforum. Having successfully participated in the seminar series the participants (especially practitioners) will obtain a certificate of the University of Oslo.

For Talanx, Professor Kiesel held a two-day seminar about "Modelling of Interest Rates". The seminar took place from 8th to 9th April 2010.

In the framework of the AXA University of AXA Group, Professor Kiesel gave a lecture on risk fundamentals for the "AXA Risk Management College" on 24th November 2010.

PRESS & NEWS

RÜDIGER KIESEL MEETS THE NOBEL PRIZE WINNER JACK STEINBERGER



On the occasion of his 90th birthday Nobel Prize Winner Jack Steinberger was honored in his hometown Bad Kissingen. During his visit the opportunity arose for an exchange of thoughts between Rüdiger Kiesel (who went to school at the Jack-Steinberger Gymnasium in Bad Kissingen) and Jack Steinberger on the topic of energy production.

Further information on Jack Steinberger can be found here:

http://www.nobelprize.org/nobel_prizes/physics/laureates/1988/steinberger.html

NOBEL PEACE PRIZE NOMINATION FOR PROJECT "ENCYCLOPEDIA OF STATISTICAL SCIENCE"

The Nomination of the Editors of the Encyclopedia of Statistical Science for the Peace Nobel Prize has been covered in the media. Professor Kiesel also contributed a chapter on "Martingales" to this Encyclopedia. Attached is one of the press releases regarding the nomination:

ISER's Peter Lynn has played a part in a remarkable scientific venture which has now been nominated for the 2011 Nobel Peace prize.

Three statisticians from three Balkan countries that were at war with one another not so long ago have collaborated in a project which has brought together statisticians from Bosnia, Serbia and Croatia as well as leading experts from around the world. In total, 619 statisticians from 105 countries on six continents participated in the project which has resulted in the publication by Springer of the 3-volume Encyclopedia of Statistical Science. Peter Lynn contributed a chapter to the encyclopedia on "Sample survey methods".

The Government of the Republika Srbska (RS), one of three autonomous entities within Bosnia and Herzegovina, has made the nomination for the Nobel Prize. The nominees are Serbian Miodrag Lovric, Bosnian Jasmin Komić and Croatian Ksenija Dumičić. A statement from the Office of Government Relations praised their work: "No one in history has managed to unite people as brothers and sisters under the auspices of pacifist and scientific ideas, as successfully as Lovric, Komić and Dumičić have done. Their many years of outstanding efforts have united scientists from countries that account for 90 percent of the world's population".

It is hoped that the award of the prize would provide a signal that a political solution to the problems of the region can only come through joint work and concessions, rather than war and violence.

One of the main aims of the encyclopedia is to raise the standard and profile of statistics in the Balkan states. ISER researchers have previously contributed to this objective through a series of projects in Bosnia. These involved setting up a household panel survey, training government statisticians, building research infrastructure, and developing a survey sampling framework. Miodrag Lovric said:

"We wanted the leading experts in each field to work with us on the encyclopedia. People in this part of the world who care about peace and social justice and the role that statistics can play in this are very grateful for the support we have received from our international collaborators."

LETTER TO THE EDITOR OF THE NEWSPAPER "DIE ZEIT" (ABRIDGED VERSION PUBLISHED IN ISSUE 34, 14 AUGUST 2013, PAGE 34)

"Die gekaufte Wissenschaft" berichtet einseitig – einige wenige Beispiele von möglichem Fehlverhalten werden ausgebreitet.

Stiftungsprofessuren werden dabei als erwerbbare Forschungsprodukte bezeichnet! Ich empfehle den <u>Code of Conduct</u> für Stiftungsprofessuren des Stifterverbands für die deutsche Wissenschaft im Sinne einer sorgfältigen Recherche zu konsultieren. Hier legt der Stifterverband klare Richtlinien, im Sinne einer die Freiheit von Forschung und Lehre wahrenden, unabhängigen Zusammenarbeit eines privaten Förderers und der Stiftungsprofessur dar. Als Beispiel sei die Stiftungsprofessur "Energiehandel und Finanzdienstleistungen" der Universität Duisburg-Essen genannt. Diese Stiftungsprofessur erlaubte es der Fakultät für Wirtschaftswissenschaften in Essen einen Masterstudiengang "Energieund Finanzwirtschaft" aufzubauen. Durch die finanzielle Förderung besteht die Möglichkeit den Studierenden praxisnahe Lerninhalte, wie z.B. Energiehandelssimulationen und Finanznachrichtensysteme, anzubieten. Die Beteiligung von Praktikern an Vorlesungen und Seminaren ergänzt die fundierte theoretische Ausbildung durch Praxisbeispiele. Daneben kann eine akademische Seminarreihe mit renommierten internationalen Wissenschaftlern durchführt werden, die natürlich den Studierenden offensteht und ihnen schon früh den Kontakt zur akademischen Forschung ermöglicht. All dies wäre ohne die Zuwendungen des Stifters nicht realisierbar.

Als anwendungsorientier Forscher gehört es zu meinem akademischen Selbstverständnis praxisnahe Forschungsfragen zu beantworten; ja ich halte es sogar für eine Notwendigkeit, dass die akademische Welt sich in die öffentliche Diskussion einbringt. Bis heute sind die Falten aus meinen Hemden dadurch noch nicht verschwunden.