Externally Funded Research Projects

The external funding raised by our faculty members totals about € 2.8 mio. in 2015, up from about € 2.6 mio. in 2014. Our main sources of revenue are the Austrian Science Foundation (FWF), the European Union and the Austrian National Bank (OeNB), see table 1. This funding enables us to investigate a broad range of issues.

On the next page we list externally funded research projects that were ongoing in the calendar year 2015 by research theme (see page 28 for a description of themes). This includes projects that have been started before 2015 as well as projects to be completed after 2015. For each theme, we sort the research projects first by start date and then by end date. Projects that address multiple themes are listed multiple times. Note that the list below reflects only a fraction of the entire research undertaken by our experts. Indeed, some of the projects do not require external funding or are funded by internal sources.

Sources of External Funding (in thousand €) - Table 1

	Funds 2013	Funds 2014	Funds 2015
FWF	1'073.9	1'437.4	1'321.5
OeNB	10.8	224.8	278.9
EU		334.4	51.1
Federal	45.1	9.3	143.4
WWTF	73.9	37.0	180.9
FFG	80.9	137.4	152.9
Other	207.0	361.0	504.8
Total	**1'491.60**	**2'541.30**	**2'633.50**

Source: Finance & Controlling 2015, University of Vienna

External Funding, 2015 - 2013 - Figure 7

2013	2014	2015
€ 1.6 mio.	€ 2.6 mio.	€ 2.7 mio.

Source: Finance & Controlling 2015, University of Vienna

Individuals and Behavior

Consumer Responses to Country-of-Origin, Region-of-Origin and Brand-Specific Cues: Cognitive and Affective Dimensions

Contact person: Diamantopoulos, Adamantios

2011 – 2016

Through a set of complementary studies, this project investigates the impact of alternative intonations (cognitive vs. affective) of country- and region-of-origin information on consumers' brand perceptions, buying intentions and willingness to pay. Particular emphasis is placed on (a) the relative importance of cognitive and affective dimensions of origin designation on consumer responses, (b) the role that multiple (i.e. national and regional) consumer identities play in shaping such responses, and (c) potential variations across different product categories.

Evaluating Competencies in Self-Regulated Learning in the Tertiary Sector

Contact person: Dresel, Markus

2012 – 2015

The project PRO-SRL addresses challenges in modelling and assessing SRL-competencies at Universities. Following a multi-method-multi-informant approach, different complementary assessment tools, namely situational judgment items, questionnaire items based on vignettes, a learning diary as well as an e-portfolio are developed.

Explicit and Implicit Country Stereotypes of Consumers

Contact person: Diamantopoulos, Adamantios

2014 – 2017

Extant country-of-origin (COO) research lacks strong theory, assumes only reflecting thinking on the part of consumers, and relies invariably on explicit (direct) measurement of country stereotypes. The proposed project integrates Fiske et al.'s (2002) stereotype content model (SCM) with Strack and Deutsch's (2004) reflective-impulsive model (RIM) into a unifying conceptual framework which is subsequently used to study the impact of both explicitly- and implicitly-assessed country stereotypes on consumer emotions and behavior. Based on a series of complementary studies – both survey- and experimentally-based – it seeks to offer detailed insights into (a) the degree of and reasons for the convergence/divergence of explicitly- and implicitly-measured country stereo-types, (b) the relative influence of such stereotypes on deliberate vs. spontaneous purchase decisions, (c) the role of implicit country stereotypes in steering consumers' attention and (automatic) approach impulses, (d) the mediating effects of (positive and nega-

tive) emotions on the stereotype-behavior relationship, and (e) the relative predictive validity of explicitly- and implicitly-measured country stereotypes with respect to a wide range of behavioral outcomes. The project findings are expected to substantially advance both COO theory and stereotyping theory as well as create several implications relevant for practice.

Understanding Combinatorial Clock Auctions

Contact person: Janssen, Maarten

2014 –2017

Combinatorial Clock Auctions (CCA) have recently been used around the world to allocate spectrum for mobile telecom licenses. However, the optimal bidding behavior in CCAs has only been (partially) analyzed in a simple context where bidders only care about the package they themselves win and in what they have to pay for it. Over the last years several papers have emerged that point at weaknesses of CCAs. In this research project, we increase the understanding of the weaknesses of the auction design, the potential damaging outcomes and the possible adaptions of the design to accommodate these weaknesses. In particular, we consider the implications of incentives to raise rivals' costs, bidding under a budget constraint and valuations depending on auction outcomes. The project uses game theoretic analyses and simulation techniques.

How do Electronic Shelf Labels Shape Consumer Behavior?

Contact person: Garaus, Marion

2015

This research project IT4PRICE tests a prototype of a combined solution of a digital signage system and electronic shelf labels. Scope of the project is a functionality test of the developed solution and to investigate the influence of various digital signage contents (affective, cognitive) in combination with electronic shelf labels on consumers' overall store evaluation and behavioral intentions.

The Influence of Digital Signage on Waiting Time Preceptions at the POS

Contact person: Garaus, Marion

2015

The current project examines the influence of an innovative digital signage system on consumers waiting time perceptions at the Point-of-Sale. Main research issues comprise the acceptance as well as the impact of digital signage on customer behavior, as well as acceptance drivers of digital signage.

Firm Dynamics, Interrelated Factor Demand and the Business Cycle

Contact person: Gehrig-Merz, Monika

2015 – 2016

Our objective is to study the quantitative contribution of particular features of firm dynamics such as entry, exit and variable firm size, and age in conjunction with frictional factor markets for business cycle dynamics. We design a dynamic stochastic general equilibrium model of firm dynamics with competitive direct search in the labor market and physical capital, and use existing firm-level evidence for calibrating the model and for evaluating the performance. Firms differ with respect to their idiosyncratic productivity, level of employment, and size of their capital stock. We successively extend the benchmark setup with fully flexible capital by adding (i) partially irreversible capital, and (ii) interrelated factor adjustment costs in order to explore their contribution to observed business cycle dynamics. We expect our comprehensive analytical framework to be useful for shedding light on the main economic determinants of firm dynamics in conjunction with firm heterogeneity and the adjustment of labor and physical capital.

Consumer Regret in Global versus Local Brand Purchase Decisions

Contact person: Vasileios, Davvetas

2015 – 2017

The project refers to the role of consumer regret in purchase decisions which involve global and local brands. Drawing from regret theory and global branding literature, the project proposes two conceptual frameworks with regards to (a) how perceived brand globalness influences post-purchase consumer responses under conditions of consumer regret and (b) how anticipated regret is affected by the purchase of global/local brands / how consumer preferences shift from/to global and local brands under conditions of regret anticipation. The project involves the design and implementation of 8 studies, including experiments and consumer surveys both, in Austria and in other emerging markets. The findings of the project are expected to enrich theory in the field of international consumer behavior and assist global/local brand managers in international marketing strategy development.

Information and Consumer Search

Contact person: Janssen, Maarten

2015 – 2017

Traditionally, economics has studied the functioning of frictionless markets, where consumers can obtain price and other relevant product information at no cost. The consumer search literature takes the search cost of consumers seriously and considers the implications of this cost for the efficiency of markets.

Consumer search theory provides a framework to assess the market power of firms that arise from search frictions. The theory has now passed the initial stage of development and it is time to reflect on common assumptions made and inquire about new applications.

This research proposal mainly focusses on the informational assumptions made in consumer search theory. Central to the consumer search literature is the idea that consumers do not know the products that are sold in the market and the prices charged. Instead, they have to devote resources on getting to know them. The research proposed here extends consumer search theory by relaxing some of the informational assumptions made and by inquiring into the incentives of firms to share information.

Some recent literature develops a different approach: consumers are unaware of some parameters of the model (for example, firms' cost) and „estimate" them in a Bayesian way using the observed prices. But also in these models, firms and consumers are assumed to know many aspects of the market that influences price setting and the market power of firms.

The proposal is divided into three subprojects. The first project considerably relaxes the informational assumptions on the consumer side of the market. The second project enquires into the incentives of firms to share information. In the consumer search literature the informational structure for firms is given, where the information consumers possess is endogenously determined. The second project also endogenizes the information structure of firms. The third project develops a more applied perspective and considers the implications of different informational assumptions in a consumer search model with a vertical industry structure. In a recent paper Janssen and Shelegia (2014) reconsider the issue of double marginalization when there is consumer search in the retail market.

Fairness, Personal Responsibility, and the Welfare State

Contact person: Tyran, Jean-Robert

2015 – 2018

The aim of the research project "Fairness, personal responsibility and the welfare state" is to analyze how fairness considerations, in particular with respect to personal responsibility, affect the support and effectiveness of welfare policies. The European welfare states are faced with important challenges, in particular related to financial strains on the welfare system, changing migration flows and increasing inequality. Partly as a response to these challenges, there is an increasing focus on personal responsibility. The research project provides new knowledge about how the welfare states can meet these challenges and how concerns for personal responsibility can be integrated in the design of welfare schemes in a

way that is perceived as fair.

Four research teams from Norway, the Netherlands, and Austria take a cross-disciplinary perspective on fairness and use an innovative combination of methods, including administrative register data, surveys, as well as field and laboratory experiments.

Organizational Design of Novel Organizational Forms

Contact person: Reitzig, Markus

2015 – 2018

We propose to study if – and where– extant theories of organizational design require elaborations in order to explain the emergence and effectiveness of so-called new organizational forms such as open source software or new business models. Building on our own on-going work, we suggest that classic theories of organizational design – among them the Carnegie School and its derivatives (e.g. contingency theory), while still capturing important features of even novel forms of organizing, may benefit from elaborations regarding three distinct sub-questions. These are as follows: First, how relevant are authority and hierarchy, traditional solutions to the design challenge of dividing labor and integrating effort, to new organizations? Second, under which conditions is self-selection, considered to be an important solution to the organizational design challenge in new forms of organizing, truly effective? Third, how do different solutions to the design challenges of task division, task allocation, rewards distribution, and information provision complement one another?

We plan on pursuing the three distinct sub-questions of our broader research question by conducting five empirical studies. The first empirical study is intended to shed light on the first sub-question, and is meant to draw on archival data of OSS projects stored in the SourceForge Research Data Archive (SRDA). More specifically, we plan to examine if OSS projects are truly authority-less in the classic sense as has recently been argued, or not. The large-scale quantitative test appears feasible given clearly competing theoretical predictions. The second empirical study plans to examine the skill-matching hypothesis (see sub question 2), an assumption usually taken for granted, in more detail. Again, we suggest resorting to available SRDA data on OSS projects to create a large-scale empirical base for testing purposes. Given the relative ignorance on the mechanistic underpinnings pertaining to the emergence of self-selection, we propose to complement the second study with a third one.

This latter investigation seeks to examine the antecedences of skill-matching in a more qualitative way – through comparative case study analysis and ethnographic observation of new entrepreneurial ventures. In a fourth study we seek to shed light on sub-question 3 by studying observable complementarity patterns between organizational solutions for a set of published examples of new

forms of organizing using Boolean qualitative comparative analysis. Again, and in order to delve deeper into the mechanistic underpinnings of these complementarities, we plan on complementing our fourth study with a fifth one in which we observe new entrepreneurial ventures over extended periods of time.

The goal of this study is to uncover the micro-mechanistic factors that account for observable complementarities. We suggest that our research will contribute to a reconciliation of the emergence of novel empirical phenomena with extensions of extant theories that have proven powerful in the past.

Distributive Preferences and Needs-Based Justice in Networks

Contact person: Kittel, Bernhard with Pritzlaff, Tanja & Schnapp, Kai-Uwe

2015 – 2018

Using theory conducted experimental approaches, Subproject B1 "Distribution Preferences and Demand Appropriateness in Networks" (Verteilungspräferenzen und Bedarfsgerechtigkeit in Netzwerken) examines the question to which extent demands in context of network structures can be recognized as legitimate and are reflected in bilateral distribution negotiation results.

Based on the sociological exchange theory, the influence of network structures on the number of possible bilateral agreements and the social preferences of position holders on the consideration of individual needs for the determination of the distribution key is explored as well as their transparency for the involved agents.

Under the assumption of individual utility maximizing behavior, a uniform distribution of resources is a result of balanced power structures and information regarding the network structure. However, unequal power structures in the network generates a skewed distribution in favor of more powerful positions. Even though this general pattern can be repeatedly found in experiments, systematic divergences of these expectations can be seen. In particular, powerful agents seem to act more aversely to inequality under certain parameters than their structural position would suggest.

On the basis of the current state of research that balanced power structures and transparency of network structures principally have an equalizing effect, the question arises if demand appropriateness can also achieve the expected distribution effects in distribution averse network structures contrary to other principles of equality. The central research question is, if demand appropriateness – contrary to other principles of equality – is reliable as a distribution principle in network structures which otherwise are against redistribution.

This result would suggest that the principle of demand appropriateness has a higher potential to legitimatize distributions than other principles.

Changing Markets and Institutions

Using Experiments to Understand Labor Markets

Contact person: Tyran, Jean-Robert

2008 – 2015

The project integrates recent findings in behavioral economics into traditional labor economics. We explore questions regarding labor supply and the provision of effort, including the analysis of incentive effects of taxation and redistribution on effort and the cognitive perception of the incentive effects. In addition, we make contributions to study cooperation in self-governed environments, the political acceptance of reform, and aspects of discrimination in the labor market.

We have initiated research to explore behavior in markets with asymmetric information, the measurement and determinants of motivation at work, gender sorting, and the effect of solidarity on social mobility. We have conducted conventional lab experiments with student subjects, large-scale internet experiments with participants from the general population, and natural field experiments.

The Evolution of Norms and Conventions in Economics

Contact person: Janssen, Maarten

2009 – 2015

Evolutionary game theory has developed into a major field of research at the interplay of mathematics, economics and biology. One of the main general aims of the analysis of evolutionary game theory is to study the conditions under which a population of players settles over time on a stable behavioral pattern. Economists have been interested in these developments in order to better understand (i) how social norms and conventions emerge, (ii) how these norms and conventions influence individual economic behavior and (iii) the conditions under which these norms and conventions are stable over time.

The present research project aims to contribute to this general field of inquiry by studying four subprojects, namely on (a) Social norms and economic incentives, (b) Work ethics and minimum effort games, (c) Selecting with whom to play and (d) Evolutionary equilibrium selection techniques.

Experimental Markets with Search Frictions and Network Externalities

Contact person: Tyran, Jean-Robert

2012 – 2015

We study two types of market institutions experimentally: Markets with search costs, and markets with network externalities. In markets with search costs the standard model provides fairly clear predictions about behavi-or. However, questions of bargaining power - and thus small group strategic interaction - are integral to search theories. A large body of experimental research shows large deviations from the equilibria of standard bargaining models. In markets with network externalities, the standard model offers less clear cut predictions. The ambiguity largely results from the absence of an accepted theory of equilibrium selection, and the fact that multiple equilibria are integral to markets with network externalities. In terms of lab behavior, markets with search costs and markets with network externalities fall between the optimism of anonymous, decentralized market behavior, and the pessimism of small group strategic interaction. It makes these markets both demanding and interesting to study.

Making Optimal Choices When Market Structures Change

Contact person: Wrzaczek, Stefan

2013 – 2015

Optimal control (unilateral decision maker) and differential game theory (several decision makers) are established tools to analyze dynamic processes in economics and related fields. Both theories rely on the assumption that the model frame- work (i.e. number of players, form of collaboration between the players, etc.) does not change over time. However, many real phenomena demonstrate the opposite, e.g. a) Monopolistic market changes to competition (and vice versa), b) Entry/ exit of competitors to/from the market, c) Begin/end of a collaboration of players.

The innovation of our project is to study such issues in continuous time, a) we combine an optimal control model and a differential game, b) use two differential games with a different number of players and c) a non-cooperative differential game with a differential game with cooperating players. Outcomes are analyzed for various switching times (e.g. exogenous, endogenous, and stochastic), for commitment structures (e.g. open-loop) and initial states.

With the analysis of such models it is possible to learn the optimal behavior before change in market structure. Comparing the results to the situation without switch provides important economic insights that go beyond the knowledge from static and two-period models. It is possible to deal with questions, like whether it is optimal to increase the capital stock before competition gets tougher and vice versa? How should a firm influence the competitors' decisions already before the switching time? Should a firm try to influence the switching time or is this too costly?

Differences in Gender Relations in Trade Unions

Contact person: Blaschke, Sabine

2013 – 2015

This research project explores the development of gender relations in trade unions on the micro level. Former research on the organizational meso level suggests that occupational status and level of qualification of the union members influence how women participate in union decisions and how interests of female members are represented. This study focuses on processes at the agent level that causes the observed differences. To achieve this, two Austrian trade unions are examined whose members differ in terms of occupational status and level of qualification. While one union consists of white-collar workers resp. employees with higher levels of qualification, the other union comprises mainly blue-collar workers resp. employees with low qualifications.

The results of this study will illustrate how differences between unions concerning the inclusion of women and their interests emerge.

Mutual Insurance – A European Perspective

Contact person: Brazda, Johann

2014 – 2015

The principle of reciprocity is a way to organize protection and risk sharing cooperatively and based on solidarity. It has been legally constituted in the mutual insurance society (mutuals) within the Austrian Insurance Supervision Act (VAG). Although the act favors a conversion to a corporation and although the number of mutuals is declining, recent developments have sparked renewed interest in evaluating the possibilities of the potential of mutuality for the organization of insurance. The study should be also seen with respect to the discussion of alternative solutions for an only profit-oriented and more and more capital-market based insurance business.

Based on historical development and structural changes of mutuals in Austria and Germany, extended by experiences from selected other European countries, perspectives for mutuals in Austria should be analyzed and classified in the light of developments in other European countries. Therefore the analysis includes in addition to Austria and Germany also France, United Kingdom, Italy and Finland and the Scandinavian countries.

Understanding the Governance of the International Franchise Firm

Contact person: Windsperger, Josef

2014 – 2015

We investigate the choice of governance modes of the international franchise firm, i.e. wholly-owned subsidiaries, joint venture franchising, area development franchising and master franchising.

Deriving hypotheses from transaction cost theory, agency theory, resource-based and organizational capabilities theory, property rights theory and international strategy theory, we conduct regression analysis on a large- scale survey of international franchise systems headquartered in Europe and the U.S. Overall, the study results will contribute to a better understanding of those determinants that influence the international franchise firm's successful choice of governance structure based on cost saving and value creation considerations.

Fluctuating Prices of Raw Materials as a Challenge for Monetary Policy

Contact person: Cunat, Alejandro

2014 – 2016

The recent recessions in the Euro Area and the US were all preceded by rising oil prices, a phenomenon that regained some interest among policy makers and scholars. In the first part of our project we plan to study - both theoretically and empirically - a disaggregated large open economy, where a trading manufacturing sector is differently affected by underlying sources of global oil price changes (such as Asian growth) than non-trading sectors (e.g. services, construction). By doing so, we examine the central bank's role in the transmission of global shocks to heterogeneously affected sectors and the entire economy over the business cycle. The second part concerns optimal policy in a small open economy that is dependent on imported food. The central bank could affect the terms-of- trade in favor of consumers but at the cost of competitiveness. We plan to study a policy that orients on the state of the global commodity market and want to evaluate welfare in a regime-switching setting.

Short Sale Bans and Price Discovery in Stock Markets

Contact person: Gehrig, Thomas

2014 – 2016

The objective of this research program is to study information aggregation and price discovery in markets with bans on short selling. Based on real time transactions data we decompose effective spreads into their basic components of adverse selection, inventory holding costs, and order processing costs (cum market power). This procedure allows us to identify and analyze the role of information on transactions costs and trading volume prior to and after the imposition of the ban.

This decomposition should prove useful to explain the ambivalent empirical evidence on the role of short sale bans. While some studies find an increase in transaction costs and price volatility others report a decline in trading costs and, hence, an increase in market liquidity.

The informational role of short-selling bans has important policy implications. To the extent that bans contribute to increase adverse selection costs, they tend to discourage liquidity-based trade relative to more fundamentally-oriented trade, implying a lower risk of herding and reducing volatility.

Representative Democracy: Theory and Experiments

Contact person: Wagner, Alexander K.

2014 – 2017

This proposal incorporates insights from psychology into economic reasoning to better understand political processes and outcomes in representative democracy. In terms of academic disciplines, the proposal is located at the crossroads of economics, psychology and political science, and in terms of method it is grounded in both theory and experiment. Economic reasoning will be used to investigate how rational and self-interested politicians change their behavior when voters are forgetful, inattentive and have limited foresight. This approach starts from the well-defined benchmark of rational choice theory and adds psychological realism to how voters are modelled.

The theoretical investigation is expected to yield clear and testable predictions. These predictions are tested in a controlled laboratory setting. The general aim is to provide an empirically grounded model of the political process and to inform us when we need to be careful in advancing conclusions from rationalistic models.

Securing Health Care in Emergency Situations

Contact person: Rauner, Marion

2014 – 2017

Large scale disasters – be they natural, deliberate or accidental – are inevitable. They do not respect borders, a large number of people will die and the long term consequences from economic to mental health can for years devastate the affected population. S-HELP targets the central challenges in risk management by developing a holistic framed approach.

The central aim of the project "Securing Health Emergency Learning Planning (S-HELP)" is to develop and deliver a holistic framed approach to healthcare preparedness, response and recovery. S-HELP is a people, process and technological solution to emergency situations.

Understanding Combinatorial Clock Auctions

Contact person: Janssen, Maarten

2014-2017

Combinatorial Clock Auctions (CCA) have recently been used around the world to allocate spectrum for mobile telecom licenses. However, the optimal bidding behavior in CCAs has only been (partially) analyzed in a simple context where bidders only care about the package they themselves win and in what they have to pay for it. Over the last years several papers have emerged that point at weaknesses of CCAs. In this research project, we increase the understanding of the weaknesses of the auction design, the potential damaging outcomes and the possible adaptions of the design to accommodate these we-

aknesses. In particular, we consider the implications of incentives to raise rivals' costs, bidding under a budget constraint and valuations depending on auction outcomes. The project uses game theoretic analyses and simulation techniques.

Youth Unemployment in Vienna: Social Background and Consequences

Contact person: Kittel, Bernhard

2014 – 2018

The project studies how unemployment at early stages of the working life affects the psycho-social constitution, motivation, and well-being of young adults aged 18-28. To this end, we match register-data (AMDB-database) with survey data based on a sample of young people who recently became unemployed. Furthermore, we plan an experimental study which shall be subject to a first pretest. Our goal is to evaluate the effects of innovative active labor market policies for young people.

Pathways from Youth Unemployment to Economic Self-Sufficiency and Entrepreneurship

Contact person: Kittel, Bernhard

2014 – 2018

The CUPESSE project (Cultural Pathways to Economic Self- Sufficiency and Entrepreneurship: Family Values and Youth Unemployment in Europe) is dedicated to the comparative analysis of youth unemployment in Europe. By taking issues related both to the demand and supply sides into consideration, the project aims to obtain a comprehensive picture of the causes and consequences of unemployment among young people as well as to formulate policy strategies and recommendations for addressing this ever-growing issue. The project brings together a broad network of researchers from the fields of economics, political science, psychology, and sociology.

How do Electronic Shelf Labels Shape Consumer Behavior?

Contact person: Garaus, Marion

2015

This research project IT4PRICE tests a prototype of a combined solution of a digital signage system and electronic shelf labels. Scope of the project is a functionality test of the developed solution and to investigate the influence of various digital signage contents (affective, cognitive) in combination with electronic shelf labels on consumers' overall store evaluation and behavioral intentions.

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Productivity, Demand, Employment: the Propagation of Business Cycles by the Input-Output Network

Contact person: Reiter, Michael

2015 – 2016

We study the relative importance of aggregate and industry-specific productivity and demand shocks in generating business cycle fluctuations. We build a highly disaggregated multi-industry DSGE model with an input-output network structure and endogenous variation in labor effort. In this model, fluctuations in measured total factor productivity can arise as an endogenous response to demand shocks.

The model is estimated by the Simulated Method of Moments using U.S. industry data from 1960 to 2005. In an extension, the model is estimated for several European countries. Furthermore, we study the employment consequences of business cycle shocks in a multi-industry context. We construct a model that explains how firms and workers adjust the margins of labor input (employment, hours per worker, effort) in response to different shocks. We use the model to analyze "jobless recoveries".

Modelling Banking Crisis

Contact person: Kunst, Robert

2015 – 2016

As a consequence of the recent economic crisis, the attention in the financial and enterprise sector has shifted to the importance of macro-economic developments and their international interdependence for risk-modeling. The proposed research and development project is dedicated to implementing an appropriate up-to-date macro-economic forecasting model which is especially suitable for conducting global scenario analysis and stress tests as well as further developing such models in selected dimensions. The outcome should be incorporated as a standardized instrument for forecasts, analysis, and stress tests for customer's risk management.

The aim of this proposal is to lift macro-economic risk analysis and management to a higher level in the private sector by using predestined newer models. The innovative accomplishment of the F&E proposal are (1) an advanced, more anticipatory and globally integrated – while at the same time a regionally customized – macro-forecasting, analysis, and stress testing tool, which (2) can be made available for the integration of risk management into the financial and enterprise sector. Thus, for the implementation of high-quality macro-analysis, customers are assessed as significant input for this kind of product as well as thereby associated services.

Fairness, Personal Responsibility, and the Welfare State

Contact person: Tyran, Jean-Robert

2015 – 2018

The aim of the research project "Fairness, personal responsibility and the welfare state" is to analyze how fairness considerations, in particular with respect to personal responsibility, affect the support and effectiveness of welfare policies. The European welfare states are faced with important challenges, in particular related to financial strains on the welfare system, changing migration flows and increasing inequality. Partly as a response to these challenges, there is an increasing focus on personal responsibility. The research project provides new knowledge about how the welfare states can meet these challenges and how concerns for personal responsibility can be integrated in the design of welfare schemes in a way that is perceived as fair.

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This result would suggest that the principle of demand appropriateness has a higher potential to legitimatize distributions than other principles.

The Effects of Liquidity Regulation in Basel III on Financial Stability

Contact person: Loranth, Gyöngyi & Kolm, Julian

2016 – 2018

We study effects of liquidity requirements on financial stability, considering both the asset and liability side. On the liability side, we argue that liquidity requirements in combination with leverage constraints give banks an incentive to use staggered debt structures, because this maximizes the amount of profitable, illiquid assets the bank can hold. We plan to analyze whether staggered debt structures are more prone to bank runs and propose to develop a model that allows to compare the probability of bank runs between staggered and concentrated debt structures. On the asset side, liquidity requirements can increase banks' investment in liquid assets. This can increase efficiency when interbank markets are incomplete (Allen and Gale, JEEA 2004). We show that efficient liquidity requirements must be actively managed by regulators: banks must be allowed to decrease their liquidity holdings responding to other banks' liquidity shocks. Inflexible liquidity requirements cause additional inefficiencies and can decrease financial stability.

Corporate Strategies and Processes

Logistics for Hybrid Electric Vehicles

Contact person: Hartl, Richard

2012 – 2015

The project VECEPT (Vehicle with cost-efficient power train) focuses on the development and testing of an all-purpose, cost-efficient PHEV (Plug-in-Hybrid Vehicle) with an electric range of ca. 50 km serving as a volume model for the global market (planned market entry 2017). A particular focus lies on the development of a cost-efficient PHEV by using a modular concept and by fully exploiting optimization potentials (battery, heating and cooling etc.). In addition to these more technical aspects, important logistic issues need to be solved. This is where University of Vienna comes into play. We evaluate, for example, optimal routing with mixed fleets as well optimal composition of the fleet.

Evaluating Competencies in Self-Regulated Learning in the Tertiary Sector

Contact person: Dresel, Markus

2012 – 2015

The project PRO-SRL addresses challenges in modelling and assessing SRL-competencies at universities. Following a multi-method-multi-informant approach, different complementary assessment tools, namely situational judgment items, questionnaire items based on vignettes, a learning diary as well as an e-portfolio are developed.

Understanding the Governance of the International Franchise Firm

Contact person: Windsperger, Josef

2014 – 2015

We investigate the choice of governance modes of the international franchise firm, i.e. wholly-owned subsidiaries, joint venture franchising, area development franchising, and master franchising. Deriving hypotheses from transaction cost theory, agency theory, resource-based and organizational capabilities theory, property rights theory, and international strategy theory, we conduct regression analysis on a large-scale survey of international franchise systems headquartered in Europe and the U.S. Overall, the study results will contribute to a better understanding of those determinants that influence the international franchise firm's successful choice of governance structure based on cost saving and value creation considerations.

Organizing Cooperative Logistics for the Last Mile

Contact person: Dörner, Karl

2014 – 2015

Main aim of the project (KoLaMBra) is to develop a cooperative organization concept for last mile logistic operations. Before being transferred to inner cities, shipment will be consolidated. Therefore, the existing resources of logistic partners who must be certified by municipalities and who specialized within an industry sector will be used. As a result, the concept will lead to a high level of transparency, ecological, economic, and social improvements.

Green City Hubs: Developing Sustainable Logistics for Delivery Within a City

Contact person: Dörner, Karl

2014 – 2016

The research project "GreenCityHubs" develops a concept of sustainable inner-city delivery logistics using inner-city distribution centers (City Hubs) and alternative fueled vehicles. The problem is addressed from the technical, urban planning and transit oriented view. This explicitly interdisciplinary research approach should lead to an economically, socially and ecologically balanced result, which will be evaluated by metrics of delivery service, economics, energy usage, and environmental emissions.

New Ways to Support Decision Making and to Guide Production Processes

Contact person: Dörner, Karl

2014 – 2016

The project "i2V NPS 2" investigates new methods for priority-rule-based guidance and control of flexible, volatile production processes at the operational shop floor level according to user-defined strategies. To do so, complex priority rules are automatically synthesized and iteratively optimized by using meta-heuristics and simulation models. To specifically define the desired production strategies, economic, environmental, and work psychological indicators are merged by holistic rating models.

Models for Ecological, Economical, Efficient, Electric Car Sharing

Contact person: Leitner, Markus

2014 – 2017

Due to growing awareness and concerns regarding pollution, sustainability and living quality, cities are confronted with severe challenges and need to manage a transformation process that ultimately shall lead to fewer emissions and less energy consumption while increasing the quality of public space available to citizens. At the same time, however, citizens ask for flexible solutions that allow to efficiently use different modes of transport without increasing their planning overhead. Among others, car-sharing systems and the usage of

electric cars are currently increasingly gaining popularity to meet some of these challenges.

In the project e4-share, we will lay the foundations for efficient and economically viable electric car-sharing systems by studying and solving the optimization problems arising in their design and operations. A main goal is to derive generic methods and strategies for optimized planning and operating. In particular concerning flexible variants which best meet preferences of customers but impose nontrivial challenges to operators. We will develop novel, exact and heuristic, numerical methods for finding suitable solutions to the optimization problems arising at the various planning levels as well as new, innovative approaches considering these levels simultaneously.

Network Optimization in Bioinformatics and Systems Biology

Contact person: Ljubic, Ivana

2014 – 2017

Mathematical models and algorithmic approaches for solving combinatorial optimization problems from the field of network optimization are known to be essential in telecommunications and the design of transportation and supply chain networks. More recently, it has been discovered that network optimization algorithms are also crucial in the context of bio-informatics and systems biology. Numerous publications in systems biology point out that studying functions, structures, and interactions of proteins in combination with networks can provide new insights regarding robust biomarkers, and can allow new discoveries regarding protein functions, or testing of new hypothesis regarding their interactions. Network optimization algorithms have also been applied in the analysis of functional modules in protein-protein interaction networks, the discovery of regulatory subnetworks, in revealing hidden components in biological processes, or in detecting transcription factor modules. Motivated by these recent developments, we aim to study several network optimization problems that are among the most challenging ones in these fields and that were not sufficiently studied or understood so far. In this project we also aim at developing the first supernetwork-driven approach in combinatorial optimization that will seamlessly integrate various methodologies from operations research (exact and metaheuristic approaches for network optimization) and computer science (machine learning) into a single mathematical framework.

Firms' Scope Decisions in High-Technology System Industries

Contact person: Reitzig, Markus

2014 – 2017

We seek to better understand how extant mechanisms describing firm boundary decisions – notably bargaining considerations and knowledge-based complementarities – can explain organizations' scope in systemic industries, in which multiple competing products may emerge as combinations of differentiated components across the value chain.

We ask: First, do firms in systemic industries increase their bargaining power over buyers and suppliers by diversifying their R&D efforts across substitutes within components to become 'bottleneck technology' owners?

Second, if they do, (a) to what extent do knowledge complementarities across solutions within a component layer facilitate building up bargaining power in the aforementioned way, and (b) how do firms trade-off alternatives to create bargaining power over buyers and suppliers? Our empirical tests will draw on an original dataset comprising data on firms' patents, standard exchange requests, alliances, licensing revenues, and network sales.

Optimization and Analysis of Large-Scale Networks

Contact person: Leitner, Markus

2015 – 2018

Networks are a ubiquitous tool to model the growing amount of data collected in science and business. In areas such as telecommunications, location theory, or social networks analysis (SNA), the size of the resulting networks and application data is ever increasing and analysis methods for large-scale data are crucial to deal with them in a meaningful way. Typically there are also inherent uncertainties associated with the input data and the implied optimization problems often face multiple objectives.

We aim to develop novel mathematical models and algorithmic solutions for solving highly relevant problems from operations management, telecommunications, and SNA at the large scale. To this end, various robust optimization concepts and their applicability in multi-objective settings will be analyzed. Results will be used to derive high-performance solution methods aiming to solve realistic, large-scale problem instances.

S-HELP (Securing Health.Emergency.Learning.Planning)

Contact person: Rauner, Marion

2014 –2017

Large scale disasters – be they natural, deliberate or accidental – are inevitable. They do not respect borders, a large number of people will die and the long term consequences from economic to mental health can for years devastate the affected population. People, not tools, are the most important asset. Healthcare practitioners and services respond to emergency situations but they are sometimes overwhelmed often requiring rapid decision-making. Decisions in the allocation of strained

resources, prioritizing casualties, while simultaneously trying to contain the level of impact are challenging.

Between 70% and 80% of disaster losses are secondary to indirect deaths that would not have occurred without the breakdown of social and health services and the information systems. Therefore, preparedness and response capabilities of Health Services will directly impact society's ability to 'bounce back' to become more resilient to such devastating shocks.

The central aim of S-HELP "Securing Health.Emergency. Learning.Planning - Development of Decision Support Tools for Improving Preparedness and Response of Health Services Involved in Emergency Situations" project is to develop and deliver a holistic framed approach to healthcare preparedness, response and recovery. S-HELP is a people, process and technological solution to emergency situations.

Heuristic Optimization in Production and Logistics

Contact person: Dörner, Karl

2014 – 2018

This project (K-Projekt HOPL) aims to develop novel algorithms in order to gain additional optimization potential by modeling and optimizing interrelated logistics and production processes in an integrative way. The main goals for the application of optimization networks in this project are:

- Integrated storage, transport, and schedule optimization
- Strategic planning and design of production and logistics systems
- Integration of data-based modeling in the optimization of production processes

Efficient Intermodal Transport Operations

Contact person: Dörner, Karl

2014 – 2020

The project is embedded in a Christian Doppler Laboratory and has two modules. Module I addresses intermodal transportation problems. The term intermodal transportation refers to the transportation of passengers or freight from an origin to a destination by at least two transportation modes, such that the transfer from one mode to the next takes place in intermodal terminals.

The primary aim of this module, is to develop new optimization solution methods based on operations research techniques to support efficient resource planning and management in intermodal transportation systems. Module II addresses efficient resource management in public transportation. This module mainly focuses on tactical and operational problems of urban public transport systems, including headway optimization and disruption management.

The CD-laboratory for efficient intermodal transport operations will develop and apply optimization techniques to logistical decision problems with a particular focus on the development of metaheuristic and matheuristics for decision problems in transport which take real-world characteristics and realistic constraints into consideration.

Information and Consumer Search

Contact person: Janssen, Maarten

2015 – 2017

Traditionally, economics studies the functioning of frictionless markets, where consumers can obtain price and other relevant product information at no cost. The consumer search literature takes the search cost of consumers seriously and considers the implications of this cost for the efficiency of markets.

Consumer search theory provides a framework to assess the market power of firms that arise from search frictions. The theory has now passed the initial stage of development and it is time to reflect on common assumptions made and inquire about new applications.

This research proposal mainly focusses on the informational assumptions made in consumer search theory. Central to the consumer search literature is the idea that consumers do not know the products that are sold in the market and the prices charged. Instead, they have to devote resources on getting to know them. The research proposed here extends consumer search theory by relaxing some of the informational assumptions made and by inquiring into the incentives of firms to share information.

Some recent literature develops a different approach: consumers are unaware of some parameters of the model (for example, firms' cost) and "estimate" them in a Bayesian way using the observed prices. But also in these models, firms and consumers are assumed to know many aspects of the market that influences price setting and the market power of firms.

The proposal is divided into three subprojects. The first project considerably relaxes the informational assumptions on the consumer side of the market. The second project enquires into the incentives of firms to share information. In the consumer search literature the informational structure for firms is given, where the information consumers possess is endogenously determined. The second project also endogenizes the information structure of firms. The third project develops a more applied perspective and considers the implications of different informational assumptions in a consumer search model with a vertical industry structure. In a recent paper Janssen and Shelegia (2014) reconsider the issue of double marginalization when there is consumer search in the retail market.

Organizational Design of Novel Organizational Forms

Contact person: Reitzig, Markus

2015 – 2018

We propose to study if – and where – extant theories of organizational design require elaborations in order to explain the emergence and effectiveness of so-called new organizational forms such as open source software or new business models. Building on our own on-going work, we suggest that classic theories of organizational design – among them the Carnegie School and its derivatives (e.g. contingency theory), while still capturing important features of even novel forms of organizing, may benefit from elaborations regarding three distinct sub-questions. These are as follows: First, how relevant are authority and hierarchy, traditional solutions to the design challenge of dividing labor and integrating effort, to new organizations? Second, under which conditions is self-selection, considered to be an important solution to the organizational design challenge in new forms of organizing, truly effective? Third, how do different solutions to the design challenges of task division, task allocation, rewards distribution, and information provision complement one another?

We plan on pursuing the three distinct sub-questions of our broader research question by conducting five empirical studies. The first empirical study is intended to shed light on the first sub-question, and is meant to draw on archival data of OSS projects stored in the SourceForge Research Data Archive (SRDA). More specifically, we plan to examine if OSS projects are truly authority-less in the classic sense as has recently been argued, or not. The large-scale quantitative test appears feasible given clearly competing theoretical predictions. The second empirical study plans to examine the skill-matching hypothesis (see sub question 2), an assumption usually taken for granted, in more detail. Again, we suggest resorting to available SRDA data on OSS projects to create a large-scale empirical base for testing purposes. Given the relative ignorance on the mechanistic underpinnings pertaining to the emergence of self-selection, we propose to complement the second study with a third one. This latter investigation seeks to examine the antecedences of skill-matching in a more qualitative way – through comparative case study analysis and ethnographic observation of new entrepreneurial ventures.

In a fourth study we seek to shed light on sub-question 3 by studying observable complementarity patterns between organizational solutions for a set of published examples of new forms of organizing using Boolean qualitative comparative analysis. Again, and in order to delve deeper into the mechanistic underpinnings of these complementarities, we plan on complementing our fourth study with a fifth one in which we observe new entrepreneurial ventures over extended periods of time. The goal of this study is to uncover the micro-mechanistic factors that account for observable complementarities. We suggest that our research will contribute to a reconciliation of the emergence of novel empirical phenomena with extensions of extant theories that have proven powerful in the past.

Management of Resources

Energy Problems in the 21st Century: Global Warming and Resource Scarcity

Contact person: Wirl, Franz

2012 – 2015

This research contributes to two opposing forces of international energy markets:

- Energy shortage on a global scale currently (energy poverty) and in particular in the future given the fast rise in demand (in China, India and other emerging economies), due to finiteness of fossil fuel resources.

- Global warming and other externalities from fossil fuel use. Therefore, from an environmental point of view, there is too much fossil energy available. If all fossil energy were burned, the planet would be heated up beyond sustainable levels.

Both problems call for immediate action because of the large inertia of energy systems due to the involved infrastructure from the field/mines, over transportation, transformation, distribution to users and their choices (e.g., home, heating, car). Although the current perception is that global warming is the much more pressing issue (in the not too distant past the emphasis was on resources), we think that both should be addressed on a comparable scale.

The common denominator is that mitigation of both threats require similar means: a rapid transition to renewable energy. In our study we plan to approach these issues from different and interdisciplinary angles. One direction is the analysis of instruments to combat global warming: control in prices (tax) or quantities (permit). Another aspect is related to incentives to promote renewable energies. We plan to use a wide range of methodologies, including equilibrium modeling, dynamic optimization, dynamic games, both deterministic and stochastic, incentive mechanism, Public Choice, etc.

HybridMOOP: Client-Centered Multi-Objective Optimization

Contact person: Parragh, Sophie

2011 – 2015

Client-centered logistics problems appear in many highly relevant areas of our daily life. They range from the design of public transportation networks to field workforce scheduling in private service companies. Many of these problems have a cost-oriented objective and a user-centered objective. These two goals are usually in conflict: lower costs lead to lower quality of service and vice versa. Decision makers are confronted with the task of assigning weights to the different objectives, representing their preferences. However, a compromise solution computed based on these weights lacks important information. This information concerns the tradeoff between costs and quality of service: would higher quality of service be possible at a small additional cost? One possibility to circumvent this problem consists in the application of multi-objective optimization methods. These methods generate a set of "equally good" compromise solutions, allowing the decision maker to choose the most appropriate one. In multi-objective combinatorial optimization, combinations of exact and heuristic search methods, so-called hybrid methods, have been barely investigated. The aim of this research project is the development of such methods for client-centered multi-objective logistics problems.

Algorithms for Field Staff Scheduling Problems

Contact person: Parragh, Sophie

2011– 2016

This research project is motivated by the problem situation faced by organizations providing mobile care or technical (maintenance) services. The kernel of these problems consists in assigning a given number of service or care tasks to a given number of employees, considering, e.g., time windows, skill compatibility, synchronization requirements, and maximum working time restrictions. The general objective is to generate least cost routing and scheduling plans taking into account travel-based, labor-based, and client as well as employee-satisfaction-based cost terms. Client satisfaction is, e.g., linked to consistency.

This means that the number of different employees serving the same client should be as low as possible. In the first part of this project, we plan to develop exact, meta-heuristic, and hybrid algorithms to address these issues. Since in reality, in particular travel and service times are hardly ever deterministic, in the second part of this project, we plan to compare approaches of the stochastic programming field and of the robust optimization domain in the context of heuristic solution methods.

Logistics for Hybrid Electric Vehicles

Contact person: Hartl, Richard

2012 – 2015

The project VECEPT (Vehicle with cost-efficient power train) focuses on the development and testing of an all-purpose, cost-efficient PHEV (Plug-in-Hybrid Vehicle) with an electric range of ca. 50 km serving as a volume model for the global market (planned market entry 2017). A particular focus of lies on the development of a cost-efficient PHEV by using a modular concept and by fully exploiting optimization potentials (battery, heating and cooling etc.).

In addition to these more technical aspects, important logistic issues need to be solved. This where the University Vienna comes into play. We evaluate, for example, optimal routing with mixed fleets as well optimal composition of the fleet.

Organizing Cooperative Logistics for the Last Mile

Contact person: Dörner, Karl

2014 – 2015

Main aim of the project (KoLaMBra) is to develop a co-operative organization concept for last mile logistic operations. Before being transferred to inner cities, shipment will be consolidated. Therefore, the existing resources of logistic partners who must be certified by municipalities and who specialized within an industry sector will be used. As a result, the concept will lead to a high level of transparency, ecological, economical, and social improvements.

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Contact person: Dörner, Karl

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Fluctuating Prices of Raw Materials as a Challenge for Monetary Policy

Contact person: Cunat, Alejandro

2014 – 2016

The recent recessions in the Euro Area and the US were all preceded by rising oil prices, a phenomenon that regained some interest among policy makers and scholars. In the first part of our project we plan to study – both theoretically and empirically – a disaggregated large open economy, where a trading manufacturing sector is differently affected by underlying sources of global oil price changes (such as Asian growth) than non-trading sectors (e.g. services, construction). By doing so, we examine the central bank's role in the transmission of global shocks to heterogeneously affected sectors and the entire economy over the business cycle. The second part concerns optimal policy in a small open economy that is dependent on imported food. The central bank could affect the terms-of-trade in favor of consumers but at the cost of competitiveness. We plan to study a policy that

orients on the state of the global commodity market and want to evaluate welfare in a regime-switching setting.

Models for Ecological, Economical, Efficient, Electric Car Sharing

Contact person: Leitner, Markus

2014 – 2017

Due to growing awareness and concerns regarding pollution, sustainability and living quality, cities are confronted with severe challenges and need to manage a transformation process that ultimately shall lead to fewer emissions and less energy consumption while increasing the quality of public space available to citizens. At the same time, however, citizens ask for flexible solutions that allow to efficiently use different modes of transport without increasing their planning overhead. Among others, car-sharing systems and the usage of electric cars are currently increasingly gaining popularity to meet some of these challenges.

In the project e4-share, we will lay the foundations for efficient and economically viable electric car-sharing systems by studying and solving the optimization problems arising in their design and operations. A main goal is to derive generic methods and strategies for optimized planning and operating in particularly for flexible variants which best meet preferences of customers but impose nontrivial challenges to operators. We will develop novel, exact and heuristic, numerical methods for finding suitable solutions to the optimization problems arising at the various planning levels as well as new, innovative approaches considering these levels simultaneously.

S-HELP (Securing Health.Emergency.Learning.Planning)

Contact person: Rauner, Marion

2014 – 2017

Large scale disasters – be they natural, deliberate or accidental – are inevitable. They do not respect borders, a large number of people will die and the long term consequences from economic to mental health can for years devastate the affected population. People, not tools, are the most important asset. Healthcare practitioners and services respond to emergency situations but they are sometimes overwhelmed often requiring rapid decision-making. Decisions in the allocation of strained resources, prioritizing casualties, while simultaneously trying to contain the level of impact are challenging.

Between 70% and 80% of disaster losses are secondary to indirect deaths that would not have occurred without the breakdown of social and health services and the information systems. Therefore, preparedness and response capabilities of Health Services will directly impact society's ability to 'bounce back' to become more resili-

ent to such devastating shocks.

The central aim of S-HELP „Securing Health.Emergency.Learning.Planning – Development of Decision Support Tools for Improving Preparedness and Response of Health Services Involved in Emergency Situations" project is to develop and deliver a holistic framed approach to healthcare preparedness, response and recovery. S-HELP is a people, process and technological solution to emergency situations.

Sansero Safe and Secure Routing

Contact person: Dörner, Karl

2015 – 2017

Main aim of the project is to model and solve a novel multi-objective route planning problem that occurs especially in the area of security services. Typically, private security companies offer a range of services that seek to protect objects and individuals (e.g., personal protection, transportation of cash/individuals, mobile guarding, custodial services for buildings). Such security services can be classified as tasks that contain a routing component, and those without any such routing component. We distinguish three groups of related security tasks, in which (i) the security guard moves, but the objects/persons to be secured are fixed; (ii) both the guards and the objects/persons to be secured move; and (iii) neither the guard nor the objects/persons move.

FEAT: Fair and Efficient Allocation of Transport

Contact person: Vetschera, Rudolf

2015 - 2017

The main aim of this project is to improve the efficiency of the allocation of transport activities to carriers by re-allocating transportation orders between carriers. This would allow carriers to develop more efficient plans, which in particular avoid empty trips, thus improving efficiency of the overall system. Such a re-allocation requires collaboration among carriers. Existing research on carrier collaboration has proposed various mechanisms for collaborative planning, which have been studied in the context of different transportation problems. The present project will systematically compare a spectrum of different approaches to carrier collaboration, in particular a fully centralized planning approach, a centralized auction mechanism, decentralized auctions and bilateral exchange between carriers. These different collaboration mechanisms will be studied in the unified setting of a hub-and-spoke transportation scenario, in which less than truckload transportation orders are collected via local tours to a hub, transported to another hub on a long-distance leg, and from there are distributed to customers via local tours Furthermore, the project will take into account that carriers (as well as possible centralized institutions) have only limited information

about the cost structure and other relevant information of other carriers by utilizing concepts from decision making under incomplete information.

Optimization and Analysis of Large-Scale Networks

Contact person: Leitner, Markus

2015 – 2018

Networks are a ubiquitous tool to model the growing amount of data collected in science and business. In areas such as telecommunications, location theory, or social networks analysis (SNA), the size of the resulting networks and application data is ever increasing and analysis methods for large-scale data are crucial to deal with them in a meaningful way. Typically there are also inherent uncertainties associated with the input data and the implied optimization problems often face multiple objectives. We aim to develop novel mathematical models and algorithmic solutions for solving highly relevant problems from operations management, telecommunications, and SNA at the large scale. To this end, various robust optimization concepts and their applicability in multi-objective settings will be analyzed. Results will be used to derive high-performance solution methods aiming to solve realistic, large-scale problem instances.

Statistics and Risk Analysis

Network Optimization in Bioinformatics and Systems Biology

Contact person: Ljubic, Ivana

2014 – 2017

Mathematical models and algorithmic approaches for solving combinatorial optimization problems from the field of net-work optimization are known to be essential in telecommunications and the design of transportation and supply chain networks. More recently, it has been discovered that network optimization algorithms are also crucial in the context of bio-informatics and systems biology. Numerous publications in systems biology point out that studying functions, structures and interactions of proteins in combination with networks can provide new insights regarding robust biomarkers, can allow new discoveries regarding protein functions, or testing of new hypothesis regarding their interactions. Network optimization algorithms have also been applied in the analysis of functional modules in protein-protein interaction networks, the discovery of regulatory subnetworks, in revealing hidden components in biological processes, or in detecting transcription factor modules. Motivated by these recent developments, we aim to study several network optimization problems that are among the most challenging ones in these fields and that were not sufficiently studied or understood so far. In this project we also aim at developing the first su-

pernetwork-driven approach in combinatorial optimization that will seamlessly integrate various methodologies from operations research (exact and metaheuristic approaches for network optimization) and computer science (machine learning) into a single mathematical framework.

Out-of-Sample Prediction Using Shrinkage-Estimators

Contact person: Leeb, Hannes

2014 – 2017

Modern statistical theory features powerful and highly efficient shrinkage estimators. In regression, performance analyses of such estimators are mainly focused on parameter estimation and on in-sample prediction, where the goal is estimation of the regression function at those points that were observed in the training sample. Comparatively little is known about the performance of shrinkage estimators for out-of-sample prediction, where the goal consists of estimating the regression function at new and hitherto un-observed points. Recently, Huber and Leeb (2013) showed that the James-Stein estimator can fail to dominate the maximum-likelihood estimator for out-of-sample prediction. The goal of the proposed research project is to analyze this and related phenomena, to design new shrinkage estimators with good predictive performance out-of-sample, and to develop inference methods like prediction intervals based on these new estimators.

Securing Health Care in Emergency Situations

Contact person: Rauner, Marion

2014 – 2017

Large scale disasters – be they natural, deliberate or accidental – are inevitable. They do not respect borders, a large number of people will die and the long term consequences from economic to mental health can for years devastate the affected population. S-HELP targets the central challenges in risk management by developing a holistic framed approach. The central aim of the project "Securing Health Emergency Learning Planning (S-HELP)" is to develop and deliver a holistic framed approach to healthcare preparedness, response and recovery. S-HELP is a people, process and technological solution to emergency situations.

Risk Capital for Flood Catastrophes in Europe

Contact person: Pflug, Georg

2014 – 2017

In recent years, we have observed lots of natural catastrophes in Austria, Europe and the whole world. These catastrophes have direct impact on the financial strength of affected countries, often leading to increasing taxes, additional public debts and budget diversion. Of course, these impacts have further consequences on the availa-

ble budget of private households and/or governments, thus reducing investments and opportunities for the future.

The aims of this project are twofold:

- to set the theoretical background for statistical risk modeling of regional and temporal distributed catastrophic events
- to analyze and design insurance schemes for inter-regional and international protection against losses from these events.

Autocorrelation Robust Testing in Regression Models

Contact person: Pötscher, Benedikt M.

2015 – 2016

Testing hypotheses on regression coefficients in linear models with correlated disturbances is a topic of central interest in econometrics and statistics. Even in a Gaussian setting this is a non-trivial testing problem due to the presence of the (possibly infinite-dimensional) nuisance parameters that govern the dependence structure. Most tests available in the literature are F-tests that are corrected for the autocorrelation in the data (also known as „autocorrelation-consistent" or "autocorrelation robust" tests), and are justified on the basis of a standard asymptotic analysis.

Recently, Preinerstorfer and Pötscher (2013) have shown analytically that in finite samples these procedures typically break down into either the size of these autocorrelation-corrected F-type tests is equal to one, or the nuisance-minimal power is equal to zero (which of the two cases arises depends on an observable quantity being either above or below a certain threshold). Furthermore, they identified the cause for this effect, namely a concentration effect due to strong correlation. Exploiting this observation they suggested an adjustment procedure for autocorrelation-corrected F-type tests that can render such a test immune to the concentration effect. For the adjustment procedure to work, assumptions concerning the behavior of the correlation structure at its "singular boundary" and the number of its so-called concentration subspaces have to be satisfied (which is, e.g., the case for autoregressive models of order 1). The goal of the proposed project is to understand the testing problem for more complex correlation models that do not satisfy these assumptions, and to design appropriate adjustment procedures that perform well in terms of finite sample size and power properties of the resulting tests in these more difficult settings.

Modelling Banking Crisis

Contact person: Kunst, Robert

2015 – 2016

As a consequence of the recent economic crisis, the attention in the financial and enterprise sector has shif-

ted to the importance of macro-economic developments and their international interdependence for risk-modeling. The proposed research and development project is dedicated to implementing an appropriate up-to-date macro-economic forecasting model which is especially suitable for conducting global scenario analysis and stress tests as well as further developing such models in selected dimensions. The outcome should be incorporated as a standardized instrument for forecasts, analysis, and stress tests for customer's risk management.

The aim of this proposal is to lift macro-economic risk analysis and management to a higher level in the private sector by using predestined newer models. The innovative accomplishment of the F&E proposal are (1) an advanced, more anticipatory and globally integrated – while at the same time a regionally customized – macro-forecasting, analysis, and stress testing tool, which (2) can be made available for the integration of risk management into the financial and enterprise sector. Thus, for the implementation of high-quality macro-analysis, customers are assessed as significant input for this kind of product as well as thereby associated services.

Externally Funded Graduate Schools

Vienna Graduate School of Economics (VGSE)

Contact person: Janssen, Maarten

2010 – 2015

VGSE offers a broad three-year PhD program in economics with a world-class faculty located in the center of the "number 1 quality of living city worldwide". VGSE is a collaboration of the University of Vienna and the Institute for Advanced Studies and specializes in offering field courses and research seminars where students and professors present ongoing research, and intensively supervised research time. The program is entirely run in English. The faculty members are recognized by the international research community as experts in Microeconomics, Macroeconomics, or Econometrics and are well connected to the international research community. The program aims at attracting the best students from Austria and abroad. Applicants at VGSE have completed a master´s program with advanced courses in microeconomics, macroeconomics, and econometrics. Students graduating from the Vienna Graduate School of Economics should have developed into independent researchers of the highest academic standards.

Vienna Graduate School of Finance (4th Funding Period)

Contact person: Gehrig, Thomas

2011 – 2016

The Vienna Graduate School of Finance provides training for junior faculty in the areas of banking and finance. Gra-

duates are internationally placed. The track record includes MIT, Georgia Tech, University of Wisconsin, University of Amsterdam, Aarhus University, BI Norwegian Business School, University of Oslo, University of Copenhagen, Humboldt University, University of Odense, Hong Kong University, University of Calgary and many more.

Vienna Graduate School on Computational Optimization

Contact person: Pflug, Georg

2015 – 2019

This project is a co-operation between the University of Vienna, the TU Vienna and the Institute for Science and Technology (IST Austria). The University of Vienna is represented by three faculties: Faculty of Business, Economics and Statistics, Faculty of Mathematics and Faculty of Informatics. The aim is to offer candidates (doctoral students) an extensive education in Optimization with special regards to algorithmic and computational aspects. The special characteristic of the project is that it covers the whole scope of theory, application and implementation. The participating faculty members guarantee the consideration of practically all aspects of modern Optimization (Combinatorial Optimization, Global Optimization, Heuristic Optimization, Nonlinear Optimization, Stochastic Optimization, Dynamic Optimization, Optimization in Game Theory and Data Analysis). The research themes to be processed developed from concrete practical problems. The works of the candidates should contribute to finding solutions. Faculty members besides Georg Pflug are Immanuel Bomze (University of Vienna), Monika Henzinger (University of Vienna), Arnold Neumaier (University of Vienna), Günther Raidl (TU Vienna), Hermann Schichl (University of Vienna) und Caroline Uhler (IST Austria).