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# Abstract

This dissertation consists of three chapters dealing with the topic of heterogeneity in macroeconomics and macroeconomic models.

*Chapter 1* contributes to the literature on computational approaches to solving DSGE models with heterogeneous agents. One possible approach, a hybrid method described in Reiter (2009) combines a nonlinear solution with respect to individual state variables and a linearized solution with respect to aggregate shocks. Since linearization has typically been used in representative agent models, a natural question is how well it works in a setting with heterogeneity and whether a higher order approximation is not needed. I compare solutions obtained with linearization and second order perturbation for a benchmark stochastic growth model with idiosyncratic labor income shocks. In terms of accuracy, I find that second order solution does not differ much when aggregate volatility is low (e.g. in case of a typical calibration for productivity shocks in developed economies), but becomes more precise when volatility is higher. Another potential issue is that linearization implies certainty equivalence, which makes it unsuitable for analyzing certain issues. I illustrate potential economic applications of the 2nd order solution by showing how it can be used to easily compute welfare costs of uncertainty conditional on an agent's individual state or to capture effects of time-varying volatility in aggregate shocks.

*Chapter 2* studies risk premia in an incomplete-markets economy with households facing idiosyncratic consumption risk. If the dispersion of idiosyncratic risk varies over the business cycle and households have a preference for early resolution of uncertainty, asset prices will be affected not only by movements in current and expected future aggregate consumption (as in models with a representative agent), but also by news about current and future changes in cross-sectional distribution of individual consumption. I investigate whether this additional effect can help to explain high risk premia in a production economy, where the aggregate consumption process is endogenous and thus can potentially be affected by the presence of idiosyncratic risk. Analyzing a neoclassical growth model combined with Epstein-Zin preferences and a tractable form of household heterogeneity, I find that countercyclical idiosyncratic risk increases the risk premium, but also effectively lowers willingness of households for intertemporal substitution and thus changes the dynamics of aggregate consumption. Nevertheless, with the added flexibility of Epstein-Zin preferences, it is possible to both increase risk premia and to maintain the same dynamics of quantities if we allow for higher intertemporal elasticity of substitution at the individual level.

*Chapter 3* investigates effects of heightened uncertainty on firms and their owners. An uncertainty shock that increases dispersion in firm-specific productivity will typically lead to a drop in economic activity as firms delay investments due to the higher value of waiting. Given that in the real world, firm ownership is far from perfectly diversified, it is also likely that larger volatility affects firm owners as well. Motivated by empirical evidence showing that more financially developed countries respond less strongly to uncertainty shocks, I use a dynamic model with heterogeneity across both firms and risk-averse firm owners to look at how a degree of diversification affects the response of the economy to such a shock. If a substantial part of an entrepreneur's income comes from a single firm which they control, an increase in uncertainty will cause a further drop in investment and consumption and a greater increase in savings due to entrepreneur's precautionary motive and risk aversion. As a result, the impact of an uncertainty shock is more amplified in economies with lower degrees of diversification.