CBAER
Center for Business Analytics and Economic Research
GEORGIA SOUTHERN UNIVERSITY

TO: Spaceport Camden

FROM: The Center for Business Analytics and Economic Research

DATE: October 5, 2020

SUBJECT: Potential Visitor Impact from One Rocket Launch

Introduction

Spaceport Camden is continuing to follow the development process required to become an operating commercial spaceport. This spaceport will focus on small-lift launch vehicles that typically cover rockets with a payload of 2,000 kg (4,400 lbs.) that go into low earth orbit (LEO).[1] When these launches begin at Spaceport Camden, the majority of the economic impact will be generated by the direct operations of the businesses located at the spaceport and visitors who come to watch these launches. For the purposes of this memorandum, the Center for Business Analytics and Economic Research is focusing on the visitors who will come to watch or aid with the launches.

Within the visitor segment, tourists who are willing to travel to watch a launch typically fall into two different market segments. First is the Space Enthusiasts' market, which includes 10.8 percent of the U.S. population, and the other is the Educational Families' market, which covers 4.9 percent of the U.S. population.[2] Both of these markets are different than the adventure market that is interested in traveling to space as a space tourist.[3] The space tourist market is not included in the economic impact segment of this analysis because the needs of these visitors are very different from those of the other types of visitors; however, given the potential for development within this market, CBAER has included an overview of the space tourism market within this memorandum.

The other segment of the launch traveler market includes the professionals who are in the area to aid with this launch. Although estimates are not included in this analysis, information collected from other spaceports Indicate that some business travelers will be included in the visitor figures. These could include engineers, payload specialists, information technology specialists or public relations professionals. Often in the space industry, the rocket launching.

[1] More, Ajay. (August 10, 2020). Global Small-Lift Launch Vehicle Market 2020: Top Countries Data, Revenue Growth Development with COVID-19 Impact Analysis and Emerging Technologies with Forecast to 2024. *MarketWatch*. retrieved from https://www.marketwatch.com/press-release/global-small-lift-launch-vehicle-market-2020-top-countries-data-revenue-growth-development-with-covid-19-impact-analysis-and-emerging-technologies-with-forecast-to-2024-2020-08-10.

[2] Annual Report, FY 2017. (2018). *Space Florida*, retrieved from https://www.spaceflorida.gov/wp-content/uploads/2018/12/SFL-2017-AnnualReport-SCREEN-version.pdf.

[3] Holton, Tammy. (2017, November 21). Current Market, Kennedy Space Center Master Plan, *NASA*. retrieved from https://masterplan.ksc.nasa.gov/Current-State/Market.

company differs from the firm that is having a payload launched into orbit. These contractual arrangements typically mean that professionals from both companies must be onsite during the launching process.

Together, the recreational and business travelers are included in the tourism economic impact analysis. The next section will cover the method used to estimate the potential value of these visitors. This section also covers the methods used to generate these data. Due to the absence of regular launches from Spaceport Camden, the team has used secondary data to define these direct impacts. Note that, whenever possible, the research team has relied on actual launch events that have occurred at similar spaceports.

Building on the method section, the team next examined the potential value linked to the development of a space tourist business at Spaceport Camden. This section includes a brief overview of what could change when high net worth adventure tourists start regularly visiting Camden County, which could shift the operations of Spaceport Camden and the types of visitors who are coming to this community. Finally, the research team will discuss the results of the tourism impact examined in the methodology section. These results will include both total impacts along with the indirect (business-to-business) and induced (consumer-to-business) transactions. The input/output model IMPLAN will be used to estimate this economic impact for a single launch event. An overview of the IMPLAN model is available in Appendix A.

Methodology

To estimate the potential economic impact of visitors linked to the launching of rockets at Spaceport Camden, the research team first began by examining similar facilities to find data that represent the potential visitors generated for unmanned vehicles. The facilities selected for this comparison were Wallops Island in Virginia and the SpaceX South Texas Launch Site. Wallops Island has both a private spaceport and a NASA-operated launch facility. This facility launched 6 orbitals[4] and 12 research rockets in 2014.[5] The SpaceX Facility has been used to both test and launch rockets from the Brownsville area.

In 2014, at the Wallops Island facility, an unmanned satellite was launched with 14,000 visitors reported by NASA.[6] This launch was one of the few with actual visitor figures reported. Building on this information, the Brownsville Economic Development Council noted that it expects about

[4] Based on the past three years
[5] 2014 Annual Report. (2014). Goddard Space Flight Center, National Aeronautics and Space Administration. *NASA*. retrieved from https://www.nasa.gov/sites/default/files/atoms/files/2014_nasa_goddard_annual_report_0.pdf.
[6] Vaughn, Carol. (2015, February 3). At Wallops, a Growing Financial Impact That Resonates. *13 News Now*, 13newsnow.com. retrieved from https://www.13newsnow.com/article/news/local/virginia/at-wallops-a-growing-financial-impact-that-resonates/222125070.

15,000 visitors per launch.[7] This area is home to the SpaceX South Texas Launch Site, which is being built to both launch and test rockets. It is owned and operated by SpaceX.[8] Based on these examples, our team assumed that 14,000 visitors would view each launch.

Building on the total number of visitors, the team next adjusted this figure to include only the visitors who are typically included in an economic impact analysis. Most critically, the local visitors were removed from the analysis to avoid overestimating the potential economic impact. Local spending is not considered to be new spending because residents will typically use their funds on a variety of goods and services in the local economy. From an economic standpoint, these funds would have been spent in the local economy even without the launch activity. In contrast, the local spending by tourists would not have been spent in the local economy without the presence of the launch activity, which makes it an economic impact.

The team adjusted the number of local visitors based on the 2018 Domestic Travel Summary released by the Georgia Department of Economic Development for both the state of Georgia and Georgia's Coastal region; see Appendix B for a list of coastal counties. This allowed the team to generate a high and low estimate for the direct visitors. Further these listed percentages are based on the non-Georgia residents who visited the areas. Removal of Georgia residents allowed the team to estimate the potential impacts of only visitors to this area. For the high estimates, the research team assumed that 68.6 percent of visitors would travel to the area for the launch.[9] For the low estimates, the team assumed about 57 percent of travelers came from out of the area to watch the launch.[10]

Next, the team further distributed the remaining visitors into parties and average nights of stay in area. This was done because each visitor is part of both a travel party and is staying in the community for a limited number of nights. Therefore, using the domestic travel summaries, each party had 1.92 people per party and stayed 2.22 nights in the area. Using these assumptions, the high group, had about 5,002 parties, and the low group had about 4,215.[11]

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[7] Brownsville Economic Development Council. Retail. retrieved from http://www.bedc.com/print/retail.
[8] SpaceX. (2019). South Padre Island. *City of South Padre Island Convention & Visitors Bureau*. retrieved from https://www.sopadre.com/spacex/.
[9] The Coast Domestic Travel 2018. (2020). 2018 Domestic Visitor Profile Summary, The Coast. *Explore Georgia*. retrieved from https://industry.exploregeorgia.org/sites/default/files/2020-01/2018%20Domestic%20Visitor%20Profile%20Summary%20The%20Coast.pdf.
[10] The Coast Domestic Travel 2018. (2020). 2018 Domestic Visitor Profile Summary, The Coast. *Explore Georgia*. retrieved from https://industry.exploregeorgia.org/sites/default/files/legacy_files/2018%20Domestic%20Visitor%20Profile%20Summary%20Statewide.pdf.
[11] *Ibid.*

Finally, to create an impact, funds must be spent within the community. Listed in Table 1 are the categories of spending typically associated with travel and tourism including food and beverage, general retail, entertainment, and gasoline and other travel-related expenses. To assign spending figures to these categories, our team used overnight visitors' spending data from the Space Coast Office of Tourism in Brevard County in Florida. Within this county, unmanned space vehicle launches generated per party spending of $1,065 per travel party.[12] Before these spending figures were attached to categories, the research team adjusted them using the consumer price index average price data.[13] This reduced the total value to $948 per overnight travel party. The consumer price adjustment was done to ensure these figures from Florida are more reflective of prices paid in Georgia for most goods and services listed in this analysis.

Table 1: Estimated Visitor Spending per Launch in Camden County

Category	Per Party Spending	High	Low
Lodging	$322	$1,612,000	$1,359,520
Restaurant Food & Beverages	$246	$1,233,000	$1,039,000
General Retail Purchases	$152	$759,000	$639,000
Entertainment & Amusement	$85	$427,000	$360,000
Gasoline & Local Transportation	$142	$711,000	$599,000
Total	$948	$4,742,000	$3,996,000

As shown in the data set, the potential direct visitor spending impact for one launch in this region will fall between $3.9 and $4.7 million per launch. In total, the difference between the high and low estimate is about $746,000. The difference between the high and low estimate is linked to the number of visitors for one launch. These estimates will change as both the frequency of launches and the ability to collect primary data through surveys and other methods becomes more possible. The number of per launch visitors could be affected by many factors including the time of year, day of the week and the level of promotion given to drive interest in the launch. This means the volume of visitors for any launch will not be constant, which is part of the reason why CBAER generated high and low estimates.

[12] Berman, Dave & Gallion, Bailey. (May 22, 2020). SpaceX Launch Will Boost Local Tourism at Critical Time After Coronavirus Downtown. *Florida Today*, retrieved from https://www.floridatoday.com/story/money/business/2020/05/22/spacex-launch-boost-tourism-critical-time-after-covid-19-plunge/5226745002/.

[13] *U.S. Bureau of Labor Statistics*. Consumer Price Index, Average Price Data. retrieved from https://www.bls.gov/cpi/data.htm.

Traveling to Space

Space tourism is a headline grabbing part of the space travel industry. This industry is currently forecast to be a $3 billion market by 2030.[14] Although this market may not appeal to everyone, a strong segment of the population is at least interested in being a space tourist. A survey conducted by the Pew Research Center found that 42% of Americans would be definitely or probably interested in going to space as a tourist. One factor driving the interest in space tourism is generational with 63% of Millennials, 39% of Generation X and 27% of Baby Boomers expressing some level of interest.[15] This illustrates that companies and communities that invest in space tourism could be able to see economic benefits well into the future.

Currently, most of the companies that are planning to compete in this market are launching visitors close to the Kármán line (62 miles or 100 kilometers) where earth's atmosphere ends and space begins.[16] Three launch methods used to reach this height include rocket, space plane or balloon. The most prominent example of spaceplanes is Virgin Galactic, which is currently selling seats at a reported $250,000 per launch.[17] While in the rocket category, Blue Origin New Shepard will offer the traditional vertical launch flight for an estimated $200,000 per seat.[18] Finally, Space Perspective is working on a height altitude balloon called Spaceship Neptune that can lift eight passengers to the Kármán line for an initial price of $125,000 per seat.[19]

Each of these examples illustrates that, if an early stage space tourism company selected Spaceport Camden and was able to begin launching customers, this event could radically change the visitor market. These visitors would primarily be considered high net worth

[14] Sheetz, Michael. (2019, March 18). Super-Fast Travel Using Outer Space Could Be $20 Billion Market, Disrupting Airlines, UBS Predicts. *CNBC*, retrieved from https://www.cnbc.com/2019/03/18/ubs-space-travel-and-space-tourism-a-23-billion-business-in-a-decade.html.

[15] Strauss, Mark & Kennedy, Brian. (2018, June 7). Space Tourism? Majority of Americans Say They Wouldn't Be Interested. *Pew Research Center*, retrieved from https://www.pewresearch.org/fact-tank/2018/06/07/space-tourism-majority-of-americans-say-they-wouldnt-be-interested/.

[16] Bartels, Meghan. (2018, December 13). Where DOES Space Begin? Virgin Galactic's SpaceShipTwo Flies Right into the Debate. *Space.com*, retrieved from https://www.space.com/42733-virgin-galactic-space-claim-relies-on-karman-line.html.

[17] Chang, Kenneth (2020, July 28). Virgin Galactic Unveils Comfy Cabin for Jet-Setting to the Edge of Space, The New York Times, retrieved from https://www.nytimes.com/2020/07/28/science/virgin-galactic-cabin.html#:~:text=Virgin%20Galactic%20has%20more%20than,selling%20tickets%20in%20December%202018.&text=The%20company%20has%20not%20set,founder%2C%20Richard%20Branson%2C%20aboard.

[18] O'Callaghan, Jonathan. (2019, December 11). Blue Origin Launches Its First Space Tourism Rocket in Seven Months—and Hopes to Take Humans to Space in 2020. *Forbes Science*, retrieved from https://www.forbes.com/sites/jonathanocallaghan/2019/12/11/blue-origin-launches-first-space-tourism-rocket-in-seven-months-ahead-of-planned-human-flights-in-2020/#578c6b605afe.

[19] Wall, Mike. (2020, June 18) Space Perspective wants to take tourists on balloon rides to the stratosphere Space.com. retrieved from https://www.space.com/space-perspective-stratosphere-balloon-tourism-flights.html

individuals. Many individuals in this category would demand a higher level of service, which would present opportunities for the tourism market in Camden County to expand high-end experiences and luxury accommodations. Currently, all rides to space are timed to be one day

experiences. This creates potential to add attractions that could entice these visitors to extend their stays in the community. Regardless of whether a space tourism company selects Spaceport Camden, the needs of launch support staff will differ from those visitors in the space tourism market.

To launch a small satellite or to send other cargo to low earth orbit, staff from both the rocket launching and satellite owning company are typically present at the launch site. This means that, at a minimum, the payload owning company will have representatives present at the launch site to ensure that the funds already invested will produce results. Simply launching a payload into orbit involves notable investment. For example, a trip on a small Rocket Lab launch vehicle starts at $7 million. This amount purchases only the trip to orbit and not the satellite being launched.[20] The level of staff sent by the payload owner will very. The research team found one example from the federal Missile Defense Agency, which needed to house 210 people near the Pacific Spaceport Complex in Alaska to manage test launches.[21] Although not all launches will have this level of support from one partner, this does illustrate that launch support personnel do travel to launch site to ensure the operation is being completed. These are business travelers who are looking for services that make their trips to the host community more comfortable and allow them to complete their work more efficiently.

Within this section the companies mentioned are not necessarily specific attraction targets for Spaceport Camden. Rather, these companies are examples of what is currently taking place in the space tourism market. Therefore, space tourism and specific information on business travelers linked to launches were excluded from this analysis. As these industries develop it is likely that future analysis of tourism impacts will be able to collect more specific information on how these visitor and companies are spending funds in the host community.

[20] Clark, Stephen. (2020, July 3). Rocket Lab Plans Next Launch Saturday Closes in on First Mission from Virginia. *Spaceflight Now*, retrieved from https://spaceflightnow.com/2020/07/03/rocket-lab-aims-for-saturday-launch-in-new-zealand-closes-in-on-first-mission-from-virginia/.
[21] Eaton, Daysha. (2018, June 21). ADN Story Unpacks Kodiak Rocket Launch Contract Dispute. *Kmxt.org*, retrieved from https://kmxt.org/2018/06/adn-story-unpacks-kodiak-rocket-launch-contract-dispute/.

Results

The analysis found the potential economic impact of launching rockets from Spaceport Camden could add economic value to the current tourism industry in Camden County. These impacts should be viewed as support for existing jobs rather than overall additions to the Camden market because it is unlikely that businesses would hire new employees for a one-off event. In contrast, a sustainable launch calendar could create added value for the tourist economy that would result in additional jobs and economic activity. Despite this limitation, within our current analysis the impacts of hosting a spaceport could potentially benefit the tourism market; see Table 2 for these benefits.

Table 2: High for a Single Launch

	Output	Gross Regional Product	Labor Income	Employment
Direct	$2,700,000	$1,366,000	$856,000	38
Indirect	$589,000	$238,000	$133,000	5
Induced	$295,000	$170,000	$67,000	2
Total	$3,585,000	$1,775,000	$1,056,000	45

Source: IMPLAN and CBAER

In the high estimate 5,002 parties are estimated to visit Camden County for the launch. To reach these visitor figures, the launch will need to be publicize, and a marketing effort could be needed. Despite this potential issue each launch could positively affect the Camden County economy, see Table 2 for details.

First, note that the direct output is about $2.7 million, which is below the $4.7 million in direct inputs. The $2 million difference is related to revenue leaving the area due to linkages. An example of a linkage is the shirt sold in Camden County that is made overseas and printed in another county in the United States. The purchase price of the shirt covers these and other costs that are benefitting other communities. When IMPLAN removes this spending, it increases the validity of the estimates by focusing the analysis on the community being analyzed.

In the High Scenario, a launch could support about $1.4 million in direct gross regional product and $408,000 in indirect (business-to-business) and induced (consumer-to-business) transactions. The impact to employment is equally positive with the addition of 38 direct jobs and 7 in the indirect and induced jobs.

In the Low Scenario, 4,215 parties are estimated to be coming to Camden County for each launch. In this scenario, $4 million was spent by visitors in this community; see Table 3 for the results of the IMPLAN analysis.

Table 3: Low for a Single Launch*

	Output	Gross Regional Product	Labor Income	Employment
Direct	$2,139,000	$1,076,000	$696,000	32
Indirect	$459,000	$184,000	$103,000	4
Induced	$238,000	$137,000	$54,000	2
Total	$2,836,000	$1,397,000	$853,000	38

Source: IMPLAN and CBAER

As was the case with Scenario 1, the linkages within the IMPLAN model removed just over $1.8 million in local spending that exited the area due to linkages in the supply chain. Even with this reduction in spending, the proposed launch would still support $1.4 million in gross regional product and a total of 38 jobs. This total includes over $320,000 in indirect (business-to-business) and induced (consumer-to-business) transactions. Also included are six jobs supported by the indirect and induced spending estimates.

Conclusion

A market for individuals, families and space professionals who will travel to watch or support a rocket launch exists. To increase the clarity of this analysis the potential economic impact for one launch was the focus. The two scenarios in this memorandum illustrate that launches at Spaceport Camden could have a notable economic impact. In the High Scenario, which included about 5,000 parties with a total contribution to gross regional product of about $1.8 million, this impact supports 45 jobs. In the Low Scenario, which includes 4,215 parties, about $1.4 million was contributed to gross regional product with a total employment impact of 38 jobs. Note that these impacts will support the existing market in Camden County. These impacts do have the potential to grow the visitor market in this community if enough regularly scheduled launches occur.

Two factors examined by this memorandum could change the economic value of these launches. The first is the timing of the launches; if many of them take place during a less busy time of the year, it is possible that these regular launches could increase year-round demand for goods and services. The team found that, in Virginia, some businesses in the area

surrounding the Wallops Island facility noted that launch events help to keep them open year around. This is also true when a launch is delayed. Many visitors will end up adding time to their stays in the host community.[22] When Spaceport Camden is launching regularly, this could add new visitors to the existing tourism market with some of these going to watch the launch and others coming to consult with the launching or payload supplying company.

The second factor is linked to the type of visitor coming to this community. For example, a spaceport that focuses on moving cargo or satellites into orbit will likely attract more technology support and space enthusiasts than launches focused on lifting tourists into orbit. In the space tourism market, companies that use rockets (Blue Origin) or space planes (Virgin Galactic) currently charge $200,000 - $250,000 per ticket.[23] Despite this price point, Virgin Galactic had more than 600 people pay for a seat before sales stopped December 2018.[24] While more affordable options for space balloon companies like Space Perspective are asking for $125,000,[25] if either type of company chose to be located in Camden County, the types of on the ground services and experiences being demanded would likely be very different from those of an engineer who is coming to aid with the launch of a satellite.

Overall, the potential economic impact linked to the prospective amount of visitors coming to Spaceport Camden is substantial. The impacts noted in this analysis will change as more primary data are collected and as the parameters of the launches are more clearly defined by the users of Spaceport Camden. These potential impacts, along with the information provided in this analysis, highlight that other spaceports are also expecting and experiencing some visitor activity. This visitor activity is having a positive economic impact on the communities and is helping to support local businesses.

In addition, during the COVID-19 pandemic, NASA and other federal agencies have noted that aerospace is part of the critical infrastructure in the United States. For many segments of the space industry postponing launches is virtually impossible due to international scientific commitments or short optimal launch windows.[26] This means that launch activity at Spaceport Camden could continue at regular intervals despite some external factors. These spaceport related visitors could act as another stable source of demand for the visitor industry in Camden County.

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[22] Harding, Hayley. (2018, November 14). Rocket Launches Are Good for Business. *Delmarva Now*, retrieved from https://www.delmarvanow.com/story/news/local/virginia/2018/11/14/nasa-wallops-flight-facility-chincoteague-business/1944232002/.

[23] *ibid*

[24] *ibid*

[25] *ibid*

[26] Burrington, Ingrid (2020, May 20) Is going to space truly essential during a pandemic?, Engadget;. retrieved from https://www.engadget.com/nasa-space-travel-pandemic-150016349.html

Appendix A: IMPLAN Methodology

Input/output (I/O) models examine the relationships between different industrial sectors in a targeted geographic area. These sectors are typically interdependent based on the goods/services being produced and consumed.[27] The regions could include (but are not limited to) the United States, Grouping of States, One State, or Sub-State (County or City). These models are not forecasting models, which are designed to predict changing economic situations. Rather, I/O models, including IMPLAN, assume that the economy is in a state of general equilibrium. When an analyst enters data into an input-output system, the economy is "shocked by the new action."

This shock to the model sets off a set of relationships between the different industrial sectors in the model. These relationships create changes in the equilibrium of the model. It is this change from the old equilibrium to new equilibrium that creates the economic impact.

The IMPLAN model follows this type of format. The general equilibrium in the model is defined using the Use Matrix and the Make Matrix. The Make Matrices are defined by the value of all commodities each industry produces making this matrix about the value of production, while the Use Matrices focus on the commodity purchases each industry makes in order to produce its output. This means each matrix is focuses on the industry outlays used for intermediate goods and services production.[28]

IMPLAN then links the structural matrix to the North American Industry Classification System (NAICS) codes. These codes organize the model into sectors of the economy that follow the NAICS codes. The codes determine how closely the economy will be examined. In general, the more specific the NAICS code, the more detailed the analysis. For example, NAICS Code 42 represents wholesale trade, which includes durable goods wholesalers, nondurable goods wholesalers, and wholesale electronic markets and agents and brokers. In contrast, NAICS Code 423220 represents a specific type of wholesale trade, home furnishing merchant wholesalers. Once the level of specificity is selected then the user can than select the targeted region.

[27] Clouse, Candi (2020) About IMPLAN, Economic Impact Report's Toolkit. IMPLAN Group, retrieved From https://implanhelp.zendesk.com/hc/en-us/articles/360044985833-About-IMPLAN

[28] Anonymous (2020) National Structural Matrix, From the Data Team, IMPLAN Group. retrieved Form https://implanhelp.zendesk.com/hc/en-us/articles/115009674648-National-Structural-Matrix#:~:text=Rearranging%20the%20U.S.%20Make%20Matrix,to%20create%20a%20Byproducts%20Matrix.&text=Accepting%20the%20Byproducts%20Matrix%20now,)%2C%20distributed%20across%20the%20matrix.

Next IMPLAN adds the regional purchase coefficient to the matrix calculation. This coefficient is the embedded estimate for total local demand of the study area. The coefficient is specific to each model's regional configuration. [29] It is important to the modeling process because it is how the model accounts for the local goods and services necessary to process one unit of output. It also determines how many of the goods and services are produced locally, and what will need to be imported into the region.[30]

This coefficient is also useful in determining the amount of output in the regional configuration being studied. Inside IMPLAN output is the base statistic used to calculate employment. This employment is total jobs and does not account for full-time, part-time, seasonal or other type of employment. This follows the standard definitions used by the Bureau of Economic Analysis and Bureau of Labor Statistics.

Data Used in the IMPLAN Model

The data used in the IMPLAN model are collected from a variety of data sources. The most important federal data sources for IMPLAN come from the U.S. Department of Commerce. This department includes the U.S. Census Bureau and the Bureau of Economic Analysis. Other data comes from the Bureau of Labor Statistics through the U.S. Department of Labor.

The major federal data sets that IMPLAN uses to develop the underlying model are.

- U.S. Bureau of Labor Statistics, Census of Employment and Wages,
- U.S. Bureau of Economic Analysis, Regional Economic Accounts,
- U.S. Census Bureau, County Business Patterns and
- U.S. Bureau of Economic Analysis, National Income and Product Accounts.[31]

Each of these data sets provides the IMPLAN model with reliable data. IMPLAN then synthesizes the information and develops appropriate equations to make the model function. In addition, IMPLAN fills in any gaps in these data using methods consistent with the common theory in this area. This allows IMPLAN data to be available at the zip code, county, metropolitan statistical area, state and national level. It is produced on an annual basis and includes inter-county trade flow data and multi-reginal analysis.[32]

[29] Anonymous (2020) Regional Purchase Coefficient, Glossary, retrieved form https://implanhelp.zendesk.com/hc/en-us/articles/115009499527-Regional-Purchase-Coefficient-RPC-
[30] Anonymous (2020) Regional Purchase Coefficients, Data Basics, IMPLAN Group. retrieved from https://implanhelp.zendesk.com/hc/en-us/articles/115009674588-Regional-Purchase-Coefficients
[31] Anonymous (2020) IMPLAN Data Source Overview, Economic Impact Report's Toolkit. retrieved from https://implanhelp.zendesk.com/hc/en-us/articles/360044458674-IMPLAN-Data-Source-Overview
[32] *Ibid*

With these tools in place, the IMPLAN model produces three elements to in determine economic impact in the analysis.

Direct effects- Direct effects are the effects of capital or labor that are directly being studied/entered in the modeling process. An example of a direct effect is the spending by visitors on goods and services within the targeted region.[33]

Indirect effects- Indirect effects are the business-to-business transactions caused by the direct effects. For example, when a general contractor purchases supplies, the supplying vendors will use the revenue generated to restock inventory and, potentially, to hire additional employees.[34]

Induced effects-Induced effects linked to consumer-to-business transactions as employees spend after tax household income on goods and services. For example, when a person uses income earned on the job to pay rent or purchase a home.[35]

These effects typically apply to four variables including, output, employment, labor income and gross regional product (value added). Using these effects, the model produces several multipliers. Multipliers are a rate of change triggered by the increase or decrease made in the direct input. These are commonly expressed as using the amount of investment made to the rate of change, which typically means that for every dollar spent in the target economy, $0.50 of economic activity is generated in the region. These changes then move through the economy multiple times and create changes to both sectors/variables directly affected by and to other sectors/variables that support these changes.[36]

In general, for every input into a transaction, an amount over that transaction is generated. For example, if a visitor or employee buys lunch at a local restaurant, the amount of this purchase will be re-circulated in the economy. This happens when the business owner replaces the ingredients used in preparing lunch (the indirect effects) or hires an employee to prepare or serve the meal (induced effect). The receivers in this transaction become the next round's inputs, and, so, the cycle continues.

[33] Anonymous (2020) Glossary, Economic Impact Report's Toolkit, IMPLAN Group. retrieved from https://implanhelp.zendesk.com/hc/en-us/articles/360044986593-Glossary
[34] *ibid*
[35] *ibid*
[36] Clouse, Candi (2020) Understanding Multipliers, Region Details: Behind the "i". IMPLAN Group. retrieved from https://implanhelp.zendesk.com/hc/en-us/articles/115009505707-Understanding-Multipliers

There are two types of multipliers used in the IMPLAN model. The first is the Type 1 which focuses on the business-to-business transactions. This means that a Type 1 analysis uses the direct information to calculate the indirect effect but not the induced effect. The second multiplier is the Social Accounting Matrix or Type SAM. This multiplier uses the direct effects, to calculate the indirect, and the induced effects which includes the household spending.[37] Type SAM multipliers are typically viewed as being a more complete form of analysis. Using the SAM multipliers also normally increases the likelihood that reported results are showing a comprehensive view of the overall economic impacts. Given these factors the Center for Business Analytics and Economic Research uses the Type SAM multipliers as the default setting for our economic impact reports.

[37] Clouse, Candi (2020) Multipliers, Region Details: Behind the "i". IMPLAN Group. retrieved from https://implanhelp.zendesk.com/hc/en-us/articles/360037178313-Multipliers

Appendix B: Georgia's Coastal

Source: Visitcoastalgeorgia.org/maps-transportation

The Counties include in this Georgia's Coastal includes:

Brantley County	Glynn County
Brantley County	Liberty County
Camden County	Long County
Charlton County	McIntosh County
Chatham County	Pierce County
Clinch County	Ware County
Effingham County	