

The Economics of Potential Reduction of the Rural Road System in Kansas

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Introduction

The increasing size of farms in Kansas has led to increasing farm vehicle size as well. Tractor and combine weight and width has increased and the majority of farmers deliver their grain in semi-trucks. Tandem axle trucks are used to deliver farm supplies. The road width and design characteristics of rural roads and bridges are inadequate for the larger and heavier vehicles that are using them. As county population declines, the financial ability of Kansas counties to maintain and rebuild the road and bridge system isn't keeping up with the rate of deterioration. Many rural Kansas counties don't have the funds to maintain the existing system with the heavier vehicles that are using them. If the county road and bridge system can't be maintained as it is, reducing the size of the system should be considered. This study addressed the benefits and costs of reducing the county network.

Project Objective

The principal objective of the research is to estimate the economic impact on selected county road systems from reducing the size of the road system. The specific objectives include:

- Objective A: For a sample of three Kansas counties, measure the benefits and costs of keeping the road system as it currently exists.
- Objective B: For the same sample of Kansas counties, measure the benefits and costs of several scenarios of simulated county road closure.

Project Description

Benefit–cost analysis was used to examine the question of road closure in the three counties. The cost of road closure is the additional travel cost of rural residents due to more circuitous routing to their destinations. The benefit is the avoided maintenance costs of roads removed from the county network. One set of ratios is calculated assuming annual maintenance cost per mile of \$3,000, and the other set assumes \$4,000 per mile.

In each county, 10 road segments were selected as potential candidates for simulated closure. This was done to analyze the traffic impacts on alternative roads near the road segments being considered for simulated closure. Selection of the road segments was based on many factors, but the most important criterion was the traffic volume on these roads.

TransCAD maps and KDOT traffic counts were used to identify candidate roads for simulated closure. Single-access roads (the only road between a specific origin and destination) were not considered for simulated closure.

Project Results

1. The benefit–cost ratios for Brown County are 0.30 and 0.41. Thus none of the 10 road segments evaluated in Brown County should be closed since the costs of simulated closure exceed the benefits.
2. For Pratt County the benefits of simulated road closure are approximately equal to the cost if maintenance cost per mile is assumed to be a very conservative \$3,000. However, if maintenance cost per mile is assumed to be \$4,000, the benefit–cost ratio is 1.33. The latter alternative indicates that Pratt County would save money by closing the evaluated road segments since the benefits exceed the costs.
3. The benefit–cost ratios for Thomas County are 1.82 and 2.42 indicating that the evaluated road segments in Thomas County should be closed since the benefits (avoided maintenance costs) exceed the travel costs of rural residents.
4. A major conclusion is that rural counties will be able to save money by closing some relatively low-volume roads and redirecting the savings toward increasing the quality of the other county roads.
5. Counties with relatively extensive road systems (miles of road per square mile) and relatively high population density (i.e., Brown County) are less likely to realize savings from road closure.
6. Counties with less extensive road systems and relatively low population density (i.e., Thomas County) are more likely to realize significant savings from closure of relatively low-volume roads.

Report Information

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