Most of macroeconomics has made two important simplifications. First, the economy is populated by a representative household that chooses aggregate consumption, savings, and labor supply. Second, agents have complete information about the economy in making their decisions. Working within alternative paradigms which have begun to be explored by macroeconomists, my research develops models which introduce heterogeneity in household circumstances and beliefs. While these considerations are not always quantitatively relevant for aggregate and individual outcomes, each turns out to be quite important in the studies described below.

**Business cycles with heterogeneous households.** While the representative agent assumption is at odds with microeconomic evidence, the business cycle predictions of representative agent models have been found to coincide closely with those from some early, richer models that allow for household heterogeneity, leading some to conclude that heterogeneity is a second order issue in business cycle analysis. However, a recent line of literature reconsiders this topic when the level of aggregate demand plays a role in determining the equilibrium production of goods. This research thus merges models of household heterogeneity with new Keynesian models of the economy in which nominal rigidities interfere with the immediate and perfect adjustment of prices and interest rates to changes in aggregate demand. Several of my research projects contribute to this literature.

My work with Ricardo Reis on automatic stabilizers explores how social insurance policies alter the business cycle by changing the distribution of income.\(^1\) The traditional logic of automatic stabilizers is that they mitigate the business cycle by stabilizing aggregate demand. Analyzing this mechanism requires a model in which both the distribution of income and the level of aggregate demand affect the business cycle. Our first paper takes a positive perspective, asking how the social insurance policies in place in the US alter the volatility of aggregate output. We find that the policies have little stabilizing effect in normal times in large part because monetary policy is capable of stabilizing aggregate demand already. When monetary policy is inefficient or constrained, however, the social insurance system has important consequences for the business cycle. We recently completed a related paper that takes a normative perspective on the design of the social insurance system in the presence of aggregate shocks and nominal rigidities. In our analysis, the optimal unemployment benefit is much larger when we account for the effects of stabilizing the business cycle. Here we find a larger role for automatic stabilizers in part because we incorporate more cyclicality in the risks that households face using the income process estimated in my work with Fatih Guvenen.\(^2\)

In the wake of the financial crisis of 2008, the Fed and other central banks have adopted unconventional approaches to monetary policy to stimulate the economy. Emi Nakamura, Jón Steinsson, and I consider how monetary policy affects the economy when households face uninsurable idiosyncratic income risks.\(^3\) In particular we focus on forward guidance—a form of unconventional monetary policy in which the central bank promises to lower interest rates in the future. Standard representative agent models used for monetary policy analysis predict an implausibly large response to these policies. Working with an incomplete markets model, we show that forward guidance is much less powerful. In the presence of uninsurable income risks, households accumulate savings as a buffer against periods of low income. This buffer-stock savings motive tempers the intertemporal substitution effects of changes in interest rates. Further, this tempering effect is stronger for the interest rate changes at long horizons brought about by forward

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\(^2\) “A Parsimonious Income Process for Business Cycle Analysis.”

guidance policies. Emi, Jón, and I are currently working on two follow-on projects that expand upon our existing work to explore how the cyclicity of the distribution of labor and financial income affects the monetary transmission mechanism and the business cycle in general.

A third related project evaluates the effects of cyclical variation in income risks on household consumption choices. New evidence from the Social Security Administration earnings data has refined our understanding of how the distribution of income evolves during a recession. In a recession workers face a substantially larger risk of a severe reduction in their earnings and a smaller chance of achieving substantial gains in earnings. I incorporate these patterns in income risks into a general equilibrium, incomplete markets model of the economy and ask how they change the cyclical dynamics of aggregate consumption. I find that recessions are associated with large but short-lived spikes in the risks households face, causing them to abruptly reduce their consumption for precautionary reasons. I show that risk rose dramatically in late-2008 and early-2009 and my analysis implies a sharp reduction in aggregate consumption, as seen in the data.

**Decision-making and inequality.** Another line of my research focuses on individual decision-making and how the randomness in choices can be a source of inequality. One project, with Filip Matějka, considers how individuals choose among discrete alternatives when they face costs of acquiring information about the alternatives. We build on the rational inattention framework in which a decision maker is free to acquire whatever information he or she likes but acquiring more information is costly. When we apply this framework to a discrete choice context we find the optimal information processing strategy results in choosing among the alternatives with probabilities that follow a generalization of the multinomial logit model. In this generalized model, it is not just the true values of the alternatives that determine the choice probabilities, as in the standard model, but also the agent's prior beliefs about these values. The relationship between rational inattention and the logit model is a useful tool because existing results in applied theory that build on the logit can be reinterpreted to study the consequences of costly information.

There is a potentially important connection between this microeconomic analysis of decision-making and the macroeconomic part of my research portfolio. In the presence of information frictions individuals may not always choose the alternative that gives them the highest utility or the highest payoff. To the extent that different individuals are more or less successful in making choices these frictions are a source of inequality. One of my projects explores how the distribution of wealth is affected by information frictions in asset markets that imply households must exert effort in seeking out financial intermediaries that pay high rates of return. There is an economy of scale in managing a portfolio and households with more savings will have stronger incentives to exert effort to find high rates of return. I show that this economy of scale leads wealthy households to become even more wealthy resulting in a more unequal distribution of wealth.

**Future research.** The role of distributional issues and household heterogeneity in shaping the business cycle and the effectiveness of stabilization policy is a very active area of research. I plan to continue my work in this area as my priority for future research.

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