

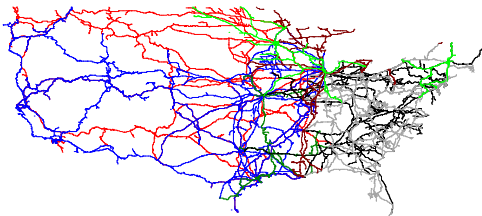
INTRODUCTION

This project will investigate whether there exists significant market power in the transport of ethanol via rail in the U.S. Recently, environmental regulations have increased the use of ethanol in gasoline and reformulated gasoline. The majority of this ethanol is produced in the Mid-Western U.S. and transported to East Coast and West Coast markets via the railroad network. The ethanol rail transport market is highly concentrated with the seven North American Class I railroads supplying approximately 80% of shipments. Many gasoline terminals are served by one or two firms. The project will econometrically estimate the effects of market power on ethanol transport prices.

DATA

- Cross-section of public tariffs (prices) for single car, gathered train and unit train shipments by origin-destination pair for U.S. Class I RR's
- Opportunity to expand to panel (2003 – present)
- GIS data for rail network ownership and trackage rights
 - Enables calculation of OD pair distances on each firm's network
 - Differentiate between ethanol markets a firm currently serves (markets with EtOH prices) and potential new markets (on firm's network) to investigate threat of entry
- GIS data on locations of ethanol plants
- GIS data on highways and waterways (non-rail competition)

GIS MAP OF U.S. RAILROAD NETWORK



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- ↗ Up_own_pls_trk_rgts.shp
- ↘ Bnsf_own_pls_trk_rgts.shp

MOTIVATION

- Environmental regulation that requires increased ethanol use may lead to increased market power in transportation fuels
 - Higher fuel prices
 - Transfers to railroads
- Increased market power may counteract environmental or security benefits of ethanol policy
- Examples from other markets include:
 - Reformulated gasoline, Brown *et al.* (2008)
 - Low sulfur coal, Busse and Keohane (forthcoming)

OPEN QUESTIONS

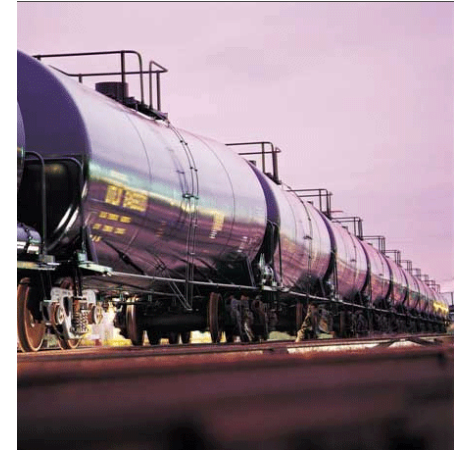
- To what extent are firms in concentrated markets able to raise prices?**
- Controlling for factors such as distance, firm characteristics, origin and destination characteristics, is there a relationship between price and the number of competitors in a given ethanol transport market?
- Are firms able to price discriminate?**
- Customers in different markets have different characteristics that are observed by firms. Ethanol use is mandated in some areas as part of reformulated gasoline regulations. In other regions, ethanol is used voluntarily in "economic blending" when the (subsidized) price of ethanol is lower than gasoline.
- Do vertically integrated firms raise rivals costs?**
- A railroad's rail network is made up of lines that are owned by the firm and lines that are leased from competitors through "trackage rights." A firm that is vertically integrated on a given route owns both the locomotive (and perhaps rail cars) and the rail lines. The vertically integrated firm can increase its profits by increasing the rate at which it offers trackage rights to its competitors and the firm's own price on a given route.

What is the impact of unit train shipments?

• Anecdotal evidence suggests that ethanol shipped by unit train has cost advantages relative to single car shipments. However, unit train transport requires special terminal facilities. Several Class I railroads have constructed new ethanol terminal in major markets. How does unit train entry affect market prices?

Other interesting facets of the market.

- What is the impact of interline carriers or short lines that connect the routes of the Class I carriers?
- Does truck transport over short distances (at the destination) increase competition?



RESEARCH APPROACH

The basic approach will be to conduct an econometric analysis of the observed prices for ethanol rail shipments. Explanatory variables will include market structure variables, for example the number of competitors at each destination, and control variables such as rail distance and firm fixed-effects.

For example,

$$P_{ijkt} = -\alpha_0 + \alpha_1 \text{ORGCOMP}_j + \alpha_2 \text{DESTCOMP}_k + \alpha_3 \text{DISTANCE}_{ijk} + \alpha_4 + \alpha_5 + \alpha_{ijk}$$

where:

- P_{ijkt} is the price per car of ethanol shipped by firm i from origin j to destination k in period t
- ORGCOMP_j is the number of competitors at origin j
- DESTCOMP_k is the number of competitors at destination k
- DISTANCE_{ijk} is the rail distance from origin j to destination k on firm i 's network
- α_4 describes factors affecting shipment price that vary by firm
- α_5 describes factors affecting shipment price that vary by destination state

Contacting the Author:

Jonathan E. Hughes (je Hughes@ucdavis.edu)