The Long-Term Development of Local Retail and Service Spending in Rural Southeastern Counties

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I. Introduction

This research is motivated by the concern that the declining downtowns, closing hospitals, and abandoned country stores often observed in rural areas indicate a decline in retail, service and other non-basic activities in the rural United States that is discouraging economic development in these areas (Flora, *et. al.*, 1992). While these losses may be the result of a decline in the economic base in some rural areas, declines also may signal that many rural areas increasingly are failing to capture local consumer dollars. The loss of these retail and service dollars, presumably to nearby urban areas or selected rural communities, certainly would act to make economic development in rural areas more difficult.

Economic development programs to help communities capture more of the local retail and service spending dollar, such as downtown redevelopment programs, have been in operation in non-metropolitan areas. These programs have had some success. But, one natural question is whether economic trends are working in favor of or against such collective efforts to improve the capture of resident spending. To address this question, this research examines whether there has been a convergence of county location quotients within southeastern counties overall and within groups of counties with a similar population and urban orientation. An affirmative finding would suggest that the trend is for each county's capture of resident spending to become more homogenous over time either overall or within groups. This deterministic trend would tend to work against efforts by county's to dramatically change their own capture of resident spending, although it may portend well for counties that have done particularly poorly in the past. Further, since there is an interest in rural areas about whether an area can expect greater or less retail and service activity in the future, this study also develops a model to estimate whether location quotients are expected to increase or decrease over time in future years.

This project benefits residents of the rural southeast through describing and analyzing the region. In particular, rural residents and policy makers get a clearer picture regarding their success, and potential for success, at capturing local dollars. This will help rural policy makers with decisions about whether and how to target development resources towards service and retail trade industries, in addition to more traditional export-oriented targets such as manufacturing or agriculture.

Another benefit of the project is an improved ability to predict changes in location quotients. This enhances efforts to build county econometric models in the rural southeast. Forecasts for service and trade employment can be made based on income growth and expected future location quotient values. These location quotients are forecast based on a region-wide forecasting equation, rather than county-specific equations. Thus, this approach would substantially reduce the number of regression equations necessary to build a simple set of county economic forecasting models.

This report proceeds as follows: Section II reviews the relevant literature on the location of retail and service activity. Section III introduces the data, location quotient definitions, and empirical methodology employed to analyze possible convergence of location quotients across South Census region counties. Section IV presents our results, and Section V concludes the report.

II. Literature

Central place theory provides a framework for analyzing the location of retail and service activity in a rural-urban continuum. It can be used to generate expectations about which size

places will capture certain types of retail and service activity. There has also been recent research that has examined what factors influence the location of retail activity in non-metropolitan areas (Shonkwiler and Harris, 1996; Yanagida, Johnson, Young and Lundeen, 1991). This section discusses both central place theory and this recent literature.

A. Central Place Theory

Central place theory is focused on the market size and range of goods and services (Christaller, 1933). Market size refers to the number of customers needed to sustain the production of a particular good or service. Alternatively, it could refer to the cost-minimizing size of a particular type of business, so that a business could exist while serving fewer customers than required at its cost minimizing size, but it would produce the good or service at a higher cost. The range of the good refers the distance that customers are willing to travel to purchase the good.

In central place theory, the production of a good or service is allocated to different economic places (communities or counties, for example) based on its market size and range. Businesses that require relatively few customers to produce at or near the cost-minimizing size tend to be located in nearly every place. However, businesses that have a large market range and require a large number of customers, either because the average customer spends little on the good (i.e., specialty stores), or there are great economies of scale in production, will tend to be located in only the largest places. Larger places that have producers of most types of goods and services are called higher order places, and smaller places that house producers of relatively few types of goods and services are called lower order places. Naturally, there is a continuum of places between the lowest and highest order places.

Residents of lower order places must travel to nearby higher order places in order to purchase a number of goods or services (or purchase them at a lower price). Leakage of consumer dollars is highest in the lower order places and declines in higher order places. This suggests that counties comprised of only the lowest order towns will tend to have relatively low location quotients as much spending leaks outside the county. Counties comprised of higher order places will have less leakage, and will attract out-of-county customers for locally produced goods and services, leading to higher county location quotients.

B. Recent Research

The location of retail activity within non-metropolitan counties has been a subject of recent research by Yanagida, Johnson, Young and Lundeen (1991), Shonkwiler and Harris (1996), and Harris and Shonkwiler (1997). Studies by Shonkwiler and Harris have focused on the interdependence of establishment location in different retail establishments. These authors concluded that the presence of an establishment in one type of retail activity (a building supply store, for example) increased the likelihood of having an establishment in other types of retail establishments (a furniture store, for example). This finding tends to enhance the argument of central place theory by giving yet another reason why retail activity might concentrate in larger places. Larger counties are more likely to have a lumber store, and, therefore, are also more likely to have a department store.

Yanagida, Johnson, Young and Lundeen examined county characteristics that help counties capture a larger share of retail spending by their residents. The authors found that larger counties and counties located further from trade centers capture a larger share of resident retail spending, as would be expected following central place theory. Interestingly, the authors also find that counties that have experienced a rapid decline in population capture a smaller share of local spending. This result is not suggested by central place theory but may indicate a difficult adjustment process in the retail sector for counties that are becoming smaller in terms of population.

III. Method

Movements among location quotients in the southeast are examined utilizing data from the 16 state South Census region. Location quotient data are gathered for the years 1969, 1979 and 1995 from the *Regional Economic Information System* database released in August 1997 by the U.S. Department of Commerce. With this data, it is possible to examine the trends in convergence or divergence among location quotients over time. It is also possible to examine how changes in location quotients are effected by factors such as county population, residential adjustment, and the like.

The trend in convergence among location quotients for services and retail businesses is the focus of the study. These two industries were selected because in most counties these are the two largest locally oriented industries. These two industries also have relatively few problems with non-disclosure. Non-disclosure occurs for a county in federal government data when there so few businesses in a particular industry that disclosing total industry employment or earnings would reveal information about particular firms. Non-disclosure at the major industry group level usually occurs in smaller counties, but is rare among the major industry groups like retail trade and services. However, non-disclosure is more common among other private major industry groups such as finance, insurance, and real estate (FIRE), and especially, wholesale trade.

In this research, location quotients among retail trade and service industries were examined in the 16 South Census region states and the District of Columbia. These states are: Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. This analysis used only the counties in these states that did not have missing (or non-disclosed) data in either 1969, 1979, and 1995.

As was discussed earlier, central place theory implies that different types of counties will have different levels of location quotients. As a result, analysis was conducted among counties as a whole as well as among metropolitan and non-metropolitan counties, and counties of different size. Specifically, analysis was conducted for six groups of non-metropolitan counties and four groups of metropolitan counties identified by Beale Codes. Beale Codes differentiate classes of non-metropolitan counties according to size and proximity to a metropolitan area. Each factor has a significant influence in a county's place in the central place hierarchy. Beale Codes differentiate metropolitan counties by place within the metropolitan area. Metropolitan (and non-metropolitan) Beale Codes are defined in Table 7.

As for non-metropolitan counties, Beale Code groups 4, 6, and 8 are for non-metropolitan counties that are adjacent to a metropolitan area. Beale Code 4 refers to non-metropolitan counties that are adjacent to metropolitan areas and have an urban population of 20,000 or more. Beale Code 6 refers to counties adjacent to metropolitan counties with an urban population of 2,500 to 19,999, and Beale Code 8 refers to counties with an urban population less than 2,500, and which are adjacent to metropolitan areas.

Beale Code groups 5, 7, and 9 cover more remote non-metropolitan counties that are not adjacent to a metropolitan area. Beale Code 5 refers to nonadjacent counties with an urban population over 20,000. Beale Code 7 refers to nonadjacent counties with an urban population of 2,500 to 19,999. Beale Code 9 refers to nonadjacent counties with an urban population of less than 2,500.

The movement in location quotients was examined over three time periods: from 1969 to 1995, 1969 to 1979, and 1979 to 1995. The year 1979 was chosen to break the 26-year period from 1969 to 1995 near its midpoint. The year 1979 was chosen because the national economy was in a severe recession in the early 1980s. Location quotients from the early 1980s may have been effected by the recession. The year 1979 was the last year before the 1980s recession, so it was chosen over 1982, even though that year is the actual midpoint.

A. Measures of Convergence

In recent years, there has been a substantial amount of research in the area of income convergence among nations (Sala-I-Martin, 1996; Quah, 1993) or among states within the United States (Carlino and Mills, 1996). This literature has contained a substantial debate about the types of convergence measures that are appropriate. Many authors have adopted the Beta-convergence and Sigma-convergence measures, which are explained below.

Several measures of convergence from this literature were used for analyzing retail and service location quotients in non-metropolitan counties in the South. The first measure was Beta-convergence. In such an approach, Beta refers to the convergence coefficient for each industry, that is, it is the coefficient showing whether the growth rate of a location quotient over a time period is influenced by its initial level. It is estimated via the following regression:

$$(lnL\ Q_{c,i,t+n}-lnL\ Q_{c,i,t})/T = a+\beta\ lnL\ Q_{c,i,t}+\epsilon, \quad (1)$$

where LQ is a location quotient, c indexes counties, t is time, T is the length of the time period, n is the number of years from the starting year to the ending year, and i indexes industry. If Beta<0 then counties with lower starting LQs tend to exhibit faster LQ growth, and vice versa. Thus, a negative and significant Beta indicates that location quotients are converging among counties. It indicates that counties with relatively low starting location quotients have seen their location quotients rise over time relative to the average location quotient. Counties with relatively high starting location quotients have location quotients that grow slower over time.

Some recent research by Quah (1993) has cast doubt on the reliability of Beta-convergence tests. In particular, Quah (1993) has demonstrated that negative coefficients can occur even in the absence of convergence in a distribution. This suggests that it is useful to directly examine whether the distribution has been converging. One such measure that has been used in the income convergence literature is the measure of Sigma-convergence. Sigma-convergence simply examines whether the standard deviation of income levels has been declining. In this research, this means testing whether the standard deviation of location quotients has been falling over time in counties in the South Census region. A declining standard deviation would indicate that location quotients are converging. The standard deviation is calculated as follows:

$$Log\ StDev_{i,t}=\left[\left[1/C\right]\sum_{c=1}^{c}\left[LogL\ Q_{i,c,t}-Mean_{i,t}\right]^2\right]^{1/2} \quad (2)$$

where C is the total number of counties and mean is the unweighted average of all location quotients. It is calculated as follows:

$$Mean_{i,t}=\left[1/C\right]\sum_{c=1}^{c} LogL\ Q_{i,c,t} \quad (3)$$

B. Location Quotient Definitions

The analysis of convergence was conducted under five alternative definitions of location quotient. Employment or earnings were used to proxy for activity in a given retail or service sector. This was done because employment and earnings data for industries are available each year from REIS while sales data are only available every five years from the Economic Census. It was also done because employment-based or earnings-based rather than sales-based location quotients will be useful for economic forecasting. Finally, there are other concerns that are inherent with location quotient measures, such as unknown levels of cross-hauling, or differing tastes and preferences over times or among residents of different counties (Shaffer, 1989).

One location quotient definition that is used is the standard definition where industry employment is used in the numerators of the location quotient and total non-farm employment is in the denominators. The equation for this type of location quotient is:

$$LQ_{South}^{Empl/Tnf} = \frac{Employment_{i,c}}{TnfEmployment_{i,c}} \Big] \frac{Employment_{i,South}}{TnfEmployment_{i,South}} \quad (4)$$

The use of non-farm employment in location quotients in non-metropolitan counties, however, may be suspect due to the importance of agricultural employment in some counties. Substantial bias can be introduced as a result. In particular, utilizing non-farm employment would tend to overstate the location quotients for retail and services in more farming-oriented counties. It also would tend to reduce the rate of location quotient growth in counties where farm employment has become less important in the last 30 years, as it has in many southern counties. To correct this problem, a second definition of location quotient was utilized, where total full- and part-time employment is utilized in the denominators rather than non-farm employment. The equation for this type of location quotient is:

$$LQ_{South}^{Empl/F\&PT} = \frac{Employment_{i,c}}{F\ \&\ PTEmployment_{i,c}} \Big] \frac{Employment_{i,South}}{F\ \&\ PTEmployment_{i,South}} \quad (5)$$

This second type of location quotient, however, fails to consider the issue of commuting. Both non-farm employment and full and part-time employment are measures of employment by place-of-work, that is, jobs located in the county. This measure can be very different than the number of jobs held by a county's residents. The county could be a manufacturing center where many workers commute into the county for work, but relatively few commute out of the county to their job. In such a county, using full- and part-time earnings by place of work in the location quotient would tend to overstate the true spending power of the local community. Location quotients would tend to be lower as a result. At the same time, location quotients would tend to be higher in counties where many more workers commute out of the county for work than commute into it. The commuting factor could clearly distort comparisons of location quotients between counties, or in some counties, changes in location quotients over time. To address this problem, an earnings by place of residence variable is substituted into the denominators of the location quotient. This variable better reflects the true purchasing power of county residents, and thus, introduces consistency into location quotient comparisons across counties and over time.

The second type of location quotient also fails to consider differences in the hours worked by each employee. Thus, the third location quotient also uses earnings in the retail or service industry in the numerators, rather than employment. Measured earnings are based on the number of employees, average hours worked, and worker wages, which are related to worker productivity. Thus, average earnings is a much better measure than employment of the level of economic activity in a county in the retail or service sector. The equation for this type of location quotient is:

$$LQ_{South}^{Earn} = \frac{Earnings_{i,c}}{TotalEarnings_{i,c}} \Big] \frac{Earnings_{i,South}}{TotalEarnings_{i,South}} \quad (6)$$

This third type of location still fails to consider differences among counties in non-work income such as transfer payments. For example, counties in Florida may differ from those in Virginia in terms of the level of transfer payments because the Florida counties are retirement destinations. Similarly, location quotients within a single county may change over time simply because the county becomes a retirement destination. This suggests that a more comprehensive measure of county spending than earnings by place of residence should be used in location quotients. In particular, total income should replace earnings by place of residence, so that location quotients would be defined by county earnings in the services or retail industry divided by county total personal income. The equation for this type of location quotient is:

$$LQ_{South}^{Earn/PI} = \frac{Earnings_{i,c}}{PersonalIncome_{i,c}} \Big] \frac{Earnings_{i,South}}{PersonalIncome_{i,South}} \quad (7)$$

There is also a fifth location quotient, similar to the kind in Equation 7 above, but with employment in the numerators of the location

quotient equation. This is the type of location quotients that may often be used when forecasting location quotients within county econometric models. This is because employment in retail and services is often forecast in these models rather than retail and service earnings. The equation for this type of location quotient is:

$$LQ_{South}^{Empl/PI} = \frac{Employment_{i,c}}{PersonalIncome_{i,c}} \rfloor \frac{Employment_{i,South}}{PersonalIncome_{i,South}} \qquad (8)$$

C. Enhanced Beta-Convergence Regression Model

The Beta-convergence regression model in Equation 1 can be enhanced by including variables for other factors that affect location quotient values for retail trade and services in non-metropolitan counties. Such an enhancement was made as follows in this research. For each estimate, we regress changes in the log county location quotients from 1969 to 1995 on a constant, log levels of the location quotient in 1969, log population shares in 1969, changes in log population shares from 1969 to 1995, Bureau of Economic Analysis estimates of residence adjustment in 1969, changes in the residence adjustment from 1969 to 1995, and a set of state dummies. We include additional regressors to account for county size and growth effects (population share variables, measures as the county share of South Census region population) and to account for distortions caused by commuting patterns (the residence adjustment and change in residence adjustment).

We perform this regression using all counties in the South Census region and then disaggregate the data based on the Rural-Urban Continuum developed by Butler and Beale (1994) (10 Beale Codes from 0 to 9). We report results for all Beale Codes individually, and we also aggregate up from individual Beale Codes to report joint results for metropolitan (Beale Codes 0-3) and non-metropolitan areas (Beale Codes 4-9). Table 7 contains Beale Code definitions.

IV. Results

This section presents analysis of the convergence of county location quotients for services and retail trade in 16 southern states. The analysis begins with an examination of the level of and movements in location quotients among all counties in the South Census region. Beta-convergence is examined using the convergence regression model of Equation 1. Sigma-convergence is also examined. Next, both Beta- and Sigma-convergence are examined for counties grouped by Beale Code. Finally, an enhanced Beta-convergence model is examined. This model is an enhancement of Equation 1 that includes other explanatory variables that may effect county location quotients such as population, population growth, and residential adjustment. Including these variables not only improves estimates of the Beta coefficient in the equation, but also provides a basis with which to forecast location quotients using readily available information such as the level and growth of population or residential adjustment. This section concludes with a forecast of a location quotient for one West Virginia County.

A. Aggregate Convergence Results

Table 1 summarizes South Census region location quotients by type of measure, Beale Code, and year. Overall, location quotients have exhibited a downward trend during the 1969 to 1995 period. This is true for all location quotient measures, for both industries, and for most Beale Codes. In addition, in most cases, location quotients are lower in the non-metropolitan counties than in metropolitan counties, which is consistent with central place theory.

Tests for Beta-convergence indicate convergence in both retail and service location quotients on average for all counties in the South Census region. However, the results differ across metropolitan and non-metropolitan counties. Table 2 shows non-metropolitan coef-

ficient estimates (and P-values) for the convergence parameter Beta under each location quotient definition for each time period. Results are presented for both retail and services. Beta coefficient estimates are consistently negative and statistically significant. This is true of each time period and for both retail trade and services.

Results also suggest that the rate of convergence among location quotients has fallen since 1979. Beta coefficient estimates for the 1979 to 1995 period are frequently lower than estimates from the 1969 to 1979 period. For retail trade location quotients calculated using the earnings relative to personal income definition, a Wald test indicates that the rate of convergence has slowed since 1979 on average for all counties in the South Census region. However, a Wald test for the metropolitan county average indicates that there was no significant slowdown. In contrast, there has been a significant slowdown in the rate of convergence for non-metropolitan counties since 1979. Wald tests for the services industry indicates slower convergence during the 1979-95 period for all counties in the South Census region, for metropolitan counties, and for non-metropolitan counties.

In addition, note that the magnitude of the Beta-coefficient estimate is lowest for the preferred location quotient definition of earnings divided by personal income. This suggests that the rate of convergence is less after accounting for between-county commuting and differences in transfer and interest income. More broadly, this suggests that the rate of measured convergence may differ with the location quotient definition that is utilized. It is, therefore, important to utilize a location quotient definition that is most appropriate for the purpose at hand, as the earnings divided by personal income is in the case of studying the ability of counties to capture retail and service activity.

The Beta coefficient estimates for metropolitan counties are similar to those for non-metropolitan counties. These estimates are also shown in Table 2. Beta coefficients are negative and significant in all cases.

Table 2 also has information about Sigma-convergence in non-metropolitan counties. This information is contained in the standard deviation data for each location quotient that is presented for 1969, 1979, and 1995. From Table 2, it is evident that the incidence of Sigma-convergence is less consistent than that of Beta-convergence. Taking the five location quotient definitions as a group, Sigma-convergence is not evident for retail trade in non-metropolitan counties in the South Census region, but is found consistently in the case of services. The rate of Sigma-convergence appears to have slowed since 1979.

Looking at the preferred location quotient definition, earnings divided by personal income, the findings are different. Sigma-convergence is found for the retail trade industry in non-metropolitan counties in the South Census region, particularly from 1969 to 1979. Sigma-convergence is not found for the service industry, even though Beta-convergence was found.

B. Within Beale Codes

The finding of consistent Beta-convergence and inconsistent Sigma-convergence among retail trade and service location quotients provides only mixed support for the idea that location quotients are converging among all non-metropolitan counties. As suggested by Quah (1993), Galton's fallacy may explain the presence of Beta-convergence but absence of Sigma-convergence under some location quotient definitions. Negative values for Beta-coefficients may simply give the appearance of convergence where it is not occurring. Another possibility in these cases is that convergence is simply occurring in clubs, that is, groups of counties. While convergence is not occurring among the location quotients of all counties, it is occurring within groups of similar counties, for example, counties with a similar population. In fact, as was mentioned in the literature review section, central place theory suggests that location quotients should be similar for places

of a similar size which are of a similar distance from higher order places. Location quotients would not be expected to be the same in all counties, but might be close in counties with a similar population and a similar distance from metropolitan areas, that is, might be close within counties in the same Beale Code. To the extent that location quotients differ within counties in the same Beale Code, location quotients may have been moving towards similar values over the 1969 to 1995 period.

Table 3 shows the estimates of the Beta-coefficient in South Census region counties with the same Beale Code. Estimates are presented for retail and services for all three time periods, and under all five location quotient definitions. Focusing on results for the non-metropolitan Beale Codes 4 through 9, the presence of Beta-convergence appears to be consistent across all of the codes. The Beta coefficient is negative and statistically significant in nearly all six Beale Code county groups under all five location quotient definitions.

Note that Beta-convergence is not consistently found among metropolitan Beale Code county groups. These are groups 0 through 3. Relative to non-metropolitan counties, there does not appear to be as strong a tendency for location quotient convergence in metropolitan counties.

Among counties with the same Beale Code, there is mixed evidence of Sigma-convergence. Using the preferred location quotient definition, earnings divided by personal income, Sigma-convergence is found for the retail trade industry in the smaller counties classified in Beale Codes 6 through 9. These four groups include non-metropolitan counties with an urban population of less than 20,000, and are composed of counties both adjacent and not adjacent to metropolitan areas. Sigma-convergence is most evident in the service industry in larger non-metropolitan counties classified in Beale Codes 4 and 5. These are non-metropolitan counties with an urban population above 20,000. Overall, results from the earnings divided by personal income definition for the location quotient indicate the strongest evidence of Sigma-convergence among service location quotients in larger non-metropolitan counties, and among retail location quotients in smaller non-metropolitan counties.

Evidence from other location quotient definitions, however, cast some doubt on this conclusion. In particular, findings regarding Sigma-convergence vary widely by location quotient. Take, for example, the finding of Sigma-convergence for retail trade in smaller non-metropolitan counties (Beale Codes 6-9). Under the employment divided by personal income definition of location quotient, Sigma-convergence is not found. Indeed, Sigma-convergence is not consistently found under any of the other three definitions of location quotient. This must cast some doubt on the robustness of convergence of retail trade location quotients in small, non-metropolitan counties.

At the same time, the finding of Sigma-convergence among service location quotients in large non-metropolitan counties (Beale Codes 4 and 5) is quite robust. There is evidence of Sigma-convergence under all five definitions of location quotient.

In summary, Beta-convergence was found for both retail trade and service location quotients under all location quotient definitions and non-metropolitan counties of all sizes and locations. However, evidence of Sigma-convergence was more limited. Sigma-convergence was consistently found for service location quotients in larger, non-metropolitan counties with an urban population over 20,000. Sigma-convergence also was found for retail trade location quotients in smaller, non-metropolitan counties with an urban population under 20,000, but only was found under the preferred definition for location quotients, earnings divided by personal income.

C. Enhanced Convergence Regression Results

In order to further examine how growth and convergence (or divergence) in the retail trade and services industries has evolved since 1969, we conduct enhanced Beta-convergence regres-

sions (i.e., enhanced versions of Equation 1) for each of the five location quotients for each industry: earnings from work relative to total personal income, earnings from work relative to total earnings by place of residents, employment relative to total full- and part-time employment, employment relative to nonfarm employment, and employment relative to total personal income. The regressions are enhanced over regression results presented in Tables 2 and 3 above in the sense that additional variables were added to the simple regression described in Equation 1.

In each case, we regress changes in the log county location quotients from 1969 to 1995 on a constant, log levels of the location quotient in 1969, log population shares in 1969, changes in log population shares from 1969 to 1995, Bureau of Economic Analysis estimates of residence adjustment in 1969, changes in the residence adjustment from 1969 to 1995, and a set of state dummies. We include additional regressors to account for county size and growth effects (population share variables, measures as the county share of South Census region population) and to account for distortions caused by commuting patterns (the residence adjustment and change in residence adjustment).

We perform this regression using all counties in the South Census region and then disaggregate the data based on the Rural-Urban Continuum developed by Butler and Beale (1994) (10 Beale Codes from 0 to 9). We report results for all Beale Codes individually, and we also aggregate up from individual Beale Codes to report joint results for metropolitan (Beale Codes 0-3) and rural areas (Beale Codes 4-9). Table 7 contains Beale Code definitions.

Results of these regressions are summarized in Table 4. Overall, results for the South Census region as a whole suggest that there has been a strong tendency for counties with lower location quotients to exhibit faster location quotient growth than counties with higher location quotients (or to exhibit Beta-convergence). See, for example, the retail trade results in the first row of Table 4. The estimated coefficient on the log retail trade location quotient in 1969 is estimated to be negative (at -0.011) and significantly different from zero, which implies that counties with low location quotients in 1969 tended to exhibit faster growth during the 1969 to 1995 period than counties with higher location quotients. In addition, the log population share is estimated to be strongly positive as is the change in the population share during the 1969 to 1995 period. Finally, the regression adjusted R-Squared is 0.36 and there were 1,356 counties in the regression.

In addition, if we disaggregate the data by Beale Code, the general sense of the results is the same. The coefficient on the log location quotient in 1969 is negative and significantly different from zero, and this holds up no matter which measure of location we use. However, the size of the coefficient appears to vary across metropolitan and rural counties (and across Beale Code). We return to this issue in more detail below.

The results for the overall South Census region services industry also suggest convergence in location quotient, in the sense that the coefficient on the log location quotient in 1969 is uniformly negative and significantly different from zero. However, in services the estimated coefficient is a bit larger, (in absolute value) at -0.019, than the coefficient for retail trade. The adjusted R-Squared in the services regression is 0.46 and there were 1,289 counties included (counties for which data was unavailable were excluded).

Finally, for services as well, the general tenor of the results generalizes both across metropolitan and rural counties (and the Rural-Urban Continuum) and across location quotient measures. However, there again appear to be differences in the size of the coefficient across Beale Code, a point which we return to below.

Each of the regressions summarized in Table 4 (and, in fact, all regressions described in this section) contains a set of state dummies to capture state-specific effects. These variables are usually highly jointly significant, indicating that there are systematic differences in location quotient growth related to the state in which the county is located. (The F-tests on state dum-

mies are not reported in Table 4, but are available from the authors upon request).

In summary, the results from Table 4 suggest that there is a strong tendency toward Beta-convergence. In addition, the inclusion of additional explanatory variables does not interfere with this result, but does suggest that state effects, the population share, and the growth of the population share, and to a lesser extent the resident adjustment, are also important in explaining the growth of retail trade and services location quotients.

As noted above, the coefficient on the log location quotient in 1969, also known as the convergence coefficient, appears to vary across the Rural-Urban Continuum. This general impression is for the most part correct. Table 5 summarizes the results of Wald tests designed to test the equality of the convergence coefficient across Beale Codes. Consider the first column of Table 5, which reports P-values from the Wald tests on the relevant Null Hypothesis for the regressions summarized in Table 4. For the earnings relative to personal income location quotients, the test rejects at the 1% significance level the Null Hypothesis that the retail trade convergence coefficient is equal across all Beale Codes. Examining this Null Hypothesis for other location quotient measures indicates that we can reject it at the 1% significance level for three out of five measures.

We can also reject the Null Hypotheses that the convergence coefficient is equal across all metropolitan Beale Codes at the 1% level for location quotients measured using earnings relative to total personal income. However, for the rest of the location quotient measures we fail to reject at the 1% level. The non-metropolitan counties generally exhibit more diversity, as we can reject the Null Hypothesis that all non-metropolitan convergence coefficients are equal at the 1% level in three out of five location quotient measures. Overall, this suggests that there is more diversity in the convergence coefficients across rural counties than for metropolitan counties.

Finally, we fail to reject the Null Hypothesis that the average metropolitan convergence coefficient differs from the average non-metropolitan convergence coefficient at the 10% significance level for all but one measure of location quotients.

For services, we can reject the Null Hypothesis that convergence coefficients are equal across all Beale Codes at the 1% level for four out of five location quotient measures. In addition, we also tend to find more similar convergence coefficients across metropolitan Beale Codes for the services location quotients than for non-metropolitan Beale Codes. We fail to reject the Null Hypothesis that all metropolitan convergence coefficients are equal (at the 1% significance level) for five out of five location quotient measures. In contrast, we reject the Null Hypothesis that all non-metropolitan convergence coefficients are equal (again at the 1% level) for two out of five location quotient measures. In conclusion, there is more diversity in the convergence coefficients of non-metropolitan counties than metropolitan counties.

Again, we fail to reject the Null Hypothesis that the average metropolitan convergence coefficient differs from the average rural convergence coefficient at the 1% significance level for all but one measure of services location quotients.

In order to examine the temporal stability of our regressions, we split the 1969-95 interval into two parts: 1969-79 and 1979-95. We re-estimate the above regressions for each sub-sample (detailed results available from the authors upon request) and perform Wald tests testing the stability of the convergence coefficient across sub-samples. The results of these Wald tests are summarized in Table 6. We reject the Null Hypothesis (at the 1% level) that the convergence coefficient is equal across sub-samples in virtually all cases. Overall, the results suggest that location quotients converged during both periods, but at different rates.

Overall rates of convergence decreased during the 1979-95 period. For example, the South

Census region convergence coefficient for the retail trade earnings/personal income location quotient was -0.019 for the 1969-79 period, but -0.009 for the 1979-95 period. As the P-value in the first cell of Table 6 shows, we can reject the Null Hypothesis that these two coefficients are equal at the 1% level. This slowdown in convergence occurs in the services industry as well, with the convergence coefficient falling (in absolute value) from -0.035 for the 1969-79 period to -0.017 for the 1979-95 period. As Table 6 shows, we can reject the Null Hypothesis that these two coefficient estimates are equal at the 1% level. This slowdown in location quotient convergence during the 1980s reflects trends observed for per capita income convergence by Drennan et.al. (1996) and Carlino and Mills (1996) among many others.

In addition, we re-examine our results in Table 5 in light of the differences exhibited across these two sub-samples. For the retail trade results, it is clear that convergence coefficients became more different during the 1979-95 period, in the sense that we generally find smaller P-values in the 1979-95 column than we do in the 1969-79 column. This effect is less striking in the services results, but it does show up in several cases.

Overall, the sample split reveals a slowdown in overall rates of convergence during the 1979-95 period compared to the 1969-79 period, although not outright divergence. Further, these results are consistent across Beale Codes and location quotient measures. In addition, the results reveal that there was an increase in the diversity of convergence across Beale Codes during the 1979-95 period. In short, the 1980s and early to mid-1990s have produced slower and more varied convergence in the retail trade and services location quotients of the counties of the South Census region.

D. An Application to Location Quotient Forecasting

As has been discussed, results of the above analysis can be used to forecast location quotients. Using the earnings/personal income definition for retail trade, the latest data put the location quotient for Doddridge County, West Virginia, at 0.318 in 1996. What do the enhanced convergence regression results forecast for 1996? Using the overall South Census region regression results for the 1995-69 period (and known data for the starting location quotient, population share, and residence adjustment, as well as data for 1996 used to compute growth rates for the population share and residence adjustment), the forecast calls the Doddridge County retail trade location quotient to be 0.600 in 1996.

However, this forecast ignores some important information we have gained about trends in location quotients in the South Census region. If we use the enhanced regression results for Beale Code 9 (and the same data as above), we arrive at a forecast location quotient for Doddridge County of 0.463. In addition, if we also include the evidence that there has been a change in Beta-convergence during the 1995-79 period, and use the enhanced regression results for Beale Code 9 for the1995-79 period, the model forecasts a retail trade location quotient for Doddridge County of 0.366. Overall, including the information that there are differences in location quotient growth rates across Beale Code and time period substantially improves the forecast, since the actual location quotient value for 1996 in Doddridge County was 0.318.

V. Conclusions

One aspect of local economic development policy in the non-metropolitan United States is the performance of local retail and service sectors. A number of programs attempt to enhance these sectors, such as downtown redevelopment, entrepreneurship development and revolving loan funds. Such programs are found in many communities around the country, although retail trade and service development efforts are by no means as common as industrial recruitment efforts.

There certainly are opportunities to enhance local retail trade and service sectors and capture local spending through collective and individual initiative. However, economic approaches such as central place theory suggest that the ability of communities and counties to capture local retail and service spending may be limited by factors such as a county's population or its proximity to larger counties and cities. The relative importance of these determining factors of population and proximity can be gauged by examining the level of location quotients of counties of different sizes and different proximity to metropolitan areas. A related issue is whether these location quotients have been converging over time among counties of similar population and proximity to large places. A finding of convergence would suggest that population, proximity and other economic factors are becoming increasingly deterministic for location quotients, and thereby, capturing local spending. The finding of convergence also would be useful information for the purpose of forecasting county location quotients, which could be helpful in county economic forecasting efforts.

This report examined convergence among retail trade and service location quotients in South Census region counties during the period 1969 to 1995. Convergence was examined for all South Census region counties together, and counties within Beale Codes, a county classification system that groups counties by population and proximity to metropolitan areas, and also classifies counties within metropolitan areas.

Beta-convergence (i.e., counties with smaller location quotients experience faster location quotient growth) was found for retail trade and service location quotients for both the 1969 to 1979 period and the 1979 to 1995 period. The finding was robust to five alternative definitions of location quotients, and occurred at the aggregate level and within each of the 10 Beale code county classifications. Thus, Beta-convergence was found for location quotients within groups of counties of all sizes. In general, the magnitude of the Beta coefficient, which influences the rate of convergence, varied more among non-metropolitan areas than in metropolitan areas, indicating more diversity in the rate of convergence in non-metropolitan areas. The magnitude of the Beta coefficient also dropped between the 1969 through 1979 period and the 1979 to 1995 period, suggesting that the rate of convergence has slowed.

These initial findings regarding convergence were for a simple model of location quotient growth on the initial level of the location quotient. Therefore, the initial regression did not consider the effect of other factors that can influence location quotient growth, such as population (central place theory), residential adjustment (shopping where you work), population growth, residential adjustment growth, and state dummy variables (state tastes and preferences or structural change). However, Beta-convergence was still found after these variables were added. The addition of these variables to the model also made the model more effective for forecasting location quotients for use in county econometric models. This is because population and residential adjustment variables are also forecast in most econometric models. Location quotient forecasts for Doddridge County, West Virginia, made using the coefficient estimates from the enhanced model were found to be accurate, and much more accurate than those produced with coefficients from the simple model.

These robust findings regarding Beta-convergence were not as evident for Sigma-convergence, which is another measure of convergence. Sigma-convergence simply refers to spread of the distribution, in this case, the dis-

tribution of location quotients among southern counties as a whole, or within Beale Codes. If that spread, as measured by the distribution's standard deviation, is declining over time, this would indicate Sigma-convergence. But, the log standard deviation's of location quotients were not found to consistently fall from 1969 to 1979 to 1995 in South Census region counties in this study. This called into question the finding of consistent convergence among location quotients that was found using the Beta-convergence measure. However, there were a number of cases where Sigma-convergence also was evident. For example, Sigma-convergence, along with Beta-convergence, was found for services location quotients in larger non-metropolitan counties under all five alternative definitions for location quotient. Sigma-convergence also was identified for retail trade location quotients for smaller non-metropolitan counties, at least under the earnings divided by personal income definition of location quotient, which is the preferred definition in the sense of reflecting the capture of local spending.

This last point reflects a general finding that the magnitude, if not the direction of findings on convergence could vary substantially depending on the definition of location quotient that is used. This suggests the importance of basing analysis of location quotient on the location quotient definition that is most appropriate for the purpose at hand. In this case, the earnings divided by personal income definition.

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Table 1
Means of Location Quotients
1969, 1979, 1995

	Earnings/Personal Income						Earnings/Earnings					
	Retail Trade			Services			Retail Trade			Services		
	1969	1979	1995	1969	1979	1995	1969	1979	1995	1969	1979	1995
South	0.91	0.82	0.80	0.72	0.61	0.55	1.22	1.11	1.08	094	0.81	0.70
Metro	0.87	0.87	0.90	0.79	0.75	0.74	1.11	1.09	1.11	0.96	0.89	0.85
Beale 0	0.87	0.92	0.96	0.86	1.00	1.07	1.04	1.08	1.07	0.96	1.07	1.06
Beale 1	0.78	0.70	0.72	0.64	0.53	0.47	1.22	1.16	1.19	0.99	0.84	0.74
Beale 2	0.84	0.83	0.87	0.79	0.70	0.69	1.10	1.08	1.11	0.98	0.86	0.82
Beale 3	1.00	1.00	1.02	0.84	0.82	0.78	1.09	1.08	1.11	0.90	0.86	0.84
Non-Metro	0.93	0.81	0.77	0.69	0.56	0.47	1.27	1.12	1.06	0.93	0.77	0.65
Beale 4	1.00	0.99	1.02	0.79	0.76	0.68	1.05	1.04	1.11	0.83	0.80	0.74
Beale 5	1.09	1.08	1.12	0.99	0.94	0.84	1.05	1.04	1.09	0.93	0.89	0.81
Beale 6	0.93	0.82	0.77	0.72	0.56	0.45	1.26	1.12	1.08	0.96	0.77	0.63
Beale 7	1.02	0.91	0.90	0.74	0.61	0.52	1.30	1.17	1.15	0.94	0.78	0.66
Beale 8	0.73	0.57	0.52	0.52	0.41	0.39	1.25	1.04	0.91	0.92	0.75	0.63
Beale 9	0.87	0.68	0.60	0.61	0.44	0.36	1.36	1.13	1.00	0.92	0.75	0.60
	Employment/Full- & Part-Time Employment						Employment/Non-farm Employment					
	Retail Trade			Services			Retail Trade			Services		
	1969	1979	1995	1969	1979	1995	1969	1979	1995	1969	1979	1995
South	0.94	0.88	0.91	0.86	0.79	0.74	1.08	0.97	0.96	0.98	0.87	0.79
Metro	0.98	0.99	1.04	0.93	0.91	0.90	1.03	1.01	1.05	0.97	0.93	0.91
Beale 0	1.06	1.09	1.07	0.97	1.08	1.09	1.03	1.06	1.05	0.93	1.05	1.07
Beale 1	0.97	0.93	1.03	0.88	0.85	0.81	1.09	1.00	1.06	0.98	0.90	0.83
Beale 2	0.96	0.97	1.02	0.95	0.88	0.88	1.01	1.00	1.04	0.99	0.91	0.89
Beale 3	0.99	1.00	1.04	0.92	0.88	0.88	1.01	1.02	1.05	0.94	0.89	0.88
Non-Metro	0.92	0.84	0.85	0.83	0.75	0.68	1.10	0.96	0.93	0.98	0.85	0.74
Beale 4	0.94	0.95	1.02	0.89	0.82	0.78	0.98	0.97	1.03	0.92	0.83	0.79
Beale 5	0.97	0.99	1.06	0.93	0.89	0.83	0.98	0.99	1.06	0.94	0.90	0.84
Beale 6	0.95	0.87	0.88	0.87	0.76	0.67	1.12	0.98	0.96	1.02	0.86	0.73
Beale 7	0.98	0.90	0.92	0.85	0.77	0.68	1.14	1.00	0.99	0.98	0.86	0.74
Beale 8	0.79	0.68	0.69	0.75	0.70	0.66	1.04	0.84	0.79	0.98	0.86	0.76
Beale 9	0.84	0.74	0.72	0.73	0.66	0.63	1.11	0.92	0.83	0.94	0.82	0.73

	Employment/Personal Income					
	Retail Trade			Services		
	1969	1979	1995	1969	1979	1995
South	1.00	0.88	0.92	0.92	0.79	0.76
Metro	0.90	0.90	0.97	0.87	0.84	0.85
Beale 0	0.85	0.93	0.95	0.80	0.97	1.00
Beale 1	0.82	0.73	0.80	0.76	0.67	0.63
Beale 2	0.87	0.87	0.95	0.87	0.80	0.82
Beale 3	1.04	1.04	1.13	0.97	0.92	0.94
Non-Metro	1.04	0.87	0.90	0.94	0.77	0.72
Beale 4	1.08	1.05	1.12	1.03	0.91	0.87
Beale 5	1.16	1.15	1.27	1.12	1.05	1.01
Beale 6	1.05	0.89	0.90	0.97	0.77	0.69
Beale 7	1.16	0.98	1.05	1.00	0.83	0.77
Beale 8	0.82	0.63	0.63	0.78	0.62	0.64
Beale 9	0.97	0.74	0.73	0.85	0.66	0.64

Table 2
Summary of Tests for Beta-Convergence in Retail and Service Sector Under 5 Location Quotient Definitions In the South Census Region

Dependent Variable: Change in the Log LQ during specified period

	Beta 1969-95 P-Value	Beta 1979-95 P-Value	Beta 1969-79 P-Value	Log St Dev 1969	Log St Dev 1979	Log St Dev 1995	Beta 1969-95 P-Value	Beta 1979-95 P-Value	Beta 1969-79 P-Value	Log St Dev 1969	Log St Dev 1979	Log St Dev 1995
	Non-Metropolitan Counties						Metropolitan Counties					
Retail Trade												
Earnings/ Personal Income	-0.006 0.00	-0.004 0.01	-0.010 0.00	0.41	0.31	0.30	-0.008 0.00	-0.005 0.00	-0.009 0.00	0.40	0.38	0.35
Employment/ Personal Income	-0.010 0.00	-0.008 0.00	-0.021 0.00	0.30	0.33	0.36	-0.014 0.00	-0.013 0.00	-0.015 0.00	0.35	0.36	0.34
Earnings/Earnings by Place-of-Residence	-0.020 0.00	-0.021 0.00	-0.021 0.00	0.33	0.36	0.36	-0.017 0.00	-0.014 0.00	-0.022 0.00	0.35	0.34	0.34
Employment/Full- and Part-time Employment	-0.017 0.00	-0.012 0.00	-0.031 0.00	0.27	0.27	0.30	-0.021 0.00	-0.018 0.00	-0.029 0.00	0.28	0.25	0.24
Employment/Non-farm Employment	-0.027 0.00	-0.022 0.00	-0.041 0.00	0.29	0.26	0.26	-0.023 0.00	-0.020 0.00	-0.036 0.00	0.29	0.24	0.23
Services												
Earnings/Personal Income	-0.015 0.00	-0.013 0.00	-0.027 0.00	0.41	0.40	0.44	-0.010 0.00	-0.005 0.00	-0.019 0.00	0.45	0.50	0.56
Employment/Personal Income	-0.026 0.00	-0.026 0.00	-0.044 0.00	0.40	0.34	0.32	-0.018 0.00	-0.013 0.00	-0.023 0.00	0.42	0.40	0.38
Earnings/Earnings by Place-of-Residence	-0.023 0.00	-0.026 0.00	-0.035 0.00	0.40	0.37	0.37	-0.019 0.00	-0.012 0.00	-0.026 0.00	0.41	0.38	0.38
Employment/Full- and Part-time Employment	-0.026 0.00	-0.020 0.00	-0.047 0.00	0.36	0.27	0.26	-0.020 0.00	-0.013 0.00	-0.032 0.00	0.34	0.30	0.28
Employment/Non-farm Employment	-0.028 0.00	-0.031 0.00	-0.046 0.00	0.35	0.30	0.25	-0.023 0.00	-0.015 0.00	-00.37 0.00	0.34	0.28	0.26

Regressions include a constant. P-Values based on White (1980) heteroskedasticity corrected standard errors.

Table 3
Convergence Regression Results
Earnings/Personal Income Location Quotient
Dependent Variable: Change in the Log LQ during specified period

	Beta 1969-95 P-Value	Beta 1979-95 P-Value	Beta 1969-79 P-Value	Log St Dev 1969	Log St Dev 1979	Log St Dev 1995	Beta 1969-95 P-Value	Beta 1979-95 P-Value	Beta 1969-79 P-Value	Log St Dev 1969	Log St Dev 1979	Log St Dev 1995
	Retail Trade						Services					
South	-0.008 0.00	-0.004 0.01	-0.011 0.00	0.41	0.35	0.32	-0.010 0.00	-0.005 0.00	-0.019 0.00	0.43	0.45	0.51
Metro	-0.008 0.00	-0.005 0.00	-0.009 0.00	0.40	0.38	0.35	-0.005 0.02	0.001 0.66	-0.008 0.10	0.45	0.50	0.56
Beale 0	-0.026 0.00	-0.021 0.00	-0.026 0.00	0.29	0.33	0.33	-0.009 0.00	-0.008 0.03	-0.010 0.05	0.54	0.55	0.52
Beale 1	-0.024 0.00	-0.011 0.15	-0.040 0.00	0.31	0.25	0.31	-0.020 0.02	-0.002 0.78	-0.032 0.02	0.30	0.33	0.41
Beale 2	-0.005 0.04	-0.004 0.10	-0.005 0.26	0.41	0.39	0.35	-0.006 0.05	0.001 0.80	-0.012 0.07	0.49	0.51	0.57
Beale 3	0.000 0.96	0.001 0.81	0.002 0.77	0.45	0.39	0.35	-0.001 0.86	-0.002 0.44	0.005 0.45	0.37	0.43	0.44
Non-Metro	-0.006 0.00	-0.004 0.01	-0.010 0.00	0.41	0.34	0.30	-0.015 0.00	-0.013 0.00	-0.027 0.00	0.41	0.40	0.44
Beale 4	-0.020 0.00	-0.023 0.01	-0.029 0.00	0.19	0.17	0.19	-0.017 0.00	-0.019 0.00	-0.020 0.02	0.28	0.28	0.26
Beale 5	-0.024 0.00	-0.022 0.00	-0.041 0.00	0.20	0.22	0.32	-0.019 0.00	-0.014 0.00	-0.031 0.00	0.46	0.35	0.32
Beale 6	-0.017 0.00	-0.015 0.00	-0.030 0.00	0.27	0.23	0.23	-0.022 0.00	-0.020 0.00	-0.039 0.00	0.35	0.31	0.33
Beale 7	-0.011 0.00	-0.0078 0.10	-0.024 0.00	0.34	0.25	0.24	-0.017 0.00	-0.015 0.00	-0.037 0.00	0.35	0.31	0.38
Beale 8	-0.010 0.01	-0.011 0.00	-0.016 0.01	0.40	0.37	0.35	-0.021 0.00	-0.029 0.00	-0.039 0.00	0.43	0.40	0.46
Beale 9	-0.012 0.00	-0.011 0.00	-0.015 0.01	0.42	0.38	0.34	-0.020 0.00	-0.019 0.00	-0.035 0.00	0.47	0.43	0.45

Regressions include a constant. P-Values based on White (1980) heteroskedasticity corrected standard errors.

Table 3, continued
Convergence Regression Results
Employment/Personal Income Location Quotient
Dependent Variable: Change in the Log LQ during specified period

	Beta 1969-95 P-Value	Beta 1979-95 P-Value	Beta 1969-79 P-Value	Log St Dev 1969	Log St Dev 1979	Log St Dev 1995	Beta 1969-95 P-Value	Beta 1979-95 P-Value	Beta 1969-79 P-Value	Log St Dev 1969	Log St Dev 1979	Log St Dev 1995
	Retail Trade						Services					
South	-0.014 0.00	-0.010 0.00	-0.024 0.00	0.32	0.34	0.36	-0.025 0.00	-0.021 0.00	-0.039 0.00	0.41	0.36	0.35
Metro	-0.014 0.00	-0.013 0.00	-0.015 0.00	0.35	0.36	0.34	-0.018 0.00	-0.013 0.00	-0.023 0.00	0.42	0.40	0.38
Beale 0	-0.030 0.00	-0.029 0.00	-0.029 0.00	0.32	0.32	0.25	-0.019 0.00	-0.020 0.00	-0.017 0.01	0.48	0.46	0.34
Beale 1	-0.027 0.00	-0.020 0.01	-0.043 0.00	0.33	0.27	0.27	-0.030 0.00	-0.027 0.00	-0.040 0.00	0.38	0.31	0.26
Beale 2	-0.012 0.00	-0.012 0.00	-0.014 0.01	0.35	0.36	0.34	-0.017 0.00	-0.012 0.00	-0.024 0.00	0.43	0.40	0.39
Beale 3	-0.004 0.19	-0.0072 0.04	0.0012 0.88	0.35	0.39	0.38	-0.013 0.00	-0.013 0.00	-0.013 0.03	0.37	0.37	0.32
Non-Metro	-0.010 0.00	-0.008 0.00	-0.021 0.00	0.30	0.33	0.36	-0.026 0.00	-0.026 0.00	-0.044 0.00	0.40	0.34	0.32
Beale 4	-0.023 0.00	-0.022 0.00	-0.047 0.00	0.20	0.15	0.16	-0.026 0.00	-0.022 0.00	-0.049 0.00	0.31	0.20	0.21
Beale 5	-0.024 0.00	-0.024 0.00	-0.043 0.00	0.31	0.21	0.17	-0.023 0.00	-0.023 0.00	-0.041 0.00	0.37	0.27	0.23
Beale 6	-0.021 0.00	-0.022 0.00	-0.041 0.00	0.23	0.23	0.24	-0.030 0.00	-0.034 0.00	-0.045 0.00	0.36	0.29	0.25
Beale 7	-0.016 0.00	-0.011 0.03	-0.033 0.00	0.24	0.24	0.30	-0.024 0.00	-0.026 0.00	-0.049 0.00	0.34	0.27	0.29
Beale 8	-0.013 0.00	-0.013 0.00	-0.024 0.00	0.35	0.36	0.38	-0.032 0.00	-0.036 0.00	-0.052 0.00	0.47	0.38	0.39
Beale 9	-0.017 0.00	-0.018 0.00	-0.035 0.00	0.31	0.34	0.36	-0.030 0.00	-0.028 0.00	-0.057 0.00	0.46	0.37	0.35

Regressions include a constant. P-Values based on White (1980) heteroskedasticity corrected standard errors.

Table 3, continued
Convergence Regression Results
Earnings/Earnings Location Quotient
Dependent Variable: Change in the Log LQ during specified period

	Beta 1969-95 P-Value	Beta 1979-95 P-Value	Beta 1969-79 P-Value	Log St Dev 1969	Log St Dev 1979	Log St Dev 1995	Beta 1969-95 P-Value	Beta 1979-95 P-Value	Beta 1969-79 P-Value	Log St Dev 1969	Log St Dev 1979	Log St Dev 1995
	Retail Trade						Services					
South	-0.020 0.00	-0.020 0.00	-0.024 0.00	0.34	0.35	0.35	-0.022 0.00	-0.019 0.00	-0.032 0.00	0.40	0.38	0.38
Metro	-0.017 0.00	-0.014 0.00	-0.022 0.00	0.35	0.34	0.34	-0.019 0.00	-0.012 0.00	-0.026 0.00	0.41	0.38	0.38
Beale 0	-0.011 0.06	-0.006 0.36	-0.014 0.23	0.32	0.34	0.37	-0.015 0.00	-0.013 0.00	-0.022 0.00	0.41	0.36	0.36
Beale 1	-0.014 0.00	-0.012 0.05	-0.017 0.01	0.46	0.42	0.43	-0.025 0.00	-0.023 0.00	-0.029 0.01	0.44	0.39	0.39
Beale 2	-0.019 0.00	-0.015 0.00	-0.027 0.00	0.34	0.31	0.33	-0.018 0.00	-0.010 0.15	-0.027 0.00	0.43	0.40	0.40
Beale 3	-0.019 0.00	-0.021 0.00	-0.022 0.00	0.33	0.31	0.29	-0.018 0.00	-0.015 0.00	-0.023 0.00	0.35	0.32	0.32
Non-Metro	-0.020 0.00	-0.021 0.00	-0.021 0.00	0.33	0.36	0.36	-0.023 0.00	-0.026 0.00	-0.035 0.00	0.40	0.37	0.37
Beale 4	-0.016 0.00	-0.011 0.09	-0.023 0.05	0.31	0.29	0.30	-0.015 0.00	-0.012 0.00	-0.020 0.08	0.37	0.35	0.35
Beale 5	-0.025 0.00	-0.024 0.01	-0.041 0.00	0.36	0.24	0.20	-0.022 0.00	-0.021 0.00	-0.034 0.00	0.49	0.35	0.35
Beale 6	-0.020 0.00	-0.026 0.00	-0.020 0.00	0.31	0.33	0.29	-0.022 0.00	-0.028 0.00	-0.027 0.00	0.36	0.38	0.38
Beale 7	-0.026 0.00	-0.027 0.00	-0.028 0.00	0.29	0.28	0.29	-0.024 0.00	-0.025 0.00	-0.034 0.00	0.34	0.31	0.31
Beale 8	-0.009 0.04	-0.020 0.00	-0.002 0.84	0.39	0.53	0.49	-0.025 0.00	-0.026 0.00	-0.047 0.00	0.45	0.39	0.39
Beale 9	-0.019 0.00	-0.020 0.00	-0.026 0.00	0.35	0.38	0.41	-0.023 0.00	-0.031 0.00	-0.037 0.00	0.47	0.44	0.44

Regressions include a constant. P-Values based on White (1980) heteroskedasticity corrected standard errors.

Table 3, continued
Convergence Regression Results
Employment/Total Full- & Part-Time Employment Location Quotient
Dependent Variable: Change in the Log LQ during specified period

	Beta 1969-95 P-Value	Beta 1979-95 P-Value	Beta 1969-79 P-Value	Log St Dev 1969	Log St Dev 1979	Log St Dev 1995	Beta 1969-95 P-Value	Beta 1979-95 P-Value	Beta 1969-79 P-Value	Log St Dev 1969	Log St Dev 1979	Log St Dev 1995
	Retail Trade						Services					
South	-0.017 0.00	-0.011 0.00	-0.028 0.00	0.27	0.28	0.30	-0.022 0.00	-0.019 0.00	-0.040 0.00	0.36	0.31	0.30
Metro	-0.021 0.00	-0.018 0.00	-0.029 0.00	0.28	0.25	0.24	-0.020 0.00	-0.013 0.00	-0.032 0.00	0.34	0.30	0.28
Beale 0	-0.022 0.00	-0.014 0.06	-0.022 0.06	0.23	0.25	0.26	-0.021 0.00	-0.020 0.00	-0.030 0.00	0.33	0.27	0.21
Beale 1	-0.017 0.00	-0.013 0.03	-0.030 0.00	0.32	0.27	0.28	-0.024 0.00	-0.022 0.00	-0.032 0.00	0.29	0.27	0.22
Beale 2	-0.021 0.00	-0.017 0.00	-0.034 0.00	0.27	0.23	0.23	-0.019 0.00	-0.011 0.11	-0.035 0.00	0.37	0.31	0.31
Beale 3	-0.021 0.00	-0.022 0.00	-0.024 0.00	0.30	0.26	0.22	-0.020 0.00	-0.017 0.00	-0.031 0.00	0.31	0.25	0.22
Non-Metro	-0.017 0.00	-0.012 0.00	-0.031 0.00	0.27	0.27	0.30	-0.026 0.00	-0.027 0.00	-0.047 0.00	0.36	0.30	0.27
Beale 4	-0.023 0.00	-0.021 0.00	-0.033 0.01	0.24	0.21	0.17	-0.019 0.00	-0.011 0.01	-0.033 0.00	0.36	0.27	0.26
Beale 5	-0.027 0.00	-0.028 0.00	-0.044 0.00	0.35	0.22	0.16	-0.023 0.00	-0.022 0.00	-0.041 0.00	0.41	0.27	0.23
Beale 6	-0.024 0.00	-0.023 0.00	-0.041 0.00	0.23	0.21	0.21	-0.026 0.00	-0.030 0.00	-0.041 0.00	0.31	0.28	0.23
Beale 7	-0.019 0.00	-0.009 0.03	-0.032 0.00	0.21	0.21	0.25	-0.023 0.00	-0.022 0.00	-0.041 0.00	0.29	0.25	0.26
Beale 8	-0.018 0.00	-0.021 0.00	-0.033 0.00	0.32	0.33	0.33	-0.031 0.00	-0.037 0.00	-0.055 0.00	0.45	0.35	0.29
Beale 9	-0.020 0.00	-0.014 0.01	-0.047 0.00	0.29	0.27	0.32	-0.028 0.00	-0.030 0.00	-0.063 0.00	0.42	0.31	0.30

Regressions include a constant. P-Values based on White (1980) heteroskedasticity corrected standard errors.

Table 3, continued
Convergence Regression Results
Employment/Non-farm Employment Location Quotient
Dependent Variable: Change in the Log LQ during specified period

	Beta 1969-95 P-Value	Beta 1979-95 P-Value	Beta 1969-79 P-Value	Log St Dev 1969	Log St Dev 1979	Log St Dev 1995	Beta 1969-95 P-Value	Beta 1979-95 P-Value	Beta 1969-79 P-Value	Log St Dev 1969	Log St Dev 1979	Log St Dev 1995
	Retail Trade						Services					
South	-0.027 0.00	-0.021 0.00	-0.042 0.00	0.29	0.25	0.26	-0.027 0.00	-0.025 0.00	-0.044 0.00	0.35	0.29	0.27
Metro	-0.023 0.00	-0.020 0.00	-0.036 0.00	0.29	0.24	0.23	-0.023 0.00	-0.015 0.00	-00.37 0.00	0.34	0.28	0.26
Beale 0	-0.020 0.00	-0.014 0.06	-0.021 0.06	0.23	0.25	0.26	-0.020 0.00	-0.019 0.00	-0.030 0.00	0.32	0.27	0.21
Beale 1	-0.022 0.00	-0.019 0.01	-0.033 0.00	0.36	0.29	0.28	-0.026 0.00	-0.025 0.00	-0.036 0.00	0.32	0.28	0.21
Beale 2	-0.025 0.00	-0.019 0.00	-0.044 0.00	0.28	0.22	0.22	-0.022 0.00	-0.013 0.10	-0.037 0.00	0.37	0.30	0.30
Beale 3	-0.024 0.00	-0.025 0.00	-0.031 0.00	0.28	0.23	0.20	-0.022 0.00	-0.016 0.00	-0.037 0.00	0.29	0.23	0.21
Non-Metro	-0.027 0.00	-0.022 0.00	-0.042 0.00	0.29	0.26	0.26	-0.028 0.00	-0.031 0.00	-0.046 0.00	0.35	0.30	0.25
Beale 4	-0.024 0.00	-0.020 0.00	-0.038 0.00	0.27	0.21	0.18	-0.021 0.00	-0.013 0.00	-0.035 0.00	0.37	0.28	0.26
Beale 5	-0.028 0.00	-0.028 0.00	-0.046 0.00	0.36	0.22	0.16	-0.024 0.00	-0.024 0.00	-0.040 0.00	0.42	0.28	0.23
Beale 6	-0.028 0.00	-0.032 0.00	-0.042 0.00	0.27	0.23	0.20	-0.027 0.00	-0.032 0.00	-0.35 0.00	0.31	0.30	0.23
Beale 7	-0.031 0.00	-0.020 0.00	-0.046 0.00	0.25	0.20	0.23	-0.027 0.00	-0.027 0.00	-0.038 0.00	0.29	0.26	0.25
Beale 8	-0.020 0.00	-0.026 0.00	-0.028 0.00	0.33	0.36	0.33	-0.031 0.00	-0.036 0.00	-0.054 0.00	0.44	0.34	0.28
Beale 9	-0.027 0.00	-0.026 0.00	-0.052 0.00	0.33	0.26	0.28	-0.031 0.00	-0.034 0.00	-0.060 0.00	0.42	0.32	0.28

Regressions include a constant. P-Values based on White (1980) heteroskedasticity corrected standard errors.

Table 4
Enhanced Convergence Regression Results–Coefficient Estimates and P-Values
Earnings/Personal Income Location Quotient

Dependent Variable: Change in the Log LQ from 1969 to 1995

	Retail Trade						Services					
	Log LQ 1969	Log Popshr 1969	Change Log Popshr 1969-95	Resadj* 1969	Change Resadj* 1969-95	Adj. R^2 Obs.	Log LQ 1969	Log Popshr 1969	Change Log Popshr 1969-95	Resadj* 1969	Change Resadj* 1969-95	Adj. R^2 Obs.
South	-0.011 0.00	0.006 0.00	0.140 0.00	0.8 0.25	0.3 0.87	0.36 1356	-0.019 0.00	0.009 0.00	0.084 0.02	0.6 0.38	-6.0 0.06	0.46 1289
Metro	-0.014 0.00	0.006 0.00	0.105 0.02	0.8 0.16	0.01 0.96	0.31 384	-0.018 0.00	0.010 0.00	0.084 0.24	0.5 0.31	-4.0 0.16	0.45 373
Beale 0	-0.026 0.00	0.004 0.04	0.202 0.07	0.8 0.10	-3.0 0.06	0.52 58	-0.017 0.00	0.006 0.00	0.100 0.38	0.4 0.45	-4.0 0.04	0.44 57
Beale 1	-0.025 0.00	0.009 0.01	0.460 0.01	-12.0 0.38	-40.0 0.05	0.54 61	-0.027 0.00	0.021 0.00	0.561 0.05	-46.0 0.13	-23.0 0.47	0.39 55
Beale 2	-0.011 0.00	0.007 0.00	0.084 0.19	5.0 0.00	-4.0 0.29	0.32 173	-0.020 0.00	0.011 0.00	0.171 0.11	5.0 0.05	-20.0 0.00	0.54 172
Beale 3	-0.021 0.00	0.013 0.00	0.316 0.01	3.0 0.59	-47.0 0.03	0.44 92	-0.013 0.00	0.008 0.00	0.100 0.38	2.0 0.70	-60.0 0.00	0.44 89
Non-Metro	-0.012 0.00	0.008 0.00	0.242 0.00	-3.0 0.59	-84.0 0.00	0.34 972	-0.022 0.00	0.009 0.00	0.223 0.00	-2.0 0.87	-194.0 0.00	0.44 916
Beale 4	-0.016 0.02	0.006 0.13	0.108 0.37	-8.0 0.37	30.0 0.34	0.08 50	-0.016 0.00	0.010 0.00	0.100 0.54	-6.0 0.53	-39.0 0.29	0.43 47
Beale 5	-0.034 0.00	0.006 0.15	0.376 0.00	3.0 0.86	-60.0 0.30	0.85 37	-0.015 0.00	0.023 0.00	0.556 0.00	38.0 0.15	-265.0 0.00	0.76 35
Beale 6	-0.018 0.00	0.008 0.00	0.290 0.00	-0.8 0.94	-103.0 0.00	0.44 323	-0.025 0.00	0.011 0.00	0.301 0.00	-10.0 0.47	-180.0 0.00	0.51 302
Beale 7	-0.013 0.00	0.005 0.00	0.360 0.00	-7.0 0.63	-122.0 0.15	0.34 265	-0.023 0.00	0.009 0.00	0.418 0.00	-18.0 0.31	-160.0 0.06	0.42 258
Beale 8	-0.006 0.06	-0.004 0.29	0.315 0.01	58.0 0.25	-303.0 0.00	0.13 138	-0.029 0.00	0.010 0.00	0.455 0.08	76.0 0.16	-949.0 0.00	0.48 123
Beale 9	-0.017 0.00	0.010 0.00	0.171 0.22	-32.0 0.40	-372.0 0.03	0.23 159	-0.024 0.00	0.010 0.00	0.337 0.07	20.0 0.64	-650.0 0.00	0.38 151

*estimated coefficient multiplied by E+8.
P-Values based on White (1980) heteroskedasticity corrected standard errors.
All regressions include a constant and state dummies. LQ=Location Quotient. Popshr=Population Share. Resadj=Residence Adjustment.

Table 4, continued
Enhanced Convergence Regression Results–Coefficient Estimates and P-Values
Employment/Personal Income Location Quotient

Dependent Variable: Change in the Log LQ from 1969 to 1995

	Retail Trade						Services					
	Log LQ 1969	Log Popshr 1969	Change Log Popshr 1969-95	Resadj* 1969	Change Resadj* 1969-95	Adj. R^2 Obs.	Log LQ 1969	Log Popshr 1969	Change Log Popshr 1969-95	Resadj* 1969	Change Resadj* 1969-95	Adj. R^2 Obs.
South	-0.013 0.00	0.005 0.00	0.174 0.00	0.3 0.67	2.0 0.42	0.39 1356	-0.026 0.00	0.006 0.00	0.078 0.01	0.3 0.58	-5.0 0.10	0.61 1289
Metro	-0.016 0.00	0.004 0.00	0.079 0.06	0.5 0.41	1.0 0.33	0.35 384	-0.025 0.00	0.007 0.00	0.072 0.20	0.2 0.69	-3.0 0.31	0.61 373
Beale 0	-0.026 0.00	0.001 0.69	0.119 0.27	0.6 0.18	0.2 0.13	0.55 58	-0.025 0.00	0.003 0.01	0.019 0.81	0.1 0.74	-3.0 0.09	0.66 57
Beale 1	-0.023 0.00	0.009 0.00	0.500 0.00	-10.0 0.40	-37.0 0.04	0.70 61	-0.030 0.00	0.012 0.00	0.437 0.01	-20.0 0.25	-24.0 0.20	0.73 55
Beale 2	-0.016 0.00	0.005 0.00	0.065 0.30	4.0 0.00	-2.0 0.52	0.38 173	-0.025 0.00	0.008 0.00	0.166 0.05	4.0 0.04	-15.0 0.00	0.67 172
Beale 3	-0.021 0.00	0.010 0.00	0.215 0.01	4.0 0.27	-4.0 0.01	0.43 92	-0.026 0.00	0.006 0.00	0.059 0.56	3.0 0.51	-51.0 0.01	0.53 89
Non-Metro	-0.015 0.00	0.007 0.00	0.298 0.00	-8.0 0.17	-85.0 0.00	0.38 972	-0.027 0.00	0.005 0.00	0.205 0.00	-6.0 0.57	-138.0 0.00	0.61 916
Beale 4	-0.017 0.05	0.004 0.18	0.137 0.17	-10.0 0.18	23.0 0.33	0.39 50	-0.025 0.00	0.005 0.24	0.081 0.53	-8.0 0.29	-15.0 0.61	0.70 47
Beale 5	-0.029 0.00	0.002 0.57	0.339 0.00	-5.0 0.70	-39.0 0.36	0.88 37	-0.012 0.00	0.012 0.12	0.306 0.09	12.0 0.61	-168.0 0.05	0.71 35
Beale 6	-0.020 0.00	0.007 0.00	0.281 0.00	-0.03 0.98	-107.0 0.00	0.50 323	-0.029 0.00	0.007 0.00	0.231 0.00	-18.0 0.08	-93.0 0.00	0.70 302
Beale 7	-0.017 0.00	0.005 0.00	0.392 0.00	-16.0 0.22	-93.0 0.26	0.37 265	-0.023 0.00	0.005 0.01	0.434 0.00	-24.0 0.08	-41.0 0.55	0.58 258
Beale 8	-0.014 0.02	0.000 0.91	0.387 0.00	19.0 0.63	-244.0 0.01	0.15 138	-0.032 0.00	0.006 0.03	0.514 0.01	90.0 0.08	-928.0 0.00	0.72 123
Beale 9	-0.020 0.00	0.010 0.00	0.342 0.01	-9.0 0.80	-411.0 0.01	0.34 159	-0.029 0.00	0.005 0.10	0.263 0.07	18.0 0.64	-500.0 0.01	0.62 151

*Estimated coefficient multiplied by E+8.
P-Values based on White (1980) heteroskedasticity corrected standard errors.
All regressions include a constant and state dummies. LQ=Location Quotient. Popshr=Population Share. Resadj=Residence Adjustment.

Table 4, continued
Enhanced Convergence Regression Results–Coefficient Estimates and P-Values
Earnings/Earnings Location Quotient

Dependent Variable: Change in the Log LQ from 1969 to 1995

	Retail Trade						Services					
	Log LQ 1969	Log Popshr 1969	Change Log Popshr 1969-95	Resadj* 1969	Change Resadj* 1969-95	Adj. R^2 Obs.	Log LQ 1969	Log Popshr 1969	Change Log Popshr 1969-95	Resadj* 1969	Change Resadj* 1969-95	Adj. R^2 Obs.
South	-0.017 0.00	0.004 0.00	0.179 0.00	-0.9 0.20	8.0 0.00	0.38 1356	-0.022 0.00	0.005 0.00	0.173 0.00	-0.3 0.40	0.3 0.85	0.51 1289
Metro	-0.019 0.00	0.002 0.01	0.132 0.00	-0.3 0.60	6.0 0.00	0.35 384	-0.021 0.00	0.006 0.00	0.160 0.01	-0.2 0.50	0.5 0.73	0.51 373
Beale 0	-0.021 0.00	0.00 0.74	0.224 0.07	0.6 0.24	0.8 0.67	0.37 58	-0.016 0.00	0.001 0.26	0.066 0.37	-0.1 0.65	-0.1 0.92	0.42 57
Beale 1	-0.013 0.00	0.001 0.85	0.226 0.29	-22.0 0.24	-0.1 0.99	0.32 61	-0.029 0.00	0.005 0.14	0.249 0.09	-23.0 0.15	12.0 0.44	0.59 55
Beale 2	-0.018 0.00	0.004 0.00	0.072 0.28	-0.5 0.81	15.0 0.00	0.36 173	-0.020 0.00	0.007 0.00	0.207 0.04	2.0 0.50	-4.0 0.44	0.49 172
Beale 3	-0.021 0.00	0.007 0.00	0.324 0.01	-6.0 0.46	32.0 0.16	0.50 92	-0.014 0.00	0.005 0.05	0.096 0.44	-12.0 0.08	22.0 0.32	0.49 89
Non-Metro	-0.016 0.00	0.006 0.00	0.204 0.00	-44.0 0.00	219.0 0.00	0.41 972	-0.022 0.00	0.005 0.00	0.173 0.00	-25.0 0.00	90.0 0.00	0.46 916
Beale 4	-0.012 0.05	0.003 0.49	-0.005 0.97	-32.0 0.01	154.0 0.00	0.45 50	-0.016 0.00	0.008 0.12	-0.018 0.91	-23.0 0.04	78.0 0.03	0.60 47
Beale 5	-0.032 0.00	0.002 0.65	0.266 0.01	30.0 0.04	30.0 0.62	0.89 37	-0.017 0.00	0.018 0.01	0.428 0.01	48.0 0.19	-186.0 0.03	0.79 35
Beale 6	-0.019 0.00	0.005 0.00	0.194 0.00	-42.0 0.00	240.0 0.00	0.48 323	-0.023 0.00	0.006 0.00	0.180 0.01	-31.0 0.02	144.0 0.00	0.46 302
Beale 7	-0.022 0.00	0.004 0.00	0.264 0.00	-48.0 0.00	267.0 0.00	0.45 265	-0.022 0.00	0.007 0.00	0.276 0.00	-52.0 0.00	262.0 0.00	0.47 258
Beale 8	-0.008 0.02	- 0.004 0.13	0.053 0.72	-125.0 0.02	595.0 0.00	0.35 138	-0.026 0.00	0.003 0.45	0.186 0.49	43.0 0.44	-115.0 0.73	0.37 123
Beale 9	-0.015 0.00	0.006 0.03	0.055 0.00	-171.0 0.00	645.0 0.00	0.34 159	-0.021 0.00	0.002 0.47	0.135 0.43	-89.0 0.12	483.0 0.04	0.41 151

*Estimated coefficient multiplied by E+8.
P-Values based on White (1980) heteroskedasticity corrected standard errors.
All regressions include a constant and state dummies. LQ=Location Quotient. Popshr=Population Share. Resadj=Residence Adjustment.

Table 4, continued
Enhanced Convergence Regression Results–Coefficient Estimates and P-Values
Employment/Full- & Part-Time Employment Location Quotient

Dependent Variable: Change in the Log LQ from 1969 to 1995

	Retail Trade						Services					
	Log LQ 1969	Log Popshr 1969	Change Log Popshr 1969-95	Resadj* 1969	Change Resadj* 1969-95	Adj. R^2 Obs.	Log LQ 1969	Log Popshr 1969	Change Log Popshr 1969-95	Resadj* 1969	Change Resadj* 1969-95	Adj. R^2 Obs.
South	-0.018 0.00	0.004 0.00	0.203 0.00	-1.0 0.09	7.0 0.00	0.46 1356	-0.026 0.00	0.004 0.00	0.216 0.00	0.00 0.99	-1.0 0.41	0.61 1289
Metro	-0.021 0.00	0.002 0.00	0.154 0.00	-0.4 0.41	4.3 0.00	0.51 384	-0.024 0.00	0.004 0.00	0.221 0.00	-0.02 0.94	-0.5 0.69	0.60 373
Beale 0	-0.026 0.00	- 0.001 0.56	0.209 0.03	0.5 0.15	0.4 0.72	0.56 58	-0.023 0.00	0.002 0.08	0.104 0.06	-0.009 0.66	-0.007 0.91	0.67 57
Beale 1	-0.013 0.00	0.002 0.45	0.285 0.02	-22.0 0.05	3.8 0.72	0.58 61	-0.029 0.00	0.003 0.16	0.270 0.00	-3.0 0.74	4.0 0.60	0.68 55
Beale 2	-0.021 0.00	0.003 0.00	0.116 0.02	-0.006 0.96	9.4 0.00	0.49 173	-0.023 0.00	0.005 0.00	0.268 0.00	2.0 0.33	-6.0 0.14	0.57 172
Beale 3	-0.025 0.00	0.007 0.00	0.285 0.00	-3.0 0.46	14.0 0.34	0.68 92	-0.021 0.00	0.002 0.08	0.093 0.31	-7.0 0.07	24.0 0.10	0.60 89
Non-Metro	-0.018 0.00	0.006 0.00	0.217 0.00	-28.0 0.00	99.0 0.00	0.47 972	-0.026 0.00	0.003 0.00	0.181 0.00	-14.0 0.02	43.0 0.11	0.61 916
Beale 4	-0.023 0.05	0.003 0.40	0.013 0.90	-11.0 0.28	70.0 0.06	0.58 50	-0.021 0.00	0.005 0.21	0.002 0.98	-10.0 0.26	31.0 0.26	0.70 47
Beale 5	-0.031 0.00	0.004 0.08	0.267 0.00	8.5 0.49	33.0 0.46	0.94 37	-0.013 0.00	0.009 0.17	0.270 0.10	16.0 0.63	-80.0 0.30	0.76 35
Beale 6	-0.016 0.00	0.004 0.00	0.184 0.00	-25.0 0.01	100.0 0.00	0.60 323	-0.028 0.00	0.004 0.00	0.180 0.00	-24.0 0.01	98.0 0.00	0.63 302
Beale 7	-0.015 0.00	0.004 0.00	0.209 0.00	-37.0 0.00	118.0 0.07	0.40 265	-0.022 0.00	0.004 0.00	0.278 0.00	-38.0 0.00	173.0 0.00	0.52 258
Beale 8	-0.019 0.02	0.000 0.99	0.170 0.08	-70.0 0.02	345.0 0.00	0.41 138	-0.030 0.00	0.002 0.44	0.257 0.20	48.0 0.29	-214.0 0.42	0.65 123
Beale 9	-0.022 0.00	0.008 0.00	0.259 0.01	-76.0 0.01	134.0 0.36	0.42 159	-0.027 0.00	0.003 0.16	0.227 0.04	-34.0 0.29	103.0 0.46	0.61 151

*Estimated coefficient multiplied by E+8.
P-Values based on White (1980) heteroskedasticity corrected standard errors.
All regressions include a constant and state dummies. LQ=Location Quotient. Popshr=Population Share. Resadj=Residence Adjustment.

Table 4, continued
Enhanced Convergence Regression Results–Coefficient Estimates and P-Values
Employment/Non-farm Employment Location Quotient

Dependent Variable: Change in the Log LQ from 69 to 95

	Retail Trade						Services					
	Log LQ 1969	Log Popshr 1969	Change Log Popshr 1969-95	Resadj* 1969	Change Resadj* 1969-95	Adj. R^2 Obs.	Log LQ 1969	Log Popshr 1969	Change Log Popshr 1969-95	Resadj* 1969	Change Resadj* 1969-95	Adj. R^2 Obs.
South	-0.024 0.00	0.004 0.00	0.180 0.00	-0.8 0.17	7.0 0.00	0.58 1356	-0.026 0.00	0.003 0.00	0.179 0.00	0.1 0.73	-2.0 0.25	0.64 1289
Metro	-0.024 0.00	0.002 0.00	0.123 0.00	-0.2 0.55	4.0 0.00	0.55 384	-0.024 0.00	0.004 0.00	0.188 0.00	0.03 0.91	-0.5 0.65	0.64 373
Beale 0	-0.027 0.00	- 0.001 0.62	0.197 0.04	0.5 0.13	0.4 0.70	0.53 58	-0.023 0.00	0.002 0.06	0.089 0.10	-0.07 0.71	0.04 0.95	0.66 57
Beale 1	-0.018 0.00	0.003 0.35	0.256 0.06	-16.0 0.18	-0.9 0.93	0.64 61	-0.030 0.00	0.002 0.24	0.215 0.10	-3.0 0.72	6.0 0.48	0.73 55
Beale 2	-0.026 0.00	0.003 0.00	0.070 0.09	0.4 0.74	9.0 0.00	0.55 173	-0.023 0.00	0.005 0.00	0.228 0.01	2.0 0.29	-6.0 0.14	0.61 172
Beale 3	-0.025 0.00	0.006 0.00	0.242 0.00	-3.0 0.47	14.0 0.35	0.70 92	-0.021 0.00	0.002 0.21	0.055 0.57	-7.0 0.08	23.0 0.12	0.60 89
Non-Metro	-0.023 0.00	0.006 0.00	0.207 0.00	-25.0 0.00	109.0 0.00	0.58 972	-0.027 0.00	0.002 0.00	0.140 0.00	-14.0 0.02	57.0 0.03	0.63 916
Beale 4	-0.022 0.05	0.004 0.35	0.031 0.77	-12.0 0.23	76.0 0.05	0.63 50	-0.021 0.00	0.006 0.19	0.018 0.89	-10.0 0.26	37.0 0.22	0.73 47
Beale 5	-0.032 0.00	0.004 0.12	0.260 0.00	7.0 0.52	40.0 0.35	0.95 37	-0.014 0.00	0.010 0.11	0.251 0.11	17.0 0.62	-101.0 0.19	0.78 35
Beale 6	-0.025 0.00	0.004 0.00	0.172 0.00	-17.0 0.06	105.0 0.00	0.66 323	-0.028 0.00	0.003 0.00	0.132 0.00	-21.0 0.02	112.0 0.00	0.64 302
Beale 7	-0.026 0.00	0.005 0.00	0.229 0.00	-33.0 0.01	133.0 0.03	0.55 265	-0.024 0.00	0.004 0.00	0.262 0.00	-38.0 0.00	196.0 0.00	0.58 258
Beale 8	-0.019 0.02	0.001 0.78	0.160 0.12	-83.0 0.01	398.0 0.00	0.46 138	-0.029 0.00	0.000 0.90	0.195 0.32	49.0 0.24	-158.0 0.53	0.64 123
Beale 9	-0.025 0.00	0.006 0.00	0.167 0.07	-80.0 0.00	225.0 0.07	0.54 159	-0.029 0.00	0.001 0.76	0.078 0.51	-35.0 0.30	217.0 0.11	0.64 151

*Estimated coefficient multiplied by E+8.
P-Values based on White (1980) heteroskedasticity corrected standard errors.
All regressions include a constant and state dummies. LQ=Location Quotient. Popshr=Population Share. Resadj=Residence Adjustment.

Table 5
Wald Tests
Comparison of Convergence Coefficient Across Beale Codes and Metro/Non-Metro By Time Period

P-Values from Wald Test based on White (1980) heteroskedasticity corrected covariance matrix

	1969-95	1979-95	1969-79	1969-95	1979-95	1969-79
Earnings/Personal Income LQ	Retail Trade			Services		
Null: All Beale Equal	0.00	0.04	0.01	0.00	0.00	0.00
Null: All Metro Beale Equal	0.01	0.45	0.03	0.17	0.54	0.05
Null: All Non-Metro Beale Equal	0.01	0.05	0.02	0.05	0.13	0.00
Null: Metro Equals Non-Metro	0.60	0.03	0.46	0.01	0.00	0.00
Earnings/Earnings LQ	Retail Trade			Services		
Null: All Beale Equal	0.00	0.20	0.47	0.03	0.01	0.00
Null: All Metro Beale Equal	0.49	0.60	0.82	0.02	0.47	0.04
Null: All Non-Metro Beale Equal	0.00	0.10	0.17	0.26	0.15	0.03
Null: Metro Equals Non-Metro	0.20	0.58	0.21	0.66	0.00	0.12
Employment/Full- & Part-Time Employment LQ	Retail Trade			Services		
Null: All Beale Equal	0.00	0.00	0.28	0.00	0.00	0.00
Null: All Metro Beale Equal	0.09	0.16	0.60	0.21	0.08	0.23
Null: All Non-Metro Beale Equal	0.00	0.00	0.12	0.00	0.00	0.01
Null: Metro Equals Non-Metro	0.07	0.60	0.54	0.10	0.00	0.01
Employment/Non-farm Employment LQ	Retail Trade			Services		
Null: All Beale Equal	0.21	0.07	0.46	0.01	0.00	0.00
Null: All Metro Beale Equal	0.39	0.36	0.41	0.14	0.09	0.13
Null: All Non-Metro Beale Equal	0.12	0.03	0.34	0.02	0.01	0.00
Null: Metro Equals Non-Metro	0.61	0.68	0.84	0.11	0.00	0.07
Employment/Personal Income LQ	Retail Trade			Services		
Null: All Beale Equal	0.10	0.00	0.35	0.01	0.00	0.03
Null: All Metro Beale Equal	0.16	0.11	0.21	0.71	0.16	0.23
Null: All Non-Metro Beale Equal	0.09	0.01	0.42	0.00	0.01	0.22
Null: Metro Equals Non-Metro	0.93	0.02	0.50	0.17	0.00	0.00

Metro Beale counties are counties with Beale Codes of 0,1,2,3.
Non-Metro Beale counties are counties with Beale Codes of 4,5,6,7,8,9.

Table 6
Wald Tests
Comparison of Convergence Coefficient Across Time Periods: 1979-95 and 1969-79
P-Values from Wald Test based on White (1980) heteroskedasticity corrected covariance matrix

	All Counties	Metro Counties	Non-Metro Counties	All Counties	Metro Counties	Non-Metro Counties
Earnings/Personal Income LQ	Retail Trade			Services		
Null: 1979-95 Equals 1969-79	0.00	0.00	0.01	0.00	0.00	0.00
Earnings/Earnings LQ	Retail Trade			Services		
Null: 1979-95 Equals 1969-79	0.75	0.02	0.34	0.00	0.00	0.00
Employment/Full- & Part-Time Employment LQ	Retail Trade			Services		
Null: 1979-95 Equals 1969-79	0.00	0.00	0.00	0.00	0.00	0.00
Employment/Non-farm Employment LQ	Retail Trade			Services		
Null: 1979-95 Equals 1969-79	0.00	0.00	0.00	0.00	0.00	0.00
Employment/Personal Income LQ	Retail Trade			Services		
Null: 1979-95 Equals 1969-79	0.00	0.00	0.00	0.00	0.00	0.00

Metro Beale counties are counties with Beale Codes of 0,1,2,3.
Non-Metro Beale counties are counties with Beale Codes of 4,5,6,7,8,9.

Table 7
Beale Code Definitions

Metro Counties	
Beale 0	Central counties of metro areas of 1 million population or more
Beale 1	Fringe counties of metro areas of 1 million population or more
Beale 2	Counties in metro areas of 250,000 to 1 million population
Beale 3	Counties in metro areas of fewer than 250,000 population
Non-Metro Counties	
Beale 4	Urban population of 20,000 or more, adjacent to a metro area
Beale 5	Urban population of 20,000 or more, not adjacent to a metro area
Beale 6	Urban population of 2,500 to 19,999 adjacent to a metro area
Beale 7	Urban population of 2,500 to 19,999, not adjacent to a metro area
Beale 8	Completely rural or fewer than 2,500 urban population, adjacent to a metro area
Beale 9	Completely rural or fewer than 2,500 urban population, not adjacent to a metro area

Source: Rural-Urban Continuum Codes for Metro and Nonmetro Counties, 1993. By Margaret A. Butler and Calvin L. Beale. Agriculture and Rural Economy Division, Economic Research Service, U.S. Department of Agriculture, Staff Report No. 9425, September 1994.