My research explores how economies grow and adapt, often drawing lessons from the historical development of the American economy. Much of economics is concerned with why some places are poor and some are rich, which is closely related to why some places became rich and some remained poor. My research uses particular historical episodes to better understand issues related to this central theme within economics, as history often provides unique opportunities to understand economic adaptation and growth.

Some common themes in my research include: how enforcement of property rights encourages growth and transaction costs constrain growth; the magnitude of agglomeration spillovers; impacts of market integration; how the economy adapts to a changing environment; and general adaptation to labor or capital scarcity. These topics relate to how economic behavior and the natural environment combine to shape economic outcomes.

Property Rights Enforcement and Transaction Costs

Economic institutions form the structure in which economic development can occur, and perhaps the primary economic institution is the enforcement of property rights. We can observe the central importance of property rights enforcement during the development of the American frontier. Farmers struggled to secure lands, as wooden fences became prohibitively expensive when settlement pushed into western timber-scarce areas. Farmers’ cost of protecting land declined substantially with the introduction of barbed wire fences, which enabled the agricultural development of timber-scarce areas. Impacts of barbed wire on the settlement of the American frontier illustrate the central economic importance of de facto property rights (Hornbeck 2010).¹

In the presence of transaction costs, however, the enforcement of property rights is insufficient for economic efficiency. Urban growth requires landowners to replace outdated durable buildings, but individual landowners do not internalize spillover effects on neighbors. The resulting inefficiency, stemming from an inability to contract over coordinated redevelopment, appears to be substantial. Following the Boston Fire of 1872, which created the opportunity for widespread and simultaneous reconstruction, there was an increase in land values comparable to the value of all buildings burned. Changes in the burned area and nearby unburned areas, and a comparison with the impacts of individual building fires, indicate

substantial inefficiencies in urban growth due to cross-plot externalities from reconstruction (Hornbeck and Keniston 2014).²

**Agglomeration Spillovers**

Agglomeration spillovers are another potential externality, which are often used to justify aspects of industrial policy. Industrial agglomeration spillovers are difficult to quantify, however, as new manufacturing plants open in particular locations following an extensive site selection process. By comparing incumbent plants’ productivity in locations where a new plant opened, relative to incumbent plants’ productivity in places where that new plant nearly opened, we estimate substantial productivity spillovers from the opening of a large new manufacturing plant (Greenstone, Hornbeck, and Moretti 2010).³ My ongoing research with Moretti extends this research agenda by analyzing the economic incidence of changes in manufacturing productivity throughout the United States. We estimate impacts on city-level wages and housing costs, which indicate how much of the gains accrue to workers or landowners. Further, using estimated impacts on worker flows, we quantify the aggregate economic incidence after including impacts on wages and housing costs in other cities affected indirectly.

**Market Integration**

Continuing my interest in spillover effects and quantifying aggregate impacts, ongoing research quantifies the railroad’s aggregate economic impacts on the American economy in the late nineteenth century (Donaldson and Hornbeck 2013).⁴ All counties are potentially impacted by changes in the railroad network, and we use a trade model to summarize these general equilibrium impacts into one measure of counties’ market access. We can then directly estimate the impact of market access and calculate the aggregate economic losses from reductions in market access associated with the absence of railroads or other counterfactual scenarios. Our first paper focuses on impacts in the agricultural sector, revisiting Fogel’s celebrated and criticized work, and our ongoing research focuses on impacts in the manufacturing sector.

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Economic Adaptation to a Changing Environment

Agriculture was of more central economic importance in the United States historically, and it is of critical importance how much agriculture might adapt to permanent changes in the environment. Following the American Dust Bowl of the 1930’s, and the associated permanent erosion of topsoil, long-run agricultural adaptation mitigated little of the short-run impacts (Hornbeck 2012). The economy adjusted mainly through out-migration. My ongoing research examines these environmental refugees in detail, quantifying how this environmental catastrophe changed the nature of migration. Other research has examined agricultural adaptation to changes in groundwater availability (Hornbeck and Keskin 2014), and how windfall gains to agriculture affect local non-agricultural sectors (Hornbeck and Keskin forthcoming). This research mirrors my ongoing work on industrial agglomeration, which includes an analysis of how gains in the manufacturing sector impact non-manufacturing sectors.

A short paper of mine steps back to take a broader look at how technological growth has changed agricultural dependence on the environment. Looking over the past century, when there was substantial innovation in American agriculture, there has been a remarkably persistent dependence of agriculture on the environment (Hornbeck 2012). While environmental challenges are projected to increase through the 21st century, there is no indication from the past that agriculture becomes systematically less dependent on the natural environment as agricultural production becomes more technologically advanced.

Technological Adaptation to Labor Scarcity

Related research explores agricultural adaptation to labor scarcity. Post-bellum Southern economic stagnation has been partly attributed to landowners’ access to low-wage black labor. Indeed, following the 1927 Mississippi Flood, black workers left flooded counties and landowners were induced to mechanize agricultural production. Landowners resisted black out-

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migration from flooded areas, however, benefiting from the status quo system of labor-intensive agricultural production (Hornbeck and Naidu 2014).\(^9\) Related research on the Malthusian era analyzes economic, demographic, and institutional responses to labor scarcity following the 1609 expulsion of Moriscos from Spain (Chaney and Hornbeck 2013).\(^10\)

**Microfinance and Capital Scarcity**

Other research examines the impacts of capital scarcity in modern India, and provides a small upper bound on the welfare impacts of microfinance. The economic surplus from microfinance borrowing is bounded by the relatively small fee required to induce many microfinance clients to give up their loan. While microfinance loans have large impacts on these clients’ businesses, the impacts are illusory and do not translate into meaningful economic gains for these borrowers (Banerjee, Duflo, and Hornbeck 2014).\(^11\) Related research measures impacts on clients from the survey itself (Zwane et al. 2011)\(^12\) and the absence of adverse selection in the bundling of microfinance with health insurance (Banerjee, Duflo, and Hornbeck 2014).\(^13\)

Overall, my research agenda is focused on institutional, technological, and environmental constraints that impact economic growth. Barriers to growth are often revealed by analyzing economic responses to natural disasters or other features of the natural environment. As my research has progressed, several themes have emerged that relate economic growth, natural resources, market integration, and technological adaptation. Future research will continue to focus on drawing insights from the historical development of the American economy.

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