Cost-of-Living Differences in Urban Versus Rural Areas: An Analysis with Expenditure Data

by Richard McHugh

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ABSTRACT

This study illustrates the usefulness of consumer expenditure data for analyzing urban/rural differences in expenditure patterns.

The primary findings are that when the effects of income, children, home ownership, aging, and college education are held constant, rural households spend a proportionately larger share of income on transportation, health care, and tobacco.

Further breakdown within the category of health care reveals that health insurance, drugs, and medical supplies are responsible for higher expenditure by rural households. Within the transportation category, vehicles, gasoline, and oil are the sources of higher rural expenditure shares.

Introduction

Variations in the growth rate of different regions are due to the decisions of two sets of economic actors. Consumers and producers both consider the relative costs of economic transactions when deciding where to live or do business. Factors influencing the cost of business include, for example, availability and cost of land and labor, the quality of public infrastructure, and the proximity of customers; some factors influencing the cost of living are prices and accessibility of private goods and services, and the availability of public goods and services. These factors interact to influence the pattern of economic development in a country.

The decade of the 1980s was one in which the rural areas of the United States grew much more slowly than urban areas. Analysts who study general regional growth differentials, and rural economic development patterns in particular, have offered explanations of the underlying causes of the slow growth in rural America. The list of suspects is long and includes all those factors mentioned above. Whether it has been a change in the pattern of taste, a change in access to markets, a change in the costs of doing business, or a change in the cost of living, each has contributed to the stagnation of rural America.

The relative importance of the above factors in explaining the patterns of economic development is not well understood. This paper focuses on the role of cost-of-living differentials in explaining economic growth patterns between rural and urban areas from 1985 to 1987. The link

between cost-of-living trends and economic development is explained and consumer expenditure data is analyzed to explore recent urban/rural spending trends.

Cost of Living and Regional Economic Development

A great deal of attention has been directed toward the process by which firms choose where to locate. Differences in tax rates, wage costs, energy prices, transportation costs, and so on have long been recognized as factors influencing a plant location decision. However, just as firms consider the relative cost of doing business in their location decisions, households also take into account the relative cost of living as they consider alternative locations. This suggests that costs facing consumers may be as important as costs facing firms in determining the growth or decline of an area.

Consumer costs affect economic growth in a number of ways. First, if higher costs result in population loss for an area, businesses tied to a local customer base may find it impossible to operate profitably in the area. Second, higher consumer costs translate into higher wages as firms find they must offer a higher wage to prevent workers from relocating to a lower cost area. These higher wages increase the cost of doing business, contributing to economic decline as firms are forced to relocate.

Cost-of-Living Data Sources

A number of studies comparing the cost of particular goods and services, such as taxes, utilities, and land, have made partial comparisons among geographical areas. However, there have been few attempts at a comprehensive comparison of the cost of living. Two notable

exceptions are the Bureau of Labor Statistics series of cost-of-living indices for 30 metropolitan areas, which was discontinued in 1981, and the American Chamber of Commerce Research Association (ACCRA) cost-of-living statistics, based on local surveys of the prices of certain items for urban areas. However, both of these efforts have been restricted to large areas that are inappropriate for the examination of differences in the cost of living in urban and rural areas.

The absence of cost-of-living studies for small geographic areas is the result of a number of discouraging factors. First, the collection of price data for a large number of commodities and local areas would be prohibitively expensive. Furthermore, the price data would have to be combined with expenditure data obtained by extensively surveying residents about their expenditure patterns so that the cost-of-living measure would incorporate the importance of an item in the consumption of an area's residents.

However, given the importance of cost-of-living differences in the pattern of economic development, it is essential that analysts explore alternatives to the expensive process of price index development.

The intent of this research is to suggest a simple approach to evaluate levels and trends in urban/rural cost-of-living differentials, focusing on the evaluation of differences in expenditure patterns between urban and rural households. Data from the ongoing Bureau of Labor Statistics (BLS) Consumer Expenditure Survey (CES) provides a rich source of information on rural versus urban living costs and a new perspective on ways to identify important trends in these costs.

Traditional Measures of Cost of Living and the Value of Expenditure Data

Differences in the cost of living between two areas (or two time periods) can arise from three sources: differences in prices for commodities, differences in environment, and differences in the demography (and tastes) of urban versus rural households.

Differences in prices of similar commodities have obvious impacts on the relative cost of living and have typically been the focus of studies of this issue. However, differences in the physical "environment" can have profound implications on variations in spending patterns. "Environment" refers to geographic and physical characteristics of an area that dictate a certain pattern of expenditures. For example, population density, the quality of a region's public infrastructure, or access to public (and private) services all influence household spending choice. Consequently, even if the price per unit of a good was the same in urban and rural areas, residents in these areas would likely devote different proportions of their incomes to various consumption items. Finally, the needs and tastes of residents of certain areas influence living costs. For example, spending patterns may differ because of the relative ages of residents. Higher expenditures on health services could be expected for older households.

Intertemporal and interregional variations in the cost of living are commonly measured using price indices. These price indices measure the cost of purchasing a typical bundle of goods in two different places or times. Basically, these calculations and the indices answer the question,

how much would a bundle of goods cost if it was bought in two different places or times? These comparisons are subject to problems of interpretation. In particular, a fixed-weight index of relative costs is valid only to the extent that consumer preferences for the bundle of goods evaluated would be expected to remain unchanged by price changes. For example, the consumer price index (a fixed-weight index) was used to measure the impact of the oil price increases in the 1970s, assuming consumers did not change spending patterns and driving habits in response to energy price increases. Empirically, the representative household or consumer was not given the liberty of making rational substitutions of alternative fuel and energy sources for gasoline and oil or of reducing consumption because of changes in relative prices. The result was an overestimate of the increase in the cost of living resulting from oil price shocks.

The more important problem with fixed-weight indices for spatial comparison is that we cannot identify the correct bundle of goods. Specifically, the tastes, demography and environment of urban and rural areas make the representative bundle of goods in each area different, so the indices are not comparable.

An alternative way to evaluate costs of living is to ignore both the bundle of goods and the price differences of items and to proceed directly to an analysis of differences in expenditure patterns by region. This does not strictly give a measure of the relative cost of living, since expenditure patterns may reflect both price and quantity differences. But the calculation allows planners to evaluate important ways in which

representative households allocate their income differently across commodities by area.

The most valuable information available from a comparison of urban and rural household expenditure patterns is the direction and severity of changes over time. Just as firms reevaluate their location decisions as economic conditions in an area change, changes in the conditions under which the household location decision were made may lead to relocation.

Policy Relevance of Expenditure Pattern Variation

Variations in expenditure patterns across areas must be interpreted in order to be a valuable input to the process of regional economic development policy. Variations in spending patterns between urban and rural areas may be caused by three factors that can be addressed by policy.

Variations may indicate differences between the actual prices of goods in rural and urban areas. To the extent that these price-related cost-of-living differences have caused slow growth by rendering a location less attractive to live and do business in, government may seek to diminish these differences. In some cases, it may be possible to exert direct control over prices of some goods in regulated industries. In other cases, the government may exert indirect control by encouraging an increase in the availability of a good or service in an area.

Variations in expenditure patterns may be caused by differences in environment, rather than actual price differences. Changes in the environment may cause spending pattern variations. One important element

of an area's environment, and one that is important in terms of public policy, is its public infrastructure. Significant changes in spending patterns that can be attributed to deterioration in public infrastructure in rural areas may point out the importance of addressing inequities arising from these sources. Efforts to improve the infrastructure in rural areas can affect, for example, transportation or communication costs and consequently the overall cost of living in rural areas.

The benefits of analyzing cost of living data go beyond the identification of rural/urban differences. This information can be a useful tool for a state's marketing effort. Cost-of-living differences between rural and urban areas are often used as a selling point in industrial recruitment activity. Furthermore, the understanding that can be gained from a careful monitoring of trends in urban and rural household expenditure patterns will improve our understanding of the dynamics of rural change, as well as the effect of existing or prospective government policy. Much of this understanding is based on general conjectures about the behavior of rural residents in response to their differences in environment and demographics. For example, it is understood that rural households spend more of their income on transportation. Is that, in fact, the case? If so, how much of this difference is attributable to the cost of operating the automobile and insuring it, and how much is caused by taste differences, as exhibited by the propensity of rural households to purchase more cars? Are these cost differentials shrinking over time or growing? Are these differences simply attributable to the occupation that rural residents choose? Will any emerging federal transportation policy affect rural households?

Similar questions can also be asked about health care costs. Are the differentials in health care spending between urban and rural households growing or declining? What is the source of these differentials: costs for medical insurance, medical service, or prescription drugs? How much of the overall difference in spending can be attributed to demographic differences versus price differentials between urban and rural communities? Answers to these questions will have important implications for policy design.

The BLS Consumer Expenditure Survey

The Consumer Expenditure Survey is a survey of expenditure patterns of households in different economic and demographic circumstances. It has been conducted by the BLS on an irregular basis since the late 1800s. The primary intent of the Consumer Expenditure Survey has been to support revisions of the expenditure or budget shares in the "typical market basket" used in the calculation of the Consumer Price Index (CPI). Since market basket for the CPI has been revised irregularly, about once each decade, the expenditure survey has been performed on a similarly irregular basis.

In 1979, the Bureau of Labor Statistics initiated the first round of interviews for the Consumer Expenditure Survey since the 1972-73 survey. This round of interviews marked the beginning of continuous monitoring of household expenditure patterns by the BLS. This ongoing record of the consumption behavior of U.S. households continues despite some discontinuities in coverage in the early 1980s due to funding cutbacks. The resulting data provide a continuous basis for monitoring expenditure patterns and budget shares.

The Consumer Expenditure Survey, as currently constructed, has two primary parts--the diary and the interview surveys. The interview survey consists of a regular interview of approximately 5,000 households each quarter. Households are asked to list their major and large expenditures, as well as the amounts of their normal regular purchases made over the previous three-month period. Finer spending detail is provided by the diary survey in which approximately 5,000 households are asked to record the details of their expenditures for a two-week period.

The interview and diary surveys, although not drawn from the same sample of households, are combined (based on the economic and demographic makeup of the participants) to provide a comprehensive picture of earnings and spending patterns of U.S. households.

The CES public use data tapes provide quarterly information on the expenditures of representative households. Except in a very few instances, total expenditures are reported rather than separate information on prices and quantities. Most of the information available on prices of individual items is derived from the detailed diary survey and is primarily for food items. Since the raw data on most prices are not available, the CES cannot be used directly for information on relative prices in rural and urban or small and large communities.

The data file also provides basic demographic information of surveyed households, such as age of household head, numbers of children, educational attainment, and region of the country. Information is also reported on whether the household is in an urban or rural area. However, because of the relatively small number of rural households in the sample, the rural household regions are not identified on the public tapes. These

data are available as part of the raw data kept at the BLS and can be accessed only under special circumstances.

One additional problem with the CES is that, owing to federal budgetary limitations, rural households were not identified in the sample from the fourth quarter of 1981 through the third quarter of 1983. Since then, the rural population has again been added to the sample of households. Given the potential value of these data for understanding costs as a cause of differences in development patterns for rural communities, and given the current data limitations for these communities, efforts would seem well taken to sustain the inclusion of the rural households.

Design of the Analysis

The initial objective of this research is to use the BLS/CES to glean information on differences in consumption patterns among rural and urban households. Trends in expenditure differences are also examined. Thereafter, the potential uses of the CES file in designing policies to address these issues will be identified.

Some work has already been completed on differences in expenditure bundles between urban and rural areas. John Rogers (1988) of the Bureau of Labor Statistics examined differences in the expenditures of urban and rural households and trends in their bundles or expenditure shares for the period 1972-73 through 1985. Rogers found a number of important differences between the expenditure patterns of urban and rural households:

- Rural households have a higher proportion of expenditures for life insurance and other personal insurance.
- Rural households have a higher proportion of total expenditure for health insurance.
- Rural households have far lower budget shares for housing.
- Rural households have higher budget shares for transportation.

These are all interesting results but their interpretation suggests a need for further analysis. For example, the fact that rural households spend more for insurance is not a surprise, given the higher average age of people in rural compared to urban areas. This demographic difference between urban and rural areas also helps explain the differences in health care and housing expenses. Careful analysis of differences in the cost of living can be achieved only by holding constant other factors that may affect expenditures.

In this section, the results of the analysis of the 1985, 1986, and 1987 Consumer Expenditure Survey are reported. Here, as in Rogers' analysis for 1985, variations in spending patterns between urban and rural households are investigated to help identify trends in these differences over time. In the process of comparison, special efforts will be taken to illustrate the importance of demographic factors in explaining expenditure differentials, and to make comparisons that abstract from the impact of demography.

This research is not intended as a comprehensive evaluation of spending pattern variations across all items. Rather, the objective is to explore the qualitative value of information available from the survey,

and to illustrate the techniques available to extract useful information from the CES.

Tabular Comparisons of Average Spending Patterns

Selected cross tabulations from the 1985-1987 CES public use tapes are reported in Tables 1-3. These tables provide information on the patterns of spending of all households in the Consumer Expenditure Survey, as well as for three subgroups of households included in the survey, in order to highlight differences within subgroups. This information not only shows differences in expenditure levels between households in urban and rural areas in each year but also can be used to examine systematic changes in spending patterns over time. To illustrate the importance of accounting for demographic differences, attention is given to categories of expenditures for which differences in spending patterns change depending upon the reference group chosen for comparison.

The average levels of expenditures for all urban and rural households are reported in the first column of these three tables. In the second column of these tables, families whose heads are over the age of 65 are eliminated, since rural areas tend to have a disproportionate number of elderly residents. This concentration of elderly in rural communities influences the pattern of spending on items such as health care and housing. In the third column, expenditures for families with farm income are eliminated, since farm households have dramatically different lifestyles and consumption requirements than those employed in an establishment setting. Although the presence of farm income does not necessarily imply that the household is a farm household, no better

Table 1. Percentage difference between expenditures of rural households and urban households, by population subgroup, 1985

Expenditure Category	All Consumers	Excluding Household Head Older than 65	Excluding Households with Farm Income	Nonfarm Families with Children
	- - - - - - - - - - (Percent) - - - - - - - - - -			
Food	-13.7	-12.2	-13.7	-19.8
Alcohol	-27.6	-26.2	-27.7	-34.4
Housing	-27.7	-26.2	-27.9	-34.3
Shelter	-36.3	-33.5	-26.4	-41.0
Utilities	-4.9	-4.8	-5.6	-17.3
Household Operation	-33.9	-32.4	-33.1	-32.2
Furnishings	-28.4	-29.4	-28.4	-36.4
Apparel	-31.5	-27.7	-31.0	-35.2
Transportation	4.9	6.7	5.9	-1.2
Vehicles	19.5	20.0	22.7	15.4
Gas and Oil	14.6	16.5	13.3	1.2
Health Care	15.5	19.8	13.1	3.8
Entertainment	-20.3	-16.3	-18.5	-25.2
Personal Care	-32.1	-32.1	-32.2	-38.0
Education	-35.6	-33.9	-34.4	-52.0
Tobacco	14.8	21.0	14.3	20.1
Personal Insurance and Pensions	-15.1	-11.0	-16.5	-22.3
Life Insurance	18.5	15.4	17.3	15.4
Retirement and Pensions	-20.2	-14.8	-21.5	-27.9

Table 2. Percentage difference between expenditures of rural households relative to urban households, by population subgroup, 1986

Expenditure Category	All Consumers	Excluding Household Head Older than 65	Excluding Households with Farm Income	Nonfarm Families with Children
	(Percent)			
Food	-18.1	-15.4	-18.1	-22.5
Alcohol	-42.6	-40.2	-41.4	-43.2
Housing	-30.0	-29.4	-31.9	-40.2
Shelter	-42.0	-40.6	-44.4	-51.3
Utilities	-1.6	-0.6	-3.0	-13.7
Household Operations	-39.1	-37.7	-37.9	-44.6
Furnishings	-22.6	-22.8	-24.0	-34.2
Apparel	-36.4	-33.3	-36.7	-35.8
Transportation	-11.7	-6.8	-12.9	-17.0
Vehicles	-12.0	-4.5	-13.3	-17.8
Gas and Oil	20.1	23.1	19.4	12.2
Health Care	11.4	14.1	7.6	-5.0
Entertainment	-23.0	-18.4	-23.8	-29.3
Personal Care	-32.0	-31.1	-33.1	-31.2
Education	-51.3	-49.2	-51.4	-57.3
Tobacco	25.4	33.2	26.6	29.4
Personal Insurance and Pensions	-23.9	-19.2	-25.8	-24.0
Life Insurance	-1.2	11.9	-2.2	-1.6
Retirement and Pensions	-27.4	-23.3	-29.4	-27.4

Table 3. Percentage difference between expenditures of rural households relative to urban households, by population subgroup, 1987

Expenditure Category	All Consumers	Excluding Household Head Older than 65	Excluding Households with Farm Income	Nonfarm Families with Children
	(Percent)			
Food	-15.9	-14.2	-15.9	-20.3
Alcohol	-28.6	-25.8	-27.8	-27.7
Housing	-28.1	-28.0	-29.6	-37.7
Shelter	-41.0	-40.3	-42.6	-49.1
Utilities	3.3	2.9	2.6	-9.2
Household Operations	-34.8	-32.8	-36.0	-43.2
Furnishings	-21.0	-21.2	-23.5	-32.9
Apparel	-33.1	-31.8	-34.3	-37.9
Transportation	-11.3	-8.7	-11.9	-8.2
Vehicles	-14.1	-10.1	-14.6	-2.8
Gas and Oil	23.3	25.3	22.0	14.4
Health Care	15.5	20.8	13.0	1.1
Entertainment	-22.7	-21.4	-22.7	-24.4
Personal Care	-33.9	-32.0	-34.6	-31.5
Education	-41.7	-41.8	-41.5	-52.6
Tobacco	21.8	27.4	23.3	16.7
Personal Insurance and Pensions	-18.5	-16.7	-22.8	-21.7
Life Insurance	10.6	12.4	6.9	-1.6
Retirement and Pensions	-22.8	-20.6	-27.1	-24.8

identifier is available. In the last column, a comparison group made up of married households with children and no farm income is evaluated. This subset is more likely to include comparable sets of households who may be faced with location decisions (that is, not tied to a location by the choice of a farming occupation or by age) and are thus a perfect subgroup for analysis of the economic development implications of living costs.

Relative expenditure levels by commodity, between urban and rural households, are qualitatively very similar in each year. In comparison to urban households, expenditures for rural households are higher for tobacco, life insurance, and health care expenditures. They are lower for most other categories. For transportation, rural households spent more in 1985 but less in subsequent years. Although expenditures for housing tend to be much lower for rural households, expenditures for household utilities are not much different from those for all households.

The disaggregation of households by subgroups verifies the importance of controlling for demographic differences. Surprisingly, relative health care expenditure differences do not change much when the sample excludes households with heads over the age of 65. This may indicate that although the rural population in the sample may be older, it does not necessarily include a greater proportion older than 65. It may also indicate that health care services are indeed more expensive for rural households.

When farm households are eliminated, the proportionate difference in spending by rural households narrows. The presence of farm families in the rural sample accounts for some of the difference in health care spending.

Finally, when we narrow the sample to families with no farm income and with children, the variations in health care costs disappear. That is, once the elderly and farmers are taken out of the sample, there does not appear to be much difference in health care spending patterns between rural and urban households.

Transportation services results are also interesting. In 1985, expenditures were higher for total transportation. However, when we narrow the subgroup to nonfarm households with children, the difference in total spending virtually disappears. Most of the higher cost for rural households is attributable to expenditures on vehicles. The difference in vehicle expenditures narrows only slightly for the subsamples. Differences in expenditures on gas and oil present a picture similar to that for health care. Rural households spend, on average, more on gas and oil than their urban counterparts. However, when the sample is narrowed to nonfarm families with children, the difference in spending virtually disappears.

An analysis of transportation spending for later years shows a similar pattern of expenditure differential narrowing for the nonfarm family subgroup.

As argued earlier, we can get important information on emerging cost differences through the analysis of change in spending patterns over time. In Table 4, the change in the relative amounts of spending for urban and rural households for the three years can be seen. Information for just two categories of households is reported: all households and nonfarm families with children. Since the overall demography, tastes, and environment of rural versus urban areas will not change substantially over

this period, changes in spending differences are more likely to reflect changes in relative prices.

First, spending for housing, always lower in rural areas, has decreased relative to urban spending from 1985 to 1987 (except for the subgroup that excludes both elderly couples and those with a large share of farm income). A look at the components of total housing spending shows that in all cases, shelter cost changes favored rural households, while changes in household operations and furnishings costs have been neutral with respect to urban/rural location. On the other hand, the relative amount of spending on utilities increased for rural households. This was true for all household subgroups. The increase in utilities expenditures, in spite of the decrease in other housing expenditures, might indicate an increase in the relative price of utilities in rural communities.

Second, spending on transportation appears to have decreased for rural households relative to urban counterparts over this period. More detailed examination of the components of transportation spending shows that almost all of the decrease is attributable to spending on vehicles. On the other hand, the share of spending going to gasoline and motor oil has increased. This, too, indicates either a change in the price of operating a vehicle in urban versus rural households, or a rapid change in the rural environment that would require more spending on the operation of motor vehicles. It may also be due to broad economic forces. Since the environment is not likely to change so rapidly, this increase in costs could lead to the hypothesis that an increase in the relative price of fuels in rural areas occurred.

Table 4. Percentage difference between expenditures of rural households relative to urban households, 1985-1987

Expenditure Category	All Consumers			Nonfarm Families with Children		
	1985	1986	1987	1985	1986	1987
Food	-13.7	-18.1	-15.9	-19.8	-22.5	-20.3
Alcohol	-27.6	-42.6	-28.6	-34.4	-43.2	-27.7
Housing	-27.7	-30.0	-28.1	-34.3	-40.2	-37.7
Shelter	-36.3	-42.0	-41.0	-41.0	-51.3	-49.1
Utilities	-4.9	-1.6	3.3	-17.3	-13.7	-9.2
Household Operations	-33.9	-39.1	-34.8	-32.2	-44.6	-43.2
Furnishings	-28.4	-22.6	-21.0	-36.4	-34.2	-32.8
Apparel	-31.5	-36.4	-33.1	-35.2	-35.8	-37.9
Transportation	4.9	-11.7	-11.3	-1.2	-17.0	-8.2
Vehicles	19.5	-12.0	-14.1	15.4	-17.8	-2.8
Gas and Oil	14.6	20.1	23.3	1.2	12.2	14.4
Health Care	15.5	11.4	15.5	3.8	-5.0	1.1
Entertainment	-20.3	-23.0	-22.7	-25.2	12.2	-24.4
Personal Care	-32.1	-32.0	-33.9	-38.0	-31.2	-31.5
Education	-35.6	-51.3	-41.7	-52.0	-57.3	-52.6
Tobacco	14.8	25.4	21.8	20.1	29.4	16.7
Personal Insurance and Pensions	-15.1	-23.9	-18.5	-22.3	-24.0	-21.7
Life Insurance	18.5	-1.2	10.6	15.4	-1.6	-1.6
Retirement and Pensions	-20.2	-27.4	-22.8	-22.9	-27.4	-24.8

Regression Analysis

While an analysis of the average level of spending can give an overall feel for urban/rural differences in spending patterns, much of what is observed as differences in the average, or representative households, is attributable to factors that vary systematically between urban and rural areas. Cross-tabulations, based on carefully selected subsamples, demonstrate how to control one of these factors at a time (such as the influence of age). However, there are many determining factors of spending patterns. We cannot simultaneously account for all of these factors by simple cross-tabulations. For example, the comparisons presented in Tables 1-4 do not permit us to take into account differences in the distribution of income across areas, and income is one of the most important determinants of spending patterns. Since urban households on the average have higher levels of annual income than rural households, their expenditure patterns will be expected to differ not just because of their urban location but because higher-income households have different needs and desires. Differences in the number of children, household ownership, and educational achievement are other examples of factors that are important determinants of spending behavior that must be held constant in assessing the independent effect of urban and rural location on levels of spending.

To account for the impact of these differences in the demographic composition of households and other relevant factors on spending, regression analysis of consumption patterns was performed. In the regressions, the impact of rural location and other factors on consumption expenditures is accounted for simultaneously. In this regression

analysis, spending on a good or service is described as a linear function of income and other factors:

$$\text{Expenditures} = B_o + b_i * \text{Income} + b_2 * \text{Children} + b_3 * \text{Rural} + \ldots,$$

where b_o, b_i, b_2, b_3, etc., are parameters estimated by the regression, relating the determining factor to the level of spending. The parameters measure the change in spending levels attendant to a one-unit change in the variable it is associated with. The regression coefficient on a dummy variable indicating that the household is located in a rural area (a variable set to one if the household is in a rural area and set to zero otherwise) measures the independent impact of rural residency on the level of expenditures, holding constant the impact of other factors. A positive coefficient on the rural dummy variable indicates a greater level of expenditures in rural areas (for reasons unrelated to the other variables included in these equations), and a negative coefficient indicates a lower level of spending.

Expenditure is estimated as a system of equations, in which consumption is a function of household income and other socioeconomic factors. This system estimates the parameters of all expenditure equations simultaneously and allows us to impose important constraints on these parameters. In particular, the system of equations is estimated with the imposition of constraints that are consistent with economic theory. For example, the equations are estimated in such a way that the

sum of the income elasticities of expenditures on all items equals one; that is, the change in a family's spending cannot exceed the change in its income. Details on estimating these equation systems can be found in Johnson, Hassan, and Green (1984). In Table 5, the coefficients for the rural dummy variable for each category of expenditures for the 1985, 1986, and 1987 sample years are presented.

Several consistencies arise, most of which are expected. The regressions indicate that rural households spend (statistically) significantly more on transportation, health, and tobacco. These results differ somewhat from the cross-tabulations in which expenditures on transportation fell for rural households in later years. Rural households spend significantly less on most of the other items.

The coefficients reported in Table 5 can be interpreted as dollar amounts. Since the raw data in the survey are amounts spent per quarter, the coefficients measure the difference in the amount spent by rural households each quarter. To illustrate, the coefficients for the food equation indicate that rural households spend $209.28 per quarter ($837.12 per year) less than do their urban counterparts.

Reading across each row of Table 5 allows us to observe the changes in spending across time. Two notable results emerge. First, in the category of transportation services, per-household differences in expenditures between rural and urban households grew substantially from 1985 to 1986. Although they fell in 1987, transportation expenditures were still 20 percent higher than the 1985 level of difference. The coefficients indicate that, in 1987, the annual difference in spending by

Table 5. Coefficients on the rural dummy variable

Expenditure Category	1985	1986	1987
Food	-209.28**	-288.68**	-210.27**
	(38.28)	(36.60)	(36.83)
Alcoholic Beverages	-25.28**	-36.20	-9.68
	(8.94)	(8.62)	(8.12)
Housing	-631.65**	-696.17	-620.96**
	(90.02)	(89.28)	(83.21)
Apparel	-113.28**	-100.05**	-120.18**
	(27.11)	(29.35)	(28.70)
Transportation	578.54**	878.77**	697.79**
	(137.95)	(129.94)	(123.24)
Health	95.90**	122.18**	148.99**
	(32.93)	(38.39)	(31.81)
Entertainment	-50.45	27.57	3.41
	(54.50)	(44.99)	(53.77)
Personal Care	-32.48**	-30.96**	-38.02**
	(3.92)	(4.07)	(4.07)
Reading Material	-6.42	-8.33*	-2.31
	(3.66)	(4.03)	(3.39)
Education	2.45	-25.59*	-4.96
	(29.41)	(30.79)	(32.44)
Tobacco	17.63**	48.46**	37.89**
	(6.34)	(6.67)	(6.49)
Miscellaneous	-41.73	33.73	62.54
	(32.50)	(22.64)	(36.49)
Cash Contributions	295.67**	-4.98	6.37
	(129.19)	(29.71)	(22.95)

Note: Standard errors are in parentheses.

* Statistically significant at the 5 percent level of confidence.

**Statistically significant at the 1 percent level of confidence.

rural households had widened by nearly $480. Again, it should be kept in mind that these estimates hold constant the effect of demographic factors, so the causes of the differential in spending are attributable either to a change in environment or to a change in relative prices.

Second, the independent impact of a rural location on expenditures for health care grew consistently over the two-year period. This result was not evident in the cross-tabulations. By 1987, the rural-specific differential in health care expenditures had grown by 50 percent. Over the two-year period, the annual spending differential had widened by more than $200 per year. While it is widely known that the relative price of health care services increased over this time period, the evidence presented in Table 5 indicates that the cost differential of health care services may have been disproportionately burdensome for rural households.

Health and Transportation Expenditures

The regression analysis indicates that there are two broad categories --transportation and health care--where expenditures by rural households have grown more rapidly than they have for urban households. Within each of these categories of spending there is information on more narrowly defined expenditures from the Consumer Expenditure Survey. An examination of the narrowly defined spending pattern helps identify precise causes of the growing spread between urban and rural spending.

Using simple cross-tabulations for these two broad categories of expenditure, changes in the relative per-household spending levels between rural and urban households from 1985 to 1987 can be expressed (Tables 6

and 8). The information is provided for all families and for nonfarm families with children. In addition, there is a system of expenditure equations in which separate equations for the subcomponents of health and transportation spending were substituted for the broad expenditure categories. The coefficients or the rural dummy variables for the subcategories of health and transportation equations are shown in Tables 7 and 9.

Health Care Expenditures. The study examined the areas of health insurance, medical services, and drugs and medical supplies as subcategories of health care expenditures. Expenditures for health insurance, already higher for rural residents in the full sample of households, grew much wider (from a 14.4 to a 28.7 percent spread). As shown earlier, much of this spread is attributable to demographic differences between rural and urban areas. When the sample of households is narrowed to nonfarm households with children, the excessive spending by rural households largely disappears. Over time, expenditures by rural households for health insurance grow slowly relative to urban households, even among the nonfarm families (turning from 5 percent less to 1.5 percent more). The causes of the apparent increase in health insurance costs in rural areas is one topic of possible additional investigation.

A similar pattern emerges from the analysis of expenditures on drugs and medical supplies. All rural households spend much more on these goods than their urban counterparts, although much of this is attributable to the demography of rural areas. Over time, the spending of rural households on these has increased relative to urban households.

Table 6. Percentage difference in expenditures of rural households relative to urban households, 1985-87: Health care expenditures

Expenditure Category	All Households			Nonfarm Families with Children		
	1985	1986	1987	1985	1986	1987
Health Insurance	+14.4	+26.7	+28.7	- 5.0	+13.9	+ 1.5
Medical Services	+13.7	- 7.2	- 4.0	+20.0	-23.9	0.0
Drugs and Medical Supplies	+31.1	+33.6	+37.5	- 1.1	+19.2	+ 4.2

Table 7. Coefficients on the rural dummy variable in detailed analyses of changes in health care expenditures

Expenditure Category	1985	1986	1987
Health Insurance	46.11*	63.74**	66.27**
	(18.59)	(10.97)	(10.70)
Medical Services	29.51	10.34	27.48
	(24.92)	(35.33)	(27.82)
Drugs and Medical Supplies	20.34**	48.31**	55.46**
	(5.35)	(7.57)	(7.76)

Note: Standard errors are in parentheses.

* Statistically significant at the 5 percent level of confidence.

** Statistically significant at the 1 percent level of confidence.

Table 8. Percentage difference in expenditures of rural households relative to urban households, 1985-87: Transportation services

Expenditure Category	All Households			Nonfarm Families with Children		
	1985	1986	1987	1985	1986	1987
Motor Vehicles	+19.5	-12.0	-14.1	+15.4	-17.8	- 2.8
Gasoline and Oil	+14.6	+20.1	+23.3	+ 1.2	+12.2	+14.4
Other Vehicle Expenditures	- 8.1	-19.9	-15.9	-19.7	-24.9	-21.0
Public Transportation	-69.5	-71.5	-68.7	-65.6	-77.2	-72.2

Table 9. Coefficient on rural dummy variable in detailed analysis of changes in transportation expenditures

Expenditure Category	1985	1986	1987
Motor Vehicles	487.64*	800.22*	566.56*
	(140.47)	(136.55)	(129.36)
Gasoline and Oil	160.12*	205.55*	224.64*
	(16.57)	(14.90)	(13.52)
Other Vehicle Expenditures	29.27	-49.40	-18.69
	(26.04)	(27.14)	(26.67)
Public Transportation	-98.41*	-77.85*	-74.91*
	(20.67)	(20.13)	(20.61)

Note: Standard errors are in parentheses.

* Statistically significant at the 1 percent level of confidence.

The average level of expenditure on medical services was much higher in 1985 for rural households than for those in urban areas. In subsequent years, this spending differential fell. Unlike the other two categories of health care expenditures, rural spending for medical services has grown more slowly than urban. By 1987, the difference in this area of medical care spending had disappeared.

Turning to the regression results measuring the differences in spending in rural areas versus urban areas (Table 7), the analysis generally confirms the results of the cross-tabulations. Holding constant socioeconomic and demographic factors, rural households are found to spend more per year on health insurance and drugs. The difference in spending on medical services, however, is not statistically significantly different from zero, indicating that it cannot, with any degree of confidence, be said that spending on medical services is higher or lower for rural households.

Comparisons of the coefficients on the rural variable over the three-year period confirm that relative rural expenditures for health insurance and drugs have increased. The differential in health insurance spending has grown by $80 per year, while that for drugs has grown by $100 per year. The difference in medical service expenditures is not significantly different from zero in all three years.

Transportation Expenditures. The percentage differences between urban and rural household expenditures on components of transportation services are shown on Table 8. Subcategories include motor vehicles, gasoline and oil, other vehicle expenses, and public transportation. At this level of disaggregation, there is substantial trend variation.

Expenditures on motor vehicles, much higher in 1985 for rural communities, are less in 1986 and 1987. These later years also illustrate the volatility of expenditures on vehicles. The ease of the postponement of this type of expenditure leads to a "lumpiness" in spending patterns over time. The large positive differential in 1985 for rural households turns into a large negative. This could be attributable to the relatively weak rural economy in 1986 versus 1985. The operating expense differential for private transportation continued to be higher for rural households. Even in the narrow nonfarm family group, gas and oil expenditures were 14.4 percent higher for rural households in 1987. Relative expenditures by rural households for gasoline and oil have grown consistently from 1985 through 1987.

Regression results for the four categories of transportation spending are given in Table 9. The importance of carefully controlling for the influence of economics and other factors is evident. Recall that the analysis using the simple average expenditure levels showed that average spending on vehicles in rural areas fell relative to urban areas, and it was speculated that the reason for this decrease was the economic slowdown that caused rural households to defer buying items such as vehicles. When household income and other economic and demographic factors in the system of regressions are accounted for, the positive average spending differential for rural households, which had disappeared in the cross-tabulations for 1986 and 1987, is evident in all three years.

The rural expenditure differential for gasoline and oil, as measured by the coefficient on the rural variable, also grew consistently over the three-year period. Expenditures on other vehicle maintenance is not

significantly different statistically for rural versus urban households in any of the study years. Rural expenditures on public transportation are far less than for urban households, but the difference decreases over the three-year period.

In general, results of this analysis of the household expenditure cross-tabulations and regressions indicate that there appear to be differences in spending levels between urban and rural households, but that many of these differences may be accounted for by the simple demographic characteristics of urban and rural areas. Once these factors are controlled, much of what appears to be differences in the cost of living disappears. Cost of living may not be as significant an issue in rural development as many have believed. Nonetheless, differences remain and appear to be changing over time.

Summary and Conclusions

While the CES is useful in identifying broad national trends, it is an imperfect instrument for the analysis of urban/rural cost-of-living differences. It has not been designed to address these geographically specific issues, and it is not particularly well-suited for urban/rural comparisons.

While it is known that cost-of-living differences between rural and urban areas exist and that they affect the pattern of economic development, there is no consistent and comprehensive measure of these cost differences currently available. Because of the expense involved in developing such an index, it is unlikely that one will be developed in the near future. However, considering the considerable benefits to be derived

from understanding the nature of urban/rural differences and tracking how they change, it is useful to narrow the scope of the analysis to one that holds the greatest potential benefit, and attempt to make use of existing data sources.

Appendix Table A.1 Coefficients of consumer expenditure system regressions, 1985

	Exogenous Variables					
Category	Income	Children Under 18	Persons Over 64	Owned Housing	College Education	Rural
Food	.078	299.29	25.29	318.58**	-63.74**	-209.28**
	(.001)	(11.35)	(21.60)	(26.45)	(25.17)	(38.20)
Alcohol	.009**	-52.47**	-64.28**	-50.68**	38.94**	-25.26**
	(.000)	(2.66)	(5.06)	(6.19)	(5.89)	(8.94)
Housing	.224**	255.04**	40.32	174.07**	744.97**	-631.65**
	(.002)	(26.74)	(50.89)	(62.34)	(50.31)	(90.02)
Apparel	.042**	51.92**	-122.27**	15.33	154.44**	-113.28**
	(.001)	(8.06)	(15.32)	(18.77)	(17.86)	(27.11)
Transpor-	.257**	-176.52**	-392.19**	-127.51	-696.42**	578.54**
tation	(.002)	(40.99)	(77.99)	(95.53)	(90.88)	(137.95)
Health	.024**	5.48	472.33**	219.20**	-21.95	95.90**
Care	(.001)	(9.79)	(18.61)	(22.81)	(21.69)	(32.93)
Entertain-	.052**	46.60**	-82.46**	36.64	91.13**	-50.44
ment	(.001)	(16.19)	(30.81)	(37.74)	(35.90)	(54.50)
Personal	.005**	3.43**	20.91**	30.98**	18.25**	-32.48**
Care	(.000)	(1.16)	(2.22)	(2.71)	(2.58)	(3.92)
Reading	.004**	-3.23**	15.89**	18.79**	40.95**	-6.42
	(.000)	(1.09)	(2.06)	(2.53)	(2.41)	(3.66)
Education	.015**	-16.72	-60.93**	-67.77**	131.38**	2.45
	(.001)	(8.74)	(16.63)	(20.37)	(19.38)	(29.41)
Tobacco	.003**	7.92**	-53.01**	-2.65	-105.81**	17.63**
	(.000)	(1.88)	(3.58)	(4.39)	(4.18)	(6.34)
Miscella-	.020**	-17.39	31.99	-28.33	-11.44	-41.73
neous	(.001)	(9.66)	(18.37)	(22.31)	(21.41)	(32.50)
Contribu-	0.175**	-299.72**	788.34**	-946.06**	-467.21**	295.67
tions	(.002)	(38.39)	(73.04)	(89.50)	(85.12)	(129.19)

** Statistically significant at the 1 percent level of confidence.

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Appendix Table A.2. Coefficients of consumer expenditure system regressions, 1986

	Exogenous Variables					
Category	Income	Children Under 18	Persons Over 64	Owned Housing	College Education	Rural
Food	.084	348.75	106.73	283.65**	-64.24**	-288.68**
	(.001)	(10.80)	(21.58)	(26.65)	(25.18)	(36.61)
Alcohol	.009**	-54.04**	-66.79**	-76.46**	49.92**	-36.20
	(.000)	(2.54)	(5.08)	(6.28)	(5.93)	(8.62)
Housing	.251**	254.23**	58.96	-126.36**	663.44**	-696.17
	(.002)	(26.34)	(52.63)	(65.00)	(61.40)	(89.28)
Apparel	.048**	43.69**	-58.65**	-123.54	147.46**	-100.05**
	(.001)	(8.66)	(17.30)	(21.37)	(20.19)	(29.35)
Transpor-	.347**	-395.41**	-87.73**	-484.27	-1090.70**	878.77**
tation	(.002)	(38.33)	(76.60)	(94.60)	(89.36)	(129.94)
Health	.030**	20.60	647.42**	240.83**	-44.37	122.18**
Care	(.001)	(11.48)	(22.95)	(28.34)	(26.77)	38.93
Entertain-	.057	19.78	-74.27	20.43	81.82	27.57
ment	(.001)	13.27	26.52	32.76	30.94	44.99
Personal	.006**	-1.55**	25.65**	25.43**	14.90**	-30.96**
Care	(.000)	(1.20)	(2.40)	(2.97)	(2.80)	(4.07)
Reading	.004**	-4.37**	14.76**	14.11**	42.93**	-8.33
	(.000)	(1.19)	(2.38)	(2.93)	(2.77)	(4.03)
Education	.017	-16.09	-62.14	-78.14	195.02	-25.59
	(.001)	(9.08)	(18.15)	(22.41)	(21.17)	(30.79)
Tobacco	.003	2.82	-60.12	-1.96	-126.70	48.46
	(.000)	(1.97)	(3.93)	(4.86)	(4.59)	(6.67)
Miscella-	0.011	-9.34	24.53	20.98	5.13	33.73
neous	(.000)	(6.68)	(13.34)	(16.48)	(15.57)	(22.64)
Contribu-	.014	-41.93	94.25	7.92	18.32	-4.99
tions	(.001)	(8.76)	(17.51)	(21.63)	(20.43)	(29.71)

**Statistically significant at the 1 percent level of confidence.

Appendix Table A.3. Coefficients of consumer expenditure system regressions, 1987

	Exogenous Variables					
Category	Income	Children Under 18	Persons Over 64	Owned Housing	College Education	Rural
Food	.093	313.67	164.24	140.38	-152.42	-210.27
	(.001)	(10.79)	(21.59)	(26.56)	(25.15)	(36.83)
Alcohol	.009	-51.70	-56.84	-71.53	44.08	-9.68
	(.000)	(2.38)	(4.76)	(5.85)	(5.54)	(8.12)
Housing	.252	266.70	222.70	-77.06	671.95	-620.96
	(.001)	(24.37)	(48.78)	(60.01)	(56.83)	(83.21)
Apparel	.050	49.79	-35.79	-50.64	158.49	-120.18
	(.000)	(8.40)	(16.82)	(20.70)	(19.60)	(28.70)
Transportation	.331	-378.68	-257.01	-536.02	-990.68	697.79
	(.002)	(36.09)	(72.25)	(88.88)	(84.16)	(123.24)
Health Care	.026	14.89	549.19	255.77	16.14	148.99
	(.001)	(9.32)	(18.65)	(22.94)	(21.73)	(31.81)
Entertainment	.066	12.26	-26.51	9.86	34.44	3.41
	(.001)	(15.75)	(31.52)	(38.78)	(36.72)	(53.77)
Personal Care	.006	1.79	31.63	24.92	13.52	-38.02
	(6.87)	(1.19)	(2.39)	(2.94)	(2.78)	(4.08)
Reading	.004	-4.54	21.39	15.79	45.69	-2.31
	(5.72)	(0.99)	(1.99)	(2.45)	(2.32)	(3.39)
Education	.019	-20.67	-71.57	-63.29	215.37	-4.96
	(.001)	(9.50)	(19.02)	(23.40)	(22.15)	(32.44)
Tobacco	.004	7.96	-47.56	-9.00	-119.32	37.89
	(.000)	(1.90)	(3.80)	(4.68)	(4.43)	(6.49)
Miscellaneous	.019	-25.62	69.71	-16.51	-54.56	62.54
	(.001)	(10.69)	(21.39)	(26.32)	(24.92)	(36.49)
Contributions	.014	-30.30	78.55	-24.12	8.09	6.34
	(.000)	(6.72)	(13.45)	(16.55)	(15.67)	(22.95)

REFERENCES

American Chamber of Commerce Researcher's Association, Cost of Living Index. Various Issues, quarterly.

Johnson, Stanley R., Zuhair A. Hassan, and Richard P. Green. 1984. Demand Systems Estimation, Ames: Iowa State University Press.

Rogers, John M. 1988. "Expenditures of Urban and Rural Consumers, 1972-73 to 1985." Monthly Labor Review (March):41-45.

U.S. Bureau of Labor Statistics, Survey of Consumer Expenditures.

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