

Richmond Fed Regional Economics Workshop

Summary of Presented Research

September 27, 2019
Richmond, Virginia

9:15 a.m.

Kyle K. Hood

Economist, Bureau of Economic Analysis
*Persistent Shocks and Incomplete Regional
Adjustment: A Model Averaging Approach*

10:00 a.m.

Simon Alder

Assistant Professor,
University of North Carolina at Chapel Hill
*Chinese Roads in India: The Effect
of Transport Infrastructure on
Economic Development*

11:00 a.m.

Kerem Coşar

Associate Professor, University of Virginia
*Regional and Aggregate Implications
of Transportation Costs and Tradability
of Services*

1:00 p.m.

Juan Carlos Suárez Serrato

Associate Professor, Duke University
*Taxing Property in Developing Countries:
Theory and Evidence from Mexico*

2:00 p.m.

Alejandro Molnar

Economist, World Bank
*The Marginal Congestion
of a Taxi in New York City*

2:45 p.m.

Felipe Schwartzman

Senior Economist, Richmond Fed
Cognitive Hubs and Spatial Redistribution

Since 2012, the Research Department of the Richmond Fed has organized an annual Regional Economics Workshop. The event attracts a number of researchers from different academic and research institutions within the Fifth Federal Reserve District. They present their ongoing work in the areas of urban and regional economics and state and local public finance.

The 2019 workshop did not have a predetermined theme, but Kartik Athreya, director of research at the Richmond Fed, noted that most of the presentations centered on “research that informs us about how policymakers should respond to shocks, such as plunging employment or rising traffic congestion.”

Indeed, the first presenter, Kyle Hood of the Bureau of Economic Analysis, discussed the advantages of “model averaging” in measuring regional recoveries from shocks to employment and labor force participation. The second speaker, Simon Alder of the University of North Carolina at Chapel Hill, compared India’s construction of the “golden quadrilateral” highway system to a counterfactual network patterned after Chinese roadbuilding in recent years. The third presenter, Kerem Coşar of the University of Virginia, shared preliminary research that analyzes the regional and aggregate implications of transportation productivity gains from 1963 to 2012 in the United States.

A fourth speaker, Juan Carlos Suárez Serrato of Duke University, explored the revenue and welfare effects of property tax increases in Mexico City to shed light on how developing nations might benefit from property tax increases — even in face of enforcement difficulties and liquidity constraints. The fifth presenter, Alejandro Molnar of the World Bank, employed aerial imagery and taxi-trip data to study recent shocks to traffic congestion in New York City, such as the introduction of green cabs that can only pick up passengers in less congested areas. The final speaker, Felipe Schwartzman of the Richmond Fed, discussed the optimal redistribution of occupations classified as cognitive and nonroutine into “cognitive hubs” in large U.S. cities.

This publication provides brief summaries of all six presentations. For more information about this conference or future regional economics workshops at the Richmond Fed, please contact Santiago Pinto at santiago.pinto@rich.frb.org.

Persistent Shocks and Incomplete Regional Adjustment: A Model Averaging Approach

By Kyle K. Hood (Bureau of Economic Analysis) and Ryan Greenaway-McGrevy (University of Auckland)

Models of regional adjustment to economic shocks typically include variables that are highly persistent, such as employment and labor force participation (LFP) rates. Researchers must decide whether these variables should be modeled as stationary or nonstationary, an assumption that can have a substantial impact on their conclusions.

As an alternative to making such a pivotal choice, Hood and Greenaway-McGrevy advocate model averaging, an approach that allows researchers to consider an array of assumptions simultaneously. While one model may receive the highest weight, based on the statistical properties of the data, researchers can hedge against the possibility that another model is the “true” model.

The authors compare model averaging to a model of regional adjustment introduced by Blanchard and Katz (1992) to determine how a negative 1 percent employ-

ment shock would be absorbed by rates of employment, LFP, and migration. In the BK model, labor supply and demand are fixed in the short run. Model averaging, on the other hand, allows Hood and Greenaway-McGrevy to remain agnostic as to whether or not employment and LFP rates are stationary.

Eight years after the shock, the BK model indicates that about 16 percent of the damage to employment and LFP rates remains. In sharp contrast, model averaging indicates that about 50 percent of the damage remains after ten years. Because the BK approach models employment and LFP rates as stationary, migration must account for all the permanent changes in the level of employment. While the BK model suggests a nearly complete recovery, model averaging indicates a partial recovery in which migration and job creation absorb four-fifths of the shock and permanent changes to local labor market conditions account for the remaining 20 percent.

Chinese Roads in India: The Effect of Transport Infrastructure on Economic Development

By Simon Alder (University of North Carolina at Chapel Hill)

Insufficient transportation infrastructure is viewed as a major constraint to economic development in emerging nations. So in the early 2000s, India built the Golden Quadrilateral (GQ), a highway project connecting the country’s four largest cities — Delhi, Kolkata, Chennai, and Mumbai.

Alder measures the net real income benefits of the GQ in terms of aggregate effects, distributional effects, and regional convergence. Then he compares those benefits to an alternative (counterfactual) highway network patterned after Chinese highway construction in recent years. The Chinese approach implies a highway system connecting India’s sixty-eight intermediate-sized cities instead of just the top four. Alder attempts to design such a network in a way that would approximately optimize aggregate real income gains minus road construction costs. He uses a heuris-

tic network design algorithm that begins with a system in which each city is directly connected to each of the other sixty-seven cities. Then Alder employs a general equilibrium trade model to quantify the net effect of each link and iteratively removes and adds individual links until no further improvements are possible.

Alder concludes that building an approximately optimal highway network instead of the GQ would increase net income by 2.77 percent of India’s 2012 GDP. He also finds that removing the GQ would cause net income to decline by 2.44 percent of India’s 2012 GDP. In addition to those aggregate effects, he finds that his counterfactual network would benefit the poorer regions of the country much more, which would reduce the diffusion of income across space and provide stronger regional convergence.

Regional and Aggregate Implications of Transportation Costs and Tradability of Services

By Kerem Coşar (University of Virginia), Sophie Osotimehin (University of Quebec at Montreal), and Latchezar Popov (Texas Tech University)

In preliminary research, Coşar, Osotimehin, and Popov study the implications of the falling real cost of transportation services for the U.S. economy. They compare data from the 1963 Census of Transportation to data from the 2012 Commodity Flow Survey to see how the movement of goods changed over those fifty years.

The researchers construct a multisectoral and multi-regional model in which: 1) every location produces a final good from goods of different sectors and locations; 2) every location produces output in different sectors using local labor and intermediate inputs from different sectors and locations; and 3) the transportation sector is modeled explicitly. Using a preliminary calibration based on 2012 data from the Commodity Flow Survey and input-output tables from the Bureau of Economic Analysis, the authors study the effects of reducing transportation productivity in 2012 to its 1963 level. They find that in 1963, transportation productivity was about 50 percent lower, which would produce a

2.8 percent decline in 2012 GDP. Among sectors, since lower transportation productivity disproportionately hurts industries that are transportation-intensive, they find that employment in agriculture, mining, and heavy/medium manufacturing would have remained lower. This implies that improvements in transportation counteracted, rather than facilitated, structural change across sectors. Among regions, since lower transportation productivity disproportionately hurts markets that are more distant, the authors find employment shares in the Mountain West and the Pacific West would have been lower and the population share of the Northeast would have remained higher. This implies that transportation productivity improvements facilitated the increased dispersion of population across regions.

To complete their research, the authors plan to introduce 2012 state-to-state flows for calibration, consider mode-specific productivity levels, increase the tradability of services, and bring capital into their model.

Taxing Property in Developing Countries: Theory and Evidence from Mexico

By Juan Carlos Suárez Serrato (Duke University), Anne Brockmeyer (World Bank), Alejandro Estefan (University of Notre Dame), and Karina Ramírez (Secretaría de Hacienda)

Suárez Serrato presented joint work with Anne Brockmeyer, Alejandro Estefan, and Karina Ramírez that investigates the efficacy of raising property taxes in countries with weak enforcement capabilities and high liquidity constraints. They begin by studying data from Mexico City, which increased its property tax rate for wealthier households in 2010, 2011, and 2012. They employ regression discontinuity and differences-in-differences analyses plus a field experiment to evaluate the revenue effects of three policy instruments: the rate increases themselves, early payment discounts, and enforcement letters.

They find that in the medium term, Mexico's property tax hikes have indeed increased revenue. Even though the tax increases caused a significant drop in compliance, the results overall show that Mexico City cannot raise tax revenue by cutting taxes — that is, it is not on the wrong side of the “Laffer curve.” The tax increases

had hardly any effect on new construction. They also find that taxpayers strongly respond to early payment discounts — which vary in magnitude across years.

The researchers also conduct a field experiment to gauge the effectiveness of enforcement letters. City officials sent two letters to noncompliant property owners that emphasized either fairness or deterrence. A third group did not receive letters. The researchers find that, relative to the control group, the groups that received letters became more likely to comply, with the deterrence letter having a slightly larger effect.

Overall, they conclude that there is potential to raise revenue by taxing property in developing countries. Moreover, to avoid triggering consumption disruptions, governments can design property tax systems to provide liquidity in the event that a taxpayer is liquidity constrained.

The Marginal Congestion of a Taxi in New York City

By Daniel Mangrum (Vanderbilt University) and Alejandro Molnar (World Bank)

Based on data from E-ZPass and more than fourteen million taxi trips per month, Mangrum and Molnar estimate that New York City traffic slowed down 15 percent to 20 percent from 2013 to 2016. The authors note several potential causes of this slowdown, and their paper estimates the impacts from, among other causes, the rapid increase in ridesharing services, the rollout of “green cabs,” and the expansion of bike lanes.

New York’s yellow cabs are heavily concentrated in Midtown Manhattan, so the city introduced green cabs in 2013 to make taxi service more available in other areas. Green cabs are not allowed to pick up passengers in Manhattan south of West 110th Street and East 96th Street, so many drivers search for passengers just north

of the no-pickup zone. The authors use taxi-trip data to derive data on street speed. They estimate that the supply shock slowed down traffic by at least 8 percent.

Using aerial imagery and car-counting data, the authors also estimate that the supply of nontaxi vehicles for hire grew 223 percent in Midtown from 2013 to 2016, which would account for about 9 percentage points (62 percent) of the 15 percent decrease in vehicle speeds in Midtown. In their paper, currently being revised for *American Economic Review*, Mangrum and Molnar state that “this is an important result both for New York City and for other cities throughout the world that are assessing the costs and benefits of ridehail and evaluating strategies for its effective regulation.”

Cognitive Hubs and Spatial Redistribution

By Esteban Rossi-Hansberg (Princeton University), Pierre-Daniel Sarte (Richmond Fed), and Felipe Schwartzman (Richmond Fed)

In the United States, cognitive nonroutine (CNR) occupations, which are associated with higher wages, are disproportionately represented in larger cities. To study the allocation of these occupations across cities, Rossi-Hansberg, Sarte, and Schwartzman build a quantitative spatial equilibrium model to measure productivity levels within 382 metropolitan statistical areas, twenty-two industries, and two types of occupations — CNRs and non-CNRs. The quantification of the model is based on data from 2011 through 2015.

Because CNR workers are scarce, it is welfare-enhancing for them to work where they are most productive, and they generally are most productive when clustered together in “cognitive hubs.” In the model, an optimal policy that benefits workers equally across occupations incentivizes the expansion of cognitive hubs, leading to larger shares of CNR workers in some of today’s largest U.S. cities. Simultaneous with these inflows, there would be larger outflows of non-CNR workers, who

would be encouraged to move to smaller cities. Both large cities and small cities would end up with industrial concentrations that would be larger and more specialized, while midsize cities would tend to become more diversified.

In theory, this optimal allocation could be implemented by taxes and/or transfer payments that would encourage both types of workers to move to cities where they would be most productive. But such a scheme is not likely under real-world constraints, and the welfare gains from the spatial redistribution of occupations and industries would not be huge (less than 1 percent of consumption), probably because the United States has been evolving toward cognitive hubs since at least 1980. Even so, the authors caution against well-intentioned economic development policies that swim against occupational and industrial flows that lead to beneficial cognitive hubs in large cities.