TRANSFER PAYMENT IMPACTS ON RURAL RETAIL MARKETS: A REGRESSION ANALYSIS

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Introduction

Retail sales in nonmetropolitan areas are especially sensitive to changes in consumer income and spending habits, competing markets and tourism. When any one of the major factors influencing retail sales volume expresses rates of uncommon change, community economists, local leaders and merchants attempt to explain, mitigate and adjust to the impacts of change. The maintenance and enhanced viability of a rural community's retail sector greatly lends to its character, function and definition, thus a critical examination of factors affecting such activity is being taken. Although changes in retail activity are of concern to many at local levels, the external forces affecting local conditions also become of interest to state and national policy makers. The external and internal relationships of community economic phenomena will be demonstrated in this paper using transfer payments and retail sales as flow variables. Observing the community as a place where endogenous economic changes occur in response to exogenous factors, the following implicit functional relationship establishes the basis for the central problem. It is assumed that: local retail sales = f(the types and amounts of local personal income, the strength and convenience of competing retail markets, the influx of tourist trade, local spending leakages and the demographic characteristics of local residents). Thus a theory stating that changes in the types and amounts of local income and the character of the consumer will affect retail sales to a greater extent than other factors is being tested. Multiple regression analysis has been chosen here to derive income impact coefficients to test the hypothesis.

The following sections will review the methodology used along with underlying concepts of community economic analysis needed to support the model's logic. The data base used in the model will be carefully defined next along with its inherent problems and conditions. A brief summary of related research will then be reviewed to observe the conclusions made from similar hypotheses, and to build an understanding of the internal logic of the present model. Next, a presentation of the regression model's results will be made, the interpretations of its limitations and strengths. A reiteration of the a priori assumptions and hypotheses, a comparison of the final results with the original hypotheses, and other concluding remarks will then be made. Finally, a forward view will be taken with respect to the model's limitations, the residual questions that had precipitated during the research process and to the model's further applications.

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Methodology

Specifically measuring the effects of individual activities on the rest of a local economy has been done through a number of methods; however, the Leontief input-output analysis may be considered as being one of the more important and useful constructs. The input-output method assigns ratios or coefficients to each sector of the economy, describing the degree to which that sector is linked to the rest of the economy [8, p. 223]. The coefficients are derived through an elaborate process of tracing flows of dollars in an economy as its inputs and outputs are being bought and sold. The use of input-output analysis is best seen when a change in a particular sector is predicted, i.e., a manufacturing plant shutdown, with the implied multiplier effects on the rest of the economy being forecasted.

Park compared the Leontief method with the OLS regression analysis approach and found that regression coefficients were sensitive to the technical coefficients of input-output analysis [12, p 365]. Another researcher also observed that general linear single equation models are theoretically equivalent to traditional input-output models for localizing exogenous change [3, p. 458]. The input-output method can be useful for assessing localized exogenous impact; however, the process of deriving the coefficients can be very time consuming and costly. In lieu of creating an input-output model for rural Wisconsin, and judging the suitability of alternative measures, the multiple regression method of analysis is being used here to measure the different income impacts on retail sales.

The structure and implementation of this research effort involves the use of regression analysis in a pooled time series form, measuring the changes in sales and types of income in four groups of rural Wisconsin counties from 1965 through 1979. The problem of determining the magnitudes of impact on retail sales again is based on the assumption that sales are functions of local income changes and external market factors. The quantification of the effects of tourism, competition and other exogenous factors was done in a very general manner in this model, thus the empirical anaylsis here mainly involves the income variables.

Employment data has been used most often in economic base analysis because of its convenient availability. Weiss and Gooding asserted that income data would be preferable to employment data in multiplier analysis due to its greater sensitivity to economic change [19, p. 238]. It follows that income data more closely accounts for interregional flows of money in terms of payroll and sales when compared to employment data. Therefore, income as a measurement of local impact becomes superior to the use of employment data. Previous research has not made calculations identical to those herein, because only until recently disaggregated income data per source at the county level has not been available. Other economists have also favored the use of regression analysis and income data to derive "differential multipliers" due to the sensitivity to change that income has, vis-a-vis that of employment. In brief, a local predictor of exogenous change is being sought in this type of analysis.

4

Traditional community economic base analyses describe local economies in terms of basic and nonbasic sectors. It is the basic activities which bring outside dollars into the community in exchange for some locally produced or sold good or service. The nonbasic sector activities can be seen as serving local needs, thus not exporting any commodity. Tweeten expanded the definitions by including public assistance as an export or basic activity since outside dollars are being imported [15, p. 99]. It has been further postulated that the basic sector drives local economic growth whereas the nonbasic sector can be seen as a consequence of the basic growth. Thus, the effects of transfer payment income should be different than those of nonbasic sector income on a local economic activity such as retail. Accepting the tenet of local economic change being a function of local and nonlocal changes, the economic base concept asserts that nonlocal dollars received locally are expended in the forms of purchases and investments, which are further respent locally and nonlocally. The nonlocal spending of income, known as leakage, reduces the impact of such income in the community; the competing market component of the model contains the leakage factor, which has been generally minimized.

The methodology required the model to be expressed in regression equation terms for the derivation of impact coefficients. The model's dependent variables was retail sales value, whereas the independent variables were total transfer payment income, all other income, and two binary variables describing location. The model's formulation appears in its linear and additive expression in equation (1.1).

$$(1.1) \quad y = b_o + b_1 X_1 + b_2 X_2 + b_3 D_1 + b_4 D_2 + e$$

where y is the dependent variable representing local annual retail sales, b_o is the interrupt term, X_1 is the total transfer payment income variable, X_2 is the all other income variable (total minus transfer payments), D_1 is the north/south group dummy variable, D_2 is an east/west subgroup dummy variable, and e is the residual term. The b_1 and b_2 coefficients are the products of final interest, since they will be interpreted as the descriptors of income change impact on local activities.

The Data

The model was intended for use in the rural (nonmetropolitan) areas of Wisconsin isolated from large cities. Recall that market competition was one of the conditioning factors of local retail change. Thus the sample counties were carefully selected to minimize external market pull conditions, i.e. not being very close to a metropolitan area. It was felt that a rural county near a metropolitan county would have its local sales strongly affected by the nearby regional shopping centers. Furthermore, the chosen counties do not contain any relatively large cities, thus the intraregional cross-over effects between sample counties should not be extreme. The sample countries are in two distinct regions: one in northern Wisconsin and one in the southwestern part of the state, separated by a sizable distance as seen in Figure 1.

FIG. 1

Wisconsin Counties Used in Analysis

The secondary data gathered concerning the counties show that they are fairly homogeneous in terms of population and industrial mix, and are all fairly remote from urban areas. See Table 1 for a description of the sample counties. Moreover, Bluestone reported that 14 of the 20 sample counties had transfer payment income as the fastest growing source of income over a recent 15-year period [1, p. 12]. Since the counties are of different land area and population totals, all sales and income data were expressed on a per capita basis, thereby minimizing the effect of a larger or smaller than average county on the results. Within each region the counties were subgrouped into two sectors, east and west, to create four units of measure. The final four groups of county data were then averaged and tabled, which resulted in 60 observations from the 15-year period. The pooling technique actually creates a bridge between cross section and time series analysis, which can be both

useful and doubtful regarding econometric modelling. The pooling, as Dutta asserts: "makes it a relatively simple and attractive solution (to potentially multicollinearity problems); the technique leaves many questions in the process unanswered" [4, p. 155]. For the moment, regard the four sectors of data as groups of counties that are more homogeneous in character than would the 20 counties be as one aggregated group.

Table 1: Characteristics of the Sample Counties

County Name	Region	Sector	1965 Pop.*	1979 Pop.*	% Cge.	Leading† Income	Major‡ Industry	Tourism§ Rank
Adams	S	E	8,043	12,056	49.9	Other	Service	7
Ashland	N	W	17,440	16,031	-8.1	Transf.	Service	13
Barron	N	W	34,850	37,395	7.3	Transf.	Mfg.	40
Bayfield	N	W	11,910	13,103	10.0	Transf.	Service	9
Burnett	N	W	9,418	11,456	21.6	Transf.	Mfg.	18
Crawford	S	W	16,077	15,539	-3.3	Mfg.	Mfg.	52
Door	N	E	20,338	24,567	20.8	Mfg.	Mfg.	8
Forest	N	E	7,403	8,713	17.7	Transf.	Mfg.	47
Iron	N	E	6,668	6,565	-1.5	Transf.	Retail	10
Juneau	S	E	18,079	19,384	7.2	Transf.	Mfg.	2
Lafayette	S	W	18,117	18,320	1.1	Other	Retail	71
Marquette	S	E	8,511	10,334	21.4	Transf.	Mfg.	17
Monroe	S	W	32,175	34,350	6.7	Transf.	Mfg.	38
Oneida	N	E	23,106	30,379	31.5	Transf.	Retail	12
Price	N	W	14,589	15,326	5.1	Transf.	Mfg.	53
Richland	S	W	17,056	16,877	-0.1	Transf.	Mfg.	70
Sawyer	N	W	9,442	11,421	21.0	Transf.	Retail	4
Vernon	S	W	25,080	25,233	0.6	Transf.	Service	69
Vilas	N	E	10,107	15,504	53.4	Other	Retail	1
Washburn	N	W	10,658	12,660	18.8	Transf.	Retail	14

* Population Source: [20].

† Leading source of income = fastest growing source of income during 1965-1979, [1, p. 14]. Transf. = transfer payments.

‡ Major industry = major industrial sector having the greatest number of employees in the county in 1979, from [15].

§ Tourism rank = 1979 ranking of counties according to the sensitivity of local sales to tourism, from [18].

All data were taken from secondary published sources of public and private origin. Annual income figures were gathered from U.S. Department of Commerce Bureau of Economic Analysis reports and computer data base print-outs [17]. Sales data were derived from a commonly used private source which reports total annual retail sales volumes at the county level [13]. Population data used to express the terms in per capita values were taken from the Commerce Department reports as well.

Total local personal income is the aggregate of income reported by residents derived from all productive and nonproductive activities. Components of the production portion of personal income include wages and salaries from

7

current employment earned locally or elsewhere, and proprietors' income. Nonproductive or nonearned income can be divided into two categories, namely: transfer payments and property income. Transfer payment income is received in the forms of Social Security (SSI) payments, AFDC (aid to families with dependent children) checks, unemployment compensation, veterans benefits, private company retirement pensions, food stamps, and other similar forms of remuneration. Property income is derived from rental receipts, interest on assets, stock or bond dividends, royalties, or other income gained from property ownership.

Total income is disaggregated in this research effort primarily to measure the effects of transfer payments on retail sales, and secondarily to compare the relative differences in impact that each type of income has on sales. It was found that between 1968 and 1975 the nonmetropolitan area of the north central U.S. had an earned income growth rate of 82 percent, a transfer payment income growth rate of 181.40 percent and a property income growth rate of 95 percent [1, p. 8]. Overall personal income in the region increased by 92 percent during the same period, therefore transfer payments can be regarded as the fastest-growing source of income when compared to the total and to other types of income. Although transfer payment income is rapidly growing in rural areas of the region, it still accounts for only 12 percent of total personal income, whereas earned income accounts for 72 percent of total personal income [1, p. 8].

Observing the different rates of growth among the components of total income, the research question was further stimulated by examining the characteristics of the income recipients. Since the original assumption included changes in consumer income, spending habits, competing markets and tourism as forces acting on local sales, a brief analysis of the consumers will identify the relevance of targeting the research to one source of income. The data base used in this analysis revealed that 60 to 70 percent of all transfer payments were from retirement funds, dominated by SSI payments. In other research of retirement economies, it was found that of all retirees receiving income from at least one source in rural areas of Wisconsin, that 80 percent of them had SSI income, 46 percent had job pensions and 62 percent had property income [6, p. 8]. Judging from related research and distribution policies of pension funds, it is assumed that the majority of transfer payment income recipients are retired persons. Nonretirement related transfers are largely received by other groups of people not actively engaged in wage or salary employment, or who do not have earned income as their major source of income.

Characteristically, retired people are at least 60 to 65 years old and are assumed to be relatively less mobile than their younger counterparts. Research has found that the tendency to shop nonlocally increases with the distance driven to a person's place of work, but decreases with the person's age [2, p. 17]. Thus, taking these facts into account, a situation where transfer payment income changes will affect local sales differently when compared to nontransfer payment income changes can be hypothesized. The difference may be partially due to the habits of the income recipients; however, it is the

income and sales levels that have been quantified for analysis rather than the spending habits of different income recipients.

The problem with using some conventional secondary data lies in the place where the data were measured. Published income and employment data reflect only locally reported conditions; much of reported income could have been earned in other counties. Thus, not all of a community's income can be seen as a function of local sources or local employment. Employment data measures the number of full or part-time jobs held in the county, regardless of where the employee resides. The present model was seeking to identify only the impacts of locally earned or locally gathered income on retail sales. The adjustment needed to rectify this problem was not done here because an "income earned and gathered locally" data source was not located. Since the counties were carefully chosen to minimize the shopping leakage factor, it was also assumed that income earned nonlocally had been minimized as well.

Sales data is also reported on a local basis, regardless of where customers reside. Local purchases made from tourism can inflate local sales figures to volumes larger than what would normally be reported without tourism. In this context, tourism includes all local purchases made by nonresident shoppers, regardless of the leisure orientation. Traditional hospitality/recreation/tourism (HRT) economies in rural counties often have more developed service and retail sectors when compared to rural nontourist related economies. The influx of visitors to an area may create a condition whereby more and different types of retail and service activities can be supported in addition to what a "normal" rural population could support. Therefore an assumption suggesting different leakage factors in the presence of a dominant tourism economy can be made. Likewise it follows that nontourism related economies may have greater retail shopping leakages because of their fewer number and type of service and retail activities.

Correcting for the tourism effect on local retail sales was done through grouping counties and by weighing their group with a binary variable. Northern Wisconsin has been traditionally known as a vacation area; however, not all of the region's counties are equal in tourism impact. Likewise many other counties elsewhere in the state also have tourism related economic bases. In analyzing the sample's dependence on tourism, it was found that the northern group of counties had a mean rank in the upper second quartile of all counties in the state in terms of tourism impact on local sales [18]. The southern region had a mean rank below the state median, in the third quartile, and thus can be considered as being of lesser importance in terms of tourism, relative to the northern region. Regional location was then seen as a proxy for indicating tourism dependency, thus the binary variable D_1 having a northern bias was included in the model.

Another problem in the model and data lies in the income derived from retail activity. It was earlier assumed that retail sales are functions of personal income and habits, markets, and tourism. Part of earned personal income is derived from retail activities, i.e., clerks' wages and business owners' in-

9

comes. Furthermore, property income also includes rental receipts from retail properties. Thus it follows that part of total personal income is derived from retail activity, and part of total retail sales is a function of personal income. The bilateral flow of retail sales and retail sector income may be a source of potential multicollinearity; however, a suitable adjustment method for correcting this anomaly was not found. If earned and property income derived from local retail activities could be subtracted from sales, a potential measurement error in this model could be avoided. Limitations aside, the data used here provide a logical base around which the model can be built and tested.

Related Research

Other attempts have been made at measuring the impact of transfer payments and unilateral income changes on local economies; however, none found to date were identical in form to the model used here. Similarly constructed models approaching like-hypotheses have been tested and will be reviewed next for relative comparison.

A recent research effort derived regression coefficients describing transfer payment impacts on nonbasic employment changes. Hirschl found beta-values in the range of 0.251 to 0.253 in a large cross section analysis, implying the creation of approximately 250 nonbasic sector jobs as a result of $1,000,000 received locally in transfer payments [7, p. 26]. A particularly interesting result found in Hirschl's model was the relative magnitude of impact that transfer payments had compared to other factors. The results revealed that transfer payments were the most efficient generators of nonbasic employment growth when compared to other sources of income in rural areas. This observation is salient to the hypothesis being tested herein, since one type of income's change was having a marked impact on the economy, relative to other factors. A comparison of the Hirschl model to that found herein suggested that the scale of measurement was too different for their direct comparability; however, the relative importance of the transfer payment coefficient becomes the cogent point.

McNulty found in a 19-year time series analysis that transfer payments had a regression coefficient of 0.973 in determining service sector income changes; however, property income in his model showed a higher coefficient of 2.0 [10, p. 359]. Although McNulty's sample included only metropolitan areas, the implications are pertinent in terms of transfer payments having a dynamic role in local economic development. The structure and data sample of McNulty's model were also not directly comparable to those herein, thus its parameters were not seen in being potentially useful for testing in the present model.

A cross section analysis in rural Kentucky revealed a regression coefficient of 0.000226 in determining the number of new jobs as a result of $1,000,000 in transfer payments [14, p. 19]. The authors compared the derived coefficients of other sources of income and found them being as much as 100 times smaller than that of transfer payments. The authors also strongly noted the necessity of including transfer payments as a basic sector activity in commun-

ity economic base analyses. Neglecting their presence, Smith asserts, could be another potential source of biased estimators of the population when modelling the structure of the community economic base [14, p. 20].

The Kentucky model expressed a great difference in the coefficients when it was tested in different sizes of communities. The conclusion to the market size influence on the regression model in Kentucky was that leakage is greater in smaller communities, which may cause an upward bias on the regression coefficients. The differences between the Smith and the present models were also assumed to be too different for a direct comparison of estimated parameters. Thus, the Kentucky model was noted for the recurrent theme of the larger impact of transfer payments relative to other sources of income.

The indicators seen in this type of analysis imply that the impact of transfer payment income on local activity is positive and different relative to that of other variables. Harmston found similar results when in 1970 the incomes of elderly residents in a small Missouri community had an effect on the local economy that far exceeded the effects of any other group's income [5, p. 9]. Another researcher also found a similarly extreme result when an input-output analysis indicated that the equivalent of 60 new jobs were represented by the economic impact of one type of transfer payment (food stamps) in a rural Tennessee county [11, p. 28].

Although no direct comparison of the results of other regression analyses can be made with the present model, their implications can be theoretically seen. An interim conclusion that can be drawn at this point is mainly that transfer payment income changes have greater impacts on local economies when compared to other variables. Thus from the current body of related research and the logic proposed herein, it now follows that transfer payments are received from outside the community, mostly by retired persons who spend much of it in the community. The impacts of the transfer payments on retail activity can be measured via input-output or regression analysis methods. The derived coefficients then become statements about the specific relationships between different types of exogenous variables and endogenous activity, such as basic income and retail sales.

Model Results and Analysis

The original economic model stated that total local retail sales was a function of earned, transfer and property income, and tourism, all of which were included as independent variables in the regression equation. The regression equation's results are seen in equation 1.2.

$$(1.2) \quad Y = 0.241 + 1.0604X_1^* + 0.3039X_2^* + 0.3894D_1^* - 0.0067D_2$$
$$ (0.2341) \quad\quad (0.0785) \quad\quad (0.0750) \quad\quad (0.0594)$$

$R^2 = 91.6 \quad \overline{R^2} = 91.0 \quad S = 0.227 \quad SSR = 2.843 \quad d = 1.21$
$F = 150.02 \quad N = 60$

Y is the dependent variable of retail sales per capita, 0.241 is the constant b_o

intercept term, $1.0604X_1$ is the transfer payment income variable coefficient, $0.3039X_2$ is the all other income variable coefficient, $0.3894D_1$ is the north/south variable coefficient, and $-0.0067D_2$ is the east/west variable co-efficient. Standard deviations appear in the parentheses and the asterisk indicates t-test significance at the 0.05 level. The tests of significance used here are in the form of $H_o : \beta_n = 0$ found by: $b_n/s_n = t$. Values of t exceeding two indicates the rejection of the null hypothesis regarding the value of β_n being zero. Therefore the coefficients, except that of the east/west sector variable, are seen as reasonable proxies for their respective b_n values.

Jointly, a null hypothesis testing the significance of all the variables working together was seen in the form: $H_o : \beta_1 + \beta_2 + \beta_3 + \beta_4 = 0$. The rejection of this null hypothesis states that the independent variables collectively have an effect on the dependent variable. The usual F test used in this model refuted the null hypothesis. The hypotheses of transfer payment income, all other income, and the north/south difference being significant predictors of sales variation is upheld by the regression results. The adjusted R^2 was 91.0, giving the equation a fair amount of credence regarding its accuracy. A similar conclusion can be drawn from observing the model's S and SSR statistics. The standard error of the regression defines variability of the observed values about the calculated regression line, and the sum of squared residuals describes the extent of variation among the data's unexplained values. The low values of both of these characteristics indicate a minimized variation of the observed results about the derived regression line, further demonstrating their reliability.

The conventional test for autocorrelation, Durbin-Watson, was deemed inappropriate on account of the pooled time series format. The diagnostic d statistic is normally used to indicate positive autoregressiveness among pure time series analyses, thus its value becomes meaningless in this model. Conversely the scrutiny of heteroskedasticity, common to purely cross section analyses, also could not be positively asserted. Hence the problematic nature of pooled time series analysis. Despite the limitations of the regression results, they can facilitate the interpretation of one variable's impact on the dependent variable. The Chow Test was also used here, which enables one to determine the validity of applying pooled coefficients to its component groups [4, p. 173]. The derived Chow Test F statistic here did not exceed tabled values at the 0.05 level, thus the null hypothesis $H_o : (\beta_{01}, \beta_{11}) = (\beta_{02}, \beta_{11})$ was accepted, allowing the pooled regression coefficients to be applied to the component groups in a meaningful manner.

The tests of significance used here implied that β_n was significantly different from zero when b_n/s_n exceeded two. If possible, one would test values of the coefficients of parameters drawn from similar research efforts. As noted in the previous section, no other model found to date had similar enough data bases, structures or hypotheses to those found herein. Therefore, testing dissimilar coefficients against those derived here would most likely give nebulous results. Since the population parameters of this type of system are unknown, the coefficient values derived here will be temporarily accepted as the parameters.

A direct interpretation of the coefficients' values as impact indicators can now be done to address the initial hypothesis. It was originally hypothesized that transfer payment income was affecting local retail sales differently than were earned and property income, with the difference being due to the character of the income recipients. The regression model revealed a transfer payment coefficient of 1.0604, which can be considered to imply a $106.04 increase in local retail sales resulting from a $100.00 increase in transfer payments. Likewise, an additional $30.39 of retail sales would be theoretically seen as a result of a $100.00 increase in all other income. Comparing the 3:1 ratio of the different income effects, it can be concluded that a difference in impact on local sales from the different types of income does in fact exist. The value of the northern weighted binary variable would mainly be interpreted as shifting the regression line's intercept. Its value would be added to the intercept term when analyzing a northern group county, hence acting in-dependently from the income variables. These observations would be most accurate during the time period of analysis, therefore predictions concerning future negative impacts based on these parameters could be faulty.

The implications of the results herein are mainfold. Transfer payments are growing at faster rates than any other source of income in many rural counties. The retired sector of the population is also growing in marked rates in the nonmetropolitan areas. Although dollars are indifferent to their destination, it is the recipients of those dollars who make the differences concerning impact. Despite the retail effect of $100.00 of transfer payment income spending exceeding that of other income by a factor of three, it may be that recipients of transfer payments spend more of their disposable income on retail goods than do other people. The nonretail expenditures of the recipients of earned and property income may be largely in mortgages, other debt payments, or in investments. Furthermore, the relatively younger and more mobile recipients of earned and property income are assumed to have greater propensities to consume nonlocally than do the recipients of transfer pay-ments. Thus the total impact of the different incomes on the total economy cannot be intimated by the model's results. Katoona and Mueller found in their research of consumer behavior that long term expenditures, i.e. housing and large durables, varied negatively for groups of people over 55 years of age and that net income changes had the greatest effect on liquid savings [9, p. 341]. It then follows that retired people tend to spend less on durables and also change their saving habits after an income change, hence using more of their disposable income on retail purchases and service expenditures than their younger counterparts.

The regression equation of the model can be used to answer some questions regarding transfer payment income effects on retail sales. Although beset with limitations, the utility of the model lies in its evidence of the differing impacts on retail activity of different income types, as revealed by the coefficients.

Conclusion

The hypothesis testing results indicate that retail sales in nonmetropolitan Wisconsin have been influenced differently by different sources of income and by tourism factors. It was found in this analysis that income variations significantly explain retail sales variations. Moreover, the regression coefficients indicated that transfer payments had an effect on retail sales that differed from that of all other income by a factor of three. Tourism, as expressed in the model, had a significant effect on local sales and could be defined in terms of a county's location. Thus the original hypotheses of sales being functions of income and consumer mobility, transfer payments having a different impact relative to other types of income, and northern Wisconsin having a significant tourism impact on its economy were all supported by the results.

Since the regression equation was constructed with time series data from 1965 through 1979, the results should not be used in forecasting future change impacts. The habits and propensities of people regarding their retail expenditures may have changed over time and may still be changing. Competing markets, tourism, and other exogenous variables could also have changed since the model's time period, hence rendering the present model's results skeptical in terms of projected impacts.

Another limitation inherent to the model lies in its casual treatment of leakage and tourism. If specific indices of tourism dollar expenditures and residents' external spending were available, the current model could be more accurate for ex post predictions. The retail income-sales double flow rectification could also reduce the bias of the model. If income derived from sales, both earned and property, could be identified and subtracted from the income side of the equation, the model would then provide potentially less-biased results.

Further work in the pursuit of a more exact model of this type should begin with a rectification of the present model's limitations. A 300-observation case, for example, would ameliorate the problem of individual counties differing from their regional mean, and facilitate the use of conventional tests that were ruled out on account of the pooled data. A more specific adjustment for tourism and propensities to consume locally should also be considered in future models. Finally, a further disaggregation of income per source may give more indicators of how different employment groups spend their retail dollars. For example, if earned income was expressed in values per employment activity, the model may then describe the effects of manufacturing, construction, service, etc. derived income on retail sales. With this additional information, in lieu of input-output tables, the model would then be a more useful tool for community economic impact analysis. The disaggregation of transfer payment per source may also lend an insight to the consumption patterns of various dependent groups of people, since not all recipients of transfer payments are alike. One final enhancement of the model would involve the expansion of the dependent variable. Although retail sales are important to analyze in the community, a similar body of knowledge is also needed concerning investment, savings, and service sector expenditures among

different income groups of people. Limitations aside, the present model has accomplished the original objectives, and produced some meaningful results. Therefore, the model can be seen as a contribution to community economic analysis, and a signal for further research.

REFERENCES

1. Bluestone, Herman. *Income Growth in Non-Metro America,* 1968-75. Washington: U.S. Department of Agriculture, Economics, Statistics and Cooperatives Service, 1979.

2. Boehm, William T. and Martin T. Pond. "Job Location, Retail Purchasing Patterns, and Local Economic Development." *Growth and Change* 7 (January 1976): 7-19.

3. Braschler, Curtis C. "A Comparison of Least Squares Estimates of Regional Employment Multipliers with Other Methods." *Journal of Regional Science* 13 (1972): 457-468.

4. Dutta, M. *Econometric Methods.* Cincinnati: Southwestern Publishing Co., 1975.

5. Harmston, Floyd K. *A Study of the Economic Relationships of Retired People in a Small Community.* Columbia: University of Missouri, 1979. (Mimeographed).

6. Hewitt, Lynn J., Sydney D. Staniforth, and Rudolph A. Christiansen. *The Economic Impact of Retirement in the Resort Areas of Oneida and Vilas Counties, Wisconsin.* Madison: University of Wisconsin, College of Agriculture and Life Sciences, 1968. Research Report No. 34.

7. Hirschl, Thomas H., and Gene F. Summers. *Cash Transfers and the Export Base of Small Communities.* Madison: University of Wisconson, Department of Rural Sociology, 1982. (Mimeographed).

8. Hoover, Edgar M. *An Introduction to Regional Economics. New York: Alfred A. Knopf, 1975.*

9. *Katoona, George, and Eva Mueller. Consumer Response to Income Increases.* Washington: The Brookings Institution, 1968.

10. McNulty, James E. "A Test of Time Dimension in Economic Base Analysis," *Land Economics* 53 (1977): 359-368.

11. Matsumoto, Masao. *Impact of the Food Stamp Program on Three Local Economies: An Input-Output Analysis.* Washington: U.S. Department of Agriculture, Economic Research Service, 1977. Research Report No. 503.

12. Park, Se-Hark. "Least Squares Estimates of the Regional Employment Multiplier: An Appraisal." *Journal of Regional Science* 10 (1970): 366-374.

13. Sales Management and Marketing Company. *Annual Survey of Buying Power.* New York: Sales Management and Marketing Company, 1966-1980.

14. Smith, Eldon D., Merlin W. Hackbart, and Johannes Van Veen. "A Modified Regression Base Multiplier Model." *Growth and Change* (July 1982): 17-22.

15. Tweeten, Luther. "Enhancing Economic Opportunity" in *Communities Left Behind, Alternatives for Development,* pp. 91-107. Edited by Larry R. Whiting. Ames: Iowa State University Press, 1974.

16. U.S. Department of Commerce. *County Business Patterns.* Washington: U.S. Department of Commerce, Bureau of the Census, 1979.

17. U.S. Department of Commerce. *Local Area Personal Income.* Washington: U.S. Department of Commerce, Bureau of Economic Analysis, 1977-79.

18. University of Wisconsin-Extension. *Impact of Tourism in Wisconsin,* 1979. Madison: University of Wisconsin-Extension, 1980.

19. Weiss, Steven J. and Edwin C. Gooding. "Estimation of Differential Employment Multipliers in Small Regional Economies." *Land Economics* 44 (1968): 235-244.

20. Wisconsin Department of Administration. *Annual Population Estimates.* Madison: Wisconsin Department of Administration, 1965-1980.