FE839

Using Implicit Economic Multipliers to Guide Local Economic Development: An Agricultural Example in Brevard County, Florida[1]

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Introduction

Not since the Great Depression have job losses and unemployment had such dramatic effects throughout the United States, and Florida in particular has experienced significant unemployment rates that have been higher than the national average. In April 2010, Florida's unemployment rate rose as projected to 12.3 percent, with 1.14 million people unemployed. In some sections of the state, the unemployment rate was higher, and in some instances lower than the state average.

As a result of the overall conditions brought on by the economic recession that began in 2007, job growth and economic development are high-priority concerns among Florida residents, especially to those unemployed, and to Florida local and state government policy makers. This is true in Brevard County, for example, where proposed changes in the space shuttle program could have large employment impacts.

To make informed economic development decisions requires realistic and timely data and information. It appears that at least in some instances economic development decisions are being made based on beliefs, myths, hearsay, and anecdotal information and that these sources of information will not result in informed decisions.

In the current economic environment, funding is relatively tight and expenditures on economic development studies by external groups can be a difficult sell, especially at the local government level. Costs for detailed studies would probably start in the $40,000 range and go upward into six figures. Because of fiscal concerns, funding for these types of studies is currently limited. However, some information on economic development can be secured for much less than this amount and any information is better than no information.

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The intent of this fact sheet is to provide an example of information for a Florida county that can assist in the economic development decision process, which can be completed for minimal expenditures and can aid in the success of economic development efforts. Brevard County, Florida is used as an example.

Background and Model

Many local economic development efforts concentrate on the same types of economic growth: seeking firms or businesses that employ a large number of employees (500–1,000); offer higher than prevailing wage rates; or target medical, biotechnology, biofuel, and/or green industries.

In reality, there are not enough firms with these types of characteristics for all cities and counties in Florida, let alone the United States. Automatically taking this approach to economic development may lead to overlooking firms and industries that could contribute to the area in terms of output and employment, and may lead to inefficient allocation of fiscal resource to "grow," "retain," or "attract" firms and industries that do not exhibit these characteristics. Comparing local implicit economic multipliers for a range of industries is a low-cost method of identifying industries, or a group of industries, that have an above average potential to generate jobs and income for a county. Such multipliers can be obtained from Input-Output software such as IMPLAN Pro.

The IMPLAN Pro Economic Impact and Social Accounting software package, which is licensed to the University of Florida, was used to generate estimated output and output impacts for 17 economic sectors in Brevard County with specific emphasis on the agriculture and natural resource sectors of the local economy. The agricultural sector was subdivided into production agriculture, agriculture inputs, mining production and natural resources, and food product manufacturing and distribution. In addition to direct sales of the industries in question, the implicit economic multipliers captured inter-industry purchases (indirect effects) and employee household spending (induced effects).

The analysis focused only on the economic data for Brevard County internal to the IMPLAN model; no attempt was made to adjust for particular local conditions. The agriculture and natural resource sector information reported consisted of production agriculture, natural resource industries (forestry, mining, fishing, and golfing), food and forest products manufacturing and distribution, agricultural input supply, and agricultural services. The information derived from IMPLAN should be considered "relative" in nature rather than precise absolute estimates of economic activity. Data represent conditions in 2007 (see Table 1 for glossary of economic impact terms).

This study was jointly funded by the Brevard County Cattlemen's Association, the Brevard County Farm Bureau, and the Brevard County Soil and Water Conservation District. The total cost for computation of the implicit economic multipliers was less than $3,000.

Brevard County Economic Sectors

Table 2 displays results for 17 industry sectors in Brevard County: industry output, total output impacts (direct, indirect, and induced), and an implicit economic multiplier. The industry sectors are standard with other economic impact assessments completed by the Food and Resource Economics Department and are not aggregations suggested by IMPLAN. Output in the county was about $31.3 billion and the implicit economic multiplier was 1.28. This means that for every $1 county output is increased, the model indicates that, on average, about $1.28 in economic activity is generated in the county, including $0.28 through indirect and induced activity.

The most economic activity generated from a $1 increase in output in Brevard County was in the Manufacturing Sector. The model indicates that for every $1 increase in output/sales from the manufacturing sector, economic activity in the county increases by $1.66, and thus the implicit economic multiplier value is 1.66. Other leading industry sectors and the associated implicit economic multipliers are Agriculture, Natural Resources, and Mining Production [note that the manufacturing and distribution sectors have been separated from the production, mining, and natural resource sectors as mentioned previously] (1.44); Professional and

Technical Services (1.44); and Social Organizations and Services (1.32). Many people might be surprised that the agriculture, natural resources, and mining production sector is tied for second in creating economic activity for every dollar that output is increased.

Even though the economic sectors in Brevard County identified above generate the most economic activity from an increase in output/sales, this does not imply that other sectors with smaller implicit economic multipliers, such as Retail Trade, Wholesale Trade, Construction, and Health Care, should be overlooked. These sectors are very large in the county in terms of direct impacts. However, these sectors do not generate large amounts of indirect and induced economic activity in the county.

Indirect effects represent changes in sales, income, or employment within the region in backward-linked industries supplying goods and services to businesses (e.g., increased sales in input supply firms resulting from more nursery industry sales). **Induced effects** represent activity within the region from household spending of the income earned in the direct and supporting industries. Employees in direct and supporting industries spend their incomes on housing, utilities, groceries, and other consumer goods and services, which generate sales, income, and employment throughout a regional economy.

Commodity-Level Detail

Table 3 presents more detail for the Agriculture, Natural Resources, and Mining Production Industry Sector at the commodity level. Economic activity generated from an increase in output activity is largest in the following sectors: Support activities for agriculture and forestry (1.95); Stone mining and quarrying (1.91); Commercial fishing (1.86); and Forest nurseries, forest products, and timber tracts (1.78). In total, there are 14 agriculture, natural resource, and mining commodity sectors that have implicit economic multipliers that exceed the county average (1.28). Included among this group are the primary production agriculture commodity sectors of cattle ranching and farming (1.45), fruit farming (1.4), greenhouse-nursery and floriculture production (1.5), and vegetable and melon farming (1.37). Two nature-based recreation commodity sectors, golf courses (1.59) and recreational fishing (1.59), are also above the county average multiplier.

Other Brevard County Industry Commodity Sectors

Table 4 presents information on other industry commodity sectors in Brevard County. Brevard County is atypical to many other Florida counties because of a well-developed and specialized manufacturing sector. The manufacturing sector in the county is closely aligned with the U.S. space and defense industries. For example, printed circuit board manufacturing (1.83), guided missile and space vehicle manufacturing (1.82), and semiconductor and related device manufacturing commodity sectors (1.76) all have implicit economic multipliers greater than 1.76, which is significantly higher than the county average (1.28). However, many other commodity sectors, such as retail trade general merchandise (1.18), retail trade health and personal products (1.14), and wholesale trade (1.09), have implicit economic multipliers less than the county average.

Implications and Summary

The information presented in this fact sheet should be considered "relative" rather than "absolute" estimates of economic activity in Brevard County based on the IMPLAN model. Use of information such as this should improve the decision-making ability to allocate resources for economic development in the county. The use of implicit economic multipliers should result in more informed decisions relative to economic development decisions that are made based on beliefs, myths, hearsay, and anecdotal information. It also needs to be remembered that information such as this can be obtained for relatively modest costs (less than $3,000).

The information presented in no way implies that sectors such as Retail Trade and Wholesale Trade be overlooked as economic development opportunities. While these sectors in general have smaller implicit economic multipliers, they are very large in the county in terms of direct impacts. However, these

sectors do not generate large amounts of indirect and induced economic activity in the county.

What does this information convey about economic development in Brevard County? That agriculture, natural resource, and mining production should not be overlooked from an economic development perspective. With a need for current and future job growth, it is important not to overlook opportunities. However, it also must be remembered that economic development is more than just economic analysis. Other factors such as environmental and community values need to be considered in economic development decisions.

References

Bureau of Labor Statistics (BLS). 2010. *Bureau of Labor Statistics Table 3: Civilian labor force and unemployment by state and selected area, seasonally adjusted*. Economic News Release, April 16. http://www.bls.gov/news.release/laus.t03.htm

Bureau of Labor Statistics (BLS). 2010. *Bureau of Labor Statistics Table 3: Civilian labor force and unemployment by state and selected area, seasonally adjusted*. Economic News Release, July 20. http://www.bls.gov/news.release/laus.t03.htm

Clouser, R.L. 2009. Presentation to Florida Association of Counties County Commissioner Certification class (May).

Hodges, A.W. and M. Rahmani. 2010. Economic contributions of Florida's agricultural, natural resource, food and kindred product manufacturing and distribution, and service industries in 2008. Electronic Data Information Source (EDIS) FE829, Food and Resource Economics Department, University of Florida, Gainesville, FL. http://edis.ifas.ufl.edu/FE829

Hodges, A.W. and M. Rahmani. 2008. Economic contributions of Florida agriculture, natural resources, food and kindred product manufacturing and distribution, and service industries in 2006. Electronic Data Information Source (EDIS) FE702, Food and Resource Economics Department, University of Florida, Gainesville, FL. http://edis.ifas.ufl.edu/FE702

Minnesota IMPLAN Group (MIG), Inc. 2008. *IMPLAN Professional Software and Database for Florida Counties, 2007*. MIG, Stillwater, MN.

Table 1. Glossary

Glossary of Economic Impact Terms
IMPLAN is a microcomputer-based input-output modeling system and Social Accounting Matrix (SAM). With IMPLAN, one can estimate I-O models of up to 440 sectors for any region consisting of one or more counties. IMPLAN includes procedures for generating multipliers and estimating impacts by applying final demand changes to the model. The current version of the software is IMPLAN Pro 2.0.
Input-output (I-O) model is a representation of the flows of economic activity between industry sections within a region. The model captures what each business or sector must purchase from every other sector to product its output of goods or services. Using such a model, flows of economic activity associated with any change in spending may be traced backwards (e.g., purchases of plants that lead growers to purchase additional inputs, such as fertilizers, containers, etc.). Multipliers for a region may be derived from an input-output model of the region's economy.
Sector is a grouping of industries that produce similar products or services, or production processes. Most economic reporting and models in the United States are based on the Standard Industrial Classification System (SIC code) or the North American Industrial Classification System (NAICS).
Direct effects are changes in economic activity during the first round of spending.
Indirect effects are changes in sales, income, or employment within the region in backward-linked industries supplying goods and services to businesses (e.g., increased sales in input supply firms resulting from more nursery industry sales).
Induced effects are increased sales within a region from household spending of the income earned in the direct and supporting industries. Employees in direct and supporting industries spend their incomes on housing, utilities, groceries, and other consumer goods and services. This generates sales, income, and employment throughout a region's economy.
Total effects are the sum of direct, indirect, and induced effects.
Multipliers capture the total effects, both direct and secondary, in a given region, generally as a ratio of the total change in economic activity in the region relative to the direct change.
Multipliers (implicit, economic, imputed, or derived) are total output impacts divided by total output. This includes direct, indirect, and induced effects.
Margins (retail, wholesale, and transportation) are the portions of the purchaser price accruing to the retailer, wholesaler, and grower, respectively. Only the retail margins of many goods purchased by consumers accrue to the local region, as wholesalers, shippers, and manufacturers often lie outside the local area. For manufactured good, the purchaser price equals the producer price plus a retail margin, a wholesale margin, and a transportation margin.
Basic industries sell goods and services to markets located outside the local area.
Service industries provide goods and services to local businesses and residents.
Sources: Clouser (2009); Hodges and Rahmani (2008).

Table 2. Brevard County, Florida industry output, output impacts, and implicit multipliers (2007 data)

Industry Group	Industry Group Output ($M)	Industry Group Impact ($M)	Total Output Impacts / Industry Output
Agriculture, Natural Resources, Related Manufacturing & Services	1,907	2,199	1.15
Food and Kindred Product Manufacturing & Distribution	1,486	1,594	1.07
Agriculture, Natural Resources, and Mining Production	421	605	1.44
Construction	2,594	2,754	1.06
Consumer Services	805	909	1.13
Education*	171	203	1.19
Government	2,942	3,018	1.03
Health Care	2,259	2,580	1.14
Households	1,708	1,708	1.00
Information and Communications	792	951	1.20
Manufacturing	6,910	11,502	1.66
Professional and Technical Services	4,490	6,444	1.44
Real Estate and Financial Services	2,775	3,280	1.18
Retail Trade	1,607	1,767	1.10
Social Services & Organizations	490	648	1.32
Transportation	462	551	1.19
Travel and Entertainment Services	394	474	1.20
Utilities	204	204	1.00
Wholesale Trade	769	838	1.09
Grand Total	31,280	40,029	1.28

*Computed at state average
Source: MIG, Inc. (2008)

Table 3. Selected Brevard County, Florida commodity group output, output impacts, and implicit economic multipliers (2007 data)

Commodity Group (Agriculture, Natural Resources, and Kindred Products)	Industry Output ($M)	Output Impacts ($M)	Total Output Impacts / Industry Output
Agricultural Inputs & Services	184.62	246.78	1.34
Landscape services	99.44	117.59	1.25
Pest control services	28.91	36.00	1.25
Veterinary services	60.48	92.15	1.52
Crop, Livestock, Forestry & Fisheries Production	68.32	106.69	1.56
All other crop farming	0.55	0.84	1.54
Animal production, except cattle and poultry	2.06	2.33	1.13
Cattle ranching and farming	6.66	9.69	1.45
Commercial fishing	6.33	11.75	1.86
Forest nurseries, forest products, and timber tracts	5.29	9.43	1.78
Fruit farming	17.50	24.57	1.40
Greenhouse, nursery, and floriculture production	18.79	28.15	1.50
Support activities for agriculture and forestry	6.65	12.95	1.95
Vegetable and melon farming	4.49	6.13	1.37
Food & Kindred Products Distribution	1,398.59	1,483.94	1.06
Food & Kindred Products Manufacturing	87.43	109.68	1.25
Forest Products Manufacturing	92.73	134.11	1.45
Mining	29.17	45.16	1.55
Other nonmetallic mineral mining and quarrying	4.21	6.57	1.56
Sand, gravel, clay, and ceramic and refracting minerals mining and quarrying	2.52	4.31	1.71
Stone mining and quarrying	1.93	3.69	1.91
Nature-based Recreation	45.99	73.09	1.59
Golf courses	38.06	60.49	1.59
Recreational fishing	7.93	12.60	1.59
Grand Total	1,906.84	2,199.44	1.15

*Numbers may not add to 100 due to rounding
Source: MIG, Inc. (2008)

Table 4. Brevard County, Florida other commodity output, output impacts, and implicit multipliers (2007 data)

Commodity Group (Other Industry and Commodity Group Sectors)	Industry Output ($M)	Output Impacts ($M)	Total Output Impacts / Industry Output
Construction	2,594.03	2,753.79	1.06
Construct other new nonresidential structures	472.90	468.11	1.09
Maintenance & repair construct of nonresident structure	267.50	468.11	1.36
Consumer Services	805.16	909.40	1.13
Personal and household goods repair and maintenance	84.06	106.22	1.26
Health Care	2,259.32	2,579.54	1.14
Nursing and residential care facilities	185.71	202.57	1.09
Offices – physicians, dentists, other health practitioners	1,091.63	1,394.82	1.28
Information and Communications	792.08	950.53	1.20
Data processing, hosting,and related services	106.42	191.16	1.80
Manufacturing	6,909.73	11,501.77	1.66
Aircraft manufacturing	108.87	167.57	1.54
Bare printed circuit board manufacturing	499.12	913.97	1.83
Broadcast and wireless communications equipment	158.32	214.61	1.36
Guided missle and space vehicle manufacturing	1,328.36	2,421.67	1.82
Ready-mix concrete manufacturing	74.48	123.91	1.66
Semiconductor and related device manufacturing	1,504.99	2,650.81	1.76
Professional and Technical Services	4,489.56	6,443.90	1.44
Architectual, engineering, and related services	567.92	770.92	1.36
Custom computer programming services	395.19	480.39	1.22
Real Estate and Financial Services	2,775.43	3,280.31	1.18
Insurance agencies, brokerages, and related activities	322.44	562.20	1.74
Retail Trade	1607.13	1,766.73	1.10
Retail stores – electronics and appliances	90.68	102.56	1.13
Retail stores – general merchandise	312.61	367.40	1.18
Retail stores – health and personal care	150.57	171.09	1.14
Transportation	462.00	551.21	1.19
Transport by rail	7.73	8.26	1.07
Transport by truck	139.85	147.59	1.06
Transport by water	31.38	41.12	1.31
Travel and Entertainment Services	394.48	473.74	1.20
Amusement parks, arcades, and gambling industry	145.85	188.51	1.29
Other amusement and recreation industries	33.30	52.93	1.59
Wholesale Trade	769.16	837.50	1.09

Source: MIG, Inc. (2008)