



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

# The Impact of Tourism for a Small City: A CGE Approach

**Perry Burnett, Harvey Cutler and Ray Thresher**  
*Colorado State University - USA*

**Abstract.** We use a data intensive CGE model to examine tourism at the small city level, and find that household migration and commuting play important roles in economic outcomes. The primary objective of the paper is to determine whether tourism should be used as a method to stimulate economic growth or as a method to change the structure of the economy in order to increase the efficiency of collecting tax revenue. Given the land usage of the tourism expansion, we consider alternative commercial uses of the land to determine if tourism is an optimal use of the land.

## 1. Introduction

Dywer, Forsyth and Spurr (2003) argue that the study of tourism has undergone a paradigm shift away from I-O analysis and toward the use of computable general equilibrium (CGE) models. The advantages of CGE models are well known as they impose utility and profit maximization, resources are allocated according to changes in relative prices and supply restrictions can alter economic outcomes. In the case of tourism expansions, crowding out of employment becomes an important consequence policy-makers need to consider. Many tourism studies are conducted at the national level where changes in exchange rates play a key role in the analysis. We use a data intensive CGE model to examine tourism at the small city level and find that household migration and commuting are important to economic outcomes.

A broader issue encompassing the economic impact of tourism is the optimal use of land in a city economy and the menu of choices that exists for the city planner. McDonald (2001) develops a cost-benefit analysis approach to compare the allocation of land for either residential or industrial use. The economic gain for each use is compared to the incurred costs such as educating new children and the increased supply of city services. We perform a similar analysis by comparing the economic benefit of allocating a similar

amount of land for tourism, manufacturing and retail. We examine several different measures of efficiency per acre use and find that tourism is a desirable choice to allocate land.

Most studies have examined the role of tourism at the national level. Archer (1977) analyzed the Bahamas, Khan et al. (1990) examined Singapore, Lui et al. (1984) studied Turkey, Freeman and Sultan (1997) examined Israel, Balaguer and Cantavella-Jordá (2002) looked at Spain and Narayan (2004) studied Fiji. The majority of these papers use I-O analysis, which uses linear relationships with little attention paid to resource constraints. However, Adams and Parmenter (1995) and Dywer, Forsyth and Spurr (2003) use a CGE model to examine tourism in Australia and find that significant crowding out will occur in the face of a tourism expansion. Adams and Parmenter (1995) examine tourism expansions within specific regions in Australia and conclude that even though Queensland is thought to be one of the centers of tourism in the country, it actually experiences a downturn in economic activity due to crowding out in export sectors such as agriculture and mining. They argue that the crowding out is large enough to offset the gains due to tourism, and thus the economy does not grow. We also find that crowding out offsets the economic gains of tourism, but in our analysis, we observe crowding out in both export and local sectors.

Copeland (1991) uses a general equilibrium model to examine the impact of tourism in a small open economy. Copeland demonstrates that the host country benefits when the price of non-tradeables or the real exchange rate increases. The larger the immigration of households, the smaller is the net benefits to the host country. Copeland can observe crowding out in his model, but is unable to derive results regarding the impact on the distribution of income. Since our model has three labor groups and six household groups all distinguished by income, we are able to derive specific results regarding the distribution of household income.

We have collected an *extensive* data set for Fort Collins, Colorado, a city of 100,000 people in northern Colorado for 1996. Our CGE model is detailed enough to observe crowding out for multiple sectors as well as estimating the impact on the level and distribution of household income. Fort Collins competes for retail sales tax dollars with other towns in the region. Due, in part, to this dynamic, we examine tourism's viability as an alternative source of sales tax dollars when compared to retail and manufacturing. We make these comparisons by estimating the impact on household income and tax revenue per acre. Section II presents the CGE model and the data, section III presents the simulation results and section IV is the conclusion.

## 2. The CGE Model and Data

### 2.1 CGE Model

This section presents an intuitive description of the CGE model, with the objective of providing a basic understanding of the interaction between households, private sectors, the local government and the regional economy. The equations of the model are available upon request from the authors. A more complete description of the model is presented in Cutler and Davies (2007).

Households represent all families who live in the city, in either single residential homes or multiple unit dwellings, and are differentiated by income, as shown in Table 1. Household income consists of labor, land, and capital income. Labor income is derived from earnings within the city and wages of earners who commute out of the city. Disposable income is calculated by adding retirement flows and remittances, and subtracting taxes paid. Consumption demand is derived from a Cobb-Douglas utility function and is affected by real disposable income and relative price changes of sector output but leisure is not included. Two other equations solve for house-

hold savings and the overall price level faced by a given household.

Firms are grouped into 17 productive sectors that demand inputs from three labor groups, which are differentiated by level of wages, and from capital and land. (These are not nested functions.) There are a series of equations that describe the output of producers and their demand for factors. A Cobb-Douglas production function is used for all private sectors, with first order conditions that guarantee that private firms maximize profits by choosing optimal levels of all factors. Table 1 presents the specific groupings of these factors. The producing sectors demand intermediate inputs in fixed proportions. Similar to Pasha and Ghaus (1995), housing services are also modeled as a productive sector that demands land as an input. In turn, households demand housing services.

The local supply of labor comes directly from the six household groups described earlier, commuters in and out of the city, and household migration. The proportion of local households who are working is a function of real wages internal to the city versus how they compare to external wages. The total supply of households is determined by its base value times the natural rate of population growth, real household income, and the relative size of nonworking to working households in the economy. This effect describes the manner in which households migrate into or out of the city. Commuting out and in are functions of base commuting values and relative wages inside and outside of the city.

The supplies of land and capital are treated differently. Land supply is a function of its base value times the relative returns to land and the ratio of domestic supply relative to its base. In a similar fashion, capital supply is a function of a base value of capital, relative returns to capital, and the domestic supply ratio. Investment by sector of source is determined as a function of capital supply, while the total capital stock is a function of the base stock less depreciation plus the new capital supply.

Exports for the private sectors are a function of the base value of exports, and local domestic prices of a product compared to the world price of the sector's exports. Imports are found by first calculating the proportion of domestic demand that is supplied locally, which is described by a base value, relative domestic prices compared to import prices, and an elasticity that describes the responsiveness of domestic supply to price changes. Imports are then determined as the

**Table 1.** Structure of the System

Profit Maximizing Sectors		
1) Agriculture services	10) Transportation and utilities	
2) Agricultural production	11) Lodging	
3) Agricultural processing	12) Wholesale	
4) Low services – hair, cleaners, etc.	13) Retail	
5) High services – legal, medical	14) Finance, insurance and real estate (FIRE)	
6) Construction	15) Restaurants	
7) Manufacturing	16) Universities and JCs	
8) Mining	17) School District	
9) Computer Manufacturing		
Housing Market		Local Government
HS1 < \$120,000		1) Services: Police, Fire, Transportation, Library, Parks and Recreation, and Administration
\$120,000 < HS2 < \$200,000		2) Taxes: Sales, Use, Property and Other
\$200,000 < HS3		
HS4- multiple units		
Household Groups		
HH1 # \$10,000		
\$10,001 # HH2 # \$20,000		
\$20,000 < HH3 # \$40,000		
\$40,000 < HH4 # \$50,000		
\$50,000 < HH5 # \$70,000		
\$70,000 < HH6		
Factors of Production		
Labor Groups:	Capital Stock:	Land:
\$20,000 $\exists$ L <sub>1</sub>	K – buildings and factories	Land – land used by the used by the productive,, residential and public use and public use (acres)
\$20,000 < L <sub>2</sub> # \$50,000		
\$50,000 < L <sub>3</sub>		

portion of domestic demand that is not supplied locally.

Finally, the financial side of the trade balance is calculated. Since Fort Collins is a small, open economy, savings can easily flow out of or into the city to help finance new investment or net exports. Clearly, it is not accurate to constrain investment by local savings, given that the economy draws resources from many different parts of the country via branch banking and other financial institutions. Net foreign savings is available, as an unconstrained variable, to take up the difference between net foreign investment, net exports, remittances, government transfers and net wages from commuters.

The local city supplies services such as police, fire and transportation, which requires the purchase of labor. In addition, intermediate inputs are demanded in fixed proportions, while the demand for factors is calculated in much the same manner as in the productive sectors. Local government revenue is a function of a wide range of taxes related to local production, exports, imports, factor taxes and household taxes that are used to finance these services. The city also receives revenues from the state and federal governments that are modeled as transfer payments. The city is constrained to have a balanced budget so any increase in tax revenue has to be spent on city services.

Each of the factor and goods markets has a set of closure equations that provides important insights

into equilibrium in the model. Closure in the labor market is achieved by setting total supply of labor to total labor demand. Supply consists of laborers from working households in the city plus those commuting into the city. A matrix, JOBCOR, transforms working households into numbers of workers. This is set equal to local factor demand for labor plus those commuting out of the city. There is one equation for each labor category, which determines the wage rate for that labor group. Capital and land closure equations have an individual equation specified for each possible product and factor, so capital stock must equal factor demand for capital in each of the 17 productive sectors. Thus, there are separate returns to capital determined through these closure equations for each sector in the city. The land closure equation works the same way. There are two other closure identities. One ties all sources and uses of a sector's product together and the other solves for total domestic demand, which is calculated by summing demand for intermediate inputs, household consumption, investment and government expenditures.

## 2.2 Data

Since the data set used in this paper is fairly extensive, we have elected to only discuss the sources of employment, wages, land, capital and various local taxes. A more complete description of the data set is presented in Schwarm and Cutler (2003). It is our belief that we have collected a complete data set that represents the entire city.

The Colorado Department of Labor collects data on the number of workers in each sector as well as the wages paid to those workers. These data are collected from two different sources; ES-202 and unemployment insurance (UI) sources. ES-202 data set summarizes quarterly reports by firms concerning the number of workers employed and the total wage bill. Theoretically, every private employer is required to supply this information and data are collected on a town-by-town basis. In addition, every worker in the private sector has a UI number, which allows the state to track wages earned by individual workers for every quarter. There are several employers who are not covered by the ES-202 and UI programs, such as school districts and local, state, and federal governments. These entities must be contacted separately to obtain their wage and employment data. In addition, single proprietors must also be accounted for and added to the data set.

By merging these sources, a distribution of employment and wages by sector (Table 1) can be created which can then be evaluated for a wide range of policy scenarios. For the purposes of our analysis, we have

divided workers into the three groups ( $L_1$ ,  $L_2$  and  $L_3$ ) presented in Table 1. All sectors employ different percentages of the three types of workers. The distributions for computer manufacturing, manufacturing and retailing play an important role in the analysis of this paper.

The county assessor's office keeps records on the use of each parcel of land in the county because property taxes differ across commercial and residential properties. Abstract codes identify commercial parcels for most productive sectors and residential housing categories shown in Table 1. Included in each parcel are data on the acreage of the parcel and market values for land and the structures (capital) on the parcel. The county assessor's office thus provides excellent data on land and capital.

The data collected from the City of Fort Collins consist of employment and wages, non-labor expenditures for city services and the taxes collected by the local government. We divided the city into five categories: the police, fire and transportation departments; city administration; and library, parks and recreation.

## 3. Simulation Setup and Results

This section is composed of three parts. The first part describes some general characteristics of the Fort Collins economy with an emphasis on the tourism industry. The second part discusses how the simulations were set up in terms of expanding the tourism sector. The last section presents the results and subsequent analysis.

### 3.1 Characteristics of the Fort Collins Economy

It is modeled that tourism expenditures are made in the lodging, restaurant and retail sectors. Table 2 presents the restaurant sector as the largest employer in the tourism sector with 6,309 workers and an average annual wage of \$10,182. The lodging sector employs 858 workers with an average annual wage of \$3,490. The reason for such a low wage is that this sector is dominated by part-time workers. The average wage in the city is approximately \$23,000, thus the tourism sectors pays a relatively low wage. Table 2 also presents the number of workers in each labor group, and it is the case that each tourism sector employs a large percentage of low-wage workers.

**Table 2.** Characteristics of Private Sectors and Households

Sector Characteristics	Retail	Restaurants	Lodging
Employment (Percent of Total)	4,208 (6.6%)	6,309 (9.8%)	858 (1.3%)
Average Wages	\$10,178	\$10,182	\$3,490
Number of L1 Workers: (< \$20,000)	3,641	5,459	839
Number of L2 Workers (\$20,000- \$50,000)	474	711	15
Number of L3 Workers (> \$50,000)	93	139	4
Household Characteristics	Workers per HH		
HH1: < \$10,000	1.1		
HH2: \$10,000 - 19,999	1.8		
HH3: \$20,000 - \$39,999	1.4		
HH4:\$40,000 - \$49,999	1.9		
HH5:\$50,000 - \$69,999	1.7		
HH6: > \$70,000	2.1		

The bottom half of Table 2 presents the number of workers per household for each household group. HH6 averages 2.1 workers per household while HH1 averages 1.1 workers per household. These numbers were obtained by looking at U.S. census data, information from the State Demographer’s Office and estimation done by the authors. Workers per household play an important role in the interpretation of the simulations below.

The types of tourist activity in the city are quite varied. First, the city hosts a variety of conventions that brings in people from all over the country for meetings and training opportunities. A second component is business travelers that visit the city in order to conduct business with local commercial entities. The third component is the leisure traveler that visits the city for recreational interests.

Tourism is an intriguing industry in Fort Collins given that it is small in terms of employment and output, but contributes a significant amount to total tax revenue for the city. The number of workers in the lodging sector combined with approximately 35% of employment in retail and restaurant account for 4,538

workers of the 64,284 total workers in the economy.<sup>1</sup> The tourism sector employs 7% of the workforce and accounts for 2.2% of total production in the economy. However, the attractive feature of tourism is that it is sales tax intensive, our base data indicates that 16.6% of total tax revenue for the city come from tourist related activities.

The lodging sector in Fort Collins is currently operating at about 65% of capacity and the Fort Collins Convention and Visitors Bureau (FCVB) is responsible for attracting conventions and leisure travelers to the city. The top half of Table 3 summarizes the daily expenditures for the three types of travelers to the Fort Collins economy. They are the business/conventioneer travelers who come to the city on business or some type of training. The second group is referred to as high leisure and these are travelers that stay at the high-end lodging in the city. The last

<sup>1</sup> It has been estimated that approximately 35 % of the workers in retail and restaurants accommodate the tourism sector in the Fort Collins economy. This has been determined by some informal surveying by the Finance Department in 1998.

group is referred to as the moderate leisure group and they stay at the less expensive lodging facilities in town.

The bottom half of Table 3 presents the total increase in expenditures associated with an increase in tourism that raises the utilization rate of lodging increases from 65% to 80%. The current proportions

between the three tourist groups were maintained as the expansion was modeled. We chose this increase to reflect similar expansions that have been modeled in the literature. Referring back to the discussion of the export specification, we increased export demand for lodging, restaurants and retail until we arrived at the values reported in Table 3.

**Table 3.** Daily Expenditures of Each Type of Traveler

Expenditure Category	Convention/Business		High Leisure		Moderate Leisure	
	Avg. Daily Expenditure	% of Daily Expenditure	Avg. Daily Expenditure	% of Daily Expenditure	Avg. Daily Expenditure	% of Daily Expenditure
Lodging	\$92.58	48.0	\$79.00	37.0	\$50.00	37.0
Restaurant	\$51.04	26.4	\$100.00	46.0	\$63.29	46.0
Retail	\$49.39	25.6	\$37.00	17.0	\$23.42	17.0
Total	\$193.01	100.0	\$216.00	100.0	\$136.71	100.0

The Increase in Tourism Expenditures (millions of dollars)

	Business/Convention	High Leisure	Moderate Leisure	Total
Lodging	1.09	0.47	0.38	1.94
Restaurant	0.60	0.58	0.48	1.67
Retail	0.68	0.22	0.18	1.07
Total	2.37	1.27	1.04	4.68

### 3.2 Simulation Results

The objective of this section is to first determine the economic impact of a tourism increase on general economic growth, employment and the distribution of income. We also examine how tourism impacts the structure of the economy in terms of changes in the distribution of employment across sectors. The second part examines the impact of population changes and the third section compares the optimal use of land for tourism, manufacturing and retail in terms of generating tax revenue and income per acre.

The economic impact of tourism on economic growth is primarily determined by the size of the income and employment multipliers. There have been numerous studies, primarily using I-O analysis, that have estimated income multipliers related to tourism expansions. Archer (1977), Khan et al. (1990), Lui et al. (1984), Milne (1987, 1992), Pepping and De Bruijn (1991), and Var and Quayson (1985) estimated values for the income multiplier that range from 0.37 and 1.98. Briassoulis (1991), Groenwald, Hagger, and

Madden (1993), Dwyer and Forsyth (1998), and Johnson (1999) argue that income multipliers greater than unity are suspect since the I-O approach has no constraints on capacity, and does not allow relative prices to change. The dependence on linear relationships results in excessive income multipliers.

Our estimate of the income multiplier is 0.47, which is on the low end of the above spectrum, and is due, in part, to the low wages paid in the tourism industry as well as strong crowding out effects for local resources. It has been well documented that the tourism sector is a labor intensive sector whose majority of jobs are low-paying and/or seasonal positions (Baajans, Nijkamp, and Van Monfort 1998). In our case, the percentage of low-wage earners (L1) employed by the lodging, retail and restaurant sectors are 97.8%, 86.5%, and 86.5% respectively. As employment expands for low-wage workers, the indirect multiplier effects are small, which has important consequences for the income and employment multipliers.

Table 4 presents the change in employment for selected sectors. Employment increases by 187 work-

ers in the three tourist related sectors, but 60 of those workers are competed away from other sectors so the net gain is only 127 workers. The size of the crowding out effect is determined by the factors contributing to the supply of labor. They are new households moving into the city, an increase in workers commuting into town, a reduction in workers commuting out of town and the conversion of non-working households to working households (changes in unemployment). When these four factors are insufficient to meet the new labor demands, a fifth factor, the competition for workers originally employed in other basic and non-basic sectors, comes into play. As Table 4 indicates, the majority of workers are bid away from the local sectors as opposed to the export sectors.

**Table 4.** Change in Employment in Selected Sectors

Sector	Change in Employment
Retail	25
Restaurants	46
Lodging	111
<i>Net Increase in Employment</i>	<i>187</i>
<b>Local Sectors</b>	
Construction	-4
FIRE	-10
Low Services	-4
High Services	-14
Transportation	-2
<b>Export Sectors</b>	
Computer Manufacturing	-1
Wholesale	-6
Manufacturing	-11
<i>Total Crowding out Effect</i>	<i>-60</i>

Since the tourism sectors are dominated by low-wage workers, we see wages for labor group L1 increase by 0.34%, but wages for L2 and L3 remain largely unchanged.

The small change in wages for L1 is not large enough to bring many new workers into the economy. Table 5 presents the growth in the number of households for each group. We see that 39 of the 53 new households come from the lower earning groups HH1 – HH3. Recalling from Table 2, the number of workers per household is relatively small for HH1 – HH3, so the increase in labor supply is also relatively small.

Table 6 presents the breakdown for the factors contributing to the change in the supply of labor. The immigration of new households results in 81 additional workers in the economy, which satisfies 44.0% of the increased demand for workers. The increase in commuting in and the reduction in commuting out accounts for approximately 9.3% of the labor supply response. Thus, the competition for workers from the local and export sectors satisfy the remaining demand for workers as crowding out accounts for 32.6% (60 workers) of the tourism expansion. The employment multiplier is 0.68.

**Table 5.** Change in the Number of Households and Real Income

Households	Change in Number of Households	Change in Real Income (mil of \$)
HH1 < \$10,000	12 (0.34%)	0.09 (0.50%)
HH2: \$10,000 - \$20,000	9 (0.17%)	0.28 (0.27%)
HH3: \$20,001 - \$39,999	18 (0.20%)	0.62 (0.23%)
HH4: \$40,000 - \$49,999	2 (0.08%)	0.15 (0.12%)
HH5: \$50,000 - \$69,999	7 (0.08%)	0.47 (0.14%)
HH6: > \$70,000	5 (0.04%)	0.84 (0.11%)
Total	53 (0.13%)	2.46 (0.15%)

**Table 6** The Contributing Factors to the Increase in the Supply of Labor

	Change	Percent Change Contributing to the Change in Employment
New Households (Number of Workers)	81	44.0%
Number of Locally Unemployed Workers Now Working	24	13.0%
Number of Workers Commuting In	7	3.8%
Number of Workers Commuting Out	12	6.5%
Number of Workers Coming From Other Industries	60	32.6%



Examining tourism at the country level Adams and Parmenter (1995), Dwyer, Forsyth and Spurr (2003) and Narayan (2004) argue that crowding out mostly occurs in the traditional export sectors and import-competing sectors. A tourism expansion causes an appreciation of the home country's exchange rate and thus reduces the demand for exports. Another factor is that the tourism expansion leads to an increase in wages across all industries and thus further reduces competitiveness of manufacturing against international competition.

Our city level analysis results in a different factor underlying the crowding out effect. We argue that it is not the export and import-competing sectors that are most adversely affected by a tourism expansion, but the sectors that are the most dependent on low-wage workers. Since the in-migration of households is relatively small, the tourism sector bids low-wage workers away from other sectors, and those sectors that employ the largest number of low-wage workers lose the most workers. As an example, the high services sector employs 4,968 low-wage workers while computer manufacturing employs only 340 workers. Given the tourism increase, high services lose 14 workers while computer manufacturing loses only one worker. Referring back to Table 4, the two right-hand-side columns report the loss of workers for the five selected local sectors and the three selected export sectors. Consistent with the relative proportions of low-wage workers in each sector, the selected local sectors lose 34 workers while the export sectors lose 18 workers. Our results are dependent on having a large number of local and export sectors, which allows the crowding out to occur over multiple sectors. Export sectors lose workers due to two reasons. First, since the demand for exports are not changing in sectors such as manufacturing and computer manufacturing, they cannot compete with the tourism sectors' demand for workers at the margin and lose workers. In addition, the rise in wages reduces the quantity demanded for workers by the basic sectors. The loss of workers by local sectors is due to the combination of the small tourism multipliers and the modest increases in household migration.

Our simulation results indicate that even though the wage increase for labor group L1 is large relative to labor groups L2 and L3, the increase is not large enough to attract many new households to the city or change commuting patterns. Thus, there is a small increase in population. Baajans, Nijkamp, and Van Monfort (1998) use meta-analysis to estimate a positive relationship between the tourist income multiplier and population size. This is not a surprising result as a greater base population in a region or country should

lead to less crowding out and thus, a larger expansionary impact of tourism.

We can increase the size of the income and employment our multipliers by exogenously increasing the growth rate of population in the tourism simulations. Table 7 presents results for ten simulations where population increases by increments of 0.1% until population increases by 1.0%.

Table

**Table 7.** The Impact of Increases in the Rate of Population Growth

Percent Increase in Population	Income Multiplier	Employment Multiplier
0.000	0.47	0.68
0.1	0.63	0.81
0.2	0.84	0.96
0.3	0.96	1.11
0.4	1.13	1.26
0.5	1.30	1.42
0.6	1.46	1.57
0.7	1.63	1.72
0.8	1.80	1.88
0.9	1.97	2.04
1	2.13	2.19

As expected, both the income and employment multipliers increase as population increases, which is consistent with Baajans, Nijkamp, and Van Monfort (1998). When the population grows at a 0.3% rate, then the employment multiplier becomes greater than unity. As population increases, crowding out disappears first in the local sectors since new households simultaneously demand more locally produced goods, which results in an increased demand for workers in local sectors. The supply of workers primarily comes from the new households migrating into the city. When the population growth rate reaches 0.9%, there are sufficient new workers entering the economy so that there is no crowding out in either the local or export sectors.

As the policy maker considers expending resources to attract tourism, it is important to consider the impact on residents with respect to the distribution of income. Copeland (1991) and Adams and Parmenter (1995) suggest that tourism could have some effect on income distribution, but the direction and magnitude of its effect is largely unknown. Our analysis allows for a detailed examination of the distribution of income question. Given the reliance on low-wage workers in the tourism industry, wages increase by 0.34% for labor group L1 while the wages for L2 and L3 remain largely unchanged. To obtain a more com-

plete picture, the impact on real household income, which consists not just of wage income, but land and capital income has to also be considered. Consider again Table 5, which presents that real household income increases by 0.50% for HH1, 0.27% for HH2 and 0.23% for HH3. The percentage increase for HH4-HH6 is between 0.12% and 0.15%. The expansion in tourism does lead to relative gains in the lower income earning households which can begin to alleviate the affordable housing concerns in the city.

Dwyer, Forsyth and Spurr (2003) and Adams and Parmenter (1995) argue that tourism does not cause economic growth but only changes the composition of the economy. We agree with this assessment at the city level since the tourism expansion leads to an increase in GCP of only 0.09%. As discussed above, the structure of the economy does change.

We maintain that there is one more perspective that has to be considered as the city considers expanding the tourism industry. The tourism simulation resulted in an additional 7.6 acres being used for commercial and residential needs. Alternative uses of the land in terms of collecting tax revenue and generating economic activity must be considered. Performing a similar analysis to McDonald's (2001), we computed manufacturing and retail expansions by raising export demand for both of these sectors until an additional 7.6 acres were used. Table 8 presents several different measures of efficiency in terms of allocating land to different commercial activities. In terms of tax revenue per acre used, the retail case resulted in \$68,433 per acre while tourism was second with \$51,678. For tax revenue per household, manufacturing and retail were considerably larger than tourism. However, for GCP per acre and real household income per acre, tourism had the largest values.

**Table 8.** Alternative Measures of Economic Efficiency

	Tourism	Manufac- turing	Retail
Tax Revenue /Acre	\$51,678	\$39,335	\$68,433
Tax Revenue/ Household	\$7,519	\$17,632	\$16,715
GCP/Acre Household	\$285,531	\$226,667	\$243,425
Income/Acre	\$322,436	\$247,191	\$268,295

From a policy perspective, the optimal use of the 7.6 acres is complicated. Fort Collins is the largest

employment center in northern Colorado but it does compete with the city of Loveland (five miles south of Fort Collins) in terms of offering new retail options. In fact, Loveland recently opened up a large new retail center that is expected to attract a significant amount of sales tax dollars from the region as well as many shoppers from Fort Collins. At the present time, Fort Collins does not offer significant competition to Loveland and it is feared that the region may not be able support a second new major retail center. Therefore, the probability associated with successfully expanding retail for Fort Collins is problematic.

The prospect of expanding tourism is much more optimistic since Fort Collins has the most convention space in the area, so there is little competition. Fort Collins has been successful in attracting large religious conventions, youth sports events and a number of agricultural events that contributes significantly to tax revenue. Given that tourism contributes the most to GCP per acre and household income per acre, it does indicate that expanding the tourism sector is a viable alternative.

#### 4. Conclusion

Our analysis examined the impact of a tourism expansion at the city level, while it is more common in the literature to examine tourism at the country level. We found that the size of household migration contributes to the extent of crowding out. Also, at the national level, it was common to find that export sectors primarily lost workers in the face of a tourism expansion. This was due to an appreciation of the home currency and a reduction in competitiveness of the export sectors in the world market. In our analysis, crowding out occurred in the sectors that employed the highest number of low-wage workers in proportions consistent with the base level data for basic and non-basic sectors. This was due to the low wages paid by the tourism sector, which led to minimal amounts of household migration, and thus, small indirect multiplier effects. The positive effects of tourism were offset by crowding out, which resulted in tourism causing very little economic growth.

We also examined the tourism industry as an alternative source of tax revenue in the face of increased competition for retail sales tax dollars regionally. The tourism industry was found to contribute the most to GCP per acre and household income per acre along with being close to retail in tax revenue per acre. Since Fort Collins has most of the tourism facilities in the region and this sector is tax intensive, our analysis indicates investing resources in the tourism sector could be advantageous for the city.

## References

- Adams P. and B. Parmenter. 1995. An applied general equilibrium analysis of the economic effects of tourism in a quite small, quite open economy. *Applied Econometrics* 27: 985-94.
- Archer, B.H. 1977. Tourism in the Bahamas and Bermuda: two case-studies. *Bangor Occasional Papers in Economics* No. 10, University of Wales Bangor.
- Baaijans S., P. Nikamp and J Van Montfort. 1998. Explanatory meta-analysis for the comparison and transfer of regional tourist income multipliers. *Regional Studies* 32(9): 839-849.
- Balaguer, J. and M. Cantavella-Jorda. 2002. Tourism as a long-run economic growth factor: the Spanish case. *Applied Economics* 34: 877-884.
- Briassoulis, H. 1991. Methodological issues: Tourism input-output analysis. *Annals of Tourism Research* 18: 161-176.
- Copeland, B. 1991. Tourism, welfare and de-industrialization in a small open economy. *Economica* 58: 515-529.
- Cutler, H. and S. Davies. 2007. The impact of specific-sector changes in employment on economic growth, labor market performance and migration. *Journal of Regional Science* 47(5): 935-63
- Dwyer, L., and P. Forsyth. 1998. Estimating the employment impacts of tourism to a nation. *Tourism Recreation Research* 23(2): 1-12.
- Dwyer, L., P. Forsyth and R. Spurr. 2003. Inter-industry effects of tourism growth: Implications for destination managers. *Tourism Economics* 9(2): 117-132.
- Freeman D. and E. Sultan. 1997. The economic impact of tourism in Israel: A multi-regional input-output analysis. *Tourism Economics* 3(4): 341-359.
- Fritz, R. 1982. Tourism, vacation home development and residential tax burden. *American Journal of Economics and Sociology* 41(4):ns.
- Groenwold, A., A. Hagger and J. Madden. 1993. Measuring industry importance: An Australian application. *Annals of Regional Science* 27: 175-182.
- Johnson R. 1999. Input-output models with and without the multiplier effect. *Valuing Tourism: Methods and Techniques* Occasional Paper No. 28. Canberra: Bureau of Tourism Research.
- Khan H., C.F. Seng and W.K. Cheon. 1990. Tourism multiplier effects on Singapore. *Annals of Tourism Research* 17: 408-18.
- Liu J., T. Var and A. Timur. 1984. Tourist income multipliers for Turkey. *Tourism Management December*, pp. 280-87.
- Narayan, Paresh Kumar. 2004. Economic impact of tourism on Fiji's economy: Empirical evidence from the computable general equilibrium model. *Tourism Economics* 10(4): 419-33.
- McDonald, J.F. 2001. Cost-benefit analysis of local land use allocation decisions. *Journal of Regional Science* 41(2): 277-99.
- Milne, S. 1992. Differential multipliers. *Annals of Tourism Research* 4: 499-515.
- Nowak J.J., M. Sahli and P. Sgro. 2003. Tourism, trade and domestic welfare. *Pacific Economic Review* 8(3): 245-258.
- Pasha, Hafiz A. and A.F. Aisha Ghaus. 1995. General equilibrium effects of local taxes. *Journal of Urban Economics* 38: 253-271.
- Pepping G. and M. De Bruijn. 1991. Tourism: Emphasis on selective development. Unpublished MA thesis, Universite du Provence, Aix en Provence.
- Sinclair M. T. 1998. Tourism and economic development: A survey. *The Journal of Development Studies* 34(5): 1-51.
- Schwarm, W. and H. Cutler. 2003. Building small city and town SAMs and CGE models. *Review of Urban & Regional Development Studies* 15(2): 132-46.
- Var T. and J. Quayson. 1985. The multiplier impact of tourism in the Okanagan. *Annals of Tourism Research* 12, 497-514.
- Wong J. 1996. The impact of tourism on local government expenditures. *Growth and Change* 27(3): 313-26.