The Economic Impact Study for a Big Box Retailer

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INTRODUCTION

THE DIRECT ECONOMIC IMPACT OF A BIG BOX RETAIL FACILITY occurs in two parts—the construction phase and the operation phase of the subject property. The construction phase provides a short-term effect while the operation phase generates a long-term effect on the local economy. The direct economic impact consists of the:

- Employment involved in the construction and the operation phases of the facility.
- Wages paid to on-site employees during both the construction and the operation phases of the facility.
- Retail purchases from establishments in the local economy made in association with the construction and the operation of the facility.

THE RESEARCH DESIGN

The research design requires primary data gathered for the construction and operation phases of the facility. Construction data for the analysis comes from both the general contractor and the *Marshall & Swift Cost Manual*. Data for the operation of the facility comes from the operations manager of the corporate chain of the retail establishments under the assumption of normal business operational circumstances. These costs of operation are evaluated for reasonableness by considering the operational and sales data identified in *Dollars and Cents of Shopping Centers* published by the Urban Land Institute and the data from the International Council of Shopping Centers. To the extent possible, all information from the client needs to be independently supported and verified.

The second phase of the analysis is the allocation of the array of expenditures by the Big Box facility within Alpha County. These expenditures are:

- wages and salaries during the construction phase;
- construction material purchases;
- wages and salaries during the operations phase;
- services required during operation of the facility; and
- retail purchases during the operations phase.

The third part of the research design is the estimation and the application of the relevant economic impact multiplier for the Alpha County local economy. This multiplier translates the direct effect of the expenditures into the total effect of the expenditures by estimating the indirect and induced effects of these direct expenditures. The wages generated by the facility that remain in the local economy provide for increased consumer spending that in turn generates a need for additional workers to service the needs of the facility. This is the indirect effect. The induced effect is the increase in employment associated

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Exhibit 1—Construction Expenditures by Components

Expense Category	Components in the Category	Cost
Gross Building Size	150,000 square feet	$8,250,000 Total Cost $55 per square foot
On-Site Improvements	Parking Area construction, improvements to the land, etc., for approximately 15 acres	$10,500,000
Total Cost for On-Site Construction by Subcontractor:	Concrete = 20% Masonry = 20% Wallboard/Doors = 8% Special Construction = 4% Mechanical/Fire Systems = 8% Electrical = 20% General Conditions = 10% Miscellaneous = 10%	$18,750,000

Exhibit 2—Allocation Percentages for Construction Components and Local Expenditure

Expenditure Category	Construction Cost Components	Allocation to Local Economic Area	Local Economic Area Expenditure
Total Cost for On-Site Construction by Component	Labor = 30% Materials = 70%	Labor = 80% Materials = 50%	$4,500,000 $6,562,500
TOTAL			**$11,062,500**

with the general spending for consumer goods and services by the workers associated with the direct and indirect effects and the subsequent increase in employment caused by this spending. This is the iterative process that underlies all multipliers used by economists since the outset of Keynesian economics.

DIRECT ECONOMIC IMPACT DURING CONSTRUCTION

The information that describes the construction phase of the analysis consists of the data for direct property-related expenditures. To determine the direct impact on a local economy such as Alpha County, the portion of these direct construction-related expenditures made on the property need to be allocated between the portion made for the property that remain in the county and the portion made that are paid to personnel and establishments outside the local economy.

The direct construction expenditures fall into the categories presented in Exhibit 1. The best estimates of the allocation of those expenditures also appear in Exhibit 1. The gross building size of approximately 150,000 square feet is estimated at a total construction cost of $8.25 million. This translates into a square foot construction cost of $55. These figures were provided by the Big Box Company. An independent verification of the square foot value was performed using data from the Marshall and Swift Cost Service. The cost per square foot estimate for the major structure from this source is $56.92. The on-site improvements are also verified in this manner and estimated to be approximately $10,500,000. The lower square foot construction cost figure is used in the analysis.

Total cost of construction and development are estimated at approximately $18,750,000 for the main structure and the necessary supporting site work in Exhibit 1. The construction process, in simplified terms, will require labor and material; some portion of these construction resources will come from the local economic area. For the construction phase of the project, the local economic area was the array of counties that were adjacent to Alpha County including Alpha County itself. In simplified terms this area is approximated by a radius of 20 to 30 miles and an estimated rush hour drive time of 45 to 60 minutes.

The allocation estimates for labor and materials appear in Exhibit 2. Labor cost was estimated at 30% of total construction costs with construction materials in the most general sense being 70%. Care must be taken at this point

Exhibit 3—Expenditures during Operation

Expenditure Category	Components in the Category
Total Wage Bill for On-Site Personnel: Wages and Salaries	Store Manager, Assistant Store Manager (s), Cashiers, Meat Cutters, Bakery Personnel, Warehouse Personnel, Maintenance Personnel, Security Personnel
Service Expenditures and Service Contracts	HVAC, Plumbing, Electrical, Landscaping/Lawn Care, Solid Waste Disposal, Pest Control, Exterior Painting/Repair, Legal, Advertising, Other
Retail Expenditures	Hardware, Office Supplies, Photocopying/Printing, Other

Exhibit 4—Personnel and Earnings During Operations

Job Category	Number	Wages or Salary	Annual Wage Bill
Store Manager	1	$85,000	$85,000
Assistant Store Managers	2	$60,000	$120,000
Cashiers	80	$28,000	$2,240,000
Warehouse Staff	190	$30,000	$5,700,000
TOTAL	273		$8,145,000

in the analysis to make certain that both "hard" and "soft" costs of construction are included in the analysis.

A reasonable allocation of construction labor between workers from the local economic area and workers who migrate to the area for the job is 80% from the local economic area. This allocation is supported by data from the County about the geographic dispersion of employees in Alpha County. Application of these percentages generates the estimate for a local wage bill of $4,500,000 ($18,750,000 * 30% * 80%) and a local construction materials purchase of $6,562,500 ($18,750,000 * 70% * 50%). As shown in Exhibit 2, the local area contribution to the total construction cost is $11,062,500 of the total construction cost of $18,750,000. This is 59% of total construction resources coming from the local economy.

The construction process will certainly take at least one year and may well take two years until the property can be occupied and placed in service. The analysis in this study assumes that the construction process will take two years so that the $4,500,000 wage bill and the $6,562,500 materials cost will be allocated over the two year period.

DIRECT ECONOMIC EFFECT DURING OPERATION

The information sought in the analysis consists of the data for direct property-related expenditures. These direct expenditures fall into the sets of data displayed in Exhibit 3.

DIRECT IMPACT FROM EMPLOYMENT AND SALARIES

The typical Big Box retail store operates with the personnel and the relevant wage and salary levels presented in Exhibit 4. Total employment for the subject property at full capacity operation will be 273 employees with a total wage bill for such a retail operation of $8,145,000.

DIRECT IMPACT FROM SERVICE EXPENDITURES AND RETAIL EXPENDITURES

The typical Big Box retail store also purchases retail products and services from the local market area. This data typically comes from the records of the corporate offices of the Big Box operator and interviews with store managers of close by same chain facilities as well as interviews with close by competing facilities. These purchases from local firms are displayed in Exhibit 5.

SUMMARY OF THE DIRECT IMPACTS OF THE BIG BOX FACILITY

The summary of the direct monetary impacts of the Big Box Facility appears in Exhibit 6 which carries forward the information provided in Exhibits 4 and 5. The total value of the direct impact for both construction and operation phases for both labor and materials are arrayed for the two year construction period and the operation period which is depicted in the "Year 3 and beyond" column.

THE DIRECT IMPACT OF THE BIG BOX RETAIL FACILITY IN ALPHA COUNTY

Introduction—The State Department of Labor provides employment data for Alpha County. As shown in Exhibit

Exhibit 5—Retail and Service Expenditures by Category

Retail and Service Categories	Expenditure per year
Service Contract for HVAC	$2,500
Plumbing Repairs	$2,000
Lawn and Grounds Maintenance	$6,000
Waste Disposal	$55,000
Building Maintenance and Repairs @ $0.12 per square foot	$18,000
Roof maintenance and repairs @ $0.01 per square foot	$1,500
Parking lot maintenance and repairs @ $0.05 per square foot of lot	$26,000
Other Maintenance and repair @ $0.10 per square foot	$15,000
Office supplies	$3,500
TOTAL Expenditure per year	**$129,500**

Exhibit 6—Summary of the Direct Impacts of the Big Box Facility

Direct Impact of the Big Box Facility	Year 1	Year 2	Year 3 and beyond
Direct Labor	$2,250,000	$2,250,000	$8,145,000
Direct Materials and Services	$3,281,250	3,281,250	$129,500
TOTAL IMPACT	**$5,531,250**	**$5,531,250**	**$8,274,500**

Exhibit 7—Allocation of the Direct Impacts of the Big Box Facility to Alpha County

	Year 1	Year 2	Year 3 and beyond
Direct Labor	$2,250,000	$2,250,000	$8,145,000
Allocation %	48%	48%	48%
Allocated Direct Labor	$1,080,000	$1,080,000	$3,909,600
Direct Materials and Services	$3,281,250	$3,281,250	$129,500
Allocation %	45%	45%	90%
Allocated Direct Materials and Services	$1,476,563	$1,476,563	$116,550
ALLOCATED TOTAL DIRECT IMPACT	$2,556,563	$2,556,563	$4,026,150

6, the economic impact is $5,531,250 in years 1 and 2 during construction and $8,274,500 per year during the operation of the property. Assuming that the economic feasibility of the facility will last into the future, this value will change. It will increase as the population in Alpha County and its environment increases; it will decrease as competition enters the market and if population declines. A market study to determine these potential effects is not part of economic impact analysis, so for the near term the estimate of the economic impact on the Alpha County is $8,274,500.

If a market study is associated with the economic impact study, the third-year impact can be modeled as it moves through a predetermined time period such as 10 years. Inflation will cause the sales volume to increase but will generally not affect the amount of product being sold. An increase in trade area population may cause prices to rise but will affect the amount of product being sold and thereby increase the need for employees in the facility. The change in the direct economic impact over time can be capitalized at the end of the holding period and all of the future impacts can be discounted to the present to get a total figure for the direct economic impact over the remaining economic life of the facility. Most economic impact studies do not take this extra step.

ALLOCATION OF THE DIRECT IMPACT TO EARNINGS IN ALPHA COUNTY

To determine the direct impact on Alpha County, the portion of these direct expenditures made during the operation of the property need to be allocated between the portion made on the property that remain in the county and the portion made that are paid to personnel and establishments outside the local economy. The most direct evidence of the magnitude of this allocation percentage to Alpha County from the local economic area is based on U.S. Census data for 2000 reported for Alpha County by the State Department of Labor. The allocation percentage from this data source is 48% based on the fact that 48% of the residents of Alpha County work in Alpha County. The reasonable assumption is that this relationship holds true for 2000 and that it will remain relatively stable in the years after the decennial census. This allocation percentage is applied to both construction labor in the local economic area (80% of total construction labor) and to employees during operation of the facility.

As stated earlier in Exhibit 2, 50% of construction materials are shipped directly to the site from non-local suppliers and 50% are purchased in the local economic area and most of these in the county in which the facility is located. A reasonable assumption is that 90% of the 50% is purchased in the county. For this reason an allocation percentage of 45% (90% * 50%) is applied to construction materials.

Exhibit 8—Total Impact of the Big Box Facility

Source of Earnings	Year 1	Year 2	Year 3 and beyond
Total Direct Impact	$5,531,250	$5,531,250	$8,274,504
Multiplier for Retail Activity	3.8	3.8	3.8
TOTAL	**$21,018,750**	**$21,018,750**	**$31,443,115**

Exhibit 9—Total Impact of the Big Box Facility to Alpha County

	Year 1	Year 2	Year 3 and beyond
Total Impact of the Big Box (Direct, Indirect and Induced)	$2,556,563	$2,556,563	$4,026,150
Multiplier for Retail Activity	3.8	3.8	3.8
TOTAL Impact of the Big Box to Alpha County (Direct, Indirect and Induced)	**$9,714,939**	**$9,714,939**	**$15,299,370**

Application of these allocation percentages converts the total impact numbers in Exhibit 6 for Alpha County to those in Exhibit 7 for Alpha County.

THE TOTAL IMPACT OF THE BIG BOX RETAIL FACILITY IN ALPHA COUNTY

Introduction—The total economic impact is the sum of the direct impact plus the indirect and the induced impact. The direct impact is the initiating, the primary, economic force. The direct impact is the number of jobs created and the earnings associated with those jobs. These earnings are spent creating the indirect and induced impact on additional jobs and earnings. The indirect and induced impacts are the secondary forces set in motion by the direct impact that work their way through the economy. The indirect and induced effect is the subsequent series of jobs and earnings created as the initial direct earnings filter through the local economy. The economic impact multiplier represents the iterative process in a single number.

The process for calculating the multiplier is fully developed in the Appendix to this article. Consider the following comments as a brief conceptual introduction to the topic. The key to the estimation of the economic impact multiplier is the identification of the industries and firms that are selling goods and services to the non-local economy. These are the basic industries. The basic industries are identified by the application of the location quotient technique, which compares the industrial structure of the local economy, Alpha County, to a regional or national economy (the State, U.S. region or the Nation). The significance of basic industries and basic employment versus non-basic industries and employment are explained, as is their role in the estimation of the location quotient. The economic impact multiplier for the basic industry is estimated by dividing total employment by basic employment in a static as well as a comparative static (dynamic) perspective. The nature and significance of the static versus the dynamic multiplier is discussed and the appropriate one is selected. The calculations set the basic economic impact multiplier at 3.8 for the 1996 to 2004 time period.

Retail is typically not a basic industry. However, in the case of Alpha County, retail trade does present itself as a basic industry during this time period. The retail trade location quotient is greater than one in each of the three years being used as data points. Therefore, the retail trade multiplier can be the basic multiplier of 3.8. However, in more typical situations were retail is a non-basic industry the multiplier would be reduced to 2.8.

ESTIMATION OF THE TOTAL IMPACT OF A RETAIL ACTIVITY TO THE ALPHA COUNTY AREA AND TO ALPHA COUNTY

The total impact of a retail activity is expressed as the multiplier times the direct change in employment and earnings as expressed in Exhibits 6 and 7. The results presented in these two Exhibits are reproduced in Exhibits 8 and 9 respectively. The basic economic impact multiplier is estimated to be 3.8 as shown in the Appendix. Exhibit 8 shows the total impact of the big box retailer in the metropolitan area during the two years of construction and then the years of operation.

Exhibit 9 shows the portion of the total impact that will affect Alpha County during the two years of construction and then the years of operation.

ESTIMATE OF THE SALES TAX REVENUE TO ALPHA COUNTY FROM THE BIG BOX FACILITY

Big Box records indicate that the typical Big Box facility sells approximately $80 million in goods ranging from food items to electronics to jewelry items. In Alpha County, food and beverage items are items subject to a sales tax of 1% while all of the other items sold in the

Exhibit 10—Total Sales by Product Category and Sales Tax Rates

Sales Tax Rate	Product Category		
@ 1%	Fresh Food	14%	
	Packaged Food (60% of 51%)	30.6%	
	Total Percentage @ 1% sales tax rate	44.6%	(45%)
@6%	Hard line items	23%	
	Soft line items	12%	
	Sundries (40% of 51%)	20.4%	
	Total Percentage @ 6% sales tax rate	55.4%	(55%)

Exhibit 11—Conclusion and Summary of Total Impact Items for Alpha County

Impact Item	Year 1 and 2 (Construction)	Year 3 and beyond
Total Wages and Earning	$9.7 Million/year	$15.3 Million/year
Total Employment	$3,281,250	498/year
Sales Tax Revenue	**$5,531,250**	**$3,000,000/year**

store are subject to a 6% sales tax. The sales in this typical Big Box facility consist of 23% "hard line" items, 12% "soft line" items, 51% food and sundry items, and 14% in fresh food items. This data comes from the corporate offices of the subject property and interviews with close by stores in the same chain. The hard line items and the softline items are taxed at 6%; the fresh food items are taxed at 1%. The "food and sundry items" category must be allocated between food items at a tax rate of 1% and sundry items at a tax rate of 6%. The allocation will be 60/40% to food versus sundries. Based on these figures, the chart shown in Exhibit 11 was developed from the Big Box data on product categories.

The information presented in Exhibit 10 was coupled with an estimate for total annual sales to obtain the following calculations for Alpha County. The figure of $80 million in annual sales volume was generated from information provided by the client and then verified through interviews with the managers of other big box retailers in the local area and national data from secondary data providers like Dollars and Cents of Shopping Centers.

55 % of these sales subject to a 6% sales tax rate = $2,640,000

45% of these sales subject to a 1% sales tax rate = $360,000

Total Sales Tax Revenue = $3,000,000

CONCLUSIONS AND SUMMARY FROM THE ECONOMIC IMPACT STUDY

The conclusion of the analysis yields the information that is summarized in Exhibit 11.

The values for total wages and salaries carry over from Exhibit 7. The total employment number is estimated to be 498 (273 from Exhibit 4 * 48% * 3.8)

EPILOGUE

The application of an economic impact study provides information about the impact of an event, in this case a big box retailer, on the employment level and household income level in a local economy. This information is important to a client for presentation to the local authorities when seeking approval from the local jurisdiction to initiate a development project. In this context, the economic impact study plays an important part in rezoning applications and eminent domain decisions.

The accuracy of the resulting information is highly dependent on the accuracy of the information placed into the analysis. The following points become important to recognize:

- Much of the data for the analysis comes from the client. For this reason it is incumbent on the analyst to verify the accuracy of this information. The analyst should not assume that this client-generated data is accurate and unbiased.

- The geographic delineation of the "local economy" is a critical issue in the analysis. Some development projects can affect an entire metropolitan area (i.e. several counties). This is especially true if the development project is very large and/or if the metropolitan area is small. The typical retail project affects the geographic areas set out in the guidelines (not hard and fast rules) used by the International Council of Shopping Centers and the Urban Land Institute. Neighborhood shopping centers are affected by their retail market areas and their retail trade areas. The retail trade area is typically 1 to 2 miles and 5 to 6 minutes drive time; the retail market area is generally a factor of 3 times the retail trade area distances and times. In turn, the neighborhood shopping center's effect on employment and household income are more localized; the majority of the employees come from relatively short distances. On the other hand, the super regional shopping center has a retail trade area that is typically 10 to 20 miles and 30 to 45 minutes drive time. The labor market for the supper regional shopping center is safely assumed to by co-terminus with its market area.

- Typically, the economic impact study focuses on a local jurisdiction. It focuses on a specific county in a metropolitan area. It focuses on a City within the boundaries of a County. This situation sets up a mismatch between the conceptual area of the "local economy" and the "area of interest" which is a portion of geography that could be affected by the development project. Here the analyst needs to decide on an "allocation" percentage to determine what portion of the economic impact is felt in the "area of interest."

- The magnitude of the multiplier is also a matter of close scrutiny for the analyst. It has to be based on historic facts that provide a relationship between basic employment and total employment at both points in time (static and comparative static analysis), and over time (dynamic analysis). The analysis must also be assured that the evidence from the past is applicable to the future. A multiplier of 3 based on historic data concerning the industrial structure of the local economy is not directly relevant to the future if the local economy is undergoing a fundamental change in that industrial structure. An increase in the proportion of basic industries in the industrial structure will increase the size of the multiplier and vice versa.

APPENDIX

THE ECONOMIC IMPACT MULTIPLIER FOR ALPHA COUNTY

Introduction—An economic impact study provides information about the effect of a business on the local economy in which it exists. For this study the business being analyzed is the Big Box Retail Facility and the local economy is Alpha County. The economic impact includes the affect on earnings and employment in both the retail business as well as the affect on additional employment in the local economy brought about by the employment change in the Big Box Retail Facility. In addition, the economic impact extends to the increase in retail products and services purchased by the Big Box Retail Facility from retailers and service providers in Alpha County.

ANALYSIS OF ALPHA COUNTY EMPLOYMENT-BY-SITE DATA

The magnitude of the economic impact multiplier is determined from data on employment-by-job-site in Alpha County. The source of this data is the Department of Labor from which information about employment-by-site was gathered for Alpha County. This information is displayed in Appendix Tables 1, 2, and 3 respectively. Table 1 presents the following information about Alpha County in 1996.

1. The entries at the left hand margin in Column A identify the one digit Standard Industrial Classification [SIC] Codes by which the U.S. Department of Commerce and the State organize their employment data and statistics. Column B shows the two-digit industrial classification categories.

2. Column C provides the 1996 employment-by-site data for these SIC codes for Alpha County.

3. Column D provides the distribution of the 1996 employment data across the SIC codes for Alpha County. For example, 16.79% of the 1996 employment in Alpha County was in the Manufacturing sector while 23.9% was in the service sector.

4. Column E provides the 1996 employment-by-site data for these SIC codes for Alpha County.

5. Column F provides the distribution of the 1996 employment data across the SIC codes. For example, 9.06% of the 1996 employment in Alpha County was in the Manufacturing sector while 31.53% was in the service sector.

Exhibit A— Economic Impact Multiplier Summary

LQ > 1.0			
Basic Static Industry Multiplier			
1996	2000	2004	Average
7.20	6.15	6.66	6.67
Non Basic Static Industry Multiplier			5.67

6. Column G presents the location quotient for Alpha County based on a comparison with the data. The numbers in Column G are generated by dividing the value in Column F the values in Column D. Location Quotients greater than 1.0 are considered export industries and the source of economic growth.

7. Column H shows the amount of basic employment by export industry. The numbers in this column are Column E times the LQ minus 1. For example, basic employment in the two-digit printing industry is 5409 times (1.45 - 1) = 2408.

Tables 2 and 3 are duplications of Table 1 but presented employment data for 2000 and 2003. The columns in these two Tables are the same as they are in Table 1.

THE LOCATION QUOTIENTS

The next important piece of information is the identification of those industrial classification categories (SIC codes in 1996, NAISC codes in 2000 and 2003) in Alpha County that produce products and services that meet the needs of the population in the local economy and also can be sold to people who live outside of Alpha County. The location quotient [LQ] is an analytical method that identifies the industrial classification codes that export goods and services.

The LQ is calculated by means of the following formula:

$$[e_{SIC}/e_{TOTAL}]/[E_{SIC}/E_{TOTAL}]$$

Where:

e_{SIC} = Alpha County employment in the jth SIC code

e_{TOTAL} = Total employment in Alpha County

E_{SIC} = Employment in the jth SIC code

E_{TOTAL} = Total employment in the State

When the LQ equals one, the relationship between the employment in the local economy, Alpha County, and the regional economy, is in balance. The employment in the local economy produces enough of the product to meet the needs of its population. When the LQ exceeds one, the local economy is producing more of the product than its own population needs and thus sells it to people or businesses external to the local economy. These are the export industries which are viewed as the industries that generate the growth of employment in the local economy.

THE STATIC MULTIPLIERS

The static multiplier estimation for 1996 is presented in Exhibit A. Column G presents the location quotient for each industrial category. The values in Column G are the distribution percentage for Alpha County in Column F divided by the distribution percentage for Column D. In Column G, each value greater than 1.0 identifies an export industry. These industries are viewed as industries that meet the needs of the local economy and also produce products or services for export.

The next issue is the distribution in these export industries between the portion of their output that is sold locally (the non-basic component) and the portion that is exported (the basic component). As an example consider the two-digit printing industry in Table 1. The total employment of 5,409 in the printing industry in Alpha County has to be separated between basic and non-basic employment. This is done by taking the percentage of printing in total employment in Georgia, 1.23% (1.2337% more exactly), and multiplying it by total employment in Alpha County, 303,374. This yields the non basic employment of 3,743 in printing. The basic employment is 5,409 - 3,871 = 1,538 in the printing industry. This same procedure is performed for each export industry. The static economic impact multiplier for the basic industry in Alpha in 1996 is 7.20. It is calculated by dividing the total employment of 318,529 by the basic employment estimate of 44,243.

Two decisions are depicted in Exhibit A. First, the average static economic impact multiplier of 6.67 is selected for this study. Second, the Retail Industry is not an export industry. It meets the needs of the local population. The appropriate multiplier to use is the static economic multiplier for non-basic employment of 5.67; it is one less than the basic employment multiplier. The economic meaning of the multiplier is that an initial increase in non-basic employment in the local economy will have a secondary

Exhibit B— Basic Dynamic Industry Multiplier

	Total Employment	Basic Employment	Static/ Multiplier	
1996	318,529	44,243	7.20	
2000	358,895	58,380	6.15	6.67
2004	285,479	42,848	6.66	
	Change Total Employment	**Change Basic Employment**	**Dynamic**	
2000 - 1996	40,366	14,137	2.86	
2004 - 2000	(73,416)	(15,532)	4.73	3.79
Non Basic Dynamic Industrial Multiplier				**2.79**

effect of increasing employment to meet the needs of the new employees in the non basic industrial sectors. The multiplier represents the conclusion of an iterative process. In order to generate a multiplier of 6.67, the marginal propensity to consume must be 85.03%. To generate a 5.67 multiplier, the marginal propensity to consume is still 85.03% but the multiplier formula changes from [1/ (1-b)] to [b/ (1-b)].

THE DYNAMIC MULTIPLIERS

In addition to the static multipliers that are estimated for each year, a dynamic multiplier can be estimated for the movement from year to year. The dynamic multiplier is the change in total employment in the local economy divided by the change in basic employment in the local economy. Consider the 1996 to 2000 employment situations. Total employment changed by +40,366 and basic employment changed by +14,137 during these two time period. The dynamic multiplier is 2.86 (40,366/14,137). In the 2000 to 2004 time period, total employment changed by -73,416 and basic employment changed by -15,532. The dynamic multiplier for 2000 to 2004 is +4.73 (-73,419/-15,532).

MULTIPLIER RECONCILIATION

What is the best estimate for the multiplier in the economic impact analysis? If you will allow me an analogy, the static multipliers give us three independent snapshots of the child as he changes over time—a picture at one year of age, at four years of age and a picture at eight years of age. The dynamic multiplier is more of a video covering a period of time such as 1996 to 2000 and 2000 to 2004 in this situation. (The dynamic multiplier for 1996 to 2004 yields a nonsense figure because the economy peaked in 2000. A period of growth was followed by a period of decline. The nonsense dynamic multiplier for this eight year period is 23.7. It would require a marginal propensity to consume of approximately 96.8% which is quite high.) (Table 2)

Conceptually, the dynamic multiplier gives a more realistic picture of the economic situation as long as it is used in a sensible manner. It should follow a trend line in a single direction as shown in this example. Here we had a trend line for the 1996 to 2000 period and a separate trend line for the 2000 - 2004 period. Given this statement, the appropriate economic impact multiplier is the dynamic multiplier that provides information about the two periods. This would be the average value of 3.79 for basic industrial sectors and 2.79 for the non basic industrial sectors. Analysis of Tables 1, 2 and 3 in this appendix reveals that retail is a basic industry in Alpha County.

ECONOMIC IMPACT MULTIPLIER FOR BIG BOX RETAIL FACILITY IS 3.8

Table 1—Employment in Alpha County and State in 1996

A B	1996 State Employment C	% D	1996 Alpha Employment E	% F	Alpha/State Location Quotient G	Basic Employment LQ>1.0 H
INDUSTRIAL CATEGORY						
Agriculture	39,800	1.13%	1,890	0.59%	0.53	
Mining	7,787	0.22%	405	0.13%	0.58	
Construction	165,773	4.70%	15,679	4.92%	1.05	722
Manufacturing	598,775	16.96%	28,238	8.87%	0.52	
Food and kindred products	69,348	1.96%	3,866	1.21%	0.62	
Tobacco	-		-			
Textile	120,567	3.42%	-			
Apparel	41,370	1.17%	990	0.31%	0.27	
Lumber and Wood	39,949	1.13%	987	0.31%	0.27	
Furniture	10,984	0.31%	870	0.27%	0.88	
Paper	34,169	0.97%	2,104	0.66%	0.68	
Printing	42,906	1.22%	5,409	1.70%	1.40	1,538
Chemicals	20,942	0.59%	1,444	0.45%	0.76	
Petroleum	1,134	0.03%	-			
Rubber and Plastics	24,658	0.70%	2,063	0.65%	0.93	
Leather	1,876	0.05%	-			
Stone, Clay, glass, concrete	19,460	0.55%	881	0.28%	0.50	
Primary metal	14,303	0.41%	300	0.09%	0.23	
Fabricated metal	23,938	0.68%	1,057	0.33%	0.49	
Industrial machinery & computers	35,180	1.00%	1,922	0.60%	0.61	
Electrical equipment	33,193	0.94%	1,902	0.60%	0.64	
Transportation equipment	45,895	1.30%	-			
Instruments	10,697	0.30%	368	0.12%	0.38	
Misc.	6,686	0.19%	705	0.22%	1.17	102
Not Elsewhere counted	3,456	0.10%	3,370	1.06%		
Transport and Warehousing and Utilities	236,789	6.71%	27,864	8.75%	1.30	6,500
Wholesale trade	240,990	6.83%	27,426	8.61%	1.26	5,683
Retail trade	658,513	18.65%	60,876	19.11%	1.02	1,461
Finance, Insurance and Real Estate	177,904	5.04%	19,602	6.15%	1.22	3,551
Services - Total	831,276	23.55%	95,640	30.03%	1.28	
Hotel	42,909	1.22%	4,123	1.29%	1.06	252
Business	250,858	7.11%	27,450	8.62%	1.21	4,816
Auto	31,422	0.89%	3,242	1.02%	1.14	407
Amusement and recreation	37,895	1.07%	2,148	0.67%	0.63	
Health	223,037	6.32%	26,373	8.28%	1.31	6,249
Legal	21,984	0.62%	2,134	0.67%	1.08	150
Education	34,311	0.97%	11,450	3.59%	3.70	8,354
Social	43,184	1.22%	4,059	1.27%	1.04	163
Engineering	69,696	1.97%	8,111	2.55%	1.29	1,823
Other	81,876	2.32%	8,398	2.64%	1.14	1,011
Federal government	97,223	2.75%	10,234	3.21%	1.17	1,462
Local government	326,921	9.26%	19,043	5.98%	0.65	
State government	136,749	3.87%	9,784	3.07%	0.79	
Not elsewhere classified	4,039	0.11%	-			
TOTAL	**3,530,371**	**100.00%**	**318,529**	**100.00%**		**44,243**
Basic Employment multiplier in Alpha county (1996)						**7.20**

Table 2—Employment in Alpha County and State in 2000

INDUSTRIAL CATEGORY	2000 State Employment	%	2000 Alpha Employment	%	Alpha/State Location Quotient	Basic Employment (LQ > 1.00)
A B	C	D	E	F	G	H
Agriculture	44,977	1.17%	1,871	0.52%	0.45	
Mining	7,798	0.20%	303	0.08%	0.42	
Construction	202,827	5.27%	24,780	6.90%	1.31	5,853
Manufacturing	596,200	15.50%	24,072	6.71%	0.43	
Food and kindred products	71,614	1.86%	3,071	0.86%	0.46	
Tobacco	-		-			
Textile	101,545	2.64%	-			
Apparel	23,595	0.61%	325	0.09%	0.15	
Lumber and Wood	42,697	1.11%	234	0.07%	0.06	
Furniture	12,007	0.31%	347	0.10%	0.31	
Paper	31,232	0.81%	1,278	0.36%	0.44	
Printing	43,817	1.14%	4,412	1.23%	1.08	323
Chemicals	22,171	0.58%	789	0.22%	0.38	
Petroleum	1,429	0.04%	-			
Rubber and Plastics	29,983	0.78%	1,871	0.52%	0.67	
Leather	533	0.01%	-			
Stone, Clay, glass, concrete	21,157	0.55%	804	0.22%	0.41	
Primary metal	13,961	0.36%	412	0.11%	0.32	
Fabricated metal	25,310	0.66%	912	0.25%	0.39	
Industrial machinery & computers	43,578	1.13%	2,043	0.57%	0.50	
Electrical equipment	36,678	0.95%	1,904	0.53%	0.56	
Transportation equipment	51,495	1.34%	-			
Instruments	12,456	0.32%	378	0.11%	0.33	
Misc.	7,926	0.21%	1,198	0.33%	1.62	458
Not Elsewhere counted	3,016	0.08%	4,094	1.14%		
Transport and Warehousing and Utilities	242,326	6.30%	39,865	11.11%	1.76	17,252
Wholesale trade	258,152	6.71%	33,498	9.33%	1.39	9,408
Retail trade	714,248	18.57%	68,932	19.21%	1.03	2,281
Finance, Insurance and Real Estate	189,425	4.93%	19,856	5.53%	1.12	2,180
Services Total	995,771	25.89%	112,766	31.42%		
Hotel	47,294	1.23%	5,438	1.52%	1.23	1,025
Business	329,501	8.57%	36,875	10.27%	1.20	6,127
Auto	37,638	0.98%	3,692	1.03%	1.05	180
Amusement and recreation	34,289	0.89%	2,112	0.59%	0.66	
Health	247,917	6.45%	24,868	6.93%	1.07	1,733
Legal	25,883	0.67%	2,594	0.72%	1.07	179
Education	42,335	1.10%	12,587	3.51%	3.19	8,636
Social	55,181	1.43%	6,024	1.68%	1.17	875
Engineering	89,885	2.34%	8,853	2.47%	1.06	465
Other	85,848	2.23%	8,752	2.44%	1.09	741
Federal government	97,708	2.54%	9,782	2.73%	1.07	664
Local government	328,762	8.55%	16,586	4.62%	0.54	
State government	167,800	4.36%	7,451	2.08%	0.48	
Not elsewhere classified	-		104	0.03%		
TOTAL	**3,845,994**	**100.00%**	**358,895**	**100.00%**		**58,380**
Basic Employment multiplier in Alpha county (2000)						**6.15**

Table 3—Employment in Alpha County and State in 2004

INDUSTRIAL CATEGORY	2004 State Employment	%	2004 Alpha Employment	%	Alpha/State Location Quotient	Basic Employment (LQ > 1.00)
A B	C	D	E	F	G	H
GOODS PRODUCING						
Agriculture	26,545	0.70%	44	0.02%	0.02	
Mining	7,146	0.19%	225	0.08%	0.42	
Construction	195,774	5.18%	10,552	3.70%	0.71	
Manufacturing	449,041	11.88%	20,556	7.20%	0.61	
Food	65,574	1.74%	2,975	1.04%	0.60	
Beverage	6,025	0.16%	-			
Textile mills	37,956	1.00%	78	0.03%		
Textile products	38,607	1.02%	137	0.05%		
Apparel	9,088	0.24%	94	0.03%	0.14	
Lumber and Wood	23,210	0.61%	401	0.14%	0.23	
Paper	24,619	0.65%	1,674	0.59%	0.90	
Printing	21,077	0.56%	2,504	0.88%	1.57	912
Petroleum	1,168	0.03%	-			
Chemicals	21,493	0.57%	676	0.24%	0.42	
Plastics	24,025	0.64%	2,062	0.72%	1.14	247
Nonmetallic	18,665	0.49%	1,171	0.41%	0.83	
Primary metal	7,856	0.21%	145	0.05%	0.24	
Fabricated metal	25,687	0.68%	1,199	0.42%	0.62	
Machinery	23,286	0.62%	1,224	0.43%	0.70	
Computers	14,024	0.37%	286	0.10%	0.27	
Electrical equipment	16,582	0.44%	1,221	0.43%	0.97	
Transportation equipment	41,616	1.10%	-			
Furniture	14,070	0.37%	406	0.14%	0.38	
Misc.	14,413	0.38%	942	0.33%	0.87	
SERVICE PRODUCING						
Wholesale trade	205,230	5.43%	18,765	6.57%	1.21	3,262
Retail trade	444,882	11.77%	36,543	12.80%	1.09	2,938
Transport and Warehousing	147,391	3.90%	9,245	3.24%	0.83	
Utilities	20,387	0.54%	2,050	0.72%	1.33	510
Information	122,538	3.24%	13,460	4.71%	1.45	4,204
Finance and Insurance	153,723	4.07%	13,336	4.67%	1.15	1,724
Real estate, rental and leasing	58,151	1.54%	5,647	1.98%	1.29	1,254
Professional, scientific	193,589	5.12%	15,993	5.60%	1.09	1,370
Management	51,699	1.37%	5,982	2.10%	1.53	2,077
Administrative and Waste	245,039	6.48%	21,911	7.68%	1.18	3,401
Education services	50,916	1.35%	13,695	4.80%	3.56	9,849
Health	326,387	8.64%	31,786	11.13%	1.29	7,132
Arts, entertainment and recreation	36,738	0.97%	2,901	1.02%	1.05	126
Accomodation and Food Services	311,817	8.25%	15,678	5.49%	0.67	
Other	99,380	2.63%	8,687	3.04%	1.16	1,180
Unclassified	6,473	0.17%	218	0.08%	0.45	
Federal government	94,249	2.49%	9,781	3.43%	1.37	2,662
Local government	148,449	3.93%	12,378	4.34%	1.10	
State government	383,771	10.15%	19,407	6.80%	0.67	
TOTAL	**3,779,315**	**100.00%**	**285,479**	**100.00%**		**42,848**
Basic Employment multiplier in Alpha county (2004)						**6.66**