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*Abridgment*

## Propensities to Ship Manufactures by Rail Within Four U.S. Traffic Flows

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The use of a freight transportation service at two levels of geographic aggregation, represented by nonoverlapping component traffic flows and the aggregate that combines them, is modeled. The basic aim is estimators of demand parameters. Propensity is used to denote the nonrandom part of the actual percentage of goods shipped via the specified service. Under certain conditions, propensity statistics that remove impacts of shipment distance and weight are a means of estimating impacts of demand determinants that are assumed to vary systematically among component flows (service quality might be one such determinant).

The general approach is by three hypotheses: The first states that the expected value of use in the aggregate is a weighted average of expected use in the components. The second states that expected use in each component equals expected aggregate use plus a constant. The third states that all of the random variables describing service use have the same form, whether aggregate or component. This form varies from one version of the model to another. The simplest model

is extended by explicit inclusion of variables for relative price and other determinants that are assumed to be aggregate in the sense that they influence demand in the same way everywhere. The slopes of the aggregate determinants and the geographic propensity statistics can then be estimated simultaneously.

An illustrative study of rail shipments by manufacturers uses two-digit data from the Public Use Computer Tapes, 1967 Census of Transportation, in four component traffic flows—east to east, east to south and west, south and west to east, and south and west to south and west. No aggregate determinants are included. Differences among estimated propensity statistics are often small and of mixed sign. However, greater commodity detail and the inclusion of at least a relative price are required for a conclusive empirical study.

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## Approach to Measurement of Modal Advantage

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Shipper preferences for truck or rail were determined by using shipment mass and distance as criteria. Data on individual manufactured commodities from the 1972 Census of Transportation Commodity Transportation Survey were arranged in a matrix-table format and analyzed for the extent of involvement by these primary modes in carrying cargo of various weight brackets moving over a series of distance blocks. As expected, trucks dominated the movement of lighter weight shipments and rails dominated the movement of heavy shipments. Competition, or involvement by both modes, was limited to cargo in the medium-weight range, which was not an extensive amount. Amounts of cargo either modally dominated or competitive were determined and correlated to actual overall percentages of cargo by mode. Changes in overall modal percentages of cargo over time have a strong relationship to changes in the

size of shipments over time, although not as strong and direct a relationship for the rail mode as for trucking. Major shifts of cargo between modes will not occur in the absence of artificial or arbitrary obstacles to market forces.

The national transportation policy of the United States has long recognized the importance of a balanced transportation system to satisfy the distribution demands of manufacturers and the consumption demands of the public. The system that the policy promotes and main-