

PhD dissertation by Ivan Sutóris

Essays on macroeconomic models with heterogeneous agents

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Overall comments:

This dissertation studies the importance of uninsurable idiosyncratic risk for a number of important issues in macroeconomics and finance, including the response of the macroeconomy to uncertainty shocks and the presence of risk premia. It does so using Dynamic Stochastic General Equilibrium (DSGE) models with incomplete markets. These models are notoriously difficult to solve, and Ivan makes progress both by extending state-of-the-art numerical solution methods and by proposing clever assumptions which drastically simplify the model while preserving the key mechanisms.

Overall, I think this is an excellent dissertation. All three chapters, in particular 2 and 3, should be publishable in reputable journals (although one might be asked to add more layers or realism). It displays not only a broad and deep understanding of the literature, but also the ability to push the research frontier. All the analysis seems very carefully executed, and all the important limitations are discussed upfront. Also, the material is presented in a very transparent and accessible way, even though some of it is actually quite technical.

Below I will discuss the individual chapters and will make some specific comments. None of these comments require a change of the dissertation. Rather, they are meant as suggestions for future research.

Chapter 1: Solving a heterogenous-agent DSGE model with second-order perturbation

The dissertation starts with a mostly methodological contribution. It shows how to solve a standard incomplete-markets model with aggregate shocks using second-order perturbation, extending the method of Reiter (2009) who considers only first-order perturbation. The latter has some limitations, as some of the central issues in macroeconomics and finance require higher-order solution methods. The contribution of this chapter is to lay out carefully how to apply higher-order perturbation methods to incomplete-markets models.

On a more substantive level, Ivan compares the incomplete-markets model with a representative-agent counterpart, to quantify the importance incomplete markets for the welfare costs of business cycles and for the effects of uncertainty shocks on the macro economy. He finds clear differences, although quantitatively these tend to be modest. I think this is a valuable result in its own right which is not at all a priori obvious.

I have one small remaining comment on this chapter. Figure 1.2 presents simulations of aggregate capital based on an economy with 1000 individual agents, which I think might be a little bit on the low side. The “true” model has a continuum of agents, so the law of large numbers applies. With a finite number of agents that is not the case, and even with 1000 there might be considerable randomness introduced purely due to the specific idiosyncratic shocks which hit these individuals in the simulation. For a different draw of the numerical pseudo-random number generator (for the idiosyncratic shocks), one might get results that are slightly different. This is not at all a big deal (especially since the figure is only an illustration), but it is something to keep in mind.

Chapter 2: Asset prices in a production economy with long run idiosyncratic risk

This chapter studies the asset-pricing implications of the interaction between uninsurable idiosyncratic risk and recursive (Epstein-Zin) preferences, which induce households to care about long-run risks. The latter are routinely used in the finance literature to try to explain the puzzlingly high equity risk premia observed in the data. Some recent literature has studied these interactions, but importantly they do so in endowment economies. Ivan extends this type of analysis to a production economy. This is by no means a small variation on the existing literature, since it has been often found that the model fails to generate both empirically reasonable implications for asset pricing and the macro economy. For example, risk premia tend to vanish, due to the fact that endogenous production introduces margins which households can use to smooth consumption, which tends to lower risk premia).

Building on insights of Constantinides and Duffie, Ivan proposes a way to render the model tractable, and solvable using standard methods. He first presents a simple (analytical) AK model, and then a more quantitative model with labour supply. These models allow him to quantify the importance of long- and short-term risk, and (cyclical) idiosyncratic risk and aggregate risk, based on insightful formulas. The novelty here is the presence of long-run idiosyncratic risk term, which is due to the interaction between cyclical idiosyncratic risk and recursive preferences. The contribution of this found to be substantial. Importantly, Ivan shows that in this setting one can preserve reasonable macroeconomic implications of the model.

I think this is a very nice contribution to the literature. A main challenge for future research would be to endogenize labour supply, which is fixed in the present model. On a small note, I have myself written paper with Morten Ravn (titled “Macroeconomic Fluctuations with HANK and SAM: an Analytical Approach”) in which we have a section studying the importance of the interaction between coun-

tercyclical income risk and price setting frictions in generating risk premia (with standard preferences). Putting this together with long-run preferences could also be a fruitful area for future research.

Chapter 3: Uncertainty shocks with heterogeneous firms and firm owners

The final chapter studies the effects of shocks to the cross-sectional variance of firm productivities, (“uncertainty shocks”) along the lines of work by Nick Bloom and others. The key innovation is to allow for heterogeneity and uninsurable risk among firm owners. In the standard uncertainty models, households hold a diversified portfolio of firm equity. Realistically, however, many firms are owned by a very small number of people, who do not fully diversify away idiosyncratic risk which hit the firm. Ivan introduces this reality into the model, and shows that undiversifiable firm risk can amplify the effects of uncertainty shocks on macroeconomic variables. Intuitively, such shocks exacerbate the idiosyncratic risk faced by firm owners, who then have incentives to move their savings towards safe assets (rather than invest in their own firms).

This is a really nice chapter. Generating a large decline in output, investment and consumption following an increase in uncertainty is still surprisingly difficult. Ivan’s mechanism to do so is both novel and plausible. In follow-up research, one might want to relax some stringent assumptions, in particular on the irreversibility of capital investment. On a final small note, I spotted a few typos: “procyclical” on page 76 should be “countercyclical”. Page 79: “bottomw” and ”lessfinancially”