

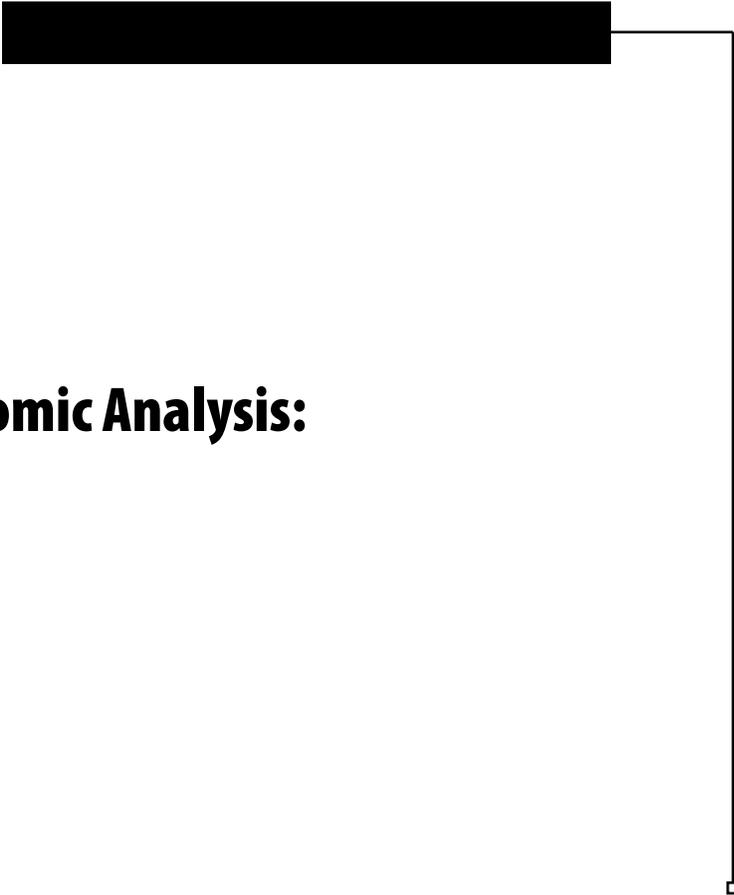


# Community Economic Analysis

## A How To Manual



Ronald J. Hustedde  
Ron Shaffer  
Glen Pulver



# **Community Economic Analysis:**

## **A How To Manual**

By

Ronald J. Hustedde  
Ron Shaffer  
Glen Pulver

Ronald J. Hustedde, Extension Professor, Department of Community and Leadership Development, College of Agriculture, University of Kentucky, Lexington, Kentucky.

Ron Shaffer, deceased, Professor Emeritus, Department of Agricultural Economics, University of Wisconsin-Extension, Madison, Wisconsin.

Glen Pulver, deceased, Professor Emeritus, Department of Agricultural Economics, University of Wisconsin-Extension, Madison, Wisconsin.

May 2005  
ISBN 0-936913-15-1

November 1984, 1st Printing  
December 1993, Revised Edition  
May 2005, Revised Edition (by Ronald J. Hustedde)

RRD 186 is available from:

North Central Regional Center for Rural Development  
Iowa State University  
107 Curtiss Hall  
Ames, IA 50011-1050  
(515) 294-9768, (515) 294-3180 fax  
khetland@iastate.edu  
<http://www.ncrcrd.iastate.edu>

Printed by Iowa State University Printing Services

*In Tribute to Professor Ron Shaffer (1945-2005): a co-founder and leader of community economics who inspired my career and many others and who taught us how to live with passion, humor and grace through adversity.*

*In Memory of Professor Glen C. Pulver (1929-2000): a co-founder and leader of community economics; my mentor and a mentor to a generation of community developers; and a spirited activist in support of rural communities.*

Ronald J. Hustedde



# Table of Contents

Preface...	iii
Why a Community Economic Analysis Manual? .....	1
Nonlocal Markets Linkage.....	7
Strategies for Economic Development .....	9
Multipliers .....	11
Employment Multipliers.....	11
Income Multipliers.....	15
Turnover .....	16
Multiplier Influences.....	18
Assessing the Size and Shape of a Community’s Trade Area .....	19
Reilly’s Law .....	20
Trade Area Capture .....	23
Pull Factors .....	25
Keeping Local Dollars in the Community.....	27
Trade (Sales) Potential .....	28
Location Quotients .....	29
Population—Employment Ratios.....	31
Measuring the Efficiency of Local Firms .....	35
Shift Share Analysis .....	35
National Growth Component .....	36
Industrial Mix Component .....	36
Competitive Share Component.....	36
Improving Efficiency.....	38
Other Strategies.....	39
Stimulating New Firm Creation .....	39
Increased Aids From Government Units .....	39
Finding Data to Do Community Economic Analysis .....	41

Appendix .....	45
Reilly’s Law .....	45
Trade Area Capture .....	47
Pull Factor .....	49
Potential Sales.....	50
Location Quotient.....	51
Population Employment Ratio.....	53
Shift-Share .....	54
National Growth Component .....	54
Industrial Mix Component.....	56
Competitive Share Component.....	57
Employment Multiplier .....	58
Income Multiplier .....	59
 Bibliography.....	 63
 Index....	 67

## Figures

Figure 1—The Community Economy Simplified.....	2
Figure 2—Multipliers and Turnovers .....	17
Figure 3—Example Trade Area .....	22

## Tables

Table 1—Estimating Trade Area Population .....	22
Table 2—Example Trade Area Capture and Pull Factor Analysis.....	25

# Preface

This manual is intended for the individual interested in the analysis of a community's economy. It is not designed for direct use in citizens' meetings. Rather the publication is designed to assist individuals who need to bring information to a group of citizens or decision makers concerned with the economic future of a community.

We encourage the user to first read the document completely. The manual poses a series of questions that might occur to someone who is preparing to share information with a group of people, or to someone who is just starting to build an understanding of community economic analysis. This publication contains analytical tools that are usually found in disparate sources. Our purpose is to demonstrate the need to integrate different forms of analysis. However, this publication is not a comprehensive report of community economic analysis tools and the reader is encouraged to pursue further understanding through the readings in the bibliography.

After reading the entire manual, the table of contents and the index can be used to locate specific items that are of particular interest.



# Why a Community Economic Analysis Manual?

Recent swings in the national and global economy have heightened the interest of individuals and businesses about economic conditions in their communities and what might be done about them. A community's economy lends itself to analysis similar to that of households and businesses. While the specific forms of this analysis may not be widely known, it still raises the same questions. What are the current economic conditions in the community? What components of the community have been growing or what components have been declining? What are the community's options for improving its economic future and which of those options should be pursued first?

Numerous tools and techniques can be used to give some insight to the functioning of a community's economy. This insight is part of the early preparation necessary before the community can initiate an effective strategy for change. The following considerations must be an important part of any community economic analysis:

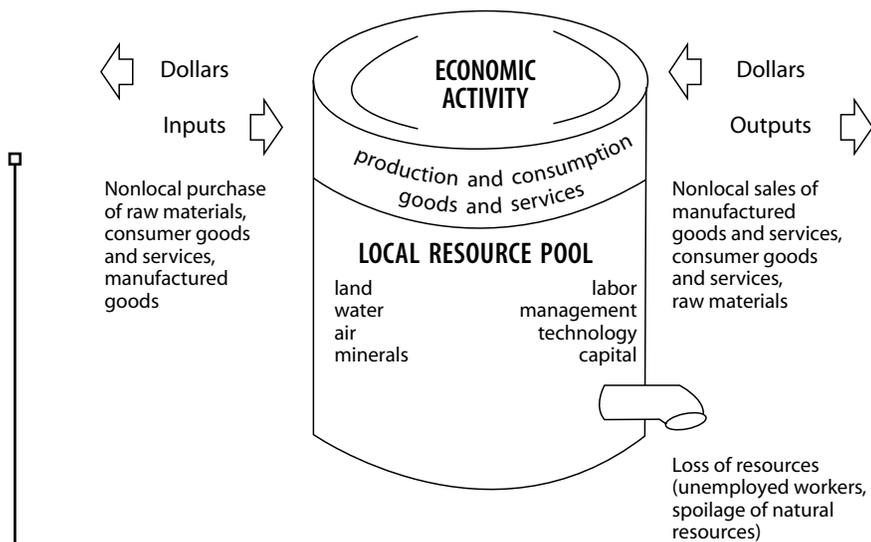
- **First**, no single number generated by the analysis provides the answer to all of a community's concerns. For instance, when a firm experiences an increase in profits, it is still unknown whether the increase is caused by greater sales or more cost efficient production. Each of those sources suggests a different strategy by the owner.
- **Second**, it is important to make comparisons among communities because the numbers used are not absolute. Again, just as any owner of a firm would compare his/her success against the industry average or similar firms, it is important for communities to make similar comparisons. These comparisons need to be among similar-sized communities to increase their validity.
- **Third**, it is important to compare changes over time to sense the direction of community change. This comparison helps to confirm or deny perceptions of current and recent conditions.
- **Fourth**, it is crucial to use a variety of information sources. The steps outlined in this publication indicate that "hard data" collected from various agencies is a starting point. It is also important for the analyst to incorporate the insights that local citizens have about their community and its economy. If there are differences,

then both sets of information need to be challenged to determine which more accurately reflects current conditions.

The following pages outline, through a series of questions, some elemental steps that might be undertaken by a community examining its economy and its economic future. An appendix describes how to calculate the specific tools along with needed data and interpretation. Readers are referred to the bibliography for additional readings and resource material. In many cases, relevant material can be obtained via the World Wide Web. Web sites are supplied for the reader's information.

Perhaps one way to think of community economic analysis is to imagine the community's economy as a barrel with money and goods flowing into the top as well as spilling out (see Figure 1). The barrel analogy represents a number of key concepts. First, the community is intimately linked with the rest of the world through the inflow and outflow of income and goods. Second, the community uses resources to produce the output it sells. These resources can be available locally or purchased elsewhere. Third, the size of the barrel is determined essentially by the inflow of outside income, the lack of leakage of income, and the volume of resources used to produce the community's output.

Figure 1. The Community Economy Simplified



Community economic analysis is a systematic examination of the components of this barrel. This examination is concerned with the forces of demand and supply and their institutional environment. This can be translated into some elemental questions: What are the linkages with the rest of the world? What are some ways to increase the potential inflow of income? How can the community better use its existing resources and businesses to produce more output and associated jobs and income? How can the community reduce the loss of resources to improve its local income situation?

### **1. Why should a community try to change its local economy? Can't the local economy take care of itself?**

Most communities are not completely satisfied with their local economy. Some want more job opportunities or income growth for all their citizens or for specific groups such as women, minorities or youth. Other communities want manageable economic growth so they can carefully plan their sewers, streets, schools and other parts of the local infrastructure. Some communities are concerned primarily with their environment and quality of life and want economic growth to reflect those concerns. Other communities are faced with economic decline and wish to alter the current trend.

Few communities choose to remain completely passive. For example, most have chambers of commerce, economic development commissions, zoning laws or community-owned industrial parks. They may use promotional efforts, government grants and various financing tools to influence economic change. Community economic analysis is a way to link and focus those efforts.

### **2. Exactly what is meant by community economic analysis?**

There is nothing particularly unique about community economic analysis. It is simply an examination of how a community functions economically. It is similar to how a business examines new products, new markets or new ways to make or distribute existing products. A community can do the same type of analysis for the goods and services it provides. However, the products are satisfactory jobs and income for current and future residents of the community.

### **3. How can community economic analysis help a community do something about its job and income situation?**

That is the central purpose of community economic analysis. While community economic analysis does not provide solutions to the problem, it provides useful information for decision-making. It uses analytical tools to answer some of the questions a community needs to ask, as it attempts to alter its job and income situation.

### **4. What type of questions?**

The questions vary, but some examples include: What is the major source of local income growth? What types of commercial activities might be possible? What changes have been occurring in the trade area?

### **5. You mentioned income and employment change. Does that mean the community needs to have that type of information available?**

That is correct. While information is not always readily available, it is often collected by a variety of state and federal agencies. This means checking with the appropriate agency in your state or locale. Comprehensive information with specific application to the question at hand is always desired, but highly unlikely.

## 6. Who might provide the necessary information?

The county extension office, planning office (regional, county or city) and local public library (larger cities) often have this information available in their reference section. State agencies are major collectors of this data. They collect it for administrative purposes, such as unemployment insurance and sales tax information. Most major universities and state data centers also supply electronically transmitted information through the World Wide Web.

The *Census of Business* <http://www.census.gov/econ/www> and *County Business Patterns* <http://www.census.gov/epcd/cbp/view/cbpview.html> are prime data sources for information about retail trade, selected services and manufacturing. In addition, the U.S. Census Bureau regularly releases economic data that may be applicable to your particular region, state or municipality. There is one book that is especially useful for finding federal and state data sources: *Local Government Guide to the Internet: Online Resources for Communities* by Priscilla Salant and Christy Dearien (2000) ISBN # 0964974649.

## 7. What type of information will be needed?

The type of information needed will depend on the particular questions being asked plus the amount of time the community wishes to devote to collecting data. Generally, a minimum of three types of data are needed: employment, income by source and amount, and sales by economic sector.

## 8. What do you mean by economic sector?

Typically, data is collected by economic sector (e.g., farming, durable manufacturing, retail trade). Thus, it can be categorized according to major output produced. The North American Industry Classification System (NAICS) was developed jointly by the United States, Canada and Mexico to provide comparability in statistics about business activity across North America. The first NAICS data were released in 1997. Substantial revisions were made to the construction, wholesale trade, and retail and information sectors in 2002. The U.S. Census Bureau publishes updated versions of the NAICS definitions for each industry or one can go to the U.S. Census Bureau NAICS Web site, <http://www.census.gov/epcd/www/naics.html> for a complete list of the codes and titles. Data about a specific NAICS sector can be downloaded from the *Economic Census* Web site or from American Fact Finder Web site <http://factfinder.census.gov>.

Prior to 1997, economic sectors were classified according to the Standard Industrial Classification (SIC) code. So, if one wishes to compare data from a sector prior to 1997 with data from 1997 or later, one will have to convert a NAICS code to a SIC code. The U.S. Bureau of the Census Web site provides information about how to make these changes: <http://www.census.gov/epcd/www/naicstab.htm>.

One of the more elementary forms of analysis is to compare the distribution of employment in the community in various sectors with state or national averages. This compari-

son becomes an initial mechanism for determining how different or similar the local economy is with some “standard.” A slightly different version of this form of analysis is to compare income by type (e.g., wages and salaries, transfers) or source (e.g., agriculture, manufacturing, government). Again, this provides a means of identifying significant sources of income. This begins to give some insight to how dependent the community is on certain economic sectors for employment or income.

### **9. What are some of the questions community economic analysis addresses?**

The questions vary by community and there is no standard list. This handbook presents tools to help provide answers to the following:

- What businesses are linked to outside/nonlocal markets?
- How will a change in these businesses affect the rest of the local economy?
- What is the geographic area community merchants might expect to sell to?
- What are the potential retail and service sales for the community?
- How effective has the community been in attracting and keeping retail and service sales?
- Are recent employment changes in the community due to national economic conditions, the type of local businesses or the efficiency of local businesses?

### **10. How do these questions relate to community economic analysis?**

A community can be perceived as responding to two sets of market forces—local and nonlocal. Community economic analysis is largely an analysis of how the community responds to these forces. The community’s linkage to nonlocal markets and how that is translated back into the community is a major source of economic change for the community. An equally important force is how the community serves and uses the local market to create jobs and income.



# Nonlocal Markets Linkage

## 11. How are communities linked to nonlocal markets?

They are linked through the sales of both goods and services to nonlocal consumers or by the attraction of consumers to the community. They also are linked through the purchases of both goods and services from outside the community.

## 12. A community's economy is complex. How can one start to make sense out of it?

Business leaders and others involved in community economic development have often explained the complexity of the local economy by dividing it into two parts. One part attracts money into the community from the outside (i.e., nonlocal markets). The other part uses the money once it is in the community (i.e., local markets).

## 13. What do you mean "attracts money"?

Income enters the community from manufacturing, mining and agriculture, as well as tourism, universities and technical schools, insurance companies, hospitals and transportation, selling their output to nonlocal customers. A community can sell goods and services (e.g., manufactured goods or insurance coverage) to nonlocal markets to be used elsewhere. Or the nonlocal consumer can come to the community for consumption as illustrated by tourism or health care. In any case, the money is generated from outside the community's boundaries. The businesses that bring money into the community are often referred to as the basic or export sector.

## 14. What happens to that money once it is in the community? Should we be concerned how it is used?

The community should definitely be concerned with how money is used once it is attracted to the community. There are really two possible uses. First, the local economy must offer consumers a chance to spend their money locally. If not, the income flows out, which is the second consideration. Income flows out of the community in various ways. For example, when a local household purchases goods and services outside the local community, money leaks out of the local economy. When a local firm buys from a supplier outside the community, those dollars also flow out of the community. As a result of that leakage, potential income and jobs in the community are lost.

**15. It was mentioned that export firms bring in income. Are all businesses exporters?**

No. Many are referred to as non-export because they do not attract the largest portion of their sales from outside. Non-export businesses serve the needs of local consumers and firms. The community needs to identify export and non-export sectors, not because one is more or less important than the other, but because they respond to different economic forces (i.e., local versus nonlocal forces).



## Strategies for Economic Development

- 16. Traditionally, many communities have focused their efforts to build export links by attracting manufacturing firms. Are there other opportunities for job and income development?**

The traditional response of communities has been to build industrial parks to lure manufacturers or service-based firms to their municipality. However, the many vacant industrial parks scattered throughout the country are poignant reminders that rural communities should also look at other possibilities for economic growth. For example, computer services, insurance, health care, tourism and service-related businesses are growing faster than manufacturing. Job and income growth is also generated through Social Security and pension benefits, food stamp programs, and other sorts of government aid. These are mechanisms to increase the flow of income into the community (e.g., inflow to the barrel). Establishing new businesses also plays a significant role in new job formation. Improving the efficiency of existing firms is another important avenue. Communities cannot afford to overlook any of these opportunities.

- 17. Does this mean that industrial recruitment is no longer a viable avenue to community economic development?**

Most communities interested in increasing their income and employment may consider recruiting firms associated with manufacturing, finance, retail, health or other service-based firms to their area. However, communities must look to other avenues for economic development if they want to increase their chances for job and income expansion. First, they need to expand their definition of the basic sector to include not just manufacturing, but also services. For example, some nonprofit organizations such as hospitals and community colleges can provide stable and satisfactory employment to the community. Second, a frequent shortcoming of many community economic development programs is the emphasis on export businesses and the failure to use other avenues for economic development that may be more successful and efficient.

- 18. What are these other economic development alternatives?**

One way to determine if a community has thought through all of its alternatives is to see if it is actively pursuing each of the following five general strategies:

- Attracting new basic or export employers.
- Capturing existing markets.
- Encouraging the start-up of new firms.
- Helping existing firms become more efficient.
- Using aids and programs from broader levels of government.

There is nothing sacrosanct about these five, and you may wish to generate your own list. The critical point is that traditional community economic development efforts have too often been limited to attracting new export employers.

**19. You mention five strategies for community economic development. Are there tools or techniques that can help me determine which of those strategies is most appropriate?**

Not really. The tools reviewed in this manual can be used to provide some guidance about which strategy and what components of that strategy might be most appropriate. But there is no one-to-one match of tool and strategy. One needs to keep the strategies in mind when interpreting the information gained from the tools. Then you can use that information to help reach a decision about a given strategy.



# Multipliers

## 20. What is so significant about attracting a new export employer?

The significance of new export employers is that generally they are able to create more jobs and income in the community than is found at the site of the new export employer. Furthermore, they tend to be a highly visible source of employment change.

## 21. Is that the multiplier process that is so well known?

Yes it is. But the multiplier is probably over-rated and overused in community economic analysis.

## 22. What do you mean?

The multiplier essentially assumes that once an export employer locates or expands in the community the multiplier effect will occur automatically and the effect will be local. This is not accurate. Furthermore, most estimates of the multiplier exceed the reality of the change.

## 23. Just what is a multiplier?

The multiplier arises from the linkages and interaction of the export sector (water pouring in the top of our barrel—dollars entering the community) and the other businesses and households in the community. If there are no linkages (e.g., local purchases of labor, suppliers, materials), then there can be no multiplier effect.

## 24. You indicate there are different types of linkages.

Yes. These linkages can occur through the hiring of workers, the disbursing of a payroll, the purchase of inputs and supplies, or consumption by households.

## 25. Does that mean there are different types of multipliers?

Yes there are. Let's examine employment multipliers first. An employment multiplier is a simple expression of the relationship between the number of workers in export businesses and the total employment in the community.

## 26. How is that done?

A ratio is formed of total employment divided by export employment and this gives the multiplier estimate:

$$\text{Employment Multiplier} = \frac{\text{Total Employment in Community}}{\text{Export Employment in Community}}$$

This is known as the average employment multiplier.

## 27. What do you mean average employment multiplier?

It represents an average in two senses. First, it estimates the average of all the different types of businesses in the export sector. Any one of those businesses may have a multiplier larger or smaller than the estimate. The export multiplier is a “quick and dirty” way to estimate multipliers. If you wanted a multiplier for a specific sector of the local economy, you would have to use input-output analysis, which will not be discussed in this manual because it requires a substantial amount of data and computer capacity.

Second, the multiplier estimated above represents an average because it measures the relationship between the export base and the total economy at one point in time rather than the change in employment over time as would be the case if the export sector increased or declined. The multipliers estimated from changes in employment are often labeled marginal employment multipliers.

## 28. How is the marginal employment multiplier calculated?

The easiest way to calculate the marginal employment multiplier is to use this ratio:

$$\text{Marginal Employment Multiplier} = \frac{\text{Change in Total Employment}}{\text{Change in Export Employment}}$$

## 29. Which is the better estimate?

Again, it depends on what you wish to do with the estimate. The marginal multiplier is preferred, but in most cases, the average multiplier is sufficiently accurate.

## 30. How can the export sector in the denominator be identified?

The export sector is the businesses that sell their product to nonlocal markets. One way to identify them is by observation. That is fairly easy in small communities, but is subject to a lot of error.

### 31. Error in what sense?

The classic problem is that all the workers at any given business are seldom engaged in production for nonlocal markets only. Some are producing for local markets. The question becomes how can the workers be allocated to the *proper market* they are serving.

### 32. Why is that so important?

An example might help demonstrate why this is so important. Let's say we have a community with a total employment of 350 jobs. Export employment could vary depending on whether all or just part of the workers in some businesses are counted as serving a non-local market. The significance is how this difference affects the multiplier estimate:

$$\text{Multiplier} = \frac{\text{Total}}{\text{Export}}$$

In our example, if 100 jobs are in the export sector, the multiplier is 3.5, but if 175 jobs are in the export sector the multiplier is 2.0.

### 33. How can the export sector be estimated to capture only the nonlocal market workers?

Location quotients can be used to distinguish the proportion of a business's workforce serving local or nonlocal markets. (Location quotients are explained more fully on pages 29–31).

### 34. How about an example of how this is done?

To determine the export employment for any business or sector the following formula can be used:

$$\text{Percent Export} = \left\{ 1 - \frac{1}{\text{LQ}} \right\} \times 100\%$$

This formula is used only for those businesses or sectors that have a location quotient greater than one (1). To determine the number of export employees in the community the total employment of each business or sector is multiplied by the appropriate percentage and summed over all sectors.

Let's say the community has three sectors and their location quotients are as indicated in table on page 14. The export employment would total 55.

Sector	Total Employment	Location Quotient	Percent Export	Export Employment
A	50	2.00	50	25
B	5	0.75	0	0
C	40	4.00	75	30
TOTAL	95			55

$$\text{Employment Multiplier} = \frac{95}{55} = 1.73$$

**35. If the export sector includes businesses that bring income into the community then it could include more than just the traditional export activities such as farming and manufacturing?**

Correct. For the most part, the location quotient approach allows you to identify most of the “non-traditional” export activities.

**36. What do you mean by most of the non-traditional activities?**

A very definite export activity in many communities is the income received by retirees through their social security, medicare, private retirement programs, etc. These also need to be included.

**37. How?**

It is actually much easier than you might expect. You simply add the number of social security recipients in the community to the export employment estimated using the location quotient approach. Because the social security recipients represent a “pure” inflow of funds to the community, they can all be counted as part of the export sector.

So, in our previous example, if our community had eight social security recipients, they would be added to the 55 export-based employees to give a new export base of 63. Since they are not actually employees they should not be added to total employment. The new multiplier would be:

$$\frac{95}{63} = 1.51$$

**38. That sounds easy enough.**

It is, but then again, employment multipliers are easier to estimate than income multipliers.

**39. What do you mean?**

While the same relationship between the export sector and the total economy holds, the estimation of the export sector income is more difficult.

**40. How is an income multiplier calculated?**

It is determined by using the formula:

$$\text{Local Income Multiplier} = \frac{1}{1 - (\text{MPC}_L \times \text{PSY})}$$

The marginal propensity to consume locally ( $\text{MPC}_L$ ) represents the proportion of total income people spend locally. One can make a crude estimate of the  $\text{MPC}_L$  by asking “What proportion of people’s incomes is likely to be spent locally?” If it is high, one would use an  $\text{MPC}_L$  such as .60 to .80. On the other hand, if a community is small and most goods and services are purchased elsewhere, the  $\text{MPC}_L$  might be as low as .20. This varies by community. The  $\text{MPC}_L$  typically ranges from .20 to .70. The most common values range from .30 to .60.

**41. What reduces the  $\text{MPC}_L$ ?**

The  $\text{MPC}_L$  is reduced by 1) in-commuters spending their wages where they live—not where they work, 2) the portion of workers’ paychecks withheld for taxes and fringe benefits—ranging from 15 percent to 30 percent of payroll, and 3) local residents spending some of their wages in neighboring communities or larger regional shopping centers.

**42. What does PSY represent?**

PSY is the percentage of money spent locally that becomes local income. Local income is local wages, salaries, profits and interest. The PSY will typically range from .25 to .75. This variable measures how much local labor, interest and profit is involved in the final price of the product. For local fast food restaurants it may be high, while for auto sales it may be quite low.

**43. How can  $\text{MPC}_L$  and PSY affect the multiplier?**

An example might help demonstrate their affect. If the  $\text{MPC}_L$  is high (e.g., .8) and the PSY is high (e.g., .75) the multiplier will be larger.

$$\frac{1}{1 - (.8 \times .75)} = 2.5$$

This multiplier is more likely in a larger community (50,000 people or more) than in a smaller community. The other extreme occurs when most of a community’s income is

spent elsewhere (low  $MPC_L$ ), and little of the local spending becomes local income (low PSY). In this case let  $MPC_L$  equal .2 and PSY equal .25. Here the multiplier becomes:

$$\frac{1}{1 - (.2 \times .25)} = 1.05$$

The total change in community income is only slightly larger than the gross payroll of the business.

#### **44. Are there other types of multipliers?**

Yes. There are sales or output multipliers, and solid waste or environmental discharge multipliers. Essentially, if you can estimate a ratio of changes in output and the item of concern, you can create a multiplier.

#### **45. I have heard of a turnover ratio. Is that a multiplier?**

It is a form of sales or output multiplier, but it is **not** a true multiplier.

#### **46. What is turnover?**

Turnover is the number of times a dollar changes hands in the community. It does not represent an economic linkage, which is critical to multiplier analysis. In Figure 2, the turnover is five, but only one cent is still in the community for that fifth turnover. The multiplier is only 1.66 in this example.

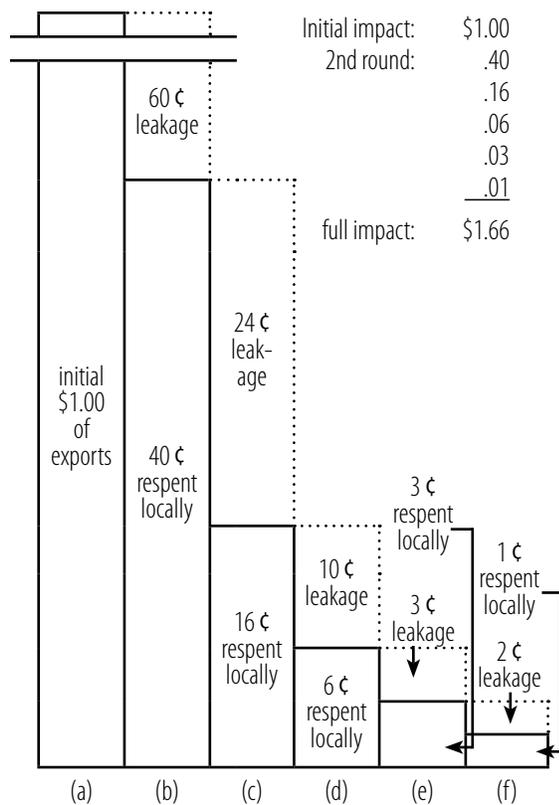
#### **47. I am still not sure I understand what you are saying?**

Let's say a community is able to expand one of its export businesses. How will a one dollar change in output by that particular business affect other sectors of the local economy? Let's look at the original dollar coming into the community. Say 60 cents of that dollar flows out of the community through nonlocal taxes, equipment purchases and other items. So 40 cents remains for local wages, taxes, raw materials and rent. Of the 40 cents that is spent locally, only 16 cents remain in the community (again a 60 percent leakage). Of the 16 cents respent locally, only six cents remain, and when that is respent, only three cents remain, and finally less than one cent. At this point, it is hard to measure further effects. This example illustrates that the economic impacts resulting from a one-dollar change in export activity leads to a change of \$1.66 in the local economy. The multiplier here is 1.66. Figure 2 depicts this process.

#### **48. Why is this distinction important?**

It becomes important for planning. If you are a merchant planning an expansion because of a new export employer, you need to use 1.66 rather than 5, in our example, or you will over-expand.

Figure 2. Multipliers and Turnover



Source: Western Rural Development Center

**49. Is it easy to misuse multipliers?**

Yes! Some people have viewed the employment and income multiplier as the same thing. It should be stressed they are different, even though they have similar values. So you cannot use one for the other. It should also be mentioned that no matter how one estimates the multiplier, it tends to be inflated.

**50. What do you mean?**

Multipliers presume there will be no change in the local economy without a change in the export sector. This fails to capture the possible changes in  $MPC_L$  and  $PSY$  that may occur. (See later discussion about transferring multipliers on page 18.) Furthermore, it takes time for the multiplier to become fully implemented. Other changes will often dampen its effect.

**51. What can a community learn from a multiplier?**

The community can use the multiplier to estimate the total effect of a development event before it happens. Such estimates will help the community prepare for the event.

## 52. Can a community apply a multiplier from a similar locale to its situation?

It is important to note that the multiplier is not automatically transferable from one place or period to another. Some of the conditions that influence the size of a community's multiplier are:

**Population:** The value of a multiplier varies with the population. Smaller communities, for example, have smaller multipliers because they cannot profitably produce or sell (insufficient market) all the goods and services needed locally to capture consumer spending (i.e., a lower marginal propensity to consume locally [ $MPC_L$ ]).

**Geographic Size of the Community:** The larger the geographic area considered, the greater the ability of the area to supply and consume the goods and services desired (i.e., higher  $MPC_L$ ).

**Transportation Networks:** Easy access to competing nonlocal sources of goods and services will reduce the local multiplier.

**Income Changes:** The multiplier is not likely to remain constant as community income changes. If a new economic activity leads to population changes by attracting more workers to the community, local consumption is likely to increase because new stores will appear. Or if the activity leads to more income per person but little population change, local people may purchase more nonlocal goods, their taxes increase and they may increase their savings, which leads to a lower multiplier.

**Economic Specialization:** A highly specialized economy, such as isolated mining towns that are less able to meet the needs of local households, will find consumers making periodic nonlocal shopping trips or using mail order catalogues. These reduce the local multiplier.

**Time:** Multipliers change over time. Let's say a firm moves into a community. At first it may depend on its former nonlocal suppliers. However, as time progresses it may switch to local suppliers. New support businesses may also eventually emerge to capture local dollars. It takes time for the multiplier effects to occur. First, local merchants may need to change merchandise lines and/or expand to meet new demands. Second, it requires time before individual merchants perceive and react to the changes in their market.

## 53. Suppose a community determines it wants to attract a certain kind of industry. What steps can it take to attract new export employers?

Community leaders have encouraged the location of export industries to their locale by establishing industrial parks, research parks and business incubators; offering attractive financial packages; extending utility lines; and providing supportive services such as excellent schools and health care facilities, and similar activities.

## Assessing the Size and Shape of a Community's Trade Area

54. **What is most important in the creation of local jobs and income—the dollars that flow into the community from the outside or the money already in the local economy?**

Both are equally important. To understand why this is true, let's return to the barrel analogy of the local economy (see page 2). It is important to keep dollars circulating in the community in order to generate local jobs and income. If the barrel is like a sieve, the economic activity pouring in will have little effect. Those outside dollars leak out if the holes in the sieve are not plugged. Once the dollars leak out, they do the community economy little good. Retailers, service businesses and suppliers that sell to local citizens and firms help keep dollars circulating locally. Those businesses also supply jobs and income to the community. The important point is the community needs to pursue both avenues in its development effort because neither can exist without the other.

55. **Let's look at retail and service businesses. It is obvious a community sells to people who do not live within the municipal boundaries, such as farmers and people from nearby areas. How can a village or city determine from how far it attracts people?**

This really starts to ask what is the community's trade area. A trade area is the geographic area from which the community draws the majority of its retail trade customers. It usually extends beyond the municipal boundaries. The general criterion is that the majority of trade area residents shop in the community.

56. **How can a community estimate the size and shape of its trade area?**

One way is to determine how far the subscribers of the local newspaper reside from the community, because newspaper advertising is often important in people's shopping decisions. Another approach is to conduct an areawide survey of shopping habits (i.e., where people shop and what they purchase). This can be used to develop a map of the trade area. A simple approach is known as Reilly's Law of Retail Gravitation.

### 57. What is Reilly's Law?

Reilly's Law can help a community determine its retail trade boundaries. It is appropriate for shopping goods (furniture, medical services and automobiles, etc.), which are the goods and services bought after comparing price, quality and style. It is less appropriate for convenience goods (groceries, gasoline, etc.), which are bought with a minimum amount of comparison. But remember, shoppers come to town for a variety of reasons and often while they are there they will also buy convenience goods.

### 58. But what does Reilly's Law really tell us?

Reilly's Law gives an estimate of the maximum distance customers travel to shop in a certain community. It can be used by the chamber of commerce or merchant group in a city to find out how far their trade area extends toward a neighboring city. Reilly's Law argues people are attracted to bigger places to do their shopping, but the time and distance they must travel influences their willingness to shop there.

### 59. What information is needed to use Reilly's Law?

To use Reilly's Law, data is required on: 1) the population of City X and City Y and 2) the road distance between the two places being compared.

### 60. How do we use this information?

Suppose City X has a population of 8,000 and City Y has a population of 6,000. The road distance between the two municipalities is 20 miles. Reilly's Law is represented by this formula:

$$\text{Distance from Smaller Community (Y)} = \frac{\text{Distance Between City X and City Y}}{1 + \sqrt{\frac{\text{Population of Larger Community (X)}}{\text{Population of Smaller Community (Y)}}}}$$

If we plug the example numbers into the formula:

$$\frac{20}{1 + \sqrt{\frac{8,000}{6,000}}} = \frac{20}{1 + 1.333} = \frac{20}{1 + 1.155} = \frac{20}{2.155} = 9.28 \text{ miles from City Y}$$

This means the retail trade area of City Y extends 9.28 miles from City Y towards City X. The result indicates the distance from the smaller community. Consumers who live more than 9.28 miles from City Y are assumed to shop in City X rather than in City Y.

### **61. How can Reilly's Law be used to draw a trade area?**

To use Reilly's Law to outline a trade area requires computing the formula for each nearby community that is competing with the community. Then connect the points dividing the travel distance between communities and create a map (circle) of the retail trade area. When drawing the map, unique barriers to travel, such as rivers without bridges or major highways that divert traffic, should be considered or the map will be distorted. Another distortion could be institutional in nature, such as school district boundaries or county lines. If such distortions exist, the analyst needs to modify the results of Reilly's Law.

### **62. After the retail trade area map is drawn, what does the community do with it?**

The next step is to use census data to gain further insight about the population, income level, age and other demographic data in the area. These figures are available in the census of population for each township, village and city located within the trade area. These figures can be used to estimate the market potential for the community.

### **63. What if our trade area includes only a portion of nearby municipalities?**

It is common for a trade area to include portions of some municipalities. If half a township is located within the trade area, count half of that population and income. Remember, we are only generating an estimate of the true trade area and its characteristics.

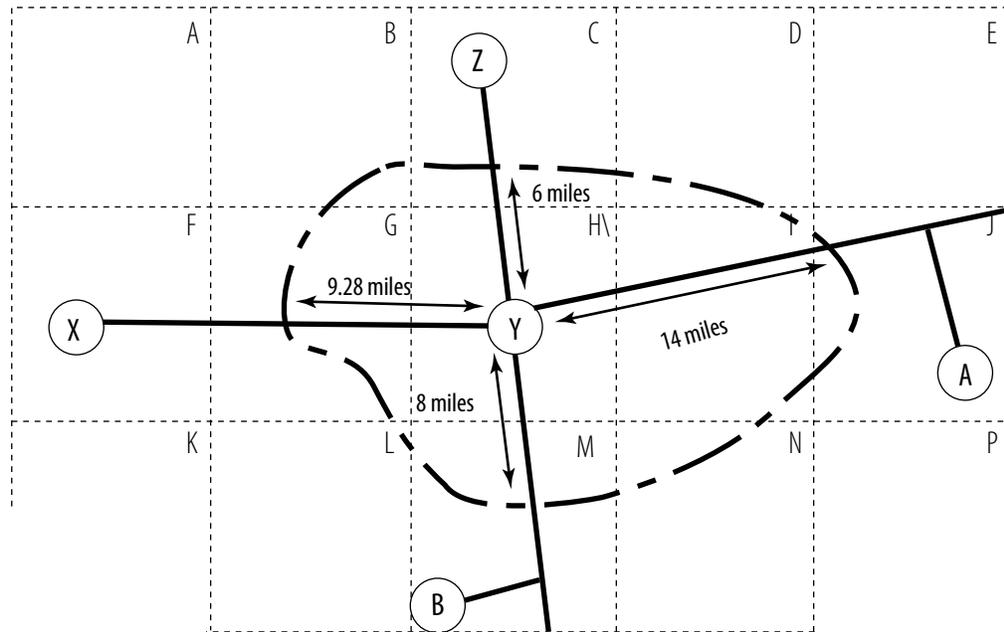
### **64. This approach sounds somewhat arbitrary.**

Perhaps it does, but it really is not. Remember, you have identified the distance people are willing to travel to shop in this community recognizing the physical barriers impeding the flow of traffic. The other portion of the arbitrariness in the estimate is computing the number of people in the trade area. This again is subject to some interpretation and difference of opinion. It is important to remember the purpose is not to provide a precise estimate as much as it is to provide a reasonable estimate of trade area population to be used with other bits of information.

### **65. I'm not sure I understand what you mean.**

Let's take an example. Let Community Y have a trade area that extends 9.28 miles towards Community X, 6 miles toward Community Z, 14 miles toward Community A, and 8 miles towards Community B. This was estimated using Reilly's Law and is displayed on the map in Figure 3 (see page 22).

Figure 3. Example Trade Area



Note that in the townships where only part of the township was included, only part of the population was counted. In Township C, if the population was concentrated near Z then the estimate of 15 percent would be reduced. The unique trade area boundary in Township G represents the presence of a large lake and a road system focused on City X rather than City Y. The grid represents the unincorporated rural townships surrounding City Y. Table 1 indicates how the trade area population could be estimated.

Table 1: Estimating Trade Area Population

Municipality	Total Population	x	Share Shopping in City Y	=	City Y Market
Y	6000		100%		6000
A	500		0		0
B	400		10		40
C	300		15		45
D	500		5		25
E	150		0		0
F	1500		0		0
G	1200		60		720
H	800		100		800
I	675		80		540
J	300		5		15
K	770		0		0
L	560		5		28
M	280		10		28
N	415		5		21
P	625		0		0
TOTAL					<u>8,262</u>

**66. Are there any limitations in applying Reilly's Law?**

There are several limitations:

- The population in the comparative communities must be relatively homogeneous from cultural, economic and social perspectives. For example, Reilly's Law is probably not very useful in estimating the boundary between an extremely wealthy and an extremely poor community.
- It should not be used to delineate neighborhood trade areas in urban areas. It is better to use Reilly's Law for independent communities surrounded by countryside rather than suburbs or urban neighborhoods.
- It should be used between similar-sized communities. For example, it should not be used to develop boundaries between a community of 200,000 people and 500 people.
- It tends to overestimate the shopping population because it assumes that everyone inside the trade area shops locally for locally available goods and services. It does not recognize that local people do some of their shopping outside the community or that some people outside the trade area will sometimes shop in the community rather than always shopping in their home community.
- It should be remembered that all one is estimating is an average trade area boundary. This means some goods or services offered by the community will have larger or smaller trade areas.

In spite of its limitations, Reilly's Law can be very useful. It can help individual merchants, chambers of commerce and other groups map the community's trade area.

**67. Reilly's Law gives us an idea of the potential retail trade area and its population and income. Is it possible to find out how many customers are actually drawn to a certain locale?**

Trade area capture analysis can provide an estimate of the number of customers actually drawn to a community. Trade area capture analysis essentially assumes local people will buy goods and services at the same rate as the state per capita average. The only force causing a variation in spending patterns is income. Trade area capture analysis estimates customer equivalents by dividing actual local sales by the state per capita sales adjusted by relative local income.

$$\text{Trade Area Capture} = \frac{\text{Actual Retail Sales of Merchandise Type Y in the Community}}{\text{State Per Capita Expenditure for Merchandise Type Y}} \times \frac{\text{Community Per Capita Income}}{\text{State Per Capita Income}}$$

**68. What data is needed?**

First, one must measure the retail sales for the community and the state. These figures are found in the *Census of Business* (<http://www.census.gov/econ/www/>). This information is published every five years (i.e., 1992, 1997 and 2002). If you are analyzing a community larger than 2,500 people, you can obtain up-to-date retail sales information from private sources such as *Standard Rate and Data* (<http://www.srds.com/> or call: 800-851-7737) or *The Journal of Personal Selling and Sales Management*. These sources generally do not provide information on smaller communities. Per capita income for the county and state are also needed. These are typically available from various state agencies such as the Department of Administration or the Department of Revenue.

**69. Can we do an example?**

Let City Y have \$1,344,000 in furniture sales in 2002. Its 2002 local per capita income was \$14,005 and the state per capita income was \$18,093. In 2002, state per capita expenditures for furniture were \$161.73. Plugging these numbers into the formula you get:

$$\frac{\$1,344,000}{161.73 \times \frac{\$14,005}{\$18,093}} = \frac{1,344,000}{161.73 \times .77} = \frac{1,344,000}{125.19} = 10,735$$

The trade area capture for City Y indicates sales in local furniture equaled that of 10,735 people assuming they had purchased furniture at the average rate of all state residents and adjusting for relative income levels. The number is not the actual number of people sold to, but rather represents customer equivalents.

**70. Can you help with the interpretation of this number?**

If the trade area capture is larger than the municipal population, the community is attracting consumers from outside its boundaries or local people are spending more for this item than the statewide average. It will require further analysis to determine the cause. If the trade area capture is less than the municipal population, then the community is not capturing the retail/service purchases of its own residents or local residents are spending relatively less than the statewide average.

**71. Are there other uses for the trade area capture estimate?**

Yes. Remember that this number provides an estimate of the number of people shopped for in the community. One important insight it can provide is the change in customers shopped for over time. Let's say that the 1997 trade area capture indicates that City Y drew 12,821 furniture customers. This suggests the city has lost 2,086 furniture customers within a five-year period. The city needs to ask itself why this occurred.

## Assessing the Size and Shape of a Community's Trade Area

**72. The trade area capture estimate includes resident consumers and those living outside the city. Is there a way for a community to find out how many customers it is attracting from outside its boundaries?**

One method to estimate the portion of customers a community draws from outside its municipal boundaries is a ratio called the pull factor. A merchant can look at the change in pull factors over time to determine his/her success in drawing customers from outside the village or city boundaries.

**73. How are pull factors calculated?**

The pull factor, for a certain type of retail good or service, is the trade area capture estimate for that retail good or service divided by the municipal population.

$$\text{Pull Factor for Item J} = \frac{\text{Trade Area Capture Estimate for Item J}}{\text{Municipal Population}}$$

The division by municipal population removes the influence of population change within a city or village and focuses attention on the community's ability to draw customers from the surrounding area.

**74. Please give an example of how trade area capture and pull factors are used.**

Let's take a community with a 1997 population of 5,950 and a 2002 population of 6,022. Sales data are obtained from the 1997 and 2002 *Economic Census: Retail Trade*. Data gathered from state agencies indicate that per capita income jumped from \$14,457 in 1997 to \$18,539 in 2002. Table 2 suggests that in spite of a 6.6 percent increase in total retail sales, the community experienced a 1.8 percent decrease in trade area capture. Its sales gain could be from inflation, not from capturing more nonlocal customers.

Table 2. Example Trade Area Capture and Pull Factor Analysis

Retail Category	1997			2002		
	Actual Sales (000s)	Trade Area Capture	Pull Factor	Actual Sales (000s)	Trade Area Capture	Pull Factor
Hardware, Building Materials, Garden Supply	2,313	19,034	2.43	\$4,007	28,845	3.68
General Merchandise	3,760	13,577	1.74	1,086	4,004	0.51
Food and Beverage	5,180	12,441	1.59	5,757	13,244	1.69
Apparel and Accessory	2,298	28,700	3.67	2,662	33,535	4.28
Furniture, Home Furnishings	2,065	22,599	2.89	1,684	17,471	2.23
Health and Personal Care	1,338	12,659	1.62	3,216	15,193	1.94
Misc. Retail	2,385	12,659	1.62	3,216	15,193	1.94
Total Retail*	34,676	17,878	2.29	36,970	17,559	2.24

\* Includes more items than those listed above because several retail categories could not be disclosed.

**75. Examining the information in the example, the trade area capture and pull factors do not change in the same direction for all the sectors. What does that mean?**

First, the general decline in the community's pull factor means relatively fewer non-residents are shopping in the community. This could mean there are nearby competing areas or maybe even a general decline in the number of people living in the rural areas outside the community. It will require additional analysis to determine the reason. In terms of the differences in direction of change, it may mean that some local merchants are more vigorous in their marketing, or another store has appeared in the community (increase) or another community (decrease). Trade area capture analysis may stimulate communities to examine reasons why they have lost pulling power, then assess options available to recapture lost retail trade. Furthermore, it can help merchants measure the effectiveness of their promotion and other efforts aimed at capturing market potential.

**76. I sense you are not telling me anything I do not already know.**

It may seem that way, but often times a community may think it is being hurt by a nearby competitor when the data show both have gained. This analysis may confirm existing suspicions or deny rumors. It cannot give you a final answer.

**77. Are there any limitations of trade area capture and pull factors?**

They are used mainly for comparison purposes to help communities assess growth or decline. However, these tools do not tell us why the growth or decline occurred or what to do to alter the situation. The community needs to conduct further analysis after they have used the pull factors and trade area capture. Another limitation is there is no definite standard for a community to judge whether it has a "good" or "bad" pull factor or trade area capture because these tools were only intended for comparative purposes.

## Keeping Local Dollars in the Community

**78. Trade area capture, pull factor and retail trade boundaries point to the ability of the community to capture dollars. How can a community improve its capacity to keep local dollars?**

If the community wishes to improve its capacity to attract local dollars, it should focus its efforts on the trade and services sector. In some cases, a merchant group may need to be activated to address the problem. In other cases, action may require education, better marketing, or the development of special financial packages for retailers. Each community will have a distinct approach reflecting local conditions in addressing its ability to capture local dollars.

A partial list of things that can be done includes:

- Identify market potential of retail outlets through survey of consumer needs and buying habits.
- Improve share of retail market captured through a downtown analysis and renewal.
- Aid employers in developing employee training programs to improve quality of service.
- Expand purchases by nonlocal people (tourists, neighboring citizens) through appropriate advertising.
- Encourage citizens and businesses to buy locally through informational programs about locally available goods and services.
- Take collective action through the formation of organizations like downtown revitalization groups or chambers of commerce.

**79. How can a community tell if it is losing trade dollars?**

The first step is to examine the change in trade area capture and pull factors. The second is to estimate sales potential and compare it with the actual sales. If actual sales are less than the potential, then the community is losing some sales. If possible, two different times should be used to determine the direction of change.

### 80. How does that work?

Let's say that the City of Hillsdale has a population of 8,000 people and a local per capita income of \$18,539. The trade area population is estimated as 24,000 people. The state income averages \$20,221 per person and furniture and home furnishing sales are \$220 per person. The potential furniture sales are computed from the following formula:

$$\text{Potential Sales} = \text{Trade Area Population} \times \text{State Per Capita Sales} \times \frac{\text{Local Per Capita Income}}{\text{State Per Capita Income}}$$

Inserting the data from the example in the formula yields:

$$\$4,840,804 = 24,000 \times \$220 \times \frac{\$18,539}{\$20,221}$$

This is the potential furniture sales in this community if trade area residents spend at the same rate as the statewide average adjusted for relative per capita income, and all trade area residents shop in this community.

### 81. How do I determine the percent of trade potential being captured?

This is done by dividing actual sales collected by the *Economic Census* by potential sales (and multiplying by 100 percent). Let's re-examine the City of Hillsdale again (see # 80) in which actual furniture sales were \$3,079,000. In this example, the community is capturing only 63.6 percent of its potential furniture sales:

$$63.6\% = \frac{\$3,079,000}{\$4,840,804} \times 100\%$$

### 82. That seems appropriate if sales data is available. What if it's not?

If sales data is not available, then another indicator must be used. Actual sales data is difficult to obtain in smaller communities. In very small communities, it may be possible to interview individual stores and acquire an estimate of actual sales. In some states, sales tax information is sufficiently good; it permits identifying the sales of particular types of businesses in specific locales. Or it may be possible to count the number of workers in particular retail and service establishments. If they are assumed to produce sales equal to a per employee average for the state or similar community, it would allow an estimate of local sales.

**83. We have discussed sales potential and actual sales. Are there other techniques to estimate sales potential or even other types of retail and service activities that might be feasible in the community?**

Yes. Three other techniques that might yield some insight are location quotients, population-employment ratios and demand thresholds.

**84. What do location quotients tell me?**

Location quotients can indicate if a community produces more than is needed for its own use and is selling the excess to nonlocal markets. It can also tell us which types of businesses are not accommodating local needs and are a source of consumption leakage.

**85. How do location quotients give that information?**

The location quotient approach assumes the national economy is self-sufficient. While that is not completely true, it is more appropriate to make that assumption for the national economy than a state, multistate or multicounty economy. The local economy is compared against that standard of self-sufficiency. If the local economy has relatively less economic activity in a particular sector, that suggests the good or service is being imported from other communities. If the local economy has relatively more economic activity in a particular sector, that suggests the good or service is being exported to other communities.

**86. How are location quotients calculated?**

First, determine the percentage of local employment in a particular sector or activity. Then, calculate the percentage of national employment in that same sector or activity. The third step involves dividing the percentage of local employment in a given activity by the percentage of national employment in that same activity. This equation determines the location quotient:

$$\text{Location Quotient} = \frac{\% \text{ of Local Employment in Activity X}}{\% \text{ of National Employment in Activity X}}$$

**87. How is the location quotient interpreted?**

The location quotient provides information for two important conditions. A location quotient greater than one (1) indicates the sector is an export activity and is an important link to the outside economy (see discussion of employment multipliers, pages 11–14 and 58–59). It is important to recognize, however, that a location quotient probably needs to exceed 1.25 before it represents much export activity. The second important value is a location quotient less than one (1), particularly .75 or less. It suggests that particular sector is not meeting local needs. The use of the range .75 to 1.25 is recognition of data imperfections. The minimum and maximum number essentially tries to restrict the analysis to those sectors that are extremes.

**88. After a location quotient has been calculated, how can it be used for community economic analysis?**

One has to be careful in making hasty conclusions from location quotients. For example, a location quotient less than one does not mean the community should strive for self-sufficiency in that activity. Each community need not be completely self-sufficient in all sectors (e.g., steel mills or shoe manufacturers). However, if the location quotient is less than one in a trade or service activity, it suggests there may be a gap in the local economy, because most trade and service activities are expected to be present in most cities and villages.

**89. That indicates one has to use a sense of judgment when interpreting location quotients. What kinds of questions should a community ask itself to interpret its location quotients?**

To a large extent, that judgment is based on the question, “Is it feasible to have this type of trade or service activity in this particular community?” If the answer is yes, there are several additional items to consider.

**90. What other items should be considered?**

The community can compare its location quotient with the location quotient of similar communities. If those communities are exporting ( $LQ > 1$ ) or are at least self-sufficient ( $LQ = 1$ ) in this sector, that reinforces the idea that the community could expand that sector.

Remember, the location quotient is only a first cut at possible activities. The real answer comes from a feasibility study. Such studies give information about potential customers, the anticipated profitability of a particular business, and offer more conclusive information about the possibility of expansion in a certain activity. People who understand marketing can conduct such studies. But it is senseless to spend a great deal of money and time on a feasibility study unless one first calculates the location quotients, compares them to similar communities, and calculates the population-employment ratios (to be discussed later, see page 32) to narrow the possibilities.

**91. What type of information is needed to compute location quotients?**

Employment data by sector of the local and national economy is needed to compute location quotients. Generally, this is just wage and salary employment and does not include proprietors.

**92. Location quotients seem to be fairly easy to calculate. Are there some cautions in their use?**

Just like any other tool, location quotients need to be used with caution because some elemental assumptions can lead to errors if they are violated. The technique requires you to assume local and nonlocal demand and productivity are similar.

**93. Why is this so important?**

Because we are trying to identify economic opportunities. If the local economy has a local demand that varies substantially from the national conditions, then the level of self-sufficiency may be quite different from that implied. For example, the local community is growing and has a relatively large share of its employment in residential housing construction because the community is experiencing a housing boom, not because it is exporting houses to other locales. Productivity is also important because if the local workforce is less productive than the national average, then relatively more people need to be employed to just meet local needs. In this case, the relatively high share of local employment in a particular sector reflects poor management or workers who do not produce at a comparable rate to the national average. Yet the location quotient would suggest they are exporting.

**94. Are there any other limitations of location quotients?**

Another caution is the aggregation of the data—location quotient values can vary because of the data used. For example, North American Industrial Classification System (NAICS) code 59 is miscellaneous retail while NAICS code 5944 is jewelry stores. A community may have a location quotient of less than one at the two-digit level, which suggests no exports. But if the data were broken down to the four-digit NAICS code level, jewelry stores, the location quotient might indicate the community is an exporter.

Although the ideal is to use three- or four-digit NAICS codes for calculating a location quotient, it is not always feasible. Most employment data for communities is only available at the two-digit level, so finding more precise data may not be feasible.

**95. Are there other measures a community can use to understand its trade and service sectors?**

There is the population-employment ratio. It measures the number of people in the local market who support each trade or service job. It is a simple ratio to make intercommunity comparisons of trade and service activities. These ratios are relative and vary by size of the community.

**96. What do you mean relative?**

Location quotients have a critical value of one (1). Population-employment ratios have no single critical value. Rather, the critical value is the average of several similar-sized communities. A population-employment ratio larger than the average indicates each local worker is selling to more customers than the average for similar-sized communities. This suggests there may be an opportunity to expand employment in this trade or service activity.

**97. What information do we get from population-employment ratios that location quotients do not tell us?**

Population-employment ratios use the entire population, which includes all consumers, not just those who are working, as location quotients do. Thus, for communities with either a lot of younger people and/or older people who are not working, the location quotient may yield biased results.

**98. How are population-employment ratios calculated?**

First, the data required is the population of the cities being compared and the number of employees in a particular trade or service activity in each city. The population-employment ratio for each city is determined by dividing the population in each city by the employment in a particular trade or service activity:

$$\text{Population-employment Ratio} = \frac{\text{Population of a City}}{\text{Number of Employees in a Particular Trade or Service Activity in that City}}$$

**99. Could you share an example?**

Suppose there are five small cities with populations between 6,000 and 9,000. Each city is the county seat, none contains a sizeable federal or state employer and none is closely linked to a major metropolitan center. Let's say the sector for comparison is NAICS code 54: professional, scientific and technical services.

Suppose the population-employment ratios for the five cities are as follows: City A, 250; City B, 249; City C, 350; City D, 193; City E, 549. The average ratio for these five cities is 318. This suggests cities A, B, and D have more than the average number of employees in professional, scientific and technical services relative to their population, while cities C and E have less. City E's relatively high ratio indicates it may have expansion opportunities in professional services. Yet, before making a final judgment on expanded professional services, it is important to examine other factors not captured in the employment data.

**100. Such as?**

The most obvious is a nearby community with an aggressive professional services facility or firm, which would make it more difficult to operate or start a firm successfully. Second, the assumptions of similar demand and productivity among communities may not be valid. Just like location quotients, if demand or productivity are not similar it requires further analysis, because one cannot be sure what the data show.

**101. Do the population-employment ratio and the location quotient give us the same information?**

They are similar, but not duplicative. A relatively high population-employment ratio and a location quotient less than one suggest an expansion possibility. A relatively low population-employment ratio and a high location quotient suggest expansion possibilities are limited. Other combinations of location quotients and population-employment ratios require additional analysis before you can make a judgment.

**102. If we are looking at the market supporting a particular trade or service worker should we not use the trade area rather than municipal population?**

To be correct, you probably should. But then, you need to include all the workers in that particular activity in the smaller communities in your trade area. This would need to be done for all the comparison communities. Furthermore, the trade area for different goods and services vary so the market population also varies. It is questionable whether it is worth the additional trouble. Again, remember that no single number will be sufficient to make a decision.

**103. You mentioned demand thresholds could be used to judge the potential for particular types of retail and service activities.**

That is true to some degree. Demand thresholds are estimates of the average number of people found in a community with a given number of a particular establishment.

**104. Just what does that mean?**

Let's say a community of 2,700 people would like to have a shoe store. A demand threshold estimate might indicate that on the average, a shoe store is not found in communities of less than 3,000 people. This means that an average size shoe store is not likely to have a sufficient local market to support its operation. But remember averages and general rules of thumb have almost as many exceptions as accurate predictions.

**105. Are you saying that demand thresholds may be misleading?**

Any of the techniques discussed in this manual can yield misleading results if not used with care and some sensitivity to other sources of information and insight.

**106. Recognizing those limitations, are there some general estimates of demand thresholds that are applicable in most communities?**

Yes there are, but the value of the estimate will change over time and among different areas of the country. Thus, there are no general numbers appropriate in every community. Often the best source of market/demand threshold information for a specific type of business (e.g., hardware store, pharmacy, etc.) is to make contact with that trade association and ask them about some general market needs for a successful operation.



## Measuring the Efficiency of Local Firms

**107. These tools give some idea about examining the trade or service sector. Are there other ways a community can address the question of community economic development?**

Yes, there are. It is important to remember there are no distinct divisions among these approaches. Another approach is to examine the efficiency of firms.

**108. Why examine efficiency of firms?**

A key mechanism for community economic development is to work with existing businesses to improve their efficiency and competitiveness. This helps the community because, if existing businesses become more competitive, they will be more viable and are more likely to generate employment opportunities.

**109. How can a community tell if its businesses are more competitive than others?**

One way to examine the competitiveness of local business would be to look at the forces affecting their growth or decline. These forces of change can come from three sources. The first is local growth (decline) stimulated by national growth (decline). The second is local growth (decline) stimulated because of a local concentration of businesses in relatively faster (slower) growth economic sectors. The third is local growth (decline) arising from more (less) competitive firms locally than the national average for that sector.

**110. Can the impact of these three factors on the local community be estimated?**

Shift-share analysis can provide some insight to the magnitude of these factors. It is a descriptive tool and does not indicate why employment changed. Rather, it is a starting point for further analysis.

**111. What is shift-share analysis?**

It measures the movement (shift) of the local economy into faster or slower growth sectors and the community's larger or smaller portion (share) of the growth occurring in a given economic sector.

### **112. How do you calculate shift-share?**

The first step is to calculate the national growth component (NG). It measures the potential change in local employment assuming the local economy is similar to the national economy. The national growth component is calculated by multiplying the base year employment in each sector by the national average employment growth rate, and then summing over all the sectors. The results show how many new jobs were created locally due to national economic trends, assuming the local and national economies are identical.

### **113. How can a community measure whether it has more or less faster growth businesses than the national average?**

The second step in shift-share is to compute the industrial mix component (IM). The industrial mix component is determined by multiplying the local employment in each economic sector by the difference in the national growth rate for that sector and the growth rate for the whole economy. A positive industrial mix indicates the majority of local employment is in sectors growing faster than national total employment. A negative industrial mix indicates just the opposite.

### **114. What might cause the slower growth?**

There are several reasons for a negative IM. The community may have businesses with declining long-run growth prospects. It may also indicate businesses are undergoing a cyclic downturn. It could also be due to poor management, obsolete technology or a shift in markets.

The community needs to examine both the total industrial mix as well as the industrial mix for specific sectors. The community could ask businesses in negative sectors what kinds of assistance they might need. If the community wants to stimulate internal growth, it needs to consider both positive and negative industrial mix businesses. But just as importantly, sectors with a positive or negative industrial mix generally require different responses from the community.

### **115. How can a community measure whether local businesses are growing faster or slower than similar businesses nationally?**

The competitive share component (CS) measures the ability of the local economy to capture an increasing (decreasing) share of a particular sector's growth. It is computed by multiplying the local employment in each economic sector by the difference in the growth rate of that sector nationally and locally. After doing this for all sectors, the results are summed to give the community competitive share.

A positive competitive share indicates the community gained additional jobs over that due to national growth and its industrial structure. This gain suggests the community is more competitive (efficient) in securing additional employment than the rest of the nation. It is

important to examine the competitive share for both the community and particular sectors. Each yields different information.

**116. Could we go through a simple example of shift-share analysis?**

Let's assume that the national employment grew at a rate of 5 percent over the last two years and nationally sector A grew 7 percent and sector B grew 4 percent. In the community, total employment grew 5.6 percent and sectors A and B grew 6 percent and 5 percent respectively. The initial local employment in these two sectors was 200 and 120. The national growth component is calculated as:

Sector	Base Employment		National Growth Rate		
A	200	x	5%	=	10
B	120	x	5%	=	6
National Growth Component					16

The industrial mix component is calculated as:

Sector	Base Employment		Sector Growth Rate		National Average Growth Rate	
A	200	x	(7%	-	5%)	= 4.0
B	120	x	(4%	-	5%)	= -1.2
Industrial Mix Component						2.8

The competitive share component is calculated as:

Sector	Base Employment		Local Sector Growth Rate		National Sector Growth Rate	
A	200	x	(6%	-	7%)	= -2.0
B	120	x	(5%	-	4%)	= 1.2
Competitive Share Component						-0.8

This community gained 18 new jobs over the last two years. Most of that gain (16 jobs) was due to national economic growth. The majority of local employment is in relatively fast growing sectors because the community has a positive industrial mix (2.8 jobs). But these sectors are not very competitive compared to national standards (a competitive share loss of .8 jobs). Note that sector B had a positive competitive share that was offset by the negative competitive share in sector A. This suggests the community needs to determine how it can support sector B's continued competitive position and help sector A

improve its competitive prospects. Likewise, the community must recognize that sector B is currently growing slower than the national average. This may be due to business cycles or shifts in demand, etc.

**117. Where do you get data to compute the national growth component, industrial mix and competitive share?**

The data can be acquired from *County Business Patterns*, which is published annually. The data is also available from the state Job Service of the state Department of Labor.

**118. Suppose shift-share analysis suggests some local businesses are not as efficient as they could be. How can a community improve the efficiency of its existing firms?**

Again there is no single avenue to success, but the community could:

- Strengthen management capacities of existing firms through educational programs (personnel, finance, organization, etc.).
- Encourage business growth through identification of capital sources:
  1. Loans (S.B.A., banks, industrial revenue bonding).
  2. Equity (small business investment corporations, investment groups).
- Increase knowledge of new technology through educational programs in science and engineering.
- Aid employers in improving work force quality through educational programs, employment counseling and social services (e.g., day care, health services).
- Develop community and regional facilities that improve local business efficiency and access to nonlocal markets (e.g., transportation, services, communications, business incubators, tourism promotion and micro-lending).



## Other Strategies

**119. Another important aspect of community economic development is the creation of new firms. What steps can a community take to encourage the formation of new firms and why is it so important?**

There is a continuing need for new businesses to meet changing needs. The rapid growth of the fast food industry for example, indicates how consumers' preferences have changed. The computer service industry sprang from a change in technologies. Population growth and shifts can also lead to business expansion.

A community economic development program should encourage entrepreneurs to form businesses that have a good chance of success. Assistance can be provided through management counseling, packaging necessary capital and other mechanisms.

**120. Another opportunity for improving community income and employment is to increase aids received from broader units of government. Why is it so important?**

A significant portion of many communities' income comes from payment received from broader units of government, such as counties, states and the nation. Individuals receive payments such as social security, veterans' benefits, aid for dependent children and retirement income. (See discussion of employment multipliers, pages 11–14 and 58–59.) Businesses receive agricultural land conservation payments, military contracts and service contracts. Local governments receive aids for schools, park and recreational development, streets and other things.

**121. We have looked at many different tools of community economic analysis. Are there any other tools that should be considered?**

This manual is not exhaustive. We have only explored some of the tools for economic analysis. Some tools are too costly, or use data that is difficult to find. For example, a community economic analysis technique not discussed in this manual is input-output analysis. This manual also did not explore descriptive data that can tell us a great deal about a particular community. The worth of such data is obvious and self-explanatory. However, this manual's primary focus is on economic analysis tools that will be helpful to community economic developers. Interested readers are referred to the bibliography for more detail (see page 63).

**122. This manual makes an argument that a community can learn more about its economy through community economic analysis. But how can we make sure the analysis leads to action and is not forgotten?**

There is no guarantee that analysis will lead to action. However, the chances for action are increased considerably if local leaders and citizens are involved in the early stages of analysis and are given the opportunity to ask questions, to learn how to calculate and interpret the tools, to identify problem areas, and to set achievable goals.



## Finding Data to Do Community Economic Analysis

### 123. Is it easy to find data for community economic analysis?

Finding data has never been easier. There is significant federal, state and county level data available on the World Wide Web.

### 124. Is there a good one-stop shop for data to do community economic analysis?

American FactFinder is a good one-stop shop for data, especially from the 2000 Census (<http://factfinder.census.gov>). The Census Bureau also has State and County Quickfacts with the most requested data for cities and counties (<http://quickfacts.census.gov/qfd>).

It should be noted that the *Economic Census* (<http://www.census.gov/econ/www/>) profiles the U.S. economy every five years; it includes data from the national to the local level. The 2002 *Economic Census* was released in 2004.

Government Information Locator Services (GILS) is a search engine that is designed to find federal government data resources on the Internet. It is available at [http://www.access.gpo.gov/su\\_docs/gils/](http://www.access.gpo.gov/su_docs/gils/). Through the use of keywords you can find unusual or hard-to-find federal government data.

### 125. How about specific state or local data?

Every state has a state data center (SDC) which makes census data and related services available to users. Many also have business and industry data centers (BIDCs) that complement the work of SDCs. More information can be found about your state by visiting the State Data Center Web site at <http://www.census.gov/sdc/www/sdctxt.html>.

Most states also have colleges and universities that operate research centers that compile information about the state economy. Most of these centers belong to the Association for University Business and Economic Research (AUBER). You can find a list of state university AUBER members and their Web sites at <http://www.auber.org/htmls/leapcomp.html>.

## 126. Are there other sources for national and local business data?

The Bureau of Economic Analysis produces a CD-ROM that contains 25 years' worth of income and employment data for every county, metropolitan area and state for a relatively modest fee. To order, call the BEA at (800) 704-0415.

The Regional Economic Information System at the Bureau of Economic Analysis maintains a frequently used Web site where one can find data to conduct community economic analysis (<http://www.bea.gov/bea/regional/reis>).

*County Business Patterns* is an annual series that contains data on businesses by state and county. The series is useful for studying the economic activities of small areas; analyzing economic changes over time; and as a benchmark for statistical series and databases between economic censuses (<http://www.census.gov/epcd/cbp/view/cbpview.html>).

The Bureau of Labor Statistics, at <http://www.stats.bls.gov>, provides monthly employment estimates by industry for states and metro areas. It also provides unemployment information and maintains the Consumer Price Index Program that gives the overall price index and indices for specific components of consumer expenditures, such as housing and food.

## 127. How can I find out more about the North American Industry Classification System (NAICS)?

NAICS (pronounced Nakes) is a system for classifying business establishments. It was adopted to replace the old Standard Industrial Classification (SIC) system. The code is used in Canada, Mexico and the United States. The Census Bureau uses the NAICS system to classify establishments according to their primary industrial activity. Other government agencies use NAICS to keep track of business trends. NAICS is not used to classify occupations. To learn more about the background and the development of NAICS, visit <http://www.census.gov/epcd/www/naicsdev.htm>.

## 128. Are there limitations or problems with data sources?

Every data source has some limitations. Regional economic data collection tends to be decentralized and idiosyncratic. However, federal data providers provide the methodological basis for data gathering and frequently discuss the limitations of interpreting or analyzing their data.

Here are some questions to ask yourself before you use the data you have found:

- Who collected the data?
- Why was it collected?
- What is the time frame of the data? Can I use the data to measure change over time?
- How was the data measured? For example, there are several ways to measure income.
- What can I live with? Is it okay if the data is two or three years old? What if the data is only available by two-digit NAICS codes?

## Finding Data to Do Community Economic Analysis

It is hard to teach learners of economic analysis about data nuances and limitations. It is suggested that one find a seasoned hand who works with data to provide some guidance: a reference librarian, a regional or community economist, or a demographer.



# Appendix

## Hypothetical Case Example Using Community Economic Analyses Tools

### Reilly's Law

#### Purpose

To determine the maximum distance customers will travel to shop in a certain community. The information is generally used to develop a trade area map of the community.

#### Example

We want to know how far the trade area extends from the city of Riverside to the cities of Mountainview, Centerville, River Falls and Forest Grove.

#### Data Needed

1. Population of each city to be compared with our community (i.e., Riverside). Each state generally makes annual estimates of community population for various official purposes. Contact the local community or call a state office, such as the administration department or the sociology department of a nearby university for this information.
2. The road distance from our community (e.g., Riverside to similar cities surrounding it—Mountainview, etc). The distance between communities can be read from road maps.

<b>Cities</b>	<b>Population</b>	<b>Distance from Riverside (Miles)</b>
Riverside	7,052	0
Mountainview	3,260	23
Centerville	18,023	61
River Falls	3,346	31
Forest Grove	6,758	17

### Reilly's Law Formula

$$\text{Distance from Smaller Community} = \frac{\text{Distance Between City X and City Y}}{1 + \sqrt{\frac{\text{Population of Larger Municipality}}{\text{Population of Smaller Municipality}}}}$$

### How to Calculate Trade Area Boundaries

Compute the boundary between Riverside and Mountainview by plugging the numbers into the formula.

$$\frac{23}{1 + \sqrt{\frac{7,052}{3,260}}} = \frac{23}{1 + \sqrt{2.163}} = \frac{23}{1 + 1.47} = 9.31 \text{ miles from Mountainview}$$

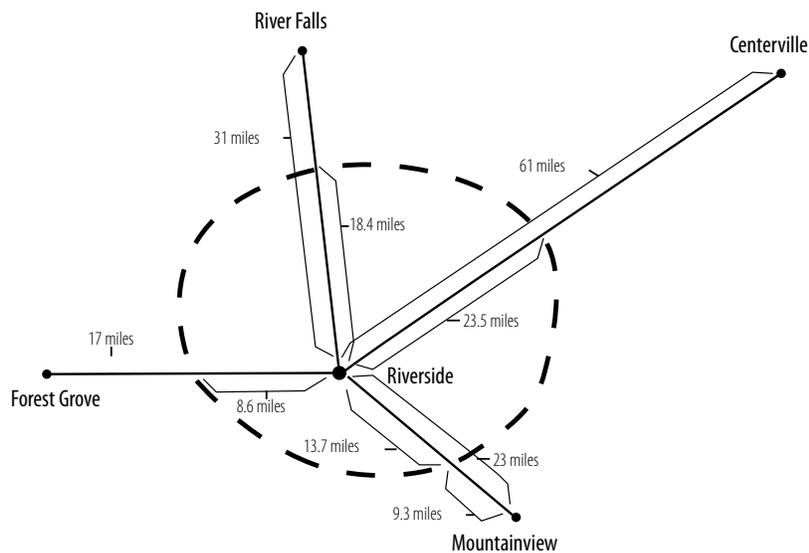
Compare Riverside and Centerville by using the same formula:

$$\frac{61}{1 + \sqrt{\frac{18,023}{7,052}}} = \frac{61}{1 + \sqrt{2.555}} = \frac{61}{1 + 1.60} = 23.47 \text{ miles from Riverside}$$

### Interpretation

The Riverside-Mountainview result means that the trade area for Riverside extends up to 9.31 miles from Mountainview. The people who live within 9.31 miles of Mountainview will be reluctant to shop in Riverside. The Riverside-Centerville comparison suggests that the trade area for Riverside extends up to 23.47 miles from the city of Riverside. Remember, the final number derived in the formula is the trade area boundary distance from the smaller community. After calculating the trade area distances for surrounding communities, connect the points. This yields a map of the trade area.

The Riverside trade area map: [not drawn to scale]



After the trade area has been identified, the population, income and other information about municipalities within the trade area can be used to help Riverside merchants understand their trade potential.

## Trade Area Capture

### Purpose

To tell how many customers are drawn to a particular community to shop for a certain type of product at any given time.

### Example

The city of Riverside wants to know how many customers it has attracted in recent years. Riverside is especially interested in its auto dealers. They want to know if they lost or attracted more customers between 1997 and 2002.

### Data Needed

1. Actual retail sales in a particular sector (i.e., Riverside auto sales in 1997 and 2002). The retail sales for the community and the state are located in the *Economic Census*. This information is published every five years (i.e., 1992, 1997 and 2002). If you are analyzing a community larger than 2,500 people, you can obtain up-to-date retail sales information from private sources such as *Standard Rate and Data* (<http://www.srds.com/>) or *The Journal of Personal Selling and Sales Management*. In some states, sales tax data can be used. This can be obtained from the appropriate state agency.
2. State per capita expenditures in that particular sector (i.e., state auto sales in 1997 and 2002).

3. County per capita income for the years being analyzed (i.e., for 1997 and 2002). Per capita income is available from various state agencies such as the Department of Revenue or Department of Administration or Census of Population or Bureau of Economic Analysis Regional Economic Information Program.
4. State per capita income for same years as local income (i.e., for 1997 and 2002).

How to Calculate Trade Area Capture

$$\text{Trade Area Capture} = \frac{\text{Actual Retail Sales of Merchandise Type J}}{\text{State Per Capita Expenditures for Merchandise Type J} \times \frac{\text{County Per Capita Income}}{\text{State Per Capita Income}}}$$

The trade area capture for Riverside motor vehicle and parts sales in 1997 =

$$\frac{\$18,446,000}{2,150 \times \frac{\$18,070}{\$23,021}} = \frac{18,446,000}{2,150 \times .785} = \frac{18,446,000}{1,687.75} = 10,929$$

The trade area capture for Riverside motor vehicles and parts sales in 2002 =

$$\frac{\$26,553,021}{2,700 \times \frac{\$20,153}{\$26,003}} = \frac{26,553,021}{2,700 \times .77} = \frac{26,553,021}{2,079} = 12,772$$

Interpretation

The 1997 figure means Riverside “captured” the motor vehicle and parts purchases of 10,929 people. It does not mean they sold 10,929 motor vehicles and parts. For example, if a family of five people purchased a car, they would be listed as five people in the trade area capture figure. The 2002 figure indicates Riverside served 12,772 motor vehicle and parts customers. An increase of 1,793 people means Riverside has improved its ability to capture auto customers. Why did this occur? Could Riverside increase its auto customers more in the next five-year period? These are some of the questions the community might ask itself.

The trade area capture analysis can also be used for other retail sectors to understand community trade growth or decline. Below, the trade area capture for furniture sales has increased while miscellaneous retail has declined. Why did it occur? What can Riverside do to promote those two sectors? These are some of the questions that follow trade area capture analysis.

Retail Category	1997		2002	
	Actual Sales (000s)	Trade Area Capture	Actual Sales (000s)	Trade Area Capture
Furniture	21,527	19,489	24,063	21,922
Miscellaneous Retail	91,300	17,399	101,599	16,113

## Pull Factor

### Purpose

To determine the portion of customers a community draws from outside its boundaries. Pull factors should be compared over several time periods to determine trends. While not a general occurrence, the pull factor could be less than one.

### Example

The City of Riverside wants to know what portion of its motor vehicle and parts customers are coming from outside its boundaries. They are interested in knowing if they have improved on their ability to attract outsiders between the years 1997 and 2002.

### Data Needed

1. Trade area capture for a particular sector for two time periods (i.e., Riverside motor vehicle sales trade area capture for 1997 and 2002).
2. Population of the community (i.e., Riverside population in 1997 and 2002). Annual estimates of the community population are available from the local library, city hall or through the World Wide Web data providers mentioned in sections 123–128 of this manual (see pages 41–43).

### How to Calculate Pull Factors

To calculate a pull factor for a certain type of retail good, divide the trade area capture estimate by the community population for the same year as the trade area estimate:

$$\text{Pull Factor} = \frac{\text{Trade Area Capture Estimate}}{\text{Community Population}}$$

Riverside's population was 6,545 in 1997 and 7,065 in 2002. Its trade area capture for motor vehicle sales was 10,929 in 1997 and 12,772 in 2002.

$$\begin{array}{l} \text{1997 Riverside} \\ \text{Motor Vehicle Sales Pull Factor} \end{array} = \frac{10,929}{6,545} = 1.67$$

$$\begin{array}{l} \text{2002 Riverside} \\ \text{Motor Vehicle Sales Pull Factor} \end{array} = \frac{12,772}{7,065} = 1.8$$

### Interpretation

To strictly interpret a pull factor of one (1) means the community is drawing all its customers from within its boundaries and none from the outside. A pull factor of 1.67 for 1997 Riverside motor vehicle and parts sales means Riverside drew some customers from outside its boundaries. The proportion of nonlocal customers was equal to 67 percent of the Riverside population.

The 2002 Riverside motor vehicle and parts sales pull factor is 1.8. It means the city attracted outside purchases equal to 80 percent of the Riverside population. Thus, the city drew 5,707 customers from outside its boundaries and 7,065 customers from within the city limits.

The 1997 and 2002 pull factors of 1.67 and 1.8 respectively indicates the community improved its ability to attract outsiders. It is obvious that Riverside's auto sales firms are drawing from a wide area. Can the market be expanded more or is it fully saturated? Why has the pull factor remained relatively stable? If the pull factor had declined, Riverside might be asking similar questions about the decline.

A pull factor of less than one suggests the community is not even capturing the shoppers within its municipal boundaries or they are spending relatively less than the state average.

## **Potential Sales**

### Purpose

To estimate the potential sales volume for a particular retail or service activity in the trade area.

### Example

The City of Riverside wants to determine what proportion of potential new motor vehicle and parts purchases it is actually capturing.

### Data Needed

1. Actual retail/service sales for a particular activity is collected from the *Census of Retail Trade* or *Selected Services* for selected years or possibly from sales tax data.
2. Trade area population is estimated from Reilly's Law and the *Census of Population*.
3. State average expenditures per person for a particular retail/service activity can be collected from the appropriate *Census of Business* or sales tax data.
4. State and local per capita income data can be collected from Bureau of Economic Analysis data, state income tax data or *Census of Population*.

## Calculating Sales Potential

The formula is:

$$\text{Potential Sales} = \text{Trade Area Population} \times \text{State Per Capita Sales} \times \frac{\text{Local Per Capita Income}}{\text{State Per Capita Income}}$$

For the city of Riverside, the following data is used in the above formula: trade area population, 22,500 (this figure was calculated using Reilly's law and then determining the potential customers within that trade area); local per capita income, \$20,153; state per capita income, \$26,003; and state per capita auto sales, \$2,700.

$$\$47,082,822 = 22,500 \times \$2,700 \times \frac{\$20,153}{\$26,003}$$

The proportion of potential sales that are captured can be estimated by using the following formula:

$$\text{Proportion Captured} = \frac{\text{Actual Sales}}{\text{Potential Sales}} \times 100\%$$

In this example, the formula becomes:

$$56.3\% = \frac{\$26,553,021}{\$47,082,822} \times 100\%$$

## Interpretation

The city of Riverside is capturing only 56.3 percent of its estimated potential sales in motor vehicle and parts purchases. This could be due to a variety of reasons including non-aggressive local businesses, nearby competition, poor choice, product selection or other reasons. Note these numbers tend to support the insight gained from the trade area capture, which indicated the city was capturing only 12,772 customers out of the 22,500 (determined by using Reilly's law) in the trade area.

## **Location Quotient**

### Purpose

1. To determine a community's degree of self-sufficiency in a particular retail or trade sector.
2. To determine if a community is losing its local trade dollars to nonlocal markets.
3. To determine if a community is producing more than needed for its own use and is selling the excess to nonlocal markets (i.e., identify export activity).

### Example

Business leaders in Riverside want to know if the community is self-sufficient in apparel and accessory stores.

### Data Needed

1. The North American Industrial Classification System code for Sector J (e.g., clothing and clothing accessories stores). First, define the type of business to be investigated in terms of its NAICS code. The U.S. Department of Commerce and Labor publish these codes. The local Job Service is likely to have a copy. Generally, three-digit NAICS codes should be used to determine location quotients, but data may be unavailable in smaller communities.
2. The percentage of local labor force employed in Sector J (e.g., clothing and clothing accessories stores). This percentage is determined by dividing the number of local people employed in Sector J by the total local employment. This employment information is available from the Job Service, Department of Labor or *County Business Patterns*. It is categorized in terms of NAICS codes.
3. The percentage of workers employed nationally in Sector J (e.g., clothing and clothing accessories stores). This information is available through the Job Service or the state Department of Labor. Other sources are the U.S. Bureau of Labor Statistics and *County Business Patterns*.

### How to Calculate Location Quotients

Location quotients are calculated by dividing the percentage of those employed locally in a particular sector by the percentage of those employed in the same sector nationally.

$$\text{Location Quotient} = \frac{\% \text{ of Local Employment in Sector J}}{\% \text{ of National Employment in Sector J}}$$

Looking at Riverside again, the North American Industrial Classification System code for clothing and clothing accessories stores is 448. In 2002, let us say that 1.38 percent of national employment is found in NAICS code 448. Riverside has 1.29 percent of its 2002 employment in NAICS code 448.

The clothing and clothing accessory location quotient for Riverside is:

$$\frac{1.29}{1.38} = .94$$

## Interpretation

A location quotient of .94 for Riverside's clothing and clothing accessories stores is almost one. It suggests the city is approximately self-sufficient in this particular sector. A location quotient generally between the values of .75 and 1.25 probably indicates the community is just self-sufficient.

If four-digit NAICS codes had been used, the analysis might indicate self-sufficiency for clothing stores (NAICS code 4481) but not for jewelry, luggage and leather goods stores (NAICS code 4483). It should be noted that one might not get to such detail because it is usually difficult to get four-digit NAICS data at the local level. On the other hand, if one uses only two-digit data, such as the NAICS code 44 and 45 for retail trade, it is difficult to determine the nature of that self-sufficiency from the location quotient.

A location quotient less than one suggests the community is not self-sufficient and may be able to supply locally what it previously imported. To make this judgment requires comparing location quotients among similar communities, plus examining the population-employment ratios and eventually doing feasibility studies.

## **Population-Employment Ratio**

### Purpose

To measure the number of people in the local market per job in a particular trade or service sector. It is used to make intercommunity comparisons of trade and service sectors.

### Example

The community of Riverside is interested in learning about its clothing and clothing accessories sector (NAICS code 448). Some people believe there is little room for expansion in this field. Others argue that the community could support more clothing and clothing accessories stores or that existing clothing stores should expand. Riverside uses the population-employment ratio to compare its retail clothing and clothing accessories sector with similar communities (e.g., Mountainview, Booneville, Forest Grove and Porterville).

### Data Needed

1. Population of each community. The population of the three or four communities to be compared with the community. Annual population estimates are available from state agencies such as the Department of Administration or the Department of Revenue. Precise figures are available for census years (i.e., 1990 and 2000) from the *Census*.
2. The number of local workers in a particular sector, defined by NAICS code. The number of local workers in each sector (i.e., NAICS code 448, clothing and clothing accessories stores) is available from the State Department of Labor or Job Service.

## How to Calculate the Population-Employment Ratio

The population of a particular city or village divided by the number of people employed in a particular trade or service sector in that city yields the population-employment ratio.

$$\text{Population Employment Ratio} = \frac{\text{Population of a City}}{\text{Number of Employees in a Particular Trade or Service in that City}}$$

The following data is needed to compute the ratios:

<u>City</u>	<u>Population</u>	<u>Employment in Apparel and Accessory</u>
Riverside	7,052	244
Forest Grove	6,758	123
Booneville	7,826	175
Mountainview	3,260	71
Porterville	7,833	108

$$\text{Riverside Population-Employment Ratio} = \frac{7,052}{244} = 28.90$$

$$\text{Forest Grove Population-Employment Ratio} = \frac{6,758}{123} = 54.94$$

Booneville, Mountainview and Porterville have population-employment ratios of 44.72, 45.92 and 72.53, respectively. The next step is to compute the average, which is 49.40.

### Interpretation

On the average, each retail clothing and clothing accessories store worker “sells” to about 50 people. However, in Riverside each retail clothing store worker only sells to about 29 people. Why does Riverside have such a low population-employment ratio? It could be because the local merchant is aggressive and is servicing a much larger nonlocal market, or the local merchant is over-staffed. In any case, the population-employment ratio here does not suggest any room for expansion. This agrees with the location quotient analysis.

## **Shift-Share: National Growth Component**

### Purpose

To measure how many new jobs were created locally due to national economic trends.

Example

The community of Riverside has four sectors and wants to know if recent employment changes were due to national economic trends or other forces.

Data Needed

- Workers employed in each sector, both nationally and locally, for at least two years. First, locate the NAICS code of the industry or sector you want to study. This data is available from the U.S. Department of Labor or Commerce and can be found at the Web sites listed under sections 123–128 of this manual (see pages 41–43). The most accessible source is *County Business Patterns*. You need to compare data for two years. For example, you might want to compare the number of workers in 2002 and 2004 in a certain sector (e.g., NAICS code 336, transportation equipment manufacturing). The number of workers employed locally in the same NAICS code and years you identified nationally is available from *County Business Patterns*, which is published annually. Again, you will need data for two years. The State Department of Labor and Job Service can also be helpful in locating this information. Be sure to use data from the same sources to reduce potential error from differences in how the data was collected.

How to Calculate

Here is how the Riverside data looks:

Sector	U.S. Employment (000)			Riverside Employment		
	2002	2004	% Change	2002	2004	% Change
A	1250	2250	80.00	50	75	50.00
B	600	800	33.33	70	100	42.86
C	900	850	-5.56	80	50	-37.50
D	450	325	-27.78	65	180	177.00
Total	3200	4225	32.03	265	405	52.8

The national growth component is calculated by multiplying the base year employment (2002 in our example) by the national average employment growth rate. The sum of the products is called the national growth component.

Sector	Local 2002 Employment		National Average Growth Rate		National Growth Component
A	50	x	32.03	=	16.02
B	70	x	32.03	=	22.41
C	80	x	32.03	=	25.62
D	65	x	32.03	=	20.81
Community National Growth Component				=	84.86

### Interpretation

The national growth component of 84.86 means 85 of the 140 new jobs in sectors A, B, C and D were due to national economic trends. Thus, if the Riverside economy was like the national economy it should have grown by 85 jobs. Likewise, Sector A would have grown by 16.02 jobs if it was like the national economy, etc.

## **Shift-Share: Industrial Mix Component**

### Purpose

To determine whether the local economy is concentrated in industries that are growing slower or faster than the national average.

### Data Needed

Same as the calculations of the national growth component.

### How to Calculate

The industrial mix component is computed by multiplying the local employment in each economic sector by the difference in the national growth rate for that sector and the whole economy.

Sector	2002 Riverside Employment		Sector's National Growth Rate (%)		National Average Growth Rate (%)		Industrial Mix Component	
A	50	x	(80.00	–	32.03)	=	23.98	
B	70	x	(33.33	–	32.03)	=	.91	
C	80	x	(–5.56	–	32.03)	=	–30.07	
D	65	x	(–27.78	–	32.03)	=	–38.88	
Community Industrial Mix Component							=	–44.07

### Interpretation

The industrial mix component is negative. It suggests that Riverside's economy has 44.07 jobs less than it would have if its economic structure were identical to the nation. Sectors A and B are growing faster than the national average. However, that growth is offset by sectors C and D, which are growing slower than the national average. The negative industrial mix means that independent of national influences, the local sectors, on balance, grew slower than the national average and reduced local employment growth. Sectors C and D were the cause. If the industrial mix component were positive, it would suggest the local economy has relatively more people employed in fast growth sectors than the national average.

Riverside's negative industrial mix should lead the community to examine what is causing the slower growth. There are several reasons for a negative industrial mix. It could be a cyclic downturn. It could also be due to a shift in markets or depletion of a resource. The negative industrial mix means the community needs to consciously seek economic activity that will offset the declining sectors. At the very least, the community should not seek activity linked to the declining sectors.

It is important to note that not all sectors of the local economy had a negative industrial mix. The community needs to identify its faster growing firms/sectors to determine if these sectors are likely to continue contributing to local employment change.

## Shift-Share: Competitive Share Component

### Purpose

To determine whether local businesses are growing faster or slower than similar businesses nationally (i.e., more or less competitive).

### Date Needed

Same as for the calculations of the national growth component.

### How to Calculate

The competitive share component is calculated by multiplying the local employment in each economic sector by the difference in the growth rate for that sector nationally and locally. The results for each sector are summed up to give the community's competitive share. The Riverside case illustrates how to compute competitive share.

Sector	2002 Riverside Employment		Local Growth Rate for Sector		National Growth Rate for Sector		Competitive Share	
A	50	x	(50.00	–	80.00)	=	–15.00	
B	70	x	(42.86	–	33.33)	=	6.67	
C	80	x	(–37.50	–	–5.56)	=	–25.55	
D	65	x	(177.00	–	–27.78)	=	133.10	
Community Competitive Share Component							=	99.22

### Interpretation

The competitive share component suggests that Riverside gained an additional 99.22 jobs beyond national growth trends and its industrial mix. It indicates that Riverside created a greater share of employment growth than other areas in the nation (i.e., more competitive). The contribution of each sector, both positive and negative, is worth noting.

Shift-share analysis does not provide the reasons local firms were more competitive. It may be due to better management, new technology, more productive workers or other factors. To make this judgment requires further analysis of local firms vs. industry averages.

Special Note

A simple check of the calculations should confirm that the sum of national growth, industrial mix and competitive share equals total local employment change:

$$140 = 84.86 + (-44.07) + 99.22 = 140.01$$

**Employment Multiplier**

Purpose

To determine how many new jobs will be created in a community resulting from an external economic change.

Example

A manufacturing plant in Riverside expects to create 100 new jobs. Community leaders wonder how the manufacturer’s expansion will affect total employment in the local economy. They decide to use the employment multiplier to estimate the total number of new jobs in Riverside.

Data Needed

1. Location quotients for the major employment sectors in the community (see section on location quotients, pages 29–31).
2. Employment in the community by sector is available from the State Department of Labor or Job Service.

How to Calculate the Employment Multiplier

For simplicity, let’s say Riverside has a two-sector economy. One sector is manufacturing and the other is trade. The information we need is:

	2004 LQ	2004 Employment
Manufacturing	4	1,500
Trade	2	<u>1,832</u>
Total		3,332



The next step is to determine the percentage of each sector serving nonlocal needs. The formula for determining that percentage is:

$$\left(1 - \frac{1}{LQ}\right) \times 100\% = \text{percentage of the community economy serving nonlocal needs}$$

This is only computed for sectors with a location quotient greater than one (1), sectors with a LQ less than one (1) are assumed to serve only local (non-export) markets.

For manufacturing, the proportion of manufacturing employment serving nonlocal needs is  $1 - \frac{1}{4} = \frac{3}{4} = 75$  percent. There were 1,500 workers employed in Riverside manufacturing plants. By multiplying 1,500 workers by 75 percent, we find 1,125 workers are serving nonlocal needs. Fifty percent of the workers in the trade sector serve nonlocal needs (e.g.,  $1 - \frac{1}{2} = 50\%$ ). If we multiply 50 percent by the number of workers in that sector, we get 916. We add the number of workers in each sector serving nonlocal needs ( $1,125 + 916 = 2,041$ ). In other words, 2,041 workers in the Riverside economy are serving nonlocal needs.

The employment multiplier is the total employment divided by the employment serving nonlocal needs (i.e., export).

$$\text{Employment Multiplier} = \frac{\text{Total Employment}}{\text{Export Employment}}$$

$$1.63 = \frac{3,332}{2,041}$$

Interpretation

The employment multiplier is 1.63. If the Riverside manufacturing plant creates 100 new jobs, there will be a total of 163 new jobs in the community, with 63 of the new jobs being created outside the manufacturing plant.

**Income Multiplier**

Purpose

To determine the impact of an external economic change on a community’s income.

Example

The community of Riverside anticipates that a large prison will be built at the edge of the city. How will the prison payroll affect community income? Riverside can get a rough answer to that question by determining its income multiplier.

### Data Needed

An ability to make some accurate guesses about the local economy. To find the information you need for the income multiplier, you need to ask people familiar with the community's economy these questions:

1. What percentage of people's income is spent locally?
2. What percentage of the money that is spent locally goes to labor-intensive services (fast food, auto repair, etc.) vs. external purchases (automobiles, stereos, television, etc.)

A note of caution: never ask a community leader to estimate the entire income multiplier. Generally, they tend to overestimate it. Hence, it is wise to ask them questions (1) and (2) to estimate better what the multiplier is.

This could be done through a survey of local residents and merchants.

### How to Calculate the Income Multiplier

$$k = \frac{1}{1 - (MPC_L \times PSY)}$$

$MPC_L$  means the portion of people's income that is spent locally. The community of Riverside is within easy driving distance of a major regional shopping center. Thus, many items are purchased outside the community. In addition, there are many in-commuters to the city who spend much of their income where they live rather than in Riverside. The estimate is only 35 percent of people's income is likely to be spent in Riverside. Hence, the  $MPC_L$  is .35.

The next question to ask is what proportion of local spending becomes local income? That is PSY in the formula. If local spending is for services such as restaurants, taverns, auto repair shops and other types of labor intensive businesses, the PSY may be as high as .50 to .60. However, if people spend the majority of their income on purchases with little local labor content (such as automobiles), the PSY may be as low as .25. Let's say the PSY is .45. Plugging the numbers into the formula our income multiplier is:

$$k = \frac{1}{1 - (MPC_L \times PSY)} = \frac{1}{1 - (.35 \times .45)} = \frac{1}{1 - .16} = \frac{1}{.84} = 1.19$$

The income multiplier for Riverside is 1.19.

If the PSY is higher (e.g., .60) and the  $MPC_L$  is higher (e.g., .50), the multiplier becomes:

$$k = \frac{1}{1 - (.50 \times .60)} = \frac{1}{1 - .30} = \frac{1}{.7} = 1.43$$

Interpretation

The income multiplier of 1.19 suggests the total income change from the prison development is slightly greater than the prison's gross payroll. It means that for every prison payroll dollar, there will be a change of \$1.19 in local income. The interpretation is similar for the multiplier of 1.43. The important point is that the size of the multiplier is sensitive to estimates of  $MPC_L$  and/or PSY.



# Bibliography

## Note to the Dedicated Reader of Bibliographies

The following list of readings may at first appear unusual since some of the papers seem to contradict each other and in some cases present a strong argument that the tool does not accomplish its stated purpose. However, the purpose of the bibliography is:

1. To give the reader more detailed insight about the tool.
2. To create some sensitivity to misuse and misinterpretation of the tool.

This is to highlight the still imperfect understanding we have of community economic analysis. Many users of this manual will need to push ahead with imperfect data and tools, but we hope with a little better understanding of what they are doing.

## Texts About Data

Dearien, Christy and Priscilla Salant. 2000. *Local Government Guide to the Internet: Online Resources for Communities*. Lexington, KY: Tennessee Valley Authority, Rural Studies/University of Kentucky. ISBN # 0964974649.

Reamer, Andrew and Joseph Cortright. 1998. *Socioeconomic Data for Understanding Your Regional Economy: A User's Guide*. Portland, OR: Imprensa, Inc. For updates to information in this publication, visit <http://www.econdata.net>.

## Text About Community Economic Development Theory and Practice

Shaffer, Ron, Steve Deller and Dave Marcouiller. 2004. *Community Economics: Linking Theory and Practice*. Second Edition, Ames, IA: Blackwell Publishing.

## Export Base/Multipliers

McNamara, K.T. and K.F. Seifarth. December 1987. "Export-base employment multipliers for Georgia counties." Georgia College Agriculture Experiment Station: Athens, GA. The Stations (542).

McVittie, E. and J.K. Swales. 1999. "Sector-Specific Factor Subsidies and Employment in a Regional Price-Endogenous Export-Base Model." *Environment and Planning* 31 (2):2145–2168.

Harris, T.R. et al. 1992. "A Historic Application of the Export-Base Model: Economic Impacts of an Indian Reservation." *Review of Regional Studies*, Fall 22 (2):185–198.

Shaffer, Ron, Steve Deller and Dave Marcouiller. 2004. "Chapter 4: Concepts of Community Markets," and "Chapter 15: Inferential Tools: Fixed-Price Models." *Community Economics: Linking Theory and Practice*. Second Edition, Ames, IA: Blackwell Publishing.

### **Location Quotients**

Hammond, George and Eric Thompson. 2001. "The Long-Term Development of Local Retail and Services Sectors in Rural Southern Counties." *Review of Regional Studies*, Summer 31 (1):51–70.

Murray, James and James Harris. 1978. *A Regional Economic Analysis of the Turtle Mountain Indian Reservation: Determining Potential for Commercial Development*. Minneapolis, MN: Federal Reserve Bank of Minneapolis.

Raab, Raymond L. and Richard W. Lichty. 2002. "Identifying Subareas that Comprise a Greater Metropolitan Area: The Criterion of County Relative Efficiency." *Journal of Regional Science* 42 (3):579–594.

Shaffer, Ron, Steve Deller and Dave Marcouiller. 2004. "Chapter 14: Descriptive Tools of Community Economic Analysis." *Community Economics: Linking Theory and Practice*, Second Edition. Ames, IA: Blackwell Publishing.

### **Reilly's Law and Measuring Retail Markets**

Batty, M. 1978. "Reilly's Challenge: New Laws of Retail Gravitation Which Define Systems of Central Places." *Environment and Planning* 10 (February):185–219.

Blomenstein, H., P. Nijkamp, and W. Van Veenendaal. 1980. "Shopping Perceptions and Preferences: A Multidimensional Attractiveness Analysis of Consumer and Entrepreneurial Attitudes." *Economic Geography* 56 (April):155–174.

Deller, Steven C., James C. McConnon, Jr., John Holden and Kenneth Stone. 1991. "The Measurement of a Community's Retail Markets." *Journal of the Community Development Society* 22 (2):68–83.

Huff, David L. 1964. "Defining and Estimating a Trading Area." *Journal of Marketing* 28 (July):34–38.

Reilly, William J. 1931. *The Law of Retail Gravitation*. New York: Knickerbocker Press.

Wagner, William B. 1974. "An Empirical Test of Reilly's Law of Retail Gravitation." *Growth and Change* 5 (July):30–35.

### Trade Area Capture

Shaffer, Ron, Steve Deller and Dave Marcouiller. 2004. "Chapter 14: Descriptive Tools of Community Economic Analysis." *Community Economics: Linking Theory and Practice*. Second Edition, Ames, IA: Blackwell Publishing.

### Shift-Share Analysis

Houston, David B. 1967. "The Shift-Share Analysis of Regional Growth: A Critique." *Southern Economics Journal* 33 (April):577–581. (See also Ashby, same journal, January 1968).

Loveridge, Scott. 1995. "A Practical Approach to Shift-Share Analysis." *Journal of the Community Development Society* 26 (1):110–124.

McDonough, Carol C. and Balbir S. Sihag. 1991. "The Incorporation of Multiple Bases Into Shift-Share Analysis." *Growth and Change* 22 (1):1–9.

Shaffer, Ron, Steve Deller and Dave Marcouiller. 2004. "Chapter 14: Descriptive Tools of Community Economic Analysis." *Community Economics: Linking Theory and Practice*. Second Edition, Ames, IA: Blackwell Publishing.

Stevens, Benjamin H. and Craig L. Moore. 1980. "A Critical Review of the Literature on Shift-Share as a Forecasting Technique." *Journal of Regional Science* 20 (1):419–438.



# Index

	Page
A:	
Aids from government units .....	9, 10, 39
Average employment multiplier .....	11–14, 58–59
B:	
Basic sector .....	9
C:	
Community competitive share (see competitive share component)	
Community economic questions .....	3–5
Community economy simplified .....	2
Community improving its capacity to keep local dollars .....	27
Community industrial mix component (see industrial mix component)	
Community national growth component (see national growth component)	
Community trade area (also see Reilly’s Law) .....	19
Competitive share component (CS) .....	36–38, 57–58
calculation of .....	37, 57
interpretation of .....	37–38, 57–58
Creation of new firms .....	10, 38
Customers drawn to a community .....	23–24
D:	
Data for economic analysis .....	4–5, 41–43
Demand thresholds .....	29, 33
Dollar turnover .....	16–17
E:	
Economic development alternatives .....	9–10
Economic sector, definition of .....	4–5

Efficiency of firms (also see shift share analysis)..... 5, 9–10, 35–36, 38  
 Employment multiplier ..... 11–14, 58–59  
     calculation of..... 12–14, 58–59  
     interpretation of ..... 59  
 Estimating community trade area (also see Reilly’s Law) ..... 19  
 Export businesses..... 7–10, 12  
 Export employers, attraction of ..... 10, 11  
 Export employment, determination of..... 13–14  
 Export multiplier ..... 11  
 Export sector ..... 5, 9–11, 12–14

F:

Feasibility of trade and service sectors (see location quotients,  
 population-employment ratio and demand thresholds)  
 Firm creation..... 10, 39  
 Firm efficiency (also see shift share analysis) ..... 10, 35–36, 39

I:

Improving efficiency of local firms ..... 38  
 Income and employment changes in communities ..... 3  
 Income flows out of the community ..... 2, 7–8  
 Income multipliers..... 14–16, 59–61  
     calculation of ..... 14–16, 60  
     interpretation of ..... 15–16, 61  
 Industrial mix component ..... 36–38, 56–57  
     calculation of..... 37, 56  
     interpretation of ..... 337–38, 56–57  
 Input-output analysis ..... 12, 38

J:

Job and income growth, ways to stimulate ..... 9–10, 38–39

K:

Keeping local dollars in community ..... 27–28

L:

Leakage of money from local economy ..... 2, 7–8, 27–30  
 Location quotients ..... 13, 29–31, 51–53  
     calculation of..... 29–30, 52  
     interpretation of ..... 29–31, 53



M:

Manufacturing firms, attracting..... 9–10  
 Manufacturing, limitations of..... 9  
 Marginal employment multiplier ..... 12

Marginal propensity to consumer locally ( $MPC_L$ )..... 15–16, 59–61  
 Multipliers, applicability of ..... 16–18  
     average employment multiplier..... 11–14, 58–59  
     employment multiplier..... 11–14, 58–59  
     income multiplier..... 15–16, 59–61  
     marginal employment multiplier ..... 12  
     misuse of multipliers..... 17–18

N:

National growth component (NG) ..... 36–37, 54–56  
     calculation of..... 36–37, 54–55  
     interpretation of ..... 36–37, 56  
 New firm creation ..... 10, 39  
 Nonlocal markets link to local economy ..... 7–8  
 North American Industry Classification Code System (NAICS) ..... 4, 31–32, 42, 52–53, 55

P:

Payments from government units..... 9–10, 39  
 Percentage of money spent locally that becomes local income (PSY) ..... 15–17, 60–61  
 Population-employment ratio ..... 29–31, 33, 53–54  
     calculation of..... 32, 54  
     interpretation of ..... 32–33, 54  
 Potential sales ..... 27–29, 50–51  
     calculation of..... 27–29, 51  
     interpretation of ..... 28–29, 51  
 Pull factors..... 25–26, 49–50  
     calculation of..... 25, 49  
     interpretation of ..... 26, 50

R:

Reilly’s Law ..... 20–23, 45–47  
     calculation of..... 20–23, 46  
     interpretation of ..... 20–23, 46–47  
     limitations of ..... 23  
 Retail trade (see Reilly’s Law, trade area capture, pull factors  
     and other analysis tools listed in this manual).



**NORTH CENTRAL REGIONAL CENTER FOR RURAL DEVELOPMENT**

IOWA STATE UNIVERSITY • 107 CURTISS HALL • AMES, IA 50011-1050  
(515) 294-9768 • (515) 294-3180 FAX • [HTTP://WWW.NCRCD.IASTATE.EDU](http://www.ncrcrd.iastate.edu)

S:

Sales data	28
Sales, potential (see potential sales)	
Sector (see economic sector)	
Shift-share analysis.....	34–38, 54–58
competitive share component .....	36–37, 57–58
industrial mix component .....	36–37, 56–57
national growth component.....	36–38, 54–56
Social Security .....	9, 14, 39
Standard industrial classification code (SIC) .....	4, 42

T:

Trade area capture.....	23–26, 47–48
calculation of.....	23–24, 48
interpretation of.....	24–26, 48
Trade area of a community.....	19
Trade potential, determination of.....	28–30
Turnover (see dollar turnover)	

