Essays in Macroeconomics

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This dissertation consists of two chapters. The first chapter, titled "Growth and Welfare Implications of Sector-Specific Innovations," identifies the optimal government support of business research and development (R&D) activities when sectors are heterogeneous. To this end, I build an endogenous growth model in which firm R&D drives macroeconomic growth and firm dynamics in two sectors that have different characteristics: a consumption-goods sector and an investment-goods sector. I calibrate my model to U.S. data. To quantitatively characterize the optimal R&D subsidy rate for each sector, I simulate the economy with various R&D subsidy rates that range from 0 to 90 percent. By explicitly examining the transition path after a change in subsidy rates, I highlight the tradeoff between the consumption level in short-run and long-run growth. I find that the optimal combination of the subsidy rates is 82 percent in the consumption sector and 78 percent in the investment sector. By moving from the baseline subsidy rates (20 percent in each sector), society can achieve a 14 percent welfare gain in consumption-equivalent terms. The investment sector R&D subsidy generates three quarters of this welfare gain. The socially optimal subsidy system increases the annual GDP growth rate from 2 percent to 3.3 percent. I also find that when the government transfer budget is limited, the consumption sector R&D should be subsidized at a higher rate than the investment sector.

The second chapter, "Worker Flows over the Life Cycle," is coauthored with Tomaz Cajner at the Federal Reserve Board and Toshihiko Mukoyama at the University of Virginia. Using Current Population Survey data, we document monthly movements across three labor market states (employment, unemployment, and out of labor market) and transitions across jobs during the life cycle of individuals. The data shows that worker flows vary substantially over the life cycle. Most labor market transition rates go down as people age, while transitions out of the labor market increase later in the life cycle of workers. We build a partial-equilibrium model of the worker life cycle that features saving decisions, idiosyncratic worker productivity shocks, and match quality shocks. We use the model to identify the forces that lead to observed patterns of worker flows over the life cycle and over the business cycle.

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