Essays on interbank interest rates

This thesis studies the behavior of interbank interest rates in the aftermath of the global financial crisis. This crisis and its macroeconomic consequences led to a sharp break in how monetary policy is conducted, with unconventional tools such as quantitative easing (QE) programs gaining prominence. One consequence of such policies is a change in the behavior of interbank interest rates. This behavioral change is due to the emergence of excess reserves, which are a side effect of many unconventional policies including quantitative easing.

The first chapter explores the nexus between the QE program conducted by the European Central Bank, its policy of negative policy rates and the interbank interest rates. It starts with data analysis that demonstrates two salient features of the behavior of interbank interest rates in the presence of excess reserves. First, when excess reserves are present interbank interest rates are anchored by the deposit rate rather than by the main refinancing rate, as was the case before emergence of excess reserves. Second, the amount of excess reserves is negatively correlated with the level of interbank interest rates whenever excess reserves are present. The chapter proposes a semi-structural time series model that links interbank interest rates to the two policy rates in a two-regime structure with a threshold variable - the amount of excess reserves - determining the prevalence of each regime. The resulting model provides a very good fit for the observed historical time series and confirms that the amount of excess reserves is a statistically significant factor influencing interbank interest rates. I then use the model to answer the policy question of the chapter: What was the effect of the QE program on interbank interest rates? Since the QE program led to a large increase in excess reserves, which in turn led to a decrease in interbank interest rates, the effect on these rates was substantial. Quantitatively speaking, the effect is on par with changes in policy rates of standard size, and the same order of magnitude as a typical estimate of the effect that the announcement the QE program by the ECB had on bond yields. Given the combination of its size and the absence of academic investigation, I call this effect 'the neglected channel of quantitative easing'.

The second chapter analyzes the importance of the factors identified in the first chapter, as well as the value of the structural model, in the context of (pseudo) out-of-sample forecasting. It starts by comparing the forecasting performance of the structural model with forecasting performance of all plausible benchmark models encompassed by the universe of linear reduced form models. This comparison reveals that, in a ex-post setting, the structural model substantially outperforms all benchmark models, especially at longer horizons. While the ex-ante forecasting exercise shows that this substantially better performance is true only when excess reserves can be forecast well, this condition is satisfied during period when a QE program is operational. The overall conclusion is that the structural model and the factors embedded in it are important for forecasting interbank interest rates. This result then serves as a basis for more general discussion of which model features are important for forecasting interbank interest rates in the presence of excess reserves. The heterogeneity in forecasting performance is then explained by the econometric nature of eurozone interbank interest rates, which are both nonstationary and cointegrated with monetary policy variables. Models that forecast interbank rates in either their stationary or nonstationary transformation are unable to account for this nature and hence produce forecasts that are problematic.

The third chapter presents the Eviews add-in - that is, user created package - I have developed as part of the work on the second chapter and subsequently published for public use under name SpecEval. The chapter is an excerpt from a longer document provided with the package which demonstrates how the package can be leveraged in developing and evaluating time series models used for forecasting. It does this by following the model development process illustrated in one of the applications presented in the full version of the document.

The fourth chapter of this thesis is dedicated to a separate research topic of experiment in rational inattention. The chapter presents experimental design and empirical results on rationally inattentive behavior of subjects in an interactive environment. Specifically, the experiment features pairs of subjects playing a simple game in which one player - the Sender - exerts costly attention effort to collect information, which is then communicated to a second player; meanwhile, the second player needs to exert costly effort to process the information provided by the Sender and then takes action that will determine the payoff of both players. The empirical analysis of the experimental data confirms the theoretical predictions. The main result is that subjects in both roles react to information about a proxy for the attention costs of their partners in the expected direction: when partner's attention costs are higher, subjects exert effort that is on average significantly

smaller, both statistically and economically. Apart from attention effort the chapter also presents results indicating that subjects reflect on information about the likely precision of the signal they have at their disposal when they take action. This can be seen in the fact that Receivers take actions that are closer to their prior belief if they know that the information communicated by the Sender is likely to be imprecise. Taken together, these results provide the first experimental evidence of rationally inattentive behavior in response to the inattention of other players.