Market structure and market outcomes in deregulated rail freight markets

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Abstract

Using cross-section data on a national sample of city-pair markets for rail freight, I examine correlations between prices, quantities, and the number of single-line and interline firms serving markets. I estimate the reduced form of a structural model in which rail rates and quantities depend on the number of firms. I find that rates increase as the number of firms serving the market falls, and quantities shipped rise as the number of firms falls. The result is consistent with market power for rail freight shippers that causes markups to rise when fewer firms serve the market, and is not consistent with other explanations of the relationship between number of firms and rates and quantities. Interline shipment is much more costly than single-line, suggesting that mergers may be desirable even if they exacerbate market power problems. © 2001 Elsevier Science B.V. All rights reserved.

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1. Introduction

Since deregulation in 1980, United States rail freight carriers have been allowed to set rates for freight shipment with only limited restrictions from regulatory

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agencies. The consolidation of the industry that followed deregulation may have increased welfare by allowing more single-line shipment and less interline shipment of goods; but it may also have allowed carriers to acquire market power as the number of firms, including interline combinations, available to carry goods for any given shipper declined.

In this paper, I use city-pair specific and commodity-specific data covering the entire United States, which contain considerable variation in market structure, to examine issues of market conduct and performance in the rail freight industry. The first issue is whether single-line shipment of goods between two cities is more efficient than interline shipment. The second issue is whether small numbers of competitors can exercise market power to raise prices above competitive levels. If single-line shipment is more efficient than interline, then end-to-end mergers between rail firms that reduce interlining can improve welfare. But, if oligopolies with fewer firms can exploit market power, then side-by-side mergers can reduce welfare.

I derive and estimate a reduced form model of supply and demand for rail freight, and measure changes in equilibrium prices and quantities as the number of firms in the market varies. Using a very flexible functional form, I find that rail rates and quantities are significantly correlated with both the number and the type of firms serving markets, after controlling for distance and other variables affecting supply and demand for shipments, and that the differences are large in economic terms. Markets without any single-line shipper have prices that are considerably higher, and quantities considerably lower, than markets with the same number of competitors but with single-line shipment; this result suggests that interline shipment has higher costs than single-line shipment. On the other hand, prices are also related to the number of shippers of either type; an additional single-line shipper in a rail freight market reduces prices by up to 10%, and increases quantities by up to 15%, compared to a market with one fewer single-line shipper. The effect of an additional indirect shipper in a market is much smaller, only 1 to 2% reductions in price and between 2 and 3% increases in quantity in most cases. I test whether simpler, linear functional forms for the number of firms are acceptable, and reject them.

The results can be explained without invoking market power if rail firms have decreasing returns to scale, in which case prices would be lower when more firms share a market and each carry a smaller quantity; but past rail cost studies have usually found that rail firms have constant or increasing returns to scale within a given origin–destination market.[1] The alternative explanation is that price–cost

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[1] Braeutigam et al. (1982) find falling average costs as quantity rises, inconsistent with DRS; Friedlaender (1991) finds that most rail firms operate with substantial increasing returns to scale, and discusses the pricing implications of that result. Berndt et al. (1993) estimates a translog cost function for rail freight using deregulated-era data and also find substantial increasing returns to scale.