SOWI-Research-News

Forschungsnewsletter der Sozial- und Wirtschaftswissenschaftlichen Fakultät
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Content – Overview

WZ Betriebswirtschaft

Operations und Information Systems

Rescheduling with New Orders under Bounded Disruption

Rescheduling problems arise when unpredicted events occur, such as the arrival of new orders. These new jobs should be integrated in a proper way in the existing schedule of the so-called old jobs, with the aim of minimizing an objective function for the joint set of jobs. To avoid a major disruption of the original schedule, each old job is not allowed to deviate from its original completion time by more than a certain threshold. Filling a gap in the existing literature, we consider the minimization of the total weighted completion time. The resulting rescheduling problem is shown to be weakly NP-hard and several properties of the structure of an optimal schedule are derived. These can be used for the construction of an exact dynamic programming algorithm with pseudo-polynomial running time. A fully polynomial time approximation scheme is obtained from the dynamic program by three different scaling and reduction steps. Finally, for the minimization of the number of late jobs a strong NP-hardness result is derived.

Planning a Zero-Emission Mixed-Fleet Public Bus System with Minimal Life Cycle Cost

The variety of available technology options for the operation of zero-emission bus systems gives rise to the problem of finding an optimal technology decision for bus operators. Among others, overnight charging, opportunity charging and hydrogen-based technology options are frequently pursued technological solutions. As their operating conditions are strongly influenced by the urban context, an optimal technology decision is far from trivial. In this paper, we propose an Integer Linear Programming (ILP) based optimization model that is built upon a broad input database, which allows a customized adaption to local circumstances. The ultimate goal is to determine an optimal technology decision for each bus line, considering its combined effects on charging and vehicle scheduling as well as infrastructural design. To this end, we develop technology-specific network representations for five distinct technologies. These networks can be viewed individually or as a multi-layered graph, which represents the input for the optimal technology mix. The proposed optimization framework is applied to a real-world instance with more than 4.000 timetabled trips. To study the sensitivity of solutions, parameter changes are tested in a comprehensive scenario design. The subsequent analysis produces valuable managerial insights for the bus operator and highlights the decisive role of certain planning assumptions. The results of our computations reveal that the deployment of a mixed fleet can indeed lead to financial benefits. The comparison of single technology system solutions provides a further basis for decision making and demonstrates relative superiorities between different technologies.

Assessing resilience measures in the Austrian dairy supply chain: a case-based simulation integrating strategic, tactical, and operational decisions

Given the increasing complexity of supply chains and the potential for disruptive environmental factors, such as the COVID-19 pandemic, decision-makers must increase their (operational) resilience. In particular, food supply chain actors must adopt proactive and reactive strategies and measures to mitigate disruptions and avoid negative consequences, especially for short-term food supply. We present a comprehensive approach to resilience-related decision-making based on empirical data from Austria's dairy supply chain. The research identifies actionable resilience measures across strategic, tactical, and operational dimensions alongside generic resilience strategies. Once done, we integrate them into a discrete-event simulation model that emulates Austria's dairy supply chain. Using a realistic decision-making environment, the model facilitates quantifying and evaluating the effectiveness of the measures in response to disruptions. Insights from the case study assessed in the simulation model emphasise the importance of preparing for different types of disruptions and impact magnitudes with a diverse set of resilience measures. Furthermore, their integration must be carefully assessed for potential unintended consequences in the post-disruption phase. Effective supply chain resilience-related decision-making requires a thoughtful selection of strategic initiatives combined with tactical and operational implementation across generic resilience strategies to prepare for and respond to disruptions.

Unternehmensrechnung und Steuerlehre

Incentive effects of tax transparency: Does country-by-country reporting call for arbitration?

The OECD proposes mandatory fiscal arbitration as a means of dispute resolution between tax authorities to avoid double taxation of multinational enterprises' profits. We investigate the effects of mandatory fiscal arbitration on tax-audit qualities in a two-country setting with country-by-country reporting (CbCR) and a tax rate differential. Our analytical model shows that tax-audit quality in the high-tax country increases under CbCR because finer information raises tax-audit effectiveness. In contrast, the low-tax country refrains from auditing as it benefits from profit shifting. While arbitration resolves double taxation, its effects on tax-audit quality depend on the procedure in place. An approach based on exogenous negotiation powers lowers audit quality, a final-offer arbitration preserves audit quality, and an

independent-opinion arbitration with minimum-quality requirement offers the strongest audit incentives: even the low-tax country engages in auditing. Our findings contribute to the policy debate about interdependencies between firm-level tax policies, national fiscal enforcement, and international fiscal cooperation.

Martini, J., Niemann, R., Simons, D., Voeller, D., Journal of Accounting and Public Policy 49, 1-28. doi.org/10.1016/j.jaccpubpol.2024.107278

Ranking: SJR 1.327 EF 37 JIF 3.92

WZ Volkswirtschaft

Volkswirtschaftslehre

Barrett's Paradox of Cooperation: A Full Analytical Proof 30 Years After

In his seminal paper, Barrett (1994) argues that international environmental agreements (IEAs) are typically not successful, which he coined "the paradox of cooperation". If the potential gains from full cooperation would be large, self-enforcing IEAs have low participation and, therefore, cannot achieve much, or, if the potential gains are small, agreements are not important, even though IEAs may enjoy large participation. This message has been reiterated by several subsequent papers. Even though these papers explain the driving forces of the paradox, the analysis of membership in stable agreements and the actual and potential gains from cooperation are still mainly based on simulations. In this paper, we provide a full analytical characterization of all items on which the paradox of cooperation is based.

Finus, M., F. Furini, A.V. Rohrer (2024), Barrett's Paradox of Cooperation: A Full Analytical Proof 30 Years After, Journal of Environmental Economics and Management128, 103045.https://doi.org/10.1016/j.jeem.2024.103045

Ranking: EF = 81; JIF = 4.6; SJR = 2.52

Enforcing Climate Agreements: The Role of Escalating Border Carbon Adjustments

Border carbon adjustments (BCAs) have been suggested as a measure to reduce carbon leakage in the presence of unilateral climate policies and/or to enforce cooperative climate agreements. In an intra-industry trade model, this paper studies whether and under which conditions a sequence of escalating threats of implementing BCA-measures could be successful in enforcing a fully cooperative agreement. We start from a situation where moving from non-cooperative production-based carbon taxes to a socially optimal tax is not attractive to the environmentally less concerned country. We then test whether the threat of imposing BCA-measures, in the form of import tariffs or, additionally, supplemented by export rebates, will enforce cooperation. We show that import tariffs are the least distortionary policy instrument but the weakest threat, and import tariffs with a full export rebate is the most distortionary instrument if implemented but the most effective threat to enforce cooperation. In an escalating penalty game, we determine the subgame-perfect equilibrium path along which threats are deterrent and credible. We show that BCA-measures help to enforce cooperation, reduce global emissions and are welfare improving if they need to be implemented. However, whenever full cooperation would generate the highest global welfare gains, BCAs fail to establish cooperation, a version of the paradox of cooperation, as proposed by Barrett (1994).

Elboghdadly, N.N., M. Finus (2024), Enforcing Climate Agreements: The Role of Escalating Border Carbon Adjustments, Strategic Behavior and the Environment 10, 79 – 128.https://doi.org/10.1561/102.00000108

Ranking: EF = N/A; JIF = 0.4; SJR = N/A

Opinion dynamics meet agent-based climate economics: An integrated analysis of carbon taxation

We introduce an integrated approach, blending Opinion Dynamics with a Macroeconomic Agent-Based Model (OD-MABM) to explore the co-evolution of climate change mitigation policy and public support. The OD-MABM links a novel opinion dynamics model that is calibrated for European countries using survey data to the Dystopian Schumpeter meeting Keynes model (DSK). Opinion dynamics regarding climate policy arise from complex interactions among social, political, economic and climate systems where a household's opinion is affected by individual economic conditions, perception of climate change, industry-led (dis-)information and social influence. We examine 133 policy pathways in the EU, integrating various carbon tax schemes and revenue recycling mechanisms. Our findings reveal that

effective carbon tax policies initially lead to a decline in public support due to substantial macroeconomic transition costs, threatening political feasibility. However, they also pave the way for a positive social tipping point in the future. This shift stems from the evolving economic and political influence associated with the fossil fuel-based industry, which gradually diminishes as the transition unfolds. Second, hybrid revenue recycling strategies that combine green subsidies with climate dividends successfully address this intertemporal trade-off in our model by accelerating the transition and mitigating its economic fallout, thus broadening public support.

Lackner, T., L. Fierro, P. Mellacher (2025), Opinion dynamics meet agent-based climate economics: An integrated analysis of carbon taxation, Journal of Economic Behavior & Organization 229, 106816.https://doi.org/10.1016/j.jebo.2024.106816

Ranking: EF = 90; JIF = 2.3; SJR = 1.33

A Maximum Likelihood Bunching Estimator of the Elasticity of Taxable Income

This paper develops a maximum likelihood (ML) bunching estimator of the elasticity of taxable income (ETI). Our structural approach provides a natural framework to simultaneously account for unobserved preference heterogeneity and optimization errors and for measuring their relative importance. We characterize the conditions under which the parameters of the model are identified and show that the ML estimator performs well in terms of bias and precision. The paper also contains an empirical application using Swedish data, showing that both the ETI and the standard deviation of the optimization friction are precisely estimated, albeit relatively small.

Aronsson, T., K. Jenderny, G. Lanot (2024), A Maximum Likelihood Bunching Estimator of the Elasticity of Taxable Income, Journal of Applied Econometrics 39, 200 – 216.
https://doi.org/10.1002/jae.3015

Ranking: EF = 83; JIF = 2.3; SJR = 2.13

Uncertain Length of Life, Retirement Age, and Pension Design

In this paper, we consider how the hours of work and retirement age ought to respond to a change in the uncertainty of the length of life. The results show that a decrease in the standard deviation of life-length leads to an increase in the socially optimal retirement age and a decrease in the hours of work per period spent working, if the preferences for the number of years spent in retirement are characterized by constant or decreasing absolute risk version. We also show how a benevolent policy maker can implement the social optimum through an actuarially fair pension policy.

Aronsson, T., S. Blomquist (2024), Uncertain Length of Life, Retirement Age, and Pension Design, FinanzArchiv/European Journal of Public Finance 80, 111 -- 128.https://DOI.org/10.1628/fa-2023-0013

Ranking: EF = 15; JIF = 0.6; SJR = 0.25

A Note on Optimal Taxation under Status Consumption and Preferences for Equality

This note analyzes optimal taxation when (i) a fraction of people has positional preferences, and (ii) concerns for relative consumption and preferences for equality are operative simultaneously. We show that incentive compatibility motivates a regressive marginal tax structure, which in the end implies that people with positional preferences are taxed at a lower marginal rate than people without such preferences. A counteracting mechanism arises if those who are not concerned with their relative consumption have preferences for income-equality, even if people with positional preferences should still be taxed at a lower marginal rate than motivated by their contributions to externalities.

Aronsson, T., T. Sjögren, S. Yadav (2024), A Note on Optimal Taxation under Status Consumption and Preferences for Equality, Oxford Economic Papers, forthcoming.

Ranking: EF = 55; JIF = 1.2; SJR = 0.65

Groundwater extraction for irrigation purposes: The case of asymmetric players

In this paper, we address the problem of groundwater exploitation by heterogeneous farmers for irrigation purposes. In particular, we study the possible inefficiencies that can arise in this type of common resource problem by considering the dynamic and strategic interactions between groundwater users. To this end, we build a two-player differential game in which two types of farmers (or many farmers grouped into two types, with a representative farmer for each group) display different characteristics related to their agricultural activity. More precisely, they can have different water demand functions, extraction costs, crop productivity, land types and time-preferences. Conditions are studied for the existence and

uniqueness of the cooperative and non-cooperative solutions asymptotically converging to a steady state. The model is then applied to the case study of the Western La Mancha aquifer. Effects of the different heterogeneities on the degree of inefficiency of non-cooperative solutions with respect to cooperative solutions are analyzed. Numerical results show that cooperation is always beneficial for the environment and for the agents: It results in higher levels of groundwater stock and total welfare. Moreover, considering heterogeneous time preferences is crucial for reducing the inefficiency of non-cooperation with respect to cooperation, regardless of the other asymmetries between farmers.

Chukaeva, V., J. de Frutos Cachorro, J. Marin-Solano (2024), Groundwater extraction for irrigation purposes: The case of asymmetric players, Water Economics and Policy, 10, 2450004. https://doi.org/10.1142/S2382624X24500048

Ranking: EF=N/A; JIF=1.0; SJR=0.28

When most fMRI connectivity cannot be detected: Insights from time course reliability

The level of correlation between two phenomena is limited by the accuracy at which these phenomena are measured. Despite numerous group reliability studies, the strength of the fMRI connectivity that can be detected given the within-subject time course reliability remains elusive. Moreover, it is unclear how within-subject time course reliability limits the robust detection of connectivity on the group level. We estimated connectivity from a working memory task. The grand mean connectivity of the connectome equaled $r = 0.41$ (95% CI 0.31–0.50) for the test run and $r = 0.40$ (95% CI 0.29–0.49) for the retest run. The mean connectivity decreased to $r = 0.09$ (95% CI 0.03–0.16) when test-retest reliability and auto-correlations of single time courses were considered, indicating that less than a quarter of connectivity is detectable. The square root of the detectable connectivity $r = 0.09$ suggests that only 0.81% of the connectivity is explained by working memory-related time course fluctuations. Null hypothesis significance testing (NHST)-based analysis revealed that within-subject time course reliability markedly affects the significance levels at which paths can be detected at the group level. This was in particular the case when samples were small or connectome coordinates were randomly selected. With a sample of 50 individuals, the connectome of a test session was completely reproduced in a retest session at $P < 2.54e$-6 despite the fact that almost no connectivity was explained by the cognitive experiment. Within-subject time course reliability can offer valuable insights on the detectable connectivity and should be assessed more frequently.

Koten, J.W., H. Manner, C. Pernet, A. Schüppen, D. Szücs, G. Wood, J.P.A. Ioannidis (2024), When most fMRI connectivity cannot be detected: Insights from time course reliability, PLOS ONE \textbf{19}(12), e0299753. https://doi.org/10.1371/journal.pone.0299753

Ranking: EF = 100 ; JIF = 2.9; SJR = 0.84

Center for Accounting Research

Economic Effects of Litigation Risk on Corporate Disclosure and Innovation

Empirical studies on the relationship between shareholder litigation and corporate disclosure obtain mixed results. We develop an economic model to capture the endogeneity between disclosure and litigation. Equilibrium disclosure is determined by two countervailing effects of litigation, a deterrence effect and an insurance effect. We derive four key results. (i) Decreasing litigation risk leads to less disclosure of very bad news, due to a weakening of the deterrence effect, but to more disclosure of weakly bad news, due to a weakening of the insurance effect. (ii) Given a sufficiently large information asymmetry, litigation risk dampens (boosts) overall disclosure of bad news for low (high) litigation risk firms. (iii) Capital markets respond more to the disclosure of bad news than of good news if the deterrence effect is strong, which arises if both insiders' penalties and litigation risk are high. (iv) In an extension, we highlight real effects of litigation on corporate innovation and establish that innovation first decreases and then increases (strictly decreases) with litigation risk if insiders' penalties are small (large). We reconcile our findings with results from a large set of U.S.-based empirical studies and make several novel predictions.

Schantl, Stefan F./Wagenhofer, Alfred: Economic Effects of Litigation Risk on Corporate Disclosure and Innovation, Review of Accounting Studies 29 (2024), 3328-3368. doi: 10.1007/s11142-023-09778-5.

Ranking: JIF 4.8, SJR 5.5

Nachhaltigkeitsberichterstattung für KMU

Dieser Beitrag gibt einen Überblick über den aktuellen Stand der Entwicklung von Nachhaltigkeitsberichterstattungsstandards für KMU in der EU. Im folgenden Abschnitt werden die Grundlagen zur Nachhaltigkeitsberichterstattung in der EU erläutert, und es wird der Frage nachgegangen, warum Standards für KMU überhaupt als notwendig erachtet werden. Im Abschnitt 3 wird der Entwurf des Standards für kapitalmarktorientierte KMU (veröffentlicht im Januar 2024) vorgestellt, wobei sowohl auf dessen konzeptionelle Grundlagen als auch auf die Unterschiede im Vergleich zu den Standards für große Kapitalgesellschaften eingegangen wird. Im Abschnitt 4 wird der Entwurf des freiwillig anzuwendenden Standards für alle anderen nicht kapitalmarktorientierten KMU (veröffentlicht im Januar 2024) präsentiert. Basierend auf den konzeptionellen Grundlagen werden der modulare Aufbau sowie das Erfolgspotenzial eines solchen freiwilligen Standards diskutiert.

Wagenhofer, Alfred, und Theresa Wittreich: Nachhaltigkeitsberichterstattung für KMU, in: Amberger, Harald, et al. (Hrsg.): Nachhaltigkeit – Wiener Bilanzrechtstage 2024, Linde: Wien S. 41-58.

Ranking: N/A