THE ECONOMIC IMPACT OF RURAL BYPASSES: IOWA AND MINNESOTA CASE STUDIES

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FINAL REPORT

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Highway bypasses around rural communities in heavily traveled transportation corridors are viewed as a highly cost effective method of improving traffic flow along non-interstate transportation routes. However the bypassing of a central business district raises concerns among merchants over possible adverse impacts to their businesses. This paper addresses the question of bypass impacts using a variety of measures. First, the effect on overall retail sales in bypassed communities will be examined by comparing to cities without bypasses for comparable periods. Next, the total sales are decomposed into categories or classes of retail sales to analyze for differential impacts from the bypass. Finally, the effects of the bypass on individual merchants will be examined by analyzing the results of a personal survey of businesses in these bypass communities to test their assessment of the bypass impacts.

The sample for this evaluation of bypass impacts is drawn from 11 communities in Iowa that had bypasses opened since the late 1970's and 10 communities in Minnesota. This time frame was chosen in order to use retail sales data which has been available in a detailed format of sales categories since 1969. Map 1 and 2 detail the location of these bypasses in each state and Table 1 lists population and date of bypass opening in these communities. Each of these bypass cities was then matched against three "control
cities" chosen as having populations, traffic volume and location to metropolitan areas comparable to the bypass cities. In another comparison, the bypass city's performance is contrasted against all other cities of a comparable population range in the state.

**Total Sales**

Data on per capita total sales for the bypass cities are plotted against the average for the control cities in Figures 1 and 2. No distinct pattern of retail sales in the bypass community versus the control cities is evident in either Minnesota or Iowa. A test for difference between the mean scores for the bypass and control cities also was not significant. In a separate paper, the issue of retail sales differential retail sales performance was tested in a model regressing total retail sales against a variety of community characteristics including population, income, size of shopping malls, freeway accessibility, county seat towns, as well as the presence of a bypass around the community (Otto 1991). This regression approach also found no significant difference in total retail sales for communities with a new bypass versus cities without bypasses.

Retail sales per capita adjusted for income and city size is another measure of retail sales performance used for comparison. This calculation, referred to as pull factors, is calculated as actual per capita retail sales for the sample city divided by the expected per capita retail sales for control cities according to the following formula:
\[ PF = \frac{PSC}{PSS} \]

Where:  \( PF \) = Pull factor

\( PSC \) = Per capita sales for city

\( PSS \) = Per capita sales for state

The score indicates the percentage rank of retail sales performance relative to other cities of comparable size. For example, a score of 1.5 indicates a city's retail sales are 50% higher than the retail performance of other cities in the same population range.

The advantage of the pull factor approach is that it compares cities of comparable size rather than all cities in the state. The pull factor approach for analyzing retail trade data has been used extensively for community trade area analysis in Iowa by Ken Stone. A recent illustration of this methodology is Stone's analysis of the impact of Wal-Marts on rural Iowa communities (Stone, 1990).

This pull factor analysis for the bypass communities compared to their paired communities for both the Iowa and Minnesota cases also indicated no apparent or significant difference in patterns (Figures 3 and 4). Two types of control cities are used in this study. In the first set, each bypass city is paired with three other non-bypass cities with comparable populations, traffic counts and location relative to other metro regions. The second set of control cities is based on all other Iowa cities within the same population range as the bypass city. Since rural retailing has been affected by a major set of structural changes including the growth of regional shopping malls, discount marketing, and stresses on rural income, it is important to develop relative measures of
performance for a comparable period rather than only before and after indicators.

The average pull factor score for the bypass cities compared to the control city adjusted for years since the bypass opening is used as our main measure of impact. Developing a performance measure for over time provides a test for whether shopping patterns adjust at some point after the new bypass opens. Figure 3 presents estimates of total sales pull factors for the 11 bypass cities in Iowa and compared to the group of control cities for the initial year and four subsequent years after the bypass opening. The same plot for the Minnesota bypass communities compared to the paired group of cities yielded similar results suggesting that a bypass did not result in a significant change in the overall retailing performance of a community (Figure 4). For both states, these results from the pull factor analysis and per capita sales plots indicate no significant difference in total sales between bypass cities and a sample of comparable cities.

Classes of Retail Sales

While overall sales do not appear to be significantly affected by the bypass, individual classes of retail businesses such as gas stations or restaurants may be more affected because they rely more on through traffic. A pull factor analysis for each category of retail sales in the bypass and control cities was used to investigate impacts of the bypass on different types of businesses within a community. Plots of the pull factor scores for bypass cities and control cities in Iowa are presented in Figures 5-16. A similar set of plots are presented for the Minnesota bypass.
cities compared to their control groups are presented in Figures 17-24. A T-test to analyze the difference in means between the bypass and control group of cities did not find a statistically significant difference between the two groups. Using a four year period to observe relative retail sales performance indicate this sample of bypass cities losing ground to the non-bypass cities in the categories of auto sales, furniture sales, miscellaneous sales, and wholesale trade. The bypass cities appeared to have relative improvement in their pull factor scores for apparel, building supplies and general merchandise. While these were apparent patterns, none of the differences were statistically significant. There appeared to be off setting or no relative change in the other categories of retail sales for the Iowa group of cities.

The sample of Minnesota cities had a somewhat different pattern. The bypass cities had an apparent improvement in retail sales performance in the categories of general merchandise and apparel sales and declines in lumber and auto sales categories. The other categories had no apparent change in relative positions. Again these differences did not test as being significantly different.

A second version of this pull factor analysis compares pull factor scores for various categories of retailing in bypass cities to the scores for all cities within the comparable population range. These results are presented in Figures 25-37. While this process meant a larger sample of control cities, the results are similar to the analysis using a paired city approach. Differences in sales patterns existed, but the differences were not
statistically significant. Bypass cities in Iowa did appear to be losing ground relative to cities of comparable size in retail categories of auto sales, eating and drinking establishments, general services, wholesaling, and miscellaneous sales. Relative gains were observed in apparel and general merchandise sales in the bypass cities. While these differences were present, none of them were significant. In the remaining categories, retail patterns in bypass and control cities moved in similar directions in response to changing economic conditions.

**Attitudes Toward Bypasses by City Businesses**

After relying solely on secondary data to evaluate bypass effects in some detail, a survey was conducted to get perspectives from business owners on how bypasses affected them personally. A survey instrument was mailed to all retail and service businesses in the 11 bypass communities in Iowa, soliciting their reaction to a variety of bypass related issues. A copy of the survey instrument is in Appendix 1. The results of this survey are interesting because they allow us to get a very detailed sense of how individual businesses have been affected as opposed to whole classes of businesses.

The survey results have been summarized for all respondents and broken out by type of business, location of business in relation to bypass as well as by community. The issues of primary interest in the survey are assessing attitude of businesses to the bypass in terms of impacts on commerce and overall quality of life in their community. Perceptions are expected to vary by type of business and by location of businesses in relation to the bypass.
Data in Figures 38-50 assess impacts of the bypass on several quality of life indicators for the communities including highway noise, shopping environment, customers and overall quality of life. Overall, the most common response appears to be that the bypass had no effect on the communities. Highway noise level, business impact, and overall quality of life were indicated to be considerably improved while customer levels and shopping environment had large number of respondents indicating that conditions had worsened. By a 2 to 1 margin, the overall reaction by businesses to the bypass suggests that businesses have not been significantly affected by its opening. An even larger majority indicated that they approved the bypass after it had been built.

Classifying the survey responses according to type of business also presents a noticeable pattern. Businesses that depend on through-traffic such as taverns and eating places, and gas stations appear to have the strongest negatives toward the bypass as it relates to issues of shopping environment and impact on business. While these businesses felt they would be negatively affected by the bypasses, they still agreed that the bypass would reduce noise levels and improve the overall quality of life in the city. Again the most common response was that they thought that the bypass would have no effect on businesses and all business categories except taverns had a majority of businesses reporting in favor of the bypass.

Responses to the survey were also classified according to the location of the business in relation to the bypass. The distribution of business type by location is presented in Figure
43. Categories included: a) Central Business District (CBD), b) near bypass, c) on old bypassed highway, and d) another location. The majority of retailing and service businesses are in the central business district along the old highway route. As expected, cafes, retailing and services tend to be located in the CBD which would place it on the old bypass route. Gas stations were the most frequent business along the new bypass route.

Overall attitudes toward the bypass again suggested that most businesses were better or no worse off regardless of location. Although they are a relatively small number, businesses reporting they were worse off from the bypass tended to be those along the old route or in the central business district. Attitude toward quality of life in the community after the bypass had a similar pattern. Businesses in all location reported quality of life changes that were better or no worse off following opening of the bypass. Businesses in the CBD did report more concerns with shopping environment and customer access than in other locations. However all locations did report improvements in noise and dust problems. Other businesses that serve trade area functions along the old bypass did not report as many instances of the bypass being bad for their business environment.

A third major schema for cross classifying bypass issues is to examine for differences according to city. The overall distribution of responses by businesses according to city is presented in Table 2. None of the cities had the majority of businesses reporting that the overall quality of life was made worse by the bypass with many cities reporting an improvement from
the bypass. A similar pattern was observed for the question of highway noise and the bypass. A somewhat different pattern begins to emerge as the shopping related questions are examined. While most cities reported mostly no effect from the bypass, businesses in the cities of McGregor and Walker reported high levels of negative impacts on business, highly negative impacts on customers, and high negative impacts on overall shopping environment. McGregor was the only city reporting more businesses opposed to the bypass than in favor (Figure 55). The high profile of tourism in the McGregor area and the high dependency of tourism businesses on drop-in and through traffic may explain much of that cities opposition to the bypass.

Summary

Efforts to evaluate the impact of bypasses around rural communities in non-interstate transportation corridors are discussed in this paper. This report focused on recently constructed bypasses completed in Iowa and Minnesota since the late 1970's. The results indicate that the overall levels of retail sales in a community do not appear to be significantly affected by the presence of a bypass. Breaking retail sales into component categories indicated some minor distributional effects, bypass cities experienced lower pull factors for furniture, auto and wholesale trade sales, while pull factors improved in building supplies and miscellaneous sales. The report found strong similarities in the responses of rural communities to bypasses in both Iowa and Minnesota. Geographical, economic, and cultural similarities in the states result in similar responses.
This report provides an initial overview evaluating role of bypasses. Additional issues which can be explored from this material are a more formal analysis of factors affecting a business' willingness to support a bypass that will contribute some predictive ability on assessing likely impacts of future bypasses, provide additional insights on variations by community in their support for bypasses and policy lessons from efforts to develop bypasses.
References


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1-Bemidji  
2-Willmar  
3-Princeton  
4-Milaca  
5-Crookston  
6-Cologne  
7-Little Falls  
8-St. James  
9-Madelia  
10-Butterfield
Figure 1.

AVERAGE TOTAL PER CAPITA SALES-IOWA
Bypass vs. Paired vs. Controlled cities

Thousands

- Bypass cities  ▲ Paired cities  ★ Controlled cities

Figure 2.

AVERAGE TOTAL PER CAPITA SALES-MINNESOTA

Bypass cities vs. Paired cities

Thousands

- Bypass cities
- Paired cities
Figure 3.

Total Sales Pull Factors-Iowa
Bypass vs. Paired Cities

Years after bypass

 jurisdictions

 jurisdictions
Figure 4.

Total Sales Pull Factors-Minnesota
Bypass cities vs. Paired cities

Years after bypass

- Bypass cities
- Paired cities
By-pass vs. Paried CitieS
Apparel Sales Pull Factors-1owA

Bypass CitieS paried citieS

Years after by-pass

four	hree	two
one

0
0.5
1
1.5
2

Figure 5.
Auto Sales Pull Factors - Iowa

Figure 7.

Bypass vs. Paired Cities
Figure 8.

Eat & Drink Sales Pull Factors-Iowa
Bypass vs. Paired Cities

Years after bypass

- bypass cities
- paired cities
Food Sales Pull Factors-Iowa

Figure 9. Bypass vs. Paired Cities
Figure 10.

Furniture Sales Pull Factors-Iowa
Bypass vs. Paired Cities

Years after bypass

- Bypass cities
- Paired cities
General Merchandise Sales Pull Factors

Bypass vs. Paired Cities

Figure 11.

Bypass year

0.5
1
1.5
2

Years after bypass

bypass cities

paired cities
Figure 12.

Miscellaneous Sales Pull Factors-Iowa
Bypass vs. Paired Cities

Years after bypass

\[ \text{bypass cities} \quad \text{paired cities} \]
Figure 13.

Services Pull Factors-Iowa
Bypass vs. Paired Cities

Years after bypass

- bypass cities
- paired cities
Specialties Pull Factors-Iowa
Bypass vs. Paired Cities

Figure 14.

Years after bypass

- bypass cities
- paired cities
Utilities Pull Factors-Iowa
Bypass vs. Paired Cities

Years after bypass

- bypass cities
- paired cities
Figure 16.

Wholesale Sales Pull Factors - Iowa
Bypass vs. Paired Cities

Years after bypass

- [bypass cities]
- [paired cities]
Figure 17.
Apparel Sales Pull Factors-Minnesota
Bypass cities vs. Paired cities

Years after bypass

- Bypass cities
- Paired cities
Figure 18.

General Merchandise Pull Factors
Bypass cities vs. Paired cities

Bypass cities
Paired cities
Figure 19: Food Sales Pull Factors-Minnesota Bypass cities vs. Paired cities
Figure 20.

Auto Sales Pull Factors-Minnesota
Bypass cities vs. Paired cities

![Bar Chart]

- Bypass cities
- Paired cities

Bypass year | One | Two | Three | Four
---|---|---|---|---

(Bar Chart Description)

- Y-axis: Sales
- X-axis: Bypass year (One to Four)
Figure 21.

Lumber Sales Pull Factors-Minnesota
Bypass cities vs. Paired cities

Years after bypass

- Bypass Cities
- Paired Cities
Figure 22.

Furniture Sales Pull Factors-Minnesota
Bypass cities vs. Paired cities

Years after bypass

- Bypass cities
- Paired cities
Figure 23.

Eat & Drink Sales Pull Factors-Minnesota

Bypass cities vs. Paired cities

Years after bypass

Bypass cities  Paired cities
Figure 24.

Miscellaneous Sales Pull Factors
Bypass cities vs. Paired cities

Years after bypass

- Bypass cities
- Paired cities
Figure 27.

Building Sales Pull Factors-Iowa
Bypass Cities vs. Control Cities
Auto Sales Pull Factors-Iowa
Bypass Cities vs. Control Cities
Figure 29.

Eat & Drink Sales Pull Factors—Iowa
Bypass Cities vs. Control Cities

- Bypass cities
- Control cities
Figure 31.

Furniture Sales Pull Factors—Iowa
Bypass Cities vs. Control Cities

[Bar chart showing the comparison of furniture sales pull factors between bypass cities and control cities over four years.]
General Merchandise Pull Factors-Iowa

Bypass Cities vs. Control Cities

Figure 32.
Figure 33.

Miscellaneous Sales Pull Factors-Iowa
Bypass Cities vs. Control Cities

\[
\text{Bypass cities} \quad \text{Control cities}
\]
Figure 34.

Services Pull Factors-Iowa
Bypass Cities vs. Control Cities
Specialties Pull Factors - Iowa

Bypass Cities vs. Control Cities

Figure 35.
Figure 36.
Utilities Pull Factors - Iowa
Bypass Cities vs. Control Cities

Bypass year
2.5 2.0 1.5 1.0 0.5 0

Bypass cities
Control cities

one
two
three
four
Wholesale Sales Pull Factors-Iowa
Bypass Cities vs. Control Cities
Figure 38.

IMPACT OF HIGHWAY NOISE
QUESTION 1

FREQUENCY

RESPONSE

- BETTER
- NO CHANGE
- WORSE
Figure 39.

IN FAVOR OF THE BYPASS

QUESTION 34

RESPONSE

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FREQUENCY

0  10  20  30  40  50  60  70
Figure 42.

IMPACT ON SHOPPING ENVIRONMENT
QUESTION 7

FREQUENCY

RESPONSE

- BETTER
- NO CHANGE
- WORSE
Figure 43.

BUSINESS LOCATION RELATIVE TO BYPASS

FREQUENCY

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Figure 44.

LOCATION BY NOISE
Q31 BY Q1

RESPONSE

LOCATION

IN CBD
OLD HWY, NOT CBD
NEAR BYPASS
OTHER LOCATION

- BETTER
- NO CHANGE
- WORSE
Figure 45.

LOCATION BY QUALITY OF LIFE
Q31 BY Q13

RESPONSE

LOCATION

- BETTER
- NO CHANGE
- WORSE
Figure 47.

LOCATION BY VOLUME
Q31 BY Q2

RESPONSE (%)

LOCATION

- IN CBD
- OLD HWY, NOT CBD
- NEAR BYPASS
- OTHER LOCATION

■ BETTER  □ NO CHANGE  □ WORSE
LOCATION BY DELIVER PROBLEMS
Q31 BY Q10

RESPONSE (%)
Figure 51.

IMPACT ON OVERALL QUALITY OF LIFE
QUESTION 13

FREQUENCY

BYPASS CITIES

- BETTER
- NO CHANGE
- WORSE
Figure 52.

IMPACT OF HIGHWAY NOISE
QUESTION 1

FREQUENCY

BYPASS CITIES

- BETTER
- NO CHANGE
- WORSE
IMPACT ON SHOPPING ENVIRONMENT
QUESTION 7

FREQUENCY

BYPASS CITIES

- BETTER
- NO CHANGE
- WORSE
Figure 54.

IMPACT ON BUSINESS
QUESTION 33

BYPASS CITIES

FREQUENCY

INCREASE  DECREASE  NO EFFECT
IN FAVOR OF THE BYPASS

QUESTION 34

BYPASS CITIES

FREQUENCY

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