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During a year as a Postdoctoral Fellow at the NBER, I will extend the empirical and theoretical results of my job market paper in order to deliver novel policy implications for place-based urban innovation policies and the effects of transportation and zoning policies on local productivity and urban inequality. First, using the paper's theoretical structure and the micro-geographic establishment level data of the Boston RDC data (to which I have access), I will estimate a structural model that will provide new, detailed estimates of the relative strengths of agglomeration and sorting forces governing entrepreneurial location decisions, and estimate the effects of entrepreneurial heterogeneity on the distribution of economic activity. I will also extend the theoretical results of the model, which points to new theoretical avenues for the effects of zoning and transportation policies on local productivity and use these in conjunction with the results of the estimation to make counterfactual policy analyses in these veins.

My dissertation begins with the stylized fact that firms in locations that are denser – by population, firm, or employment density – are more productive. These strong positive relationships have been used as evidence for productivity spillovers like learning or input-output linkages. The first paper of my dissertation builds an alternative hypothesis: the sorting pattern of ex-ante heterogeneous firms drives the density-productivity relationship.

This model represents a theoretical advance on two fronts. First, the paper introduces an indexing method, where locations are indexed by endogenous location advantage, which I determine in a second step. This allows for the derivation of tractable analytic results. The intractability of models where locations have networked geographic inter-linkages has led urban economists to abandon proximity and other geographic considerations in favor of island models of cities. This two-step equilibrium solution method, which is robust to a variety of modeling assumptions, is a technical innovation that yields tractable relationships between multiple endogenous variables without abandoning the direct consideration of geography; this synthesizes the tractability of inter-city urban models with the notion of endogenous proximity in economic geography. While the literature has previously modeled continuous space economic activity in a

Ricardian setting, this paper accounts for the full geographic mobility of firms and shows how densities endogenously adjust to these decisions.

Second, the introduction of geography improves upon the urban sorting literature by providing testable predictions that break "observational equivalence" between firm and location characteristics. The sorting literature has introduced sorting as an assumption between agents and city size. By contrast, in my model, firms sort on location advantage, which is based on a rich and potentially variable set of factors related to networked proximity to other firms and workers. Relationships between specific endogenous variables arise through this matching in equilibrium. Importantly, this theoretical innovation predicts that shocks to the sorting pattern of firms can affect the quality of firms at a location without affecting the underlying determinants of location advantage. This composition effect allows me to test the sorting hypothesis directly. I isolate and find evidence for composition effects that are consistent with the model and inconsistent with the baseline model of agglomeration forces.

In my work at the NBER, I will use this method to estimate the impact of firm heterogeneity on the distribution of economic activity and the relative influence of agglomeration forces and market access on location advantage. This model yields a discrete choice problem for firms that can be solved in a two-stage BLP model. I will decompose unobserved location productivity into observable proximity to other firms in the same industry, other firms in linked industries, and population centers, and unobservable location advantages. This will allow me to decompose total location advantages – estimated in the first stage as unobserved heterogeneity – into market access and traditional agglomeration forces. Using micro-geography available in the restricted access Census data, I will sample distances between firms and markets and estimate the relative strength of each of the proposed reasons for agglomeration.

Finally, I will use these results in conjunction with a theoretical extension to provide novel policy analyses and counterfactuals. Most urban models, divorced from geography, imply zoning laws, by inhibiting density, reduce the productivity of the urban core. Restrictions on density potentially foster higher-quality economic activity. Through marginal adjustments to zoning use and height restrictions, municipalities could

manipulate their density-productivity gradients. My findings could also help municipalities take into account the adverse effects of their infrastructure projects. In my model, transportation costs are the decisive factor governing market access and therefore the differential density across locations. Transportation networks, by generating proximity, create density: all roads lead to Rome. However, decreased transportation costs can also increase market access in the periphery. The model shows that an infrastructure project that centralizes the urban core by reducing transportation costs may, at the same time, reduce the productive advantage of the urban core relative to the periphery.

Using my dissertation work as a foundation, I hope to use a fellowship at the NBER to accomplish these next steps in a research agenda that seeks to present new methods of analyzing the implications of complex spatial interconnections on local economic activity.