

## Thesis report

**Title:** *Macroeconomics with Financial Sector Risk Constraints*

**Candidate:** Branka Matyska

**Reviewer:** Giuliano Curatola, Assistant Prof. of Economics, University of Siena

## 1 Summary

This thesis analyzes, theoretically and empirically, the macroeconomic implications of macro-prudential and fiscal policies. There are three chapters, the first two single-author and the last one co-authored (3 co-authors).

**Chapter 1** The first chapter presents an equilibrium model in the spirit of Brunnermeier and Sannikov (2014) with the aim to study the implications of spectral risk measures (i.e. the weighted average of Value at Risk (VaR) quantiles where the weights depends on the policy maker's measurement of the likelihood of market losses) for the probability of financial crises and social welfare. In particular, the author analyzes the ability of spectral risk measures to prevent fire sales or reduce the crisis probability caused by adverse financial shocks. The financial market is populated with households (unconstrained) and intermediaries (subject to risk-based capital requirement constraint) who differ in the productivity of capital and the subject discount rate. The main innovation of the paper is to propose a risk measure that depends on whether policy-makers under-weight or over-weight probabilities of financial outcomes relative to the objective probability, in the spirit of Kahneman and Tversky (1992). The author presents a very interesting (and coherent with the recent policy debate) discussion on the relationship between concavity/convexity of the probability weighting function and financial stability and on the differences between standard VaR regulation and spectral risk measures in terms of their ability of fulfilling macro-prudential goals. The main conclusion is that the shape of the weighting function is key for the ability of risk measures to reach stability goals such as reducing the crisis probability, increasing welfare or preventing fire sales. A clear policy implication then follows: the shape of the weighting function should be selected depending on the macro-prudential goal.

**Chapter 2** In this paper the author proposes a two-period version of the Gertler and Kiyotaki (2010) model designed to better understanding the macroeconomic implications of market risk measures included in the Basel framework. In particular, the author focuses on the capital requirement induced by the VaR constraints. In this framework the author shows that the VaR constraint enhances risk taking incentives of banks and makes leverage pro-cyclical. This result translates into pro-cyclical interest rates. Moreover, when banks are subject to the VaR constraint the optimal deposit insurance depends on market conditions.

**Chapter 3** In this paper the authors study theoretically and empirically the effects of corporate taxes on macroeconomic quantities. They use structural vector auto regression models and panel regressions to identify the effect of fiscal (corporate income taxes) shocks. They find that a cut in the average corporate income tax rate increases the incentives of new firms to enter the market, reduces turnover and, thus, creates new jobs and increases wages of new hires in the

short-run. Most of these findings are also obtained in a dynamic stochastic general equilibrium model (DSGE) with imperfect competition among firms and endogenous entry.

## 2 Comments

1. Chapter 1. There are some differences with respect to the original framework of Brunnermeier and Sannikov (2014) that seem important and would need to be better justified.
  - (a) The capital supply process (Eq 1.10, pag 17) has zero drift and is the same for both agents. In Brunnermeier and Sannikov (2014) the process for capital has a drift (that depends on adjustment costs and depreciation rate) which is heterogeneous across agents, reflecting differences in productivity. The different assumption in the thesis is important for tractability but reduces the degree of heterogeneity. It would be important to provide a more detailed discussion on the reason for the different assumptions and their impact on equilibrium outcomes.
  - (b) When describing Eq 1.10 (pag 17) the author writes "as in Brunnermeier and Sannikov (2014) and He and Krishnamurthy (2013),  $\sigma dW_t$  is the only shock in the economy". I think this sentence is not precise for two reasons: i) the shock is given by  $dW_t$  only, while  $\sigma$  represents its volatility, ii) Brunnermeier and Sannikov (2014) considers an extension of the baseline framework with idiosyncratic jump risk in addition to the Brownian motion  $dW_t$ .
  - (c) 1.4.2 page 33. It is not clear to me the reason for the section's name "Funding shocks". If I correctly understand, the section analyzes the equilibrium outcomes in which the difference in the subjective discount rates increases funding costs. But this is not a shock in the sense of an unexpected increase in the funding cost. Additional explanation/discussion would be beneficial.
  - (d) Section 1.4.3 (page 34). Similarly to the previous point, it is not clear to me while the author refers to this section as "uncertainty shock ( $\sigma = 0.15$ )". My impression is that the analysis is about the effect of higher shock volatility (similar to a comparative static analysis) and not about the effect of shock/uncertainty. Second, when describing Figure 1.5 the author writes "The key to welfare decline shown in the bottom *middle* panel" (page 35, below Figure 1.5). Welfare seems to be located in the bottom *right* panel.
2. Chapter 2. The risk taking incentives induced by the VaR constraint are also analyzed by Basak and Shapiro (2001). The framework is quite different and the authors do not focus on deposit insurance, nonetheless risk taking incentives induced by the VaR constraint are comparable. For this reason, I think the chapter would benefit from a comparison with Basak and Shapiro (2001).
3. Chapter 3. I have two comments on this chapter about possible extensions of the main framework.
  - (a) The chapter assumes that the dividend tax rates follows an AR(1) process. An interesting extension (probably more in line with the main goal of the paper) would be to follow the approach of Croce, Nguyen and Schmid (2012). They consider two

different taxation schemes: a zero-deficit tax rules such that the tax rate reflects the government expenditure process and a counter-cyclical tax rate such that the government runs surpluses or deficits depending on macroeconomic conditions (e.g., GDP or employment level).

- (b) The entry-exit mechanism seems to be related to the literature on creative destruction and its macroeconomic implications (e.g., Bena, Garlappi and Grüning (2016)). Discussing this literature would probably be beneficial for the chapter.

### 3 Overall evaluation

In my opinion, the thesis addresses up-to-date research questions using cutting-edge models from the financial economics literature. The candidate shows remarkable expertise in managing different models equally well (continuous time/discrete time models and DSGE models). *For these reasons my judgment is that the present version of the thesis satisfies formal and content requirements for a PhD thesis in economics and, thus, is ready for defense.* The suggestions above (Section 2) can potentially be used to improve the papers before journal submission but do not represent a pre-condition for the defense.

### References

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