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Research Statement

My research focuses on topics in macroeconomics, technical change, firm dynamics, and innovation. The unifying goal of my research is to understand the drivers of technological change and aggregate growth through studying factors that influence firms' and inventors' innovation behavior. In several projects that I briefly summarize below, I bring both new empirical evidences and theoretical insights to the study of these issues. In these projects, I analyze micro-level data on patents, firms and inventors, build micro-founded structural models of innovation and endogenous technological change, and use computational techniques to evaluate the qualitative and quantitative implications of my models.

My job market paper studies the effects of knowledge diffusion on the innovation incentives of firms characterized by different technological needs. In particular, I study the effect of the knowledge diffusion brought about by the IT revolution on aggregate growth and sectoral reallocation in the US economy in recent decades. There are two opposing effects from knowledge diffusion. The increased flow of ideas between firms and industries improves learning opportunities and spurs innovation. However, knowledge diffusion through information and communications technologies (ICT) also results in broader accessibility of knowledge by competitors, reducing expected returns from research efforts and hence harming innovation incentives. The nature of the tradeoff between these opposing forces depends on an industry's technological characteristics, which I call external knowledge dependence. Industries whose innovations rely more on external knowledge benefit greatly from knowledge externalities and expand, while more self-contained industries are more affected by intensified competition and shrink. This results in the reallocation of innovation and production activities toward more externally-focused, "knowledge-hungry" industries. I develop a general equilibrium endogenous growth model featuring this mechanism. In the model, firms belonging to technologically heterogeneous industries learn from external knowledge and innovate. These firms' abilities to access external information is governed by ICT. Using NBER patent and citations data together with BEA industry-level data on ICT, I empirically validate the mechanism of the paper. Quantitative analysis from the calibrated model illustrates that it is important to account for both technological heterogeneity and the knowledge-diffusion role of ICT to explain U.S. trends in productivity growth and sectoral reallocation in recent decades. I conduct counterfactual experiments to quantitatively assess separate channels and illustrate various growth decompositions.

To understand the determinants of technological progress, it is of primary importance to analyze policies that influence entrepreneurship and innovation. One kind of policy involves enacting non-compete laws (NCL) that significantly hinder entry by spinouts (new firms founded by former employees). In the second paper in my research portfolio, I study the effect of NCL on the creation of employee spinouts and the implications of this process for aggregate productivity growth. The process of spinout formation introduces a nontrivial tradeoff between growth-enhancing knowledge diffusion in the form of new productive firms, on the one hand, and the threat of knowledge dissemination and competition that harms innovation by incumbents, on the other hand. I use patents and inventors' data to identify spinout entrants and empirically explore their characteristics. I document that 1) they outperform regular entrants with no prior experience, 2)

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spinouts are more likely to separate from more innovative firms, 3) more productive firms spawn better spinouts, and 4) states with weaker NCL have higher rates of spinout entry. To analyze the interaction between incumbents' innovation incentives and spinout entry, I develop a dynamic general equilibrium endogenous growth model consistent with empirical facts from the data. After calibrating the parameters of the model, I quantify the importance for growth of the two above-mentioned channels. I then quantitatively investigate the implications of different non-compete policies. I find that it is welfare improving to abolish existing non-compete restrictions; however, the policy protecting firms with high technological leadership is growth-maximizing.

Though firms are organizing and leading most of the innovation in the economy, main actors in the innovation process are individual inventors. Hence, it is important to understand which policies shape the productivity evolution of inventors and their incentives to innovate and contribute to technological progress. My first of two papers in this area of research is a project together with Ufuk Akcigit and Stefanie Stantcheva. We analyze how taxation affects the location of inventors across countries. In particular, we study the effect of top tax rates on superstar inventors' mobility across 8 OECD countries since 1977. Superstar inventors are inventors in the top 5% of the quality distribution, as ranked by citations-weighted patent counts. We use combined data from the US and European patent offices to track inventors' locations over time. We proxy for inventors' counterfactual incomes in each possible destination country using a detailed set of controls including, among others, measures of patent quality and quantity and technological fit with each potential destination. We focus on inventors who are employees of companies, and which get the bulk of their income in the form of wages. We find that superstar inventors are significantly affected by top taxes when deciding on where to locate. Inventors who have worked in multinational companies are more sensitive to tax differentials. However, if the company of an inventor has a higher share of its research activity in a given country, the inventor is less sensitive to the tax rate in that country.

I recently started working on another project which contributes to the line of research studying the aspects of inventors' productivities. Together with Ufuk Akcigit, we study the determinants of inventors' team formations, its evolution and the consequences for individual and aggregate productivity growth. By empirically exploring the patent data, we uncover a set of new empirical facts about inventors' and teams' lifecycle evolution. To rationalize the empirical findings, we plan to design a tractable model of heterogeneous researchers with incomplete information making strategic decisions about collaborations. By analyzing the efficiency properties of the model of team formation, we aim to study science policies that improve allocative efficiency.