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Case Studies of the Economic Impact of Highway Bypasses in Kansas

The construction of highway bypasses has resulted in many economic benefits both for intercity motorists as well as residents of towns with bypasses. Despite the benefits of bypasses, they remain controversial. Local business owners in the town being bypassed fear that the reduction of traffic passing through the town will adversely affect their sales.

The purpose of this study is to add to the literature concerning the economic impact of highway bypasses on small towns. The measured impacts are (1) total employment of bypass towns, (2) retail sales of the towns' travel-related businesses, (3) employment of the towns' travel-related businesses, and (4) the bypass town as a whole.

To measure the impact of the bypasses on total employment of bypass towns, each of the nine sample towns was matched with a group of control towns. Total employment of each bypass town was regressed on total employment of its control towns and a bypass dummy variable used to measure the effect of the bypass. The equations were estimated by ordinary least squares (OLS) regression. The other three impacts were obtained by interviewing the owners and managers of 54 travel-related businesses located in the nine bypass towns.

The statistical results are consistent with the hypothesis that the bypass did not have a statistically significant effect on total employment of the bypass towns. In the opinion of most of the owners and managers of the travel-related businesses the bypasses had a negative impact on their retail sales and employment, and on the town as a whole. There was a substantial variation in opinion regarding the impact of the bypass on company retail sales, employment, and on the town as a whole among the industry groups in the sample.

by Michael W. Babcock, and Jose A. Davalos

The construction of highway bypasses has resulted in many economic benefits. Perhaps the most significant of these is the travel time savings of intercity motorists who avoid the slower speeds, stops, and congestion associated with driving through downtowns. Highway bypasses also result in many benefits for residents of towns with bypasses. For example, by diverting trucks and other intercity traffic away from downtown, traffic congestion and noise is reduced. Also, traffic safety is enhanced and the local population is less exposed to health-threatening vehicle emissions and hazardous materials. In addition, highway bypasses enable local motorists to realize travel time savings when driving from one end of the town to the other.

Highway bypasses promote local economic development of industries whose sales are primarily to customers located outside of town. These industries are referred to as basic industries. Because bypasses reduce transportation costs, they help local basic industries reduce their costs and increase their sales. The increased buying power will have a favorable multiplier effect on non-basic industries (i.e., retail trade and consumer services) in the town. Local economic development may also be enhanced by new firms that locate at highway bypass interchange points.

Despite the benefits of highway bypasses, they remain controversial. Local business owners in the town being bypassed fear that the reduction of traffic passing through the

town will adversely affect their sales. This is especially the case for travel-related firms such as car and truck repair shops, hotels-motels, restaurants, bars, and convenience stores.

The limited literature on the impact of highway bypasses on small towns often relies on secondary data and indicates that bypasses either have a negligible effect or an inconclusive impact on affected communities. For example, Anderson et al. (1993) used econometric models and cluster analysis to examine the impact of highway bypasses on 23 small Texas towns. The results of the estimated econometric model indicated a small decline in economic activity because of highway bypasses. However, when the results of the cluster analysis were combined with that of the econometric model, the impact of the bypasses on economic activity was positive. Anderson et al. concluded that bypasses do not have a significant negative impact on economic growth in affected small communities.

David Burress (1996) studied the impact of highway bypasses on economic activity of local Kansas communities. Burress concluded that, in general, the economies of Kansas communities with bypasses were not significantly affected in either the short or long run. However, some individual communities in the sample were negatively affected by highway bypasses.

Helaakoski et al. (1992) measured the effects of highway bypasses on small cities in Texas using econometric models and plot analysis. For the sample as a whole, the conclusion was an indeterminate effect of highway bypasses on the economies of small cities with bypasses. This result was due to some cities experiencing a positive economic impact after bypass construction, while others had a negative effect. The authors concluded that factors not related to highway bypass construction were the causes of these differences. That is, cities whose economies were growing prior to bypass construction were significantly helped by the bypass, while bypasses further depressed economic activity in cities with declining economies.

The objective of the study by Buffington and Burke (1990) was to discover if road im-

provements would cause an increase in employment and income in affected communities. The authors used data that included most of the major radial highways, bypasses, and loops affecting small Texas towns between 1955 and 1984. Buffington and Burke concluded that there was a statistically significant positive impact on local economic activity resulting from the construction of radial highways, bypasses, and loops.

The objective of the study by Kockelman et al. (2001) was to evaluate the impacts of relief routes (i.e., bypasses) on small and medium size Texas communities to help TxDOT better plan for both positive and negative impacts of relief routes. The authors use econometric models to test the hypothesis that relief routes have positive effects for quality of life, but may also have negative impacts on business in the community. The authors used a panel data set that includes data from 23 Texas cities with relief routes and 19 cities without relief routes which served as control towns. The cities ranged in population from 2,500 to 50,000. For each city, nine years of data during the 1954-1992 period were collected, resulting in a sample with 378 data points. The authors developed models for 12 economic indicators: per capita sales, number of establishments, and total sales in four highway-related sectors (total retail trade, gas stations, eating and drinking places, and services) expected to be most impacted by changes in traffic levels.

The models indicate both positive and negative impacts of relief routes. In medium size cities the impacts are mixed, whereas in small cities the impacts are mostly negative. The magnitude of the shift in traffic to the relief route is the most significant characteristic of the relief route in explaining these impacts.

The purpose of the Handy et al. (2001) study was to identify and understand the various factors that influence the economic impacts of highway relief routes (i.e., bypasses) on small and medium size Texas communities. The authors point out that highway relief routes can have both positive and negative effects on communities. On the positive side, communities benefit from a reduction in traffic through the middle of town and thus a

decrease in noise, emissions, and safety problems. But the reduction in traffic may have negative impacts on businesses located on the old route that are dependent on intercity traffic. They also note that negative impacts on local businesses may be partly offset by new businesses locating along the highway relief route. The report presents case studies of 10 small and medium size communities in Texas and analyzes the extent and nature of the impacts of the relief routes and the key factors determining those impacts. The authors also conducted case studies of four similar size Texas communities which did not have relief routes to serve as a control group. The populations of the 10 case study towns ranged from a low of 2,556 to a high of 48,465, with most of them in the 5,000 to 10,000 population range.

The authors found that the relief route reduced traffic through town by as much as 75% which improved access to local businesses, improved safety, and enhanced the quality of life. However, the reduction in traffic had negative effects on businesses concentrated in downtown areas, along the relief route, and on highway-related businesses in general. In all 10 case studies, some development occurred on the relief route, but in 8 of the 10 cases, the amount of the development was limited. The development that did occur was concentrated at the interchanges of the old routes with the relief routes, and consisted of businesses that are new to the community rather than existing businesses that relocated to the relief route. In at least four of the case studies there was a net decline in highway-related businesses after construction of the relief route. However, three of the four non-relief route (control) communities also experienced a net decline in highway-related businesses. Most of the people interviewed in the case studies identified other factors unrelated to the relief route that have caused economic change in the community. These include structural factors related to trends in the national economy such as the long-term shift of population from rural to urban areas, increases in the scale of retail stores and shopping centers, and consolidation in the distribution channels for gasoline. The people interviewed also

cited local factors relating to the economic relationship of the town to other cities in the area, the alignment of the relief route, and the policies of the local government.

Rogers and Marshment (2001) assessed the impact of bypasses on small Oklahoma towns located along U.S. Highway 70. Much of the study was devoted to the development of models to analyze the impact of bypasses, and the application of the model to Oklahoma towns with bypasses was limited. The authors concluded that the bypasses did not have a statistically significant impact on the sales tax base in the towns with bypasses.

Liff (1996) studied the effects of highways and bypass construction in rural areas of the United States and Canada. The author analyzed studies that were performed by state agencies including academic institutions. After reviewing these studies, Liff concluded that they were inconclusive in determining if bypasses had any influence on the economy of affected towns.

Otto and Anderson (1995) conducted surveys of business owners located in towns that have bypasses in Iowa and Minnesota. The authors used the survey data to calibrate probit models to identify the factors that influenced a respondent's decision to favor or oppose a bypass. Probit models were also developed for people's perception of the impact of the bypass on business activity and on the community as a whole. Otto and Anderson found that business owners in bypass communities felt that the central business district was a more attractive business environment than that of the bypass. Most of the business owners thought that the bypass had increased safety. Merchants with a longer tenure in the community were generally less concerned about the bypass impacts. However, the further the bypass from the central business district of the town, the greater concern over the impacts on the town. Otto and Anderson found no impact on total sales attributable to the bypass, and although there were observable impacts on individual sectors, they were not statistically significant.

Yeh et al. (1998) studied the economic impacts of highway bypasses on 17 Wisconsin communities using the survey-control

method in which each of the 17 bypass towns was compared to a set of similar control towns. The 17 communities were divided into three categories and control groups were developed for each category. The authors found that employment growth of the bypass communities continued along the same trend after the construction of the bypass, suggesting no connection between bypasses and employment levels. The study also found very little retail activity redistribution from the central business district to the bypass.

The purpose of this study is to add to the literature concerning the economic impact of highway bypasses on small towns. This paper utilizes an "after-the-fact" case study approach. Case studies of the impact of bypasses are useful since the effects may vary a great deal from place to place. Also case studies reveal which types of businesses are impacted by highway bypasses, and the quantitative magnitude of the impact.

The objective of the paper is to measure several impacts of highway bypasses for a sample of small Kansas towns with bypasses. The measured impacts are:

- (1) total employment of bypass towns
- (2) retail sales of the towns' travel-related businesses
- (3) employment of the towns' travel related businesses
- (4) the bypass town as a whole

In this study, the travel-related industries are defined as including restaurants, convenience stores, auto and truck repair shops, and motels. The study included in-depth analysis of nine Kansas towns located in the eastern

half of Kansas, all of which had bypasses constructed near them during the 1990s. Seven of the nine bypasses are U.S. highways. The towns, bypass highways, and their 2000 populations are listed in the table below.

METHODOLOGY AND DATA

Before discussing the methodology employed to achieve objective 1, it is useful to review the reasons for measuring the impact of highway bypasses on total employment of bypass towns. The survey of owners and managers of travel-related firms located in bypass towns indicated the effect of the bypass on employment of their company. However, the travel-related sector is just a part, although an important part, of the total local economy. Furthermore, the impact of the bypass on the non-travel related businesses could be different from that of the travel-related sector. Another reason for focusing on total employment is that employment data is the only data available for small towns on a monthly, quarterly, and annual basis.

Objective 1 was accomplished with regression analysis. To measure the impact of the bypasses on the total employment of bypass towns, each of the sample bypass towns was matched with a group of control towns (i.e., each bypass town had more than one control town). The objective was to select control towns that are as similar as possible to the bypass town, with the major difference being the absence of a bypass in the control towns. It was assumed that economic factors affect total employment in the bypass and con-

| Bypass Town | Bypass Route | Year 2000 Population | Year Bypass Opened |
|-------------|--------------|----------------------|--------------------|
| Cedar Vale | U.S. 166 | 723 | 1997 |
| Cherryvale | U.S. 169/160 | 2,386 | 1998 |
| Fredonia | U.S. 400 | 2,600 | 1998 |
| Haven | Kansas 96 | 1,175 | 1998 |
| Peabody | U.S. 50 | 1,384 | 1998 |
| Pleasanton | U.S. 69 | 1,387 | 1990 |
| Sedan | U.S. 166 | 1,342 | 1997 |
| Towanda | Kansas 254 | 1,338 | 1998 |
| Troy | U.S. 36 | 1,054 | 1991 |

control towns in a similar manner. Thus, any difference in total employment between the sample bypass town and its control towns following bypass construction is attributable to the bypass.

Potential control towns were those located in the same region of Kansas as the bypass town. Thus if the bypass town was located in southeast Kansas, the corresponding control towns had to be located in southeast Kansas as well. None of the bypass or control towns is located on an Interstate system highway or near a large metropolitan area. Although socioeconomic data for small towns is limited, population, employment, and state retail sales tax collection data is available for all Kansas towns. The Labor Market Information Service of the Kansas Department of Human Resources collects employment and payroll data which can be grouped by zip codes and thus related to each town in Kansas. The Kansas Department of Revenue has state sales tax collection data for each town in Kansas starting in November 1999. Decennial population data is available from the U.S. Bureau of the Census for every incorporated town in the United States.

The impact of the highway bypasses on total employment of the bypass towns is measured with a dummy variable. This variable has a value of zero for all years in the estimation period prior to construction of the bypass and a value of 1.0 for all years following the completion of the bypass. If the bypass was completed in the first six months of the year, the dummy variable had a value of 1.0 for that year. In contrast, if the bypass was completed in the last six months of the year, the value of the dummy variable is zero for that year.

There is no a priori relationship between the dummy variable and total employment in the bypass town. If the bypass resulted in less traffic congestion, improved safety, fewer vehicle emissions, less noise, and improved highway access for the town's businesses, the town may attract new business and the regression coefficient of the dummy variable would be positive. On the other hand, if reduced non-

resident auto traffic reduces sales and employment of travel-related business firms, ultimately leading to closure of these firms, the coefficient of the dummy variable would be negative.

The total employment data for the bypass and control towns was the ES-202 data collected by the Kansas Department of Human Resources in order to administer the unemployment compensation tax. The dataset consists of detailed firm level records that include employment of the firm for each month. Each record also contains the Standard Industry Code (SIC) of the firm and its name and address. Total average annual employment for the small Kansas towns in the sample can be obtained since the data is classified by zip code. Thus total average annual employment for the bypass and control towns is computed by adding the monthly employment data and dividing by 12. The database excludes employment of persons not subject to the unemployment insurance tax. The most important group in this category for purposes of this study is sole proprietorships since some of the travel-related firms are owned and operated by one person.

Average annual total employment of each bypass town was regressed on average annual total employment of its control towns and the bypass dummy variable. The equations were estimated by ordinary least squares (OLS) regression for the 1988-2001 period. The only exception was the Troy equation which was estimated for the 1988-2000 period. This was necessary since the 2001 total employment data of one of the Troy control towns was inconsistent with previous employment of the town.

Objectives 2, 3, and 4 were accomplished by interviewing 54 travel-related business owners and managers located in the nine bypass towns. To confirm information obtained in the interviews, a questionnaire (see Appendix A) was also distributed to these business representatives and 35 of them were returned for a response rate of 65%.

EMPIRICAL RESULTS – IMPACT OF BYPASSES ON TOTAL EMPLOYMENT OF BYPASS TOWNS

Time trends were plotted for total average annual employment of the bypass and control towns for the 1988-2001 period. Examination of the time trends did not indicate obvious differences in total employment trends of the bypass and control towns following construction of the bypasses. Thus regression analysis was employed to determine if bypasses had a statistically significant impact on total employment of the bypass towns.

Total average annual employment data of the bypass towns were regressed on total average annual employment of their respective control towns and a dummy variable representing the effect of the bypass on total employment. It is assumed that local and national economic factors will affect the bypass towns and the control towns in a similar manner. Thus, the theoretically expected sign is positive for the coefficients of the control town total employment variables. As noted above, the expected sign of the bypass dummy variable is indeterminate. The estimated equations are in Table 1.

In general, the equations have a good fit with all of the adjusted R²s > 0.72, except for the Cherryvale total employment equation. Five of the equations have adjusted R² > 0.80. None of the equations have statistically significant serial correlation as indicated by the Durbin-Watson statistics. A total of 72% of the coefficients of the control town total employment variables had the expected positive sign, and about 44% of the positive coefficients were statistically significant. Only one of the control town total employment variables had a statistically significant negative coefficient.

The sign of the coefficient of the dummy variable was negative in five equations and positive in four cases. However, the dummy variable was statistically significant only in the Fredonia equation, and the impact on total employment was negative. Thus the statistical results are consistent with the hypoth-

esis that the bypasses did not have a statistically significant effect on total employment of the bypass towns.

As is generally the case with dummy variables it can't be claimed with certainty that the variable actually measures what it is hypothesized to measure. It is possible that the dummy variable reflects other events that occurred in the bypass towns during the period following completion of the bypass, such as the closure of a major employer or location of new businesses in the town. However, employing accepted, standard statistical procedures, it does not appear that the bypass had a significant impact on total employment of the bypass towns.

EMPIRICAL RESULTS—TOTAL SAMPLE OF TRAVEL-RELATED FIRMS

The travel-related firms in the survey were grouped into four categories which were restaurants, convenience stores, auto and truck repair shops, and motels. The number of firms in each category and the industry percentage distribution of the sample firms are as follows:

| Industry Category | Number of Firms | Percent of Total Firms |
|-----------------------------|------------------------|-------------------------------|
| Restaurants | 23 | 43% |
| Convenience Stores | 14 | 26% |
| Auto and Truck Repair Shops | 14 | 26% |
| Motels | 3 | 5% |
| Total | 54 | 100% |

Impact of the Bypasses on Retail Sales. The business owners and managers were asked a series of questions concerning the impact of the highway bypasses on their firm's retail sales. The first question was "since completion of the highway bypass my company's sales have increased, decreased, or stayed the same." A total of 55% of the sample firm representatives said their sales decreased, 26% said sales had increased, and 19% indicated no change in sales.

Next, the business owners and managers were asked their opinions concerning the impact the bypass had on their company's retail

Table 1: Bypass Town Total Employment Regression Results

| Independent Variable | Bypass Towns | | | | | | | | | |
|----------------------|------------------|------------------|--------------------|----------------|-----------------|------------------|------------------|-------------------|------------------|--|
| | Cedar Vale | Cherryvale | Fredonia | Haven | Peabody | Pleasanton | Sedan | Towanda | Troy | |
| INTERCEPT | -60.5 (-0.40) | 348.5 (1.58) | 842.8* (2.83) | 97.5 (0.86) | 95.3* (2.39) | 334.6* (2.76) | 449.2* (2.30) | 295.5 (1.08) | 184.9* (2.41) | |
| BYPASS | -0.49 (-0.01) | -62.9 (-1.22) | -265.3* (-2.64) | 16.1 (0.28) | 15.8 (0.82) | 80.2 (1.28) | -70.5 (-1.60) | -235.9 (-1.51) | 19.1 (0.85) | |
| UDALL | 1.32** (3.68) | | | | | | | | | |
| THA | -0.36 (-0.53) | | | | | | | | | |
| HOW | 0.24 (0.54) | | | | | | | | | |
| CAN | | 0.04 (0.23) | | | | | 0.24* (2.08) | | | |
| OSW | | 0.02 (0.09) | | | | | 0.02 (0.10) | | | |
| YAT | | 0.07 (0.32) | | | | | 0.54** (3.05) | | | |
| NEO | | 0.15* (2.21) | | | | | | -0.20 (-0.91) | 0.08* (2.63) | |
| EUR | | | -0.25 (-1.02) | | | | | | | |
| BUR | | | 0.06 (1.30) | | | | | | | |
| GIR | | | 0.146 (1.45) | | | | | | | |
| BAX | | | 0.21 (1.63) | | | | | | | |

Table 1: Bypass Town Total Employment Regression Results (continued)

| Independent Variable | Bypass Towns | | | | | | | | | | | | | |
|----------------------|--------------|------------|----------|------------------|------------------|------------|-------|---------|------|--|--|------------------|--|----------------|
| | Cedar Vale | Cherryvale | Fredonia | Haven | Peabody | Pleasanton | Sedan | Towanda | Troy | | | | | |
| ELL | | | | -0.17 (-0.71) | | | | | | | | | | |
| AND | | | | 0.69* (1.93) | | | | | | | | | | |
| HAL | | | | 0.20** (4.15) | | | | | | | | | | |
| INM | | | | | 0.30 (1.74) | | | | | | | | | |
| MOU | | | | | 0.13* (2.40) | | | | | | | | | |
| SEDG | | | | | -0.11 (-0.90) | | | | | | | -0.10 (-0.21) | | |
| WEL | | | | | | | | | | | | | | |
| CHE | | | | | | | | | | | | | | |
| OX | | | | | | | | | | | | | | |
| COTF | | | | | | | | | | | | | | |
| STR | | | | | | | | | | | | | | |
| FLO | | | | | | | | | | | | | | |
| EFF | | | | | | | | | | | | | | 0.13 (0.46) |

Table 1: Bypass Town Total Employment Regression Results (continued)

| Independent Variable | Bypass Towns | | | | | | | | | |
|-------------------------|--------------|------------|----------|-------|---------|------------|-------|---------|------------------|--|
| | Cedar Vale | Cherryvale | Fredonia | Haven | Peabody | Pleasanton | Sedan | Towanda | Troy | |
| ONA | | | | | | | | | 0.13** (4.76) | |
| WES | | | | | | | | | 0.01 (0.05) | |
| Adjusted R-Square | 0.72 | 0.48 | 0.76 | 0.80 | 0.91 | 0.72 | 0.82 | 0.96 | 0.89 | |
| Durbin-Watson Statistic | 2.09 | 1.86 | 2.25 | 1.55 | 1.96 | 1.96 | 2.08 | 2.25 | 2.80 | |

t statistics in parentheses

* - statistically significant at .05 level

** - statistically significant at .01 level

See Appendix B for independent variable definitions

sales during the 1999-2001 period. The alternative responses were major, minor, or no effect. The three alternatives were not defined in terms of specific monetary amounts, but rather the perceptions of the individual respondents. A majority of the respondents (55%) perceived that the bypass had a major effect on sales, an additional 24% thought the bypass had a minor effect, and the remaining 21% reported that the bypass had no effect on their sales.

The business owners and managers were asked if they thought the retail sales of their firm would have been higher if the bypass had never been built. A total of 76% of the sample responded in the affirmative. Only 11% thought sales would not have been higher and 11% were uncertain.

Impact of the Bypasses on Employment.

The respondents were asked if employment in their company had changed since completion of the bypass. A majority of the firms (56%) experienced no change in employment while 33% reported a decrease, and the remaining 11% had an increase in employment.

The business owners and managers were asked their opinions concerning the effect the bypass had on their company's employment during the 1999-2001 period. The alternative responses were major, minor, or no effect. The three alternatives were not defined in terms of specific numbers of employees, but rather the perceptions of the individual respondents. A majority of the respondents (54%) thought the bypass had no effect on employment, 28% reported that the bypass had a major effect, and 18% of the firm representatives thought the bypass had a minor effect on company employment.

The business owners and managers of the travel-related firms were asked if they thought employment in their company would have been higher in the 1999-2001 period if the bypass had never been built. Almost half the

respondents (49%) thought employment in their company would have been greater if the bypass had never opened. A total of 36% of the firm representatives thought employment in their company would not have been greater, and 15% were uncertain of the impact on employment.

Impact of the Bypass on the Town. The business owners and managers of the travel-related firms in the bypass towns were asked their opinions concerning the impact of the bypass on the town as a whole. The responses are summarized as follows:

| Impact of the Bypass on the Town | Percent of Respondents |
|---|-------------------------------|
| Negative Effect | 67% |
| Positive Effect | 14% |
| Both Positive and Negative Effects | 9% |
| Uncertain | 7% |
| No Effect | 2% |

Thus, two-thirds of the respondents thought bypasses had a negative effect on the town as a whole. About one-fourth of the firm representatives had the opinion that the bypass either had a positive impact or both positive and negative impacts. The business owners and managers that thought the bypass had a negative impact on the town stressed the reduction in demand for travel-related business, the closure of many businesses, the lack of signs on the bypass to inform motorists of the businesses located in the bypass town, and the placement of the bypass several miles from the bypass town. The business owners and managers who cited the positive impacts of the bypass on the town stressed the reduction in noise and traffic congestion, improved traffic safety, development of new businesses, and improved accessibility to other cities in the area.

**EMPIRICAL RESULTS –
INDUSTRY GROUP VARIATION
OF BYPASS IMPACTS**

Although all 54 firms in the sample are travel-related businesses, there was considerable variation in opinion regarding the impact of the bypass on retail sales, employment, and the town among the four industry groups.

Industry Variation in Impact of the Bypass on Retail Sales. To assess the impact of the bypass on retail sales the business owners and managers of the travel-related firms were asked the following question. “Which of the following concerning the impact of the highway bypass on your company’s sales in the 1999-2001 period is correct?”

The possible responses were no effect, minor effect, and major effect. As for the total sample, the three alternatives are not defined in terms of specific monetary amounts, but rather in terms of the perceptions of the individual respondents. The responses by industry group are listed in the following table.

| Response | Total Sample | Restaurants | Convenience Stores | Auto and Truck Repair Shops | Motels |
|-----------------|---------------------|--------------------|---------------------------|------------------------------------|---------------|
| No Effect | 21% | 9% | 7% | 58% | 0 |
| Minor Effect | 24% | 36% | 7% | 21% | 33% |
| Major Effect | 55% | 55% | 86% | 21% | 67% |

The data reveal that a relatively low percentage (compared to that of the total sample) of representatives of restaurants, convenience stores, and motels thought they experienced no effect on sales as a result of the bypass. In contrast, a much higher relative percentage of the auto and truck repair shop

owners perceived no effect on sales. A comparatively higher percentage of the restaurant and motel owners and managers had the opinion that the bypass had a minor effect on sales, whereas a relatively low percentage of convenience store representatives thought that the bypass had a minor effect. A much higher percentage of the representatives of the convenience stores and motels had the opinion that the bypass had a major impact on sales, while the auto and truck repair shops as a group had a relatively low percentage of firms perceiving a major bypass-related effect on sales.

To further examine the impact of the highway bypass on retail sales the respondents were asked the following question: “If the highway bypass had never been built, would the retail sales of your company be higher during the 1999-2001 period?”

The alternative responses were yes, no, or uncertain. The percentage of the firms in each industry group selecting the various responses are shown in the table at the bottom of the page.

The data indicates that relative to the percentage responses of the total sample, a comparatively high percentage of the owners and managers of convenience stores and motels had the opinion that sales would have been higher if the bypass had never been built. In contrast, a relatively low percentage of the

| Response | Total Sample | Restaurants | Convenience Stores | Auto and Truck Repair Shops | Motels |
|-----------------|---------------------|--------------------|---------------------------|------------------------------------|---------------|
| Yes | 76% | 82% | 93% | 42% | 100% |
| No | 13% | 9% | 7% | 29% | 0 |
| Uncertain | 11% | 9% | 0 | 29% | 0 |

owners of the auto and truck repair firms thought that their sales would have been higher. The auto and truck repair industry group also had a relatively high percentage of negative and uncertain responses to the question.

The pattern of industry group responses is similar to that of the previous two questions when the two questions are combined. That is, we calculated the number of firm representatives in the four industry groups who thought that the bypass had a major impact on their company's sales, and that their firm's sales would have been higher in the 1999-2001 period if the bypass had never been built. The percentages of owners and managers by industry group who answered the two questions in this manner are as follows:

| | |
|-----------------------------|-----|
| Restaurants | 44% |
| Convenience Stores | 79% |
| Auto and Truck Repair Shops | 7% |
| Motels | 67% |
| Total Sample | 44% |

Thus, a relatively high percentage of the firm representatives of the convenience stores and motels thought the bypass had a major impact on their firm's sales, and that sales would have been higher in 1999-2001 in the absence of the bypass. Only 7% of the owners of the auto and truck repair shops agreed.

Industry Variation in the Impact of the Bypass on Employment. To measure the impact of the highway bypass on employment, the owners and managers of the travel-related firms were asked the following question. "Which of the following concerning the effect of the highway bypass on your company's employment during the 1999-2001 period is correct?"

The alternative responses to the question were no effect, minor effect, or major effect. The three alternatives are not defined in terms of specific numbers of employees, but rather the perceptions of the individual respondents. The responses of the various industry groups are listed in the table below.

The data indicates that a relatively high percentage (compared to the total sample) of the owners of the auto and truck repair shops and the motels thought that the bypass had no effect on their firm's employment. In contrast, the convenience store industry group had a relatively low percentage of respondents that perceived no effect of the bypass on employment, and a relatively high percentage of firm representatives that thought the bypass had a major effect on employment. A relatively low percentage of the owners of the auto and truck repair shops and the motels had the opinion that the bypass had a major effect on company employment.

| Response | Total Sample | Restaurants | Convenience Stores | Auto and Truck Repair Shops | Motels |
|-----------------|---------------------|--------------------|---------------------------|------------------------------------|---------------|
| No Effect | 54% | 48% | 43% | 72% | 67% |
| Minor Effect | 18% | 22% | 14% | 14% | 33% |
| Major Effect | 28% | 30% | 43% | 14% | 0 |

To further measure the impact of highway bypasses on industry employment, the survey respondents were asked the following question. "If the bypass had never been built, would employment of your company been higher during the 1999-2001 period?"

The potential responses to the question were yes, no, or uncertain. The percentages of the firms of the four industry groups that selected the various responses are listed in the following table.

The data indicate that a much higher percentage of (relative to the total sample) the owners and managers of convenience stores and motels thought that their firm's employment would have been higher if the bypass had never been built. In contrast, the auto and truck repair industry group had a relatively low percentage of firm owners that thought they would have had higher employment in

had major impact on their company's employment, and that their firm's employment would have been higher in the 1999-2001 era if the bypass had not been built. The percentages of firm representatives by industry group who answered the two questions in this manner is as follows:

| | |
|-----------------------------|-----|
| Restaurants | 30% |
| Convenience Stores | 43% |
| Auto and Truck Repair Shops | 7% |
| Motels | 33% |
| Total Sample | 28% |

Thus, a relatively high percentage of the owners and managers of the convenience stores thought the bypass had a major impact on their firm's employment, and that employment would have been higher in 1999-2001 in the absence of the bypass. As was the case with retail sales, only 7% of the owners of the auto and truck repair shops agreed.

| Response | Total Sample | Restaurants | Convenience Stores | Auto and Truck Repair Shops | Motels |
|-----------------|---------------------|--------------------|---------------------------|------------------------------------|---------------|
| Yes | 49% | 50% | 72% | 21% | 67% |
| No | 36% | 32% | 14% | 65% | 33% |
| Uncertain | 15% | 18% | 14% | 14% | 0 |

the absence of the bypass. A relatively low percentage of the respondents in the convenience store group had the opinion that their company employment would not have been higher if the bypass had never opened, while a relatively high percentage of the owners in the auto and truck repair group had this opinion.

As with retail sales, we calculated the number of owners and managers in the four industry groups who thought that the bypass

Industry Variation in the Impact of the Bypass on the Town. The owners and managers of the 54 travel-related firms were asked to assess the impact of the bypass on their town as a whole. The potential responses were negative effect, positive effect, negative and positive effect, no effect, or uncertain. The percentages of the firms in each industry group that selected the various alternatives are listed in the table below.

| Response | Total Sample | Restaurants | Convenience Stores | Auto and Truck Repair Shops | Motels |
|----------------------------|---------------------|--------------------|---------------------------|------------------------------------|---------------|
| Negative Effect | 67% | 73% | 80% | 47% | 67% |
| Positive Effect | 14% | 4% | 20% | 27% | 0 |
| Positive & Negative Effect | 9% | 14% | 0 | 7% | 33% |
| No Effect | 2% | 0 | 0 | 7% | 0 |
| Uncertain | 7% | 9% | 0 | 13% | 0 |

Analysis of the above data indicates that a relatively large percentage of the owners and managers of the convenience stores perceived that the bypass had a negative effect on their town, while a relatively small percentage of the auto and truck repair firm owners thought the bypass had a negative impact. A relatively small percentage of the restaurant and motel owners thought that the bypass had a positive effect on their town, while a relatively large percentage of the owners of auto and truck repair shops thought that the bypass had a positive effect.

CONCLUSION

The results of the regression analysis of the impact of bypasses on total employment of bypass towns were consistent with the results of previous studies. That is, the statistical results are consistent with the conclusion that the bypasses did not have a statistically significant effect, either positive or negative, on total employment in the bypass towns. In eight of the nine bypass towns the bypass dummy variable was not statistically significant. The sole exception was Fredonia as the bypass dummy variable was negative and statistically significant at the .05 probability level.

The owners and managers of 54 travel-related business firms in nine Kansas bypass towns were interviewed to obtain their opinions concerning the impact of the highway bypass on their company's retail sales, employment, and impact on the town as a whole.

Most of the respondents perceived that the bypasses had a negative impact on the retail sales and employment of travel-related businesses in the nine bypass towns. About three-fourths (76%) of the firm representatives thought their retail sales would have been higher in the 1999-2001 period if the bypass had never opened. About half the business owners and managers thought their company's

employment would have been higher in the 1999-2001 era in the absence of the bypass. A large majority (67%) of the firm representatives thought the bypass had a negative impact on the town as a whole.

There was substantial variation in opinion regarding the impact of the bypass on retail sales and employment among the four industry groups in the sample. Based on the views of the respondents, the bypasses appear to have a greater negative effect on the sales and employment of the convenience stores and motels than the auto and truck repair firms. Also, a relatively high percent of the owners and managers of the convenience stores and restaurants thought the bypass had a negative impact on the town as a whole, while the owners of the auto and truck repair firms were more likely to view the impact of the bypass on the town as positive.

The regression analysis found that in eight of nine cases the bypass did not have a statistically significant effect on total employment of the town. However, 76% of the owners and managers of 54 travel-related businesses in the nine bypass towns had the opinion that they would have had higher retail sales in the 1999-2001 period if the bypass had never been built. Many of these firms changed their business strategies after the bypass opened such as offering new products and services not previously available to the local market. However, the ability of a travel-related business to increase sales in a local market is limited. The loss of transient auto traffic permanently reduces the demand for travel-related business located in a bypass town. Of course, an alternative adjustment for travel-related business is to relocate to the bypass. Very little of this occurred in the 1999-2001 period in the nine bypass towns. Only four travel-related firms opened for business on the bypasses during the period.

APPENDIX A. Kansas Highway Bypass Impact Study Questionnaire

I. General Questions

1. What is the name and location of your company?
 - (a) Company Name
 - (b) Company Location
2. What is the primary business of your company?
3. How many years has your firm been in its current location?
4. How many locations does your firm have in Kansas?
5. Has your firm changed locations in the last five years? (i.e. since 1997)
 - (a) Yes
 - (b) No
6. If the answer to question 5 is yes, what were the principal reasons for relocation?
7. If the answer to question 5 is yes, did the completion of the highway bypass in 1998 have an impact on your decision to relocate?
 - (a) Yes
 - (b) No
8. How dependent is your business on non-resident auto traffic passing through town?
 - (a) Very dependent
 - (b) Somewhat dependent
 - (c) Not at all dependent

II. Impact of Highway Bypass on Retail Sales

9. Since completion of the highway bypass in 1998 my company's retail sales have:
 - (a) increased
 - (b) decreased
 - (c) stayed the same
10. If retail sales of your firm have increased since the completion of the highway bypass in 1998, by how much have sales increased in the 1999-2001 period?
 - (a) 1% to 5%
 - (b) 6% to 10%
 - (c) 11% to 15%
 - (d) 16% to 20%
 - (e) more than 20%
11. If the retail sales of your company have decreased since the completion of the highway bypass in 1998, by how much have sales decreased in the 1999-2001 period?
 - (a) 1% to 5%
 - (b) 6% to 10%
 - (c) 11% to 15%
 - (d) 16% to 20%
 - (e) more than 20%

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12. Which of the following concerning the impact of the highway bypass on your company's retail sales during the 1999-2001 period is correct? Check the response that best applies to your situation.
- (a) the bypass had no effect on sales
 - (b) the bypass had a minor effect on sales
 - (c) the bypass had a major effect on sales
13. If the answer to question 12 is (b) or (c), when did the greatest impact on your company's retail sales occur? Check the one response that best applies to your situation.
- (a) 1998
 - (b) 1999
 - (c) 2000
 - (d) 2001
 - (e) the impact was the same in all the above years
14. If the highway bypass had never been built, would the retail sales of your company been higher during the 1999-2001 period?
- (a) yes
 - (b) no
 - (c) uncertain

III. Impact of Highway Bypass on Employment

15. Since completion of the highway bypass in 1998, my company's employment has:
- (a) increased
 - (b) decreased
 - (c) stayed the same
16. If the employment of your firm has increased since completion of the highway bypass in 1998, by how much has employment increased during the 1999-2001 period?
- (a) one additional employee
 - (b) two additional employees
 - (c) three additional employees
 - (d) four additional employees
 - (e) more than four additional employees
17. If the employment of your firm has decreased since completion of the highway bypass in 1998, by how much has employment decreased during the 1999-2001 period?
- (a) one less employee
 - (b) two less employees
 - (c) three less employees
 - (d) four less employees
 - (e) more than four less employees
18. Which of the following concerning the effect of the highway bypass on your company's employment during the 1999-2001 period is correct? Check the response that best applies to your situation.
- (a) the bypass had no effect on employment
 - (b) the bypass had a minor effect on employment
 - (c) the bypass had a major effect on employment

19. If the answer to question 18 is (b) or (c) when did the greatest impact on your company's employment occur? Check the response that best applies to your situation.
- (a) 1998
 - (b) 1999
 - (c) 2000
 - (d) 2001
 - (e) the impact was the same in all the above years

20. If the bypass had never been built, would employment of your company been higher during the 1999-2001 period?
- (a) yes
 - (b) no
 - (c) uncertain

IV. Impact of Highway Bypass on Labor Cost per Employee

21. Since completion of the highway bypass in 1998 my firm's labor cost per employee has:
- (a) increased
 - (b) decreased
 - (c) stayed the same
22. If the labor cost per employee of your company increased since completion of the highway bypass in 1998, by how much has labor cost per employee increased during the 1999-2001 period?
- (a) 1% to 5%
 - (b) 6% to 10%
 - (c) 11% to 15%
 - (d) 16% to 20%
 - (e) more than 20%
23. If the labor cost per employee of your company decreased since completion of the highway bypass in 1998, by how much has labor cost per employee decreased during the 1999-2001 period?
- (a) 1% to 5%
 - (b) 6% to 10%
 - (c) 11% to 15%
 - (d) 16% to 20%
 - (e) more than 20%
24. Which of the following concerning the impact of the highway bypass on your company's labor cost per employee during the 1999-2001 period is correct? Check the response that best applies to your situation.
- (a) the bypass had no effect on labor cost per employee
 - (b) the bypass had a minor effect on labor cost per employee
 - (c) the bypass had a major effect on labor cost per employee

V. Summary

25. On balance, the highway bypass has positively affected the town (i.e. less traffic congestion, improved safety, fewer vehicle emissions, improved access for the town's businesses)? Do you agree?

- (a) yes
- (b) no
- (c) uncertain

26. On balance, the highway bypass has negatively affected the town (i.e. reduced non-resident auto traffic)? Do you agree?

- (a) yes
- (b) no
- (c) uncertain

APPENDIX B. Independent Variable Definitions for Table 1Cedar Vale

| | |
|--------|--|
| UDALL | Udall, Kansas Total Employment |
| THA | Thayer, Kansas Total Employment |
| HOW | Howard, Kansas Total Employment |
| BYPASS | Bypass Dummy Variable, Equal to 1.0 for 1998-2001, Zero in Other Years |

Cherryvale

| | |
|--------|--|
| CAN | Caney, Kansas Total Employment |
| OSW | Oswego, Kansas Total Employment |
| YAT | Yates Center, Kansas Total Employment |
| NEO | Neodesha, Kansas Total Employment |
| BYPASS | Bypass Dummy Variable, Equal to 1.0 for 1999-2001, Zero in Other Years |

Fredonia

| | |
|--------|--|
| EUR | Eureka, Kansas Total Employment |
| BUR | Burlington, Kansas Total Employment |
| GIR | Girard, Kansas Total Employment |
| BAX | Baxter Springs, Kansas Total Employment |
| BYPASS | Bypass Dummy Variable, Equal to 1.0 for 1999-2001, Zero in Other Years |

Haven

| | |
|--------|--|
| ELL | Ellinwood, Kansas Total Employment |
| AND | Andale, Kansas Total Employment |
| HAL | Halstead, Kansas Total Employment |
| BYPASS | Bypass Dummy Variable, Equal to 1.0 for 1999-2001, Zero in Other Years |

Peabody

| | |
|--------|--|
| INM | Inman, Kansas Total Employment |
| MOU | Moundridge, Kansas Total Employment |
| SEDG | Sedgwick, Kansas Total Employment |
| BYPASS | Bypass Dummy Variable, Equal to 1.0 for 1999-2001, Zero in Other Years |

Pleasanton

| | |
|--------|--|
| NEO | Neodesha, Kansas Total Employment |
| YAT | Yates Center, Kansas Total Employment |
| WEL | Wellsville, Kansas Total Employment |
| BYPASS | Bypass Dummy Variable, Equal to 1.0 for 1991-2001, Zero in Other Years |

Sedan

| | |
|--------|--|
| CAN | Caney, Kansas Total Employment |
| YAT | Yates Center, Kansas Total Employment |
| CHE | Chetopa, Kansas Total Employment |
| OSW | Oswego, Kansas Total Employment |
| BYPASS | Bypass Dummy Variable, Equal to 1.0 for 1998-2001, Zero in Other Years |

Towanda

| | |
|--------|--|
| SEDG | Sedgwick, Kansas Total Employment |
| OX | Oxford, Kansas Total Employment |
| COTF | Cottonwood Falls, Kansas Total Employment |
| STR | Strong City, Kansas Total Employment |
| FLO | Florence, Kansas Total Employment |
| BYPASS | Bypass Dummy Variable, Equal to 1.0 for 1999-2001, Zero in Other Years |

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Troy

| | |
|--------|--|
| EFF | Effingham, Kansas Total Employment |
| ONA | Onaga, Kansas Total Employment |
| WES | Westmoreland, Kansas Total Employment |
| BYPASS | Bypass Dummy Variable, Equal to 1.0 for 1991-2001, Zero in Other Years |

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