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rural economic development. Her literature review searched five areas related to transportation, the economy, economic development, rural economic development, logistics, and highway investment.

Babcock began by outlining how transportation might affect rural economic development. He then proposed several models that could be used to analyze the issues. They include a production function model, a growth location model, an interregional competition model, an import substitution model, and an export expansion model.

Armbruster expanded the discussion, pointing out that other issues, such as entrepreneurship, tourism, etc., must also be considered. He also provided a classification scheme for types of investment in rural America.

Q & A Discussion

1. How important is transportation to the rural economy?
2. Does transportation contribute to the growth of a rural region?
3. Should the definition of transportation be broadened to include communications?
4. What is the relationship between transportation, economic development, and other aspects of rural life, including health care, water, labor, tourism?
5. Does the work in this area encompass problems on Native American reservations?

A general conclusion was that any work in this area must be conducted by integrated research teams from a systems perspective. Thus, the message to researchers is we must define ways to work together. The Agricultural and Rural Transportation Cluster will include a dialogue on these issues in future issues of their newsletter.

Panelists:

- Frank Dooley
  Upper Great Plains Transp. Institute
- Walter J. Armbruster
  Farm Foundation
- Michael W. Babcock
  Kansas State University
- Jill Hough
  Upper Great Plains Transp. Institute

Effects of Partial Rail Deregulation

Session Moderator: Michael Smith, Burlington Northern

- *Labor Productivity Returns to the Personnel Budget for Class I Railroads Under Deregulation*
  by Tenpao Lee, Joel Rudin and Karen Eastwood,
  Niagara University

One of the major reasons that the railroad industry has been financially depressed is due to the inefficiency of labor productivity. It is generally believed that well-conducted personnel management should increase labor productivity in the railroad industry. Hence, personnel department budgets should be treated as investments rather than expenditures.

The purpose of this paper is to evaluate the impact of the personnel budget on railroad labor productivity under deregulation. A Cobb-Douglas production function was estimated based on nine Class I railroads from 1983 to 1988 (a pooled time-series and cross-sectional data set). Four econometric models with alternative assumptions regarding the disturbance term, including the ordinary least square (OLS) model, the dummy variable model, the error component model, and the pooled time-series and cross-sectional model, were applied to deal with problems of autoregression and heteroscedasticity.

The results of four econometric models were generally consistent and suggest 1) a positive effect on railroad labor productivity for increases in the railroad personnel budget under deregulation; and 2) the consistently more productive railroads consistently had greater personnel budgets under deregulation. Hence, an overall shift in company values towards a greater emphasis on motivating, rewarding, selecting, and training employees, with a concomitant increase in the personnel budget, may entail productivity rewards for railroads. Policy implications and suggestions for future research were drawn and discussed.

- *Service Levels, Operating Cost, and Train Crew Size in the U.S. Rail Industry*
  by Mark H. Keaton,
  Michigan Technological Univ.

Reductions in train crew cost could make it economical for U.S. railroads to provide improved service. This paper quantifies the cost to provide a range of service levels for a hypothetical rail system. Average transit time is the measure of service level. Higher levels of service are achieved by increasing the number and frequency of direct train connections, permitting cars to bypass intermediate yards. If train crew cost could be cut to about one-half its current level of $8 per train mile, reductions of 14 hours, or 15 percent, in average transit time could be achieved without an increase in total operating expenses. Moreover, employment in train and engine service will actually increase, even if trains are operated with two-person crews in place of the existing four-person crews.

Railroad Competitiveness

Panel Session Organizer and Moderator:
Frank Mulvey, U.S. General Accounting Office

Panelists:

- Michael Haverty, President
  The Atchison, Topeka and Santa Fe Railway Co.
- James Kennedy, Exec. Secretary and Treasurer
  Railway Labor Executives Assoc.
- Robert L. Banks
  R.L. Banks Associates
- W.G. "Bill" Waters
  University of British Columbia

The Impact of the U.S.-Canada Free Trade Act

Session Organizer and Moderator: L. Milton Glisson,
North Carolina A & T State University

- *Motor Carrier Perspective*
  by Garland Chow,
  University of British Columbia

While transportation services were left out of the United States - Canada Free Trade Agreement, the F.T.A. has very important implications for the transport sector. Commodity flows are predicted to shift from predominantly east-west flow to a more north-south flow. Motor carriers will play a large part in transporting these commodities and the issue arises as to whether motor carriers domiciled in Canada or motor carriers domiciled in the United States have the competitive advantage. Is there a level playing field between Canadian and U.S. carriers? If there are advantages, are these advantages due to natural market and economic conditions, or are they due to artificial influences including discriminatory government policy? These are important issues for both policy-makers and carriers in considering strategic plans for competing in the Canada - United States transborder trucking market.