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**Essays in nonlinear dynamics in economics and econometrics with applications to monetary policy and banking**

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This thesis explores the highly nonlinear profile of the modern financial world and assesses its relevance in monetary policy conduct and macroprudential supervision. It focuses on three possible different origins of nonlinear structures. Firstly, we study the role of the heterogeneous and boundedly rational expectations in driving the aggregate economic dynamics. Secondly, we investigate the irregularities of probability distributions and their consequences for quantitative inference. Thirdly, we assess the behavior of the global asset network through a prism of complex systems. Because of its extraordinary relevance in the real world, a lot of attention is being paid to the banking side of the economy. The practical goal of this thesis is to provide the tools and general directions on how to incorporate possible nonlinear dependencies into existing economic modeling techniques. In times of very non-standard policy actions, these tools might prove to be of great importance as they offer more robust and flexible approaches to financial modeling and forecasting.

Marcin Wolski (1988) holds a B.A. in Economics and a B.A. in Quantitative Methods in Economics and Information Systems from the Warsaw School of Economics, Poland (2010), and an M.Sc. in Economics from the Tilburg University, the Netherlands (2011). In 2011 he joined the European Doctorate in Economics - Erasmus Mundus, a joint PhD degree at the University of Amsterdam and Bielefeld University. His research interests include monetary policy, systemic risk, financial networks, time series analysis, complex systems and agent-based models.

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