

Confidential Waybill

Sample Application

306206

ENTERED

Office of Proceedings

February 21, 2023

Part of

Public Record

Ron Yang

Lazear Liang Postdoctoral Scholar

Stanford Graduate School of Business

Pedro Degiovanni

PhD Candidate, Economics

Department of Economics

Harvard University

Project Objectives

Our general research question is: in a transportation network with multiple modes (i.e. rail, truck, etc.) and multiple carriers, how do the effects of infrastructure improvements spill across modes and lanes? How do demand shocks spread through space? How does market power among shippers and carriers affect these spillovers?

Applied questions which we seek to answer include:

Can we use carriers choices to better estimate their marginal costs?

How do demand shocks to specific locations (say, the port of Los Angeles) affect rail costs and prices across the entire rail network?

Do the benefits from local infrastructure decisions come from increased efficiency, or "business stealing" from other localities?

The expected outcomes of our research project will include:

One or more papers for submission & publication in a top Economics journal

Presentations at academic economics conferences and seminar series

This research project will contribute to the economics literature in several ways:

We will contribute to the international trade literature by measuring the contribution of within country infrastructure to international trade costs.

We will contribute to the spatial economics literature by investigating the varying role of

market power across transportation modes.

We will contribute to the industrial organization literature by estimating the cost function of a multiproduct transportation firm.

We request additional data for the period 2019-2022 to improve the precision of our estimates.

Scope of Work

Our research will have three components:

Data Construction & Reduced Form Analysis

We begin by recovering the railroads' routing choices from the data present in the CWS. In particular, we use the origin, destination, distance traveled, and states visited variables to infer the route taken by each trip in the sample.

We then use this data to characterize how firms choose their routing. For the 1998-2018 period, we find that firms usually use multiple routes to fulfill each city pair, that low levels of traffic are served by a single "preferred" route, that additional routes are used when the preferred route has high capacity utilization, and that prices in the spot market for rail have a U-shaped relationship with capacity utilization.

Structural Estimation

We develop a methodology to infer the relative costs of alternative routes by looking at the routing choices. We model a railroads' routing department as receiving quantities that need to be shipped, and then choosing the optimal routing to minimize costs while keeping capacity constraints in mind.

We rely on the assumption that the observed routes minimize costs, and therefore any alternative choice would lead to higher costs and lower profits. This allows us to estimate the cost function of the railroad by using the Generalized Method of Moments. With this cost function, we can observe how freight costs have evolved over time and across space since 1998. We find that they have increased by around 15% due to increased congestion in the network, with high heterogeneity across space.

The additional years of data would serve two purposes in this stage: they would improve our estimates by offering us with additional observations, and they would allow us to analyze how the Covid-19 pandemic affected rail traffic and rail costs.

Counterfactual Analysis

The last stage of our project consists on performing counterfactual analysis in which we predict what would have happened to rail costs under different scenarios. In particular, we want to analyze how the increased trade with China following its accession to the World Trade Organization affected rail costs. Imports from and exports to China increased sharply since 2001; moreover, its industrial composition changed, and the ports of origin and destination shifted from the East to the West Coast.

Many papers, starting with Autor, Dorn and Hanson (2016) have documented how increase trade with China (“the China Shock”) profoundly altered the lives of millions of Americans through reductions in prices of imports and increased competition with domestic industrial jobs, leading to job gains, job losses, increased deaths of despair and unemployment.

Most studies of the China Shock focus on the effects of Chinese products in their destinations (e.g. how the availability of cheap computers affects consumers and workers in a city) while ignoring how these products made it to that point. We want to redress this deficiency, by explicitly focusing on how Chinese products travel through the transportation network to their final destination. In particular, we want to see how the increased influx of imports to the US West Coast increased rail traffic, rail congestion, and potentially rail costs. We then will trace these effects across space, as firms optimally alter their routing to account for the extra traffic.

Detailed Data Requested

As an extension to our current data request (from year 1996 to year 2018), we request all data from 2019 (inclusive) to 2022.

Our project is fundamentally about the spillovers across diverse regions and markets across the United States. As a result, we could not answer our economic question of interest with a dataset which is limited in geography or commodity. In addition, we are interested in the long-run effects of the “China Shock” as well as the effect of the Covid shock in demand, both of which require the most recent Waybill data

Data Management Plan

We will adhere to the full confidentiality and data privacy standards of the waybill data. We have access to the Faculty of Arts and Sciences Secure Environment at Harvard University which is equipped to store, handle, and protect Confidential and/or Personally-Identifiable level data. We also have access to legal resources at Harvard for signing and/or enforcing our confidentiality contract.

The waybill data will be used only for the academic research project described above, and only by the two principal investigators: Ron Yang and Pedro Degiovanni.