

HABILITATION THESIS REVIEWER'S REPORT

Masaryk University

Applicant

Dr. rer. agr. Christian Kimmich

Habilitation thesis

Shared expectations and connected games in economic resource governance

Reviewer

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Dr Christian Kimmich peruses in his habilitations thesis the quest to unravel how expectations shape economic behavior in the context of the collective provisioning of common pool resources. He is specifically interested in the interdependencies emerging from connected games at the empirical cases of natural resources and infrastructure.

He opens his habilitation with a profound literature review on the topic of subjective expectations and how they shape economic behavior in the field of behavioral economics and through the method of experimental economics. His habilitation is situated in the study of 'ecologies' of connected games, closely related to the concept of polycentricity with a clear intention to expand the approach of 'ecology of games' with a special emphasis on the distinction between isolated and connected games of public good provisioning. To do so, Christian Kimmich focuses on the importance of shared expectations and provisioning and systematized and models coordination and connected games to ultimately contribute towards the theory of polycentricity.

His habilitation builds on seven peer-reviewed journal articles in co-authorship. He contributes towards the role of expectations in supply chain governance (Kimmich and Fischbacher 2016), to the role of shared expectations and coordination (Kimmich and Sagebiel 2016) as well as to shared expectations and participatory modeling (Kimmich et al. 2019). Normative expectations play a significant role in energy modeling and (Sgouridis et al. 2022). Thus, four articles capitalize on empirical research in real-world situations to demonstrate the effects of individual and shared expectations in empirical setting of infrastructure, industrial organisations, natural resources and energy governance, such as supply chains, irrigation in India, natural resource management influenced by participatory modelling and the power of shared visions in energy systems.

The analysis of game networks in resource governance (Kimmich and Villamayor-Tomás 2019) conceptualizes connected games of common pool resource extraction and public good provision as a 'ecology of games' at the case of irrigation systems and suggests a typology. This original contribution of integrating connected games adjacent to the one game of interest builds on and applies game theory to the situation analysis with a specific focus on the applicability to empirical cases.

The contribution to the genre of archetypes as in "Game archetypes for the ecology of games" (Bruns and Kimmich 2021) generate divers models of power, conflict and

cooperation- This paper theoretically synthesizes his contribution to game theory by outlining the logic of connected games in empirical settings.

A fundamental work in the field of polycentricity is Christian Kimmichs “Systematic review on networks of action situations” (Kimmich et al. 2022), where he puts the classical action situation in games is at the center of a systematic literature review of how to study networks of games.

Given this broad oeuvre, I would like to discuss and honour his substantial contribution to public economics. He advances polycentric theory by showcasing interdependencies in connected games and respective effectiveness and efficiency given the particular properties of the resource. He is able to tackle coordination problems and spillover effect as well as alterations to equilibrium outcomes in polycentric systems.

By modelling connected games he advancing compositional game theory. Kimmich utilises the concept of open games as connected games which allows for traceability through string diagrams. This is complemented by agent-based modelling capturing spillovers, network effects and including equilibrium. Contributing to the formalisation of the Institutional Analysis and Development framework (IAD) by extending it to the Networks of Action Situations (NAS) framework he proceeds to capture the ecology of games in an agent-based model. The role of expectations is formidably tackled with carving out how expectations in coordination problems due to ambiguity or bounded rationality are influenced and overcome by participatory modelling and lead to convergence of expectations. This highlights the role of visions and norms in environments of high uncertainty and rapid technological change.

Concluding, Christian Kimmich demonstrates the role of expectations in industrial organisations and collective action for the provision of public goods and natural resource governance. With this he contributes to the debates on experimental economic research, the ecology of games, especially connected games and the overarching theory of polycentric governance. The habilitation significantly contributes by modelling connected games and networks utilising game archetypes to cover the complexity. Shared expectation in combination with participatory research processes emerge as a powerful tool reduce ambiguity for the policy process. Last not least, shared expectations at the science-policy interface are important as well as knowledge on the action situation and the relevant actors.

Reviewer's questions for the habilitation thesis defence:

1. What is the frontier in research on “ecologies of games” with a special reference to empirical application under situations of volatile institutional breakdown?
2. What are limits of explanatory power of the conceptual distinction between linked and isolated games in real-world action situations
3. Where is scope to further integrate natural sciences into game theory for advancing nexus approaches?

Conclusion

The habilitation thesis entitled *Shared expectations and connected games in economic resource governance* by Dr. rer. agr. Christian Kimmich **fulfils** requirements expected of a habilitation thesis in the field of Public Economics.

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Signature: