

Prepared by



ECONOMIC IMPACT STUDY OF LONG BEACH AIRPORT



long beach
airport

2019

**ECONOMIC IMPACT STUDY
OF
LONG BEACH AIRPORT**

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Section 1 Overview

Beyond providing critical infrastructure and services to facilitate air transportation, airports are powerful economic engines. They create and facilitate economic activities that generate revenues, support jobs, and provide incomes. These economic contributions, typically measured in terms of output, jobs, and earnings, are referred to as *economic impact*—a term derived from *economic impact analysis*, the methodology used for measuring them. In a recent economic impact study published by the Airports Council International-North America (ACI-NA), the economic impact of all 493 commercial airports in the United States in 2017 was valued at \$1.4 trillion, supporting 11.5 million jobs with annual payroll earnings of \$428 billion.¹

This study estimates the economic impact of Long Beach Airport (LGB) on the five-county region of the Los Angeles-Long Beach, CA, Combined Statistical Area (CSA), consisting of the California counties of Los Angeles, Orange, San Bernardino, Riverside, and Ventura. The two counties of Los Angeles and Orange comprise the Los-Angeles-Long Beach-Anaheim, CA, Metropolitan Statistical Area (MSA). The two principal cities of the MSA are Los Angeles and Long Beach. LGB is located approximately 6 miles northwest of downtown Long Beach.

Various economic activities take place at LGB, generating revenues for businesses, jobs for the local workforce, and incomes for households in the study region. These economic activities within LGB create additional economic activities within the region, through economic multiplier effects, so that their total economic impact is much greater than what occurs within the airport.

The various economic activities at airports attract other business establishments to locate near airports. These business establishments include not only those that have clear linkages with the economic activities that take place on-airport, but also a variety of other non-aviation related business establishments that stand to benefit from *agglomeration economies*. The term *agglomeration* is an economic term used to refer to the phenomenon of firms locating close to one another. The urban economics literature identifies two types of agglomeration economies: *localization economies* and *urbanization economies*. Localization economies are benefits enjoyed by firms within the same industry sector from locating at the same place. Urbanization economies are benefits enjoyed by firms across different industry sectors just by locating within a cluster. Urbanization economies can be derived from sharing facilities like building, parking, and other common areas, or from sharing customers.²

Such agglomeration has developed around LGB. The airport itself owns a cluster of commercial Class A office buildings, industrial facilities, and a municipal golf course. Near the airport are two business parks: Long Beach Airport Business Park and Kilroy Airport Center, developed in the 1980s and early 1990s, respectively.

¹ Airports Council International-North America, *Taking America Beyond the Horizon, The Economic Impact of U.S. Commercial Airports in 2017*, November 2018.

² Philip McCann, *Urban and Regional Economics*, Oxford University Press, 2001, pages 55-59.

The City of Long Beach has a rich history as an aerospace manufacturing center dating back to the 1940s when Douglas Aircraft Company opened a manufacturing plant near LGB. The Boeing Company continued to operate the Douglas manufacturing plant to produce the C-17 Globemaster III cargo aircraft until 2015. Other aerospace companies have located around LGB today. These include the airport’s largest leaseholder, Gulfstream, which performs maintenance and service on several models of its jets, and Virgin Orbit, which was formed in 2017 to provide launch service for small satellites. Virgin Orbit is located at the former Boeing plant site, Douglas Park.³

To recognize the important role of LGB in attracting business agglomeration, the scope of the economic impact study is expanded to cover all business entities within a defined area north of Interstate 405 and south of Carson Street, bordered by Clark Avenue and Cherry Avenue, called the LGB Aviation Complex (Figure 1-1).⁴ The expanded geographical scope of this study is consistent with the scope of previous economic impact studies for LGB. This study, however, makes a clear distinction between economic activity generated by the provision and use of transportation services at LGB—the standard scope of airport economic impact studies—and economic activity from surrounding business establishments within the defined LGB Aviation Complex.

Figure 1-1: The LGB Aviation Complex



Source: Unison Consulting, Inc., and InfoUSA.

³ “Long Beach Industry Snapshots,” *Long Beach Business Journal*, March 11, 2019.

⁴ For example, see Lisa M. Grobar, *The Economic Impact of the Long Beach Airport in 2011*, July 23, 2012, and an update by Jacobs Engineering summarized on the Long Beach Airport website.

The study follows the general guidelines provided by the Federal Aviation Administration (FAA) for airport economic impact analysis, the U.S. Bureau of Economic Analysis (BEA) guidelines for the use of Regional Input-Output Modeling System (RIMS II) multipliers, and the theory and practice of economic impact analysis established in regional economics. Economic impact analysis estimates the economic repercussions of changes in final demand—purchases of goods and services by end-users—using economic multipliers. Economic impact analysis has two basic ingredients:

- An estimate of the initial change in final demand as the exogenous economic stimulus
- A model of the regional economy that produces estimates of multiplier effects—additional rounds of spending triggered by the initial change in final demand

Estimates of changes in final demand resulting from economic activities generated by the airport are based on available data for LGB's most recent fiscal year, the 12-month period ending in September 2018. The study uses the U.S. BEA RIMS II multipliers to measure the value of additional rounds of spending (multiplier effects) that take place within the study region.

This study presents four measures of economic impact:

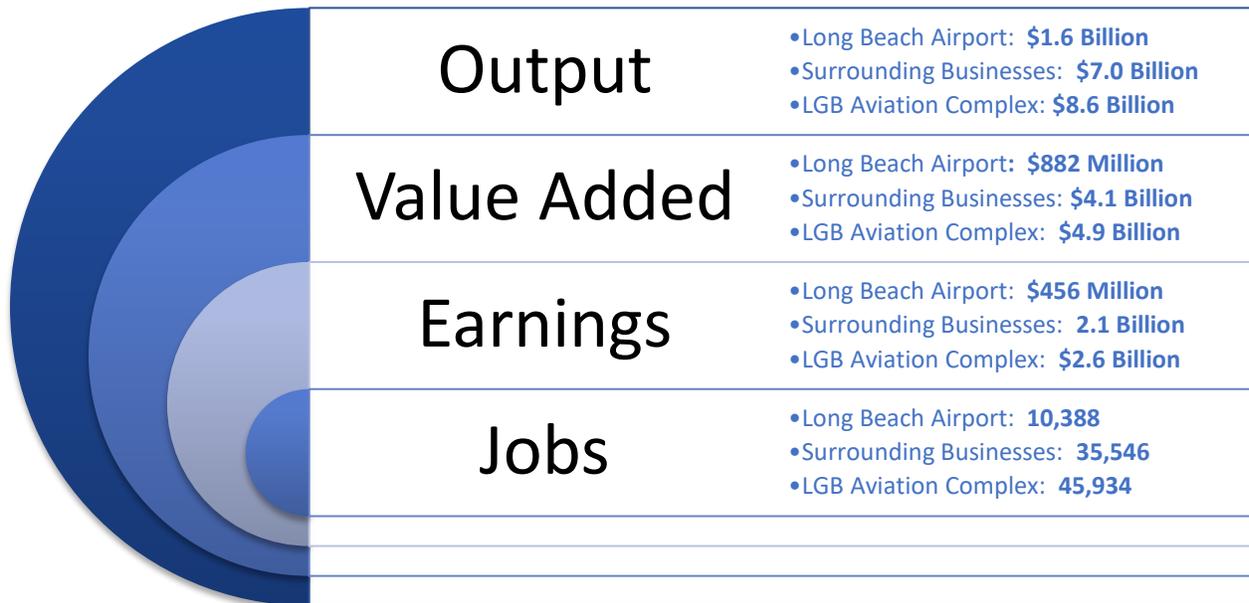
- Output – the aggregation of business revenues (sales)
- Value added – the difference between output (gross revenue) and the cost of intermediate inputs (utilities, supplies and services purchased from other firms)
- Earnings – compensation of employees and net earnings of sole proprietors and partnerships
- Employment – number of full- and part-time employees

The four measures are related, but not meant to be added together. Value added is a component of output, and earnings are a component of value added.

Output is the broadest, most popular, and most often-cited measure of an airport's overall economic impact. It is a good measure of the extent of interdependency between industries, but is subject to double-counting of intermediate inputs. Value added is a smaller measure that does not suffer from double-counting, and is the appropriate measure of contribution to GDP. Value added includes all income earned from production, including employee compensation, taxes, and gross profits.

Figure 1-2 summarizes the results for the four measures of economic impact for LGB, the surrounding businesses, and the entire LGB Aviation Complex (total for LGB and surrounding businesses).

Figure 1-2: Total Economic Impact of the LGB Aviation Complex on the Study Region



To set the results in the context of total economic activity in the study region, Table 1-1 expresses the total economic impact estimates as percentages of the values of the corresponding economic measures for the Los Angeles-Long Beach CSA: total full-time and part-time employment for employment, compensation of employees for earnings, and gross domestic product in 2007 dollars for value-added.

Table 1-1: Total Economic Impact - Proportional Contribution to the Los Angeles-Long Beach CSA Economy

	Employment (Jobs)	Earnings (Million \$)	Value Added (Million \$)
Los Angeles-Long Beach CSA ¹	11,212,783	616,708	1,252,514
Total Economic Impact of:			
Long Beach Airport	10,388	456	1,618
Share of Los Angeles-Long Beach CSA	0.09%	0.07%	0.13%
Surrounding Businesses	35,546	2,098	6,989
Share of Los Angeles-Long Beach CSA	0.32%	0.34%	0.56%
LGB Aviation Complex	45,934	2,554	8,607
Share of Los Angeles-Long Beach CSA	0.41%	0.41%	0.69%

¹ The values for Los Angeles-Long Beach CSA are for 2017, the latest available data from the U.S. Bureau of Economic Analysis as of the study date. The economic measures used for the Los Angeles-Long Beach CSA are total full-time and part-time employment for employment, compensation of employees for earnings, and gross domestic product in 2017 dollars for value-added.

Table 1-2 presents a breakdown of each measure of economic impact into its components of direct, indirect and induced impact. Much of the direct impact occurs onsite within the City of Long Beach.

Table 1-2: Total Economic Impact by Component

Component	Employment (Jobs)	Earnings (Million \$)	Value Added (Million \$)	Output (Million \$)
LGB				
Direct	5,481	214	422	779
Indirect	1,999	114	206	402
Induced	2,908	129	254	437
Subtotal	10,388	456	882	1,618
Aviation Complex (Aviation Related)				
Direct	2,148	200	416	788
Indirect	1,617	107	175	374
Induced	2,731	121	239	410
Subtotal	6,496	428	829	1,572
Aviation Complex (Non-Aviation Related)				
Direct	12,274	849	1,584	2,648
Indirect	3,453	350	723	1,169
Induced	13,323	471	930	1,599
Subtotal	29,050	1,670	3,237	5,417
LGB and Aviation Complex				
Direct	19,903	1,263	2,421	4,215
Indirect	7,069	570	1,104	1,945
Induced	18,962	721	1,423	2,447
Total	45,934	2,554	4,948	8,607

Details may not add to total due to rounding.

The remainder of the report is organized into four sections: Section 2 describes the conceptual framework and methodology of economic impact analysis. Section 3 defines the study region and provides an overview of the study region's socio-economic trends. Section 4 provides an overview of aviation activity and related services at the airport. Section 5 presents the results of the economic impact analysis.

Section 2 Economic Impact Analysis – Conceptual Framework and Methodology

Airport sponsors conduct economic impact studies to inform the public about the significant economic contributions of airport operations and development projects. Economic impact analysis determines how a particular economic activity, industry, or regulation affects the economy in a specified geographic area. The approach in this study adheres to the theory and practice in regional economic analysis. It follows the general guidelines prescribed by the FAA and is consistent with the established practice in airport economic impact analysis.

Economic impact analysis estimates the economic repercussions of changes in final demand—purchases of goods and services by final users—using economic multipliers. The multipliers measure the value of additional rounds of spending resulting from an initial purchase. This study uses the U.S. BEA RIMS II multipliers for the study region and follows the recommended best practices for using RIMS II multipliers.

To illustrate: A consumer purchase of \$100 leads to more spending in the local economy, because the business making the sale employs workers and purchases intermediate inputs from other businesses. Workers, in turn, spend their earnings on household consumption purchases that induce more rounds of spending. The entire process produces a total economic impact that is much greater than the initial consumer spending of \$100. Economic multipliers are used to estimate the total economic impact of the initial spending, capturing the expenditure's indirect and induced effects in the economy.

2.1 Conceptual Framework

Airports facilitate various economic activities that bring new money into the local economy. This new money generates revenues for local businesses—supporting local jobs and providing incomes to local households. These revenues, jobs and income constitute an airport's economic impacts.

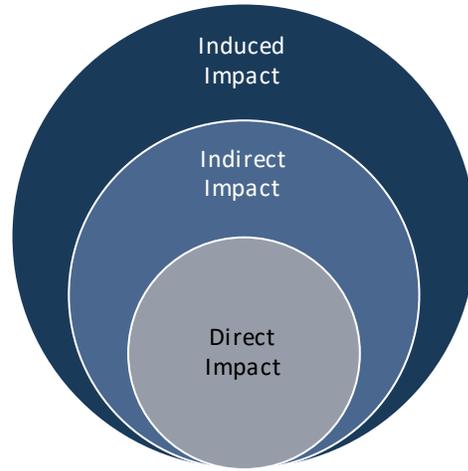
Economic impacts are not limited to the business revenues, jobs, and incomes generated within an airport. Airlines, airport concessionaires, and the airport administration rely on local firms to supply them with materials and services to run their businesses. They also employ local residents who, in turn, spend part of their earnings on purchases from local businesses. Meanwhile, the passengers visiting from out-of-town also support local businesses when they purchase goods and services while in town, including ground transportation, food, accommodation, entertainment, and retail merchandise. This process creates multiplier effects, so that the airport's total economic impact on the regional economy is much greater than what occurs within the airport.

2.1.1 Components and Sources of Economic Impact

Figure 2-1 and Figure 2-2 show the components and sources of airport economic impact. Total economic impact includes direct, indirect and induced impacts. Direct impact refers to the initial round of economic activity that occurs when:

- Airlines and other entities at the airport provide services to passengers and shippers (airport services).
- Nonresident passengers make purchases from local businesses outside the airport (visitor spending).
- The airport sponsor makes capital outlays to maintain and improve airport facilities (capital outlay).

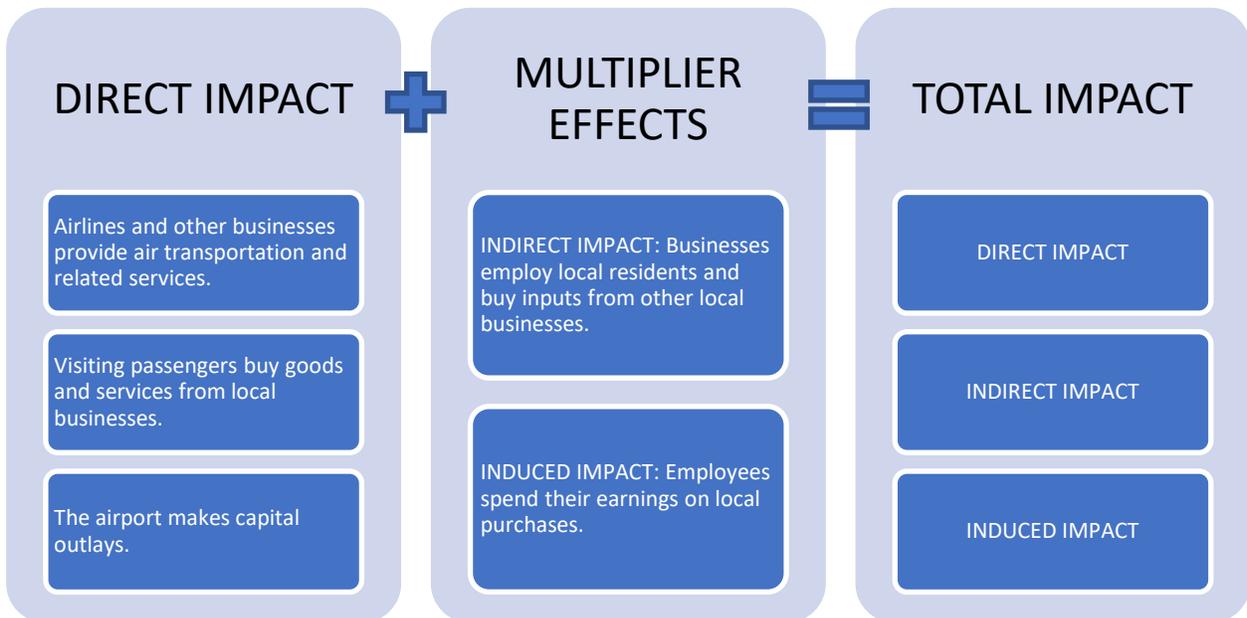
Figure 2-1: Components of Economic Impact



This initial impact generates multiplier effects throughout the economy in two ways:

- When businesses buy intermediate inputs from other businesses (indirect impact).
- When employees spend their earnings on local purchases (induced impact).

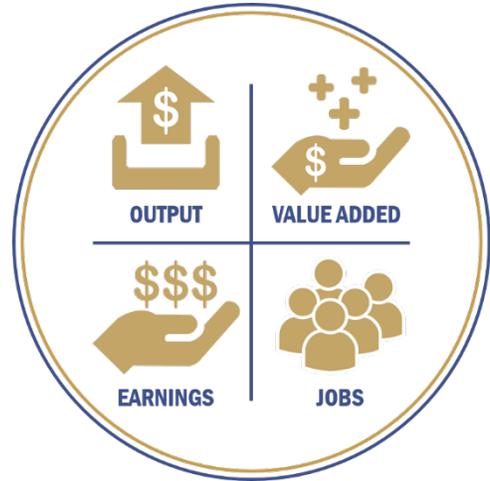
Figure 2-2: Sources and Components of Airport Total Economic Impact



2.1.2 Measures of Economic Impact

There are four measures of economic impact: output, value added, employment, and earnings. Each one presents a different way of measuring economic contributions:

- Output refers to the market value of goods and services produced, measured by gross revenue or sales. It includes the cost of intermediate inputs—utilities, supplies and services purchased from other firms—and value added.
- Value added refers to all income earned from production, including employee compensation (payments to labor), taxes (transfers to government), and gross profits (returns to capital investment).
- Earnings consist of employee compensation and proprietor’s income.
- Employment refers to the number of full-time and part-time jobs.

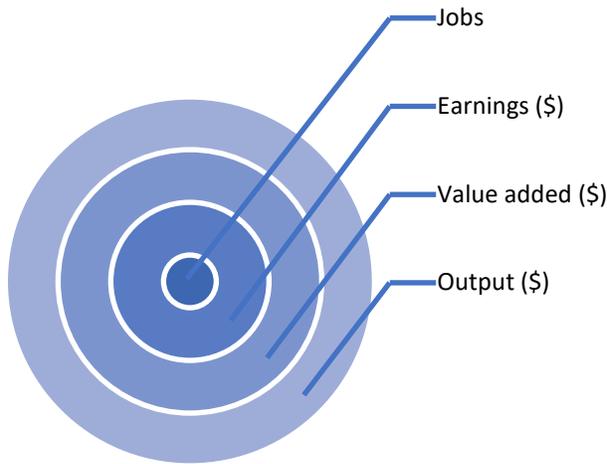


The four measures are related, but not meant to be added together. Output is the broadest, most popular, and most often-cited measure of an airport’s overall economic impact. Output is the sum of all sales revenues earned by different firms. It serves as a gauge of the extent of interdependency between industries, but overstates economic impact because it double-counts the value of goods and services used as intermediate inputs by other businesses. Output is not a measure of contribution to GDP; value added is.

Value added is what is left after subtracting the cost of intermediate inputs from output. Value added is therefore not subject to double-counting; it represents the contribution to GDP. It is less popular than output as a measure of airport economic impact, because the previous versions of RIMS II did not produce multipliers for value added.

Earnings are a component of value added, and value added is a component of output.

Figure 2-3: Four Related Measures of Economic Impact



2.2 RIMS II Multipliers

To estimate indirect and induced impacts, we use the U.S. BEA RIMS II multipliers, which are based on an accounting framework called an input-output (I-O) table. For each industry, an I-O table shows the distribution by industry of inputs bought and outputs sold, derived from two data sources:

- BEA's national I-O table showing the I-O structure of nearly 500 U.S. industries.
- BEA's regional economic accounts used to adjust the national I-O table to reflect a region's industry structure and trading patterns.

RIMS II multipliers can be estimated for any one or group of counties, and for any one or group of industries. They are widely used in economic impact analysis not only of airports, but also other industries and regulatory changes.

Economic multipliers can be produced using other proprietary models or by developing an original model of the regional economy. But empirical tests show that RIMS II multipliers produce results similar to those of more expensive models and surveys. Using RIMS II multipliers also has the following advantages:

- The level of industrial detail in RIMS II helps avoid aggregation errors.
- RIMS II multipliers can be compared across areas because they are based on a consistent estimation procedure.
- The BEA updates RIMS II with the most recent local area earnings data.
- The accessibility of data sources for RIMS II keeps the cost of RIMS II multipliers low.

These advantages, however, come with important limitations. The RIMS II I-O framework is based on at least six important assumptions:

- *Backward linkages.* An increase in the demand for output increases the demand for inputs.
- *Fixed-purchase patterns.* Industries do not change the relative mix of inputs used to produce output, so that doubling output requires a doubling of input.
- *Industry homogeneity.* All businesses in an industry use the same production process.
- *Unlimited supply.* I-O models assume fixed prices, so that businesses can use as many inputs without facing higher prices or without taking resources away from other uses.
- *No regional feedback.* RIMS II is a single-region I-O model, ignoring any feedback that may exist among regions.
- *No time dimension.* RIMS II is a static model. It does not consider the time it takes for economic impacts to be realized. There can be a long lag between the time when initial final demand changes are made and the time when the multiplier effects are realized fully.

If any of these assumptions do not hold, the true economic impacts can be more or less than the effects estimated using the RIMS II multipliers.⁵

2.3 Methodology and Data Collection

Economic impact analysis requires two inputs: an estimate of the economic stimulus—the initial change in final demand; and a model of the economy that produces estimates of the multiplier effects. Multipliers are specific to particular industries within a particular region. This report uses the RIMS II input-output multipliers for the study region.

For an estimate of the initial economic stimulus, any of these measures—jobs, payroll earnings, or gross revenue—can serve as a starting point. It is important, however, to identify economic activities that bring new money into the study region, and to count the contribution of only these activities to the initial change in final demand. These economic activities include business operations that generate revenue from out-of-town customers, public services that are not paid out of local government revenues, purchases made by visitors, and airport capital outlays.

To estimate the initial changes in final demand resulting from airport services, we collected data from various sources on either the number of employees or annual gross revenues of businesses and public enterprises that serve airport passengers and other end users. For the most part, we relied on airport records of tenant gross revenues, air traffic activity reports, and information posted on LGB’s website. LGB staff helped obtain the number of employees working for federal and state agencies that provide services at the airport, and provided a list of business tenants.

⁵ U.S. Bureau of Economic Analysis, “Regional Multipliers from the Regional Input-Output Modeling System (RIMS II): A Brief Description,” <http://www.bea.gov>, accessed on May 4, 2015.

We researched additional data from websites and online databases maintained by the following entities:

- U.S. Bureau of Transportation Statistics
- U.S. Census Bureau
- U.S. Bureau of Economic Analysis
- U.S. Bureau of Labor Statistics
- Federal Aviation Administration
- Airport Council International-North America

To estimate visitor spending, we surveyed LGB departing passengers over four days from March 27 to March 30, 2019. The survey collected data on off-airport spending by passengers visiting the study region and their airport ground access mode choices. The estimate of the initial change in final demand from airport capital outlays is based on budgeted CIP spending for FY2018.

To identify the businesses outside the LGB property within the defined LGB Aviation Complex area, we obtained data on business establishments in the City of Long Beach from InfoUSA and used number of employees for the initial final demand change measure.

Section 3 Socio-Economic Profile of the Study Region

The study region is the geographic area of interest in measuring total economic impact. It is an important study parameter because it determines the size of multipliers. The study region must be large enough to capture inter-industry linkages and to encompass areas where employees work, live, and spend most of their earnings.⁶ For this study, the study region is defined to be the five-county region of the Los Angeles-Long Beach CSA, consisting of the California counties of Los Angeles, Orange, San Bernardino, Riverside, and Ventura. The two counties of Los Angeles and Orange comprise the Los-Angeles-Long Beach-Anaheim MSA. The two principal cities of the MSA are Los Angeles and Long Beach.

3.1 Population

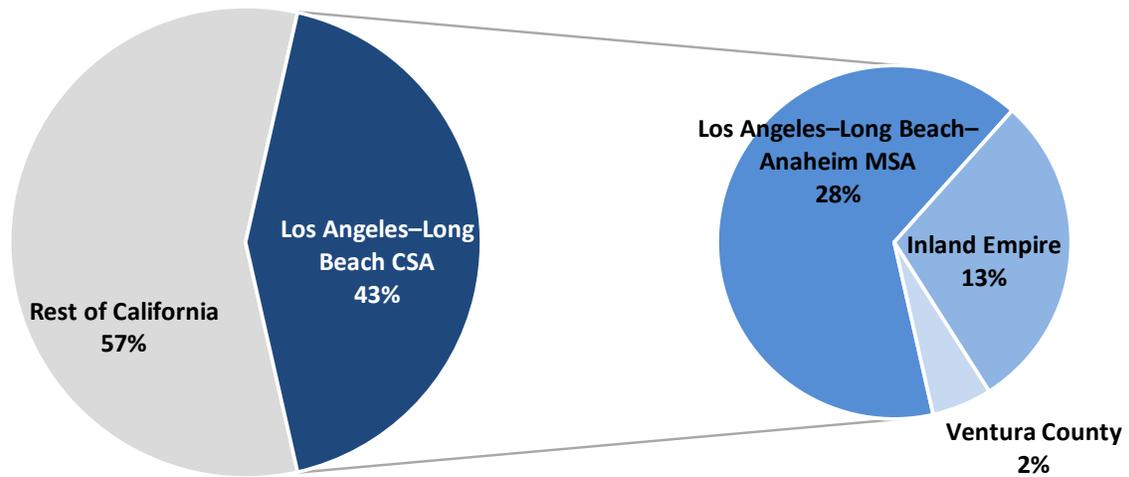
In 2017 the study region, the Los Angeles-Long Beach CSA had a total population of 18.8 million, accounting for 48 percent of the California state population (Figure 3-1). Los Angeles County and Orange County, the two counties that make up the Los-Angeles-Long Beach-Anaheim MSA, are among the most populous counties in California (Figure 3-2 and Figure 3-3). Together, they made up just over 70 percent of the study region's population in 2017. The City of Long Beach had a population of 469,450 in 2017, making up 2.5 percent of the study region's population.

The population of the Los Angeles-Long Beach CSA has been growing at a slower rate than the California state population and the U.S. total population. From 2010 to 2017, the population of the CSA increased 5.0 percent, compared with 5.9 percent in the entire state of California and 5.3 percent nationwide. A strong economy, an abundance of jobs, and nice weather year-round attract job seekers and their families into the region.

⁶ U.S. Bureau of Economic Analysis, RIMS II, *An Essential Tool for Regional Developers and Planners*, pages 3-2 and 3-3.

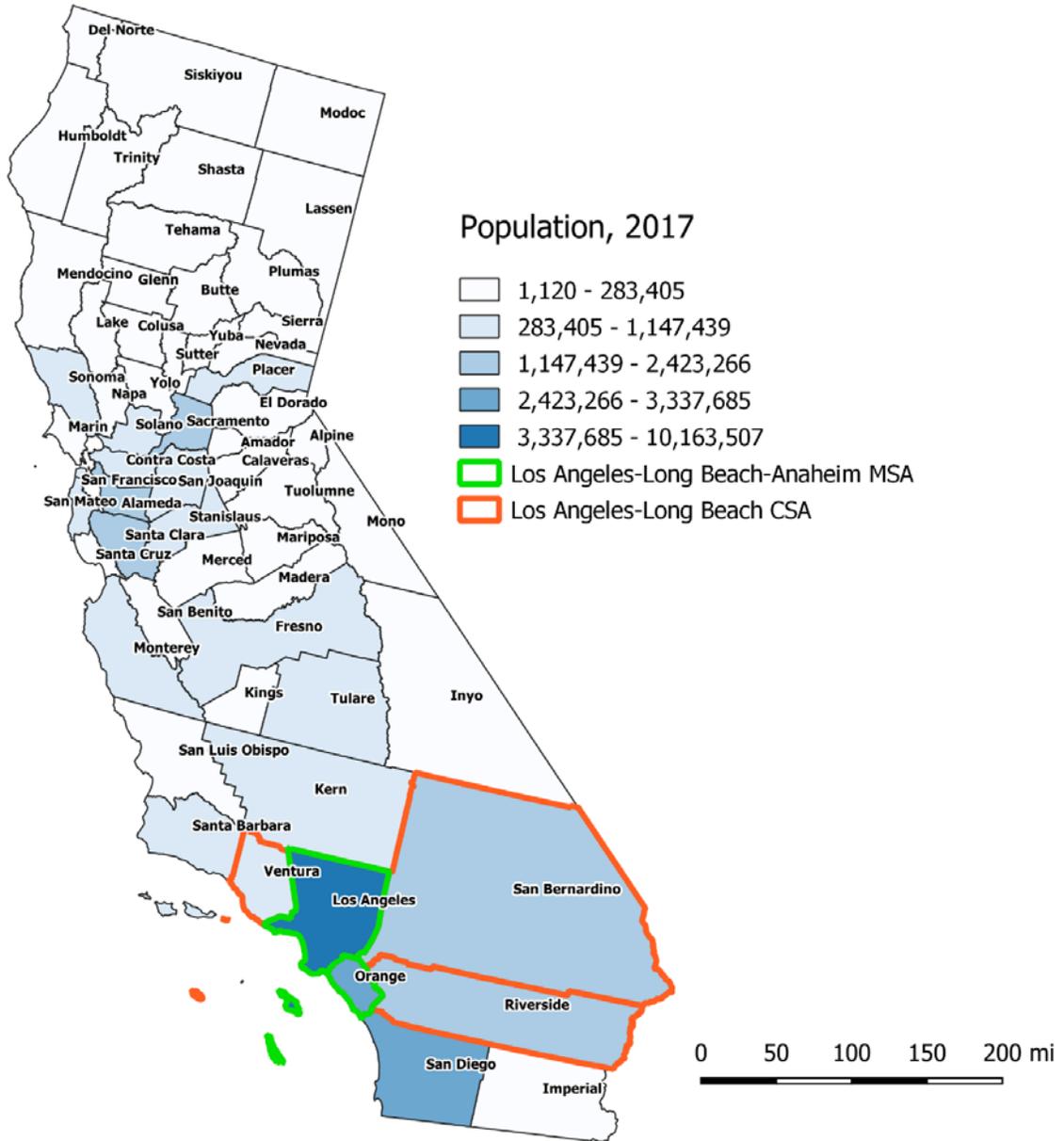
Figure 3-1: Population by County in the Study Region, 2010 and 2017

	2010		2017	
	Population	Share	Population	Share
Study Region (Los Angeles-Long Beach CSA)				
Los Angeles–Long Beach–Anaheim MSA				
Los Angeles County	9,818,605	54.9%	10,163,507	54.1%
Orange County	3,010,232	16.8%	3,190,400	17.0%
Subtotal - Los Angeles–Long Beach–Anaheim MSA	12,828,837	71.8%	13,353,907	71.1%
Inland Empire				
San Bernardino County	2,035,210	11.4%	2,157,404	11.5%
Riverside	2,189,641	12.2%	2,423,266	12.9%
Subtotal - Inland Empire	4,224,851	23.6%	4,580,670	24.4%
Ventura County	823,318	4.6%	854,223	4.5%
Total - Five-County Study Region	17,877,006	100.0%	18,788,800	100.0%



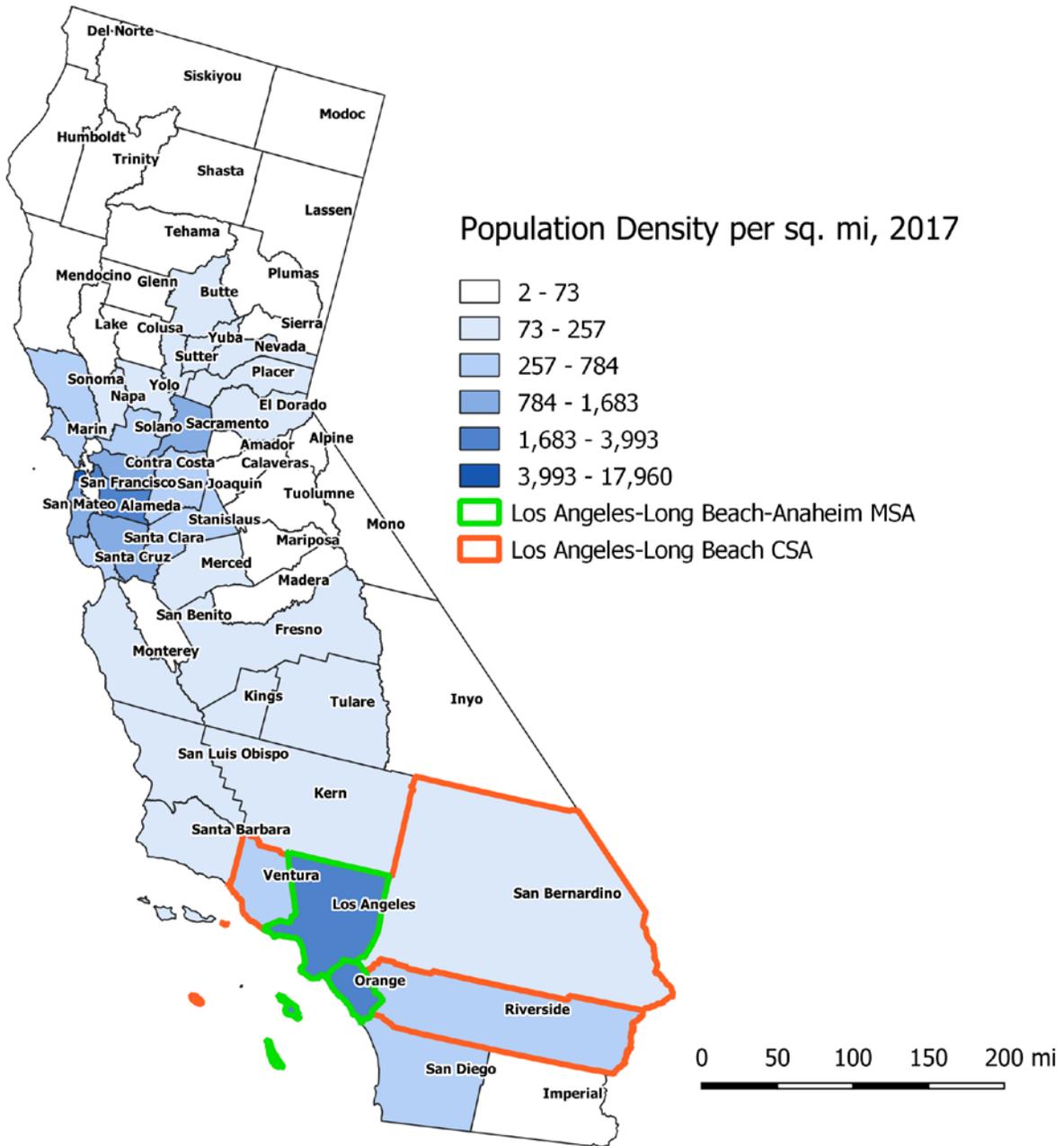
Source: U.S. Census Bureau mid-year population estimates.

Figure 3-2 Population by County in California, 2017



Source: Unison Consulting and U.S. Census Bureau, Population Division.

Figure 3-3 Population Density by County in California, 2017

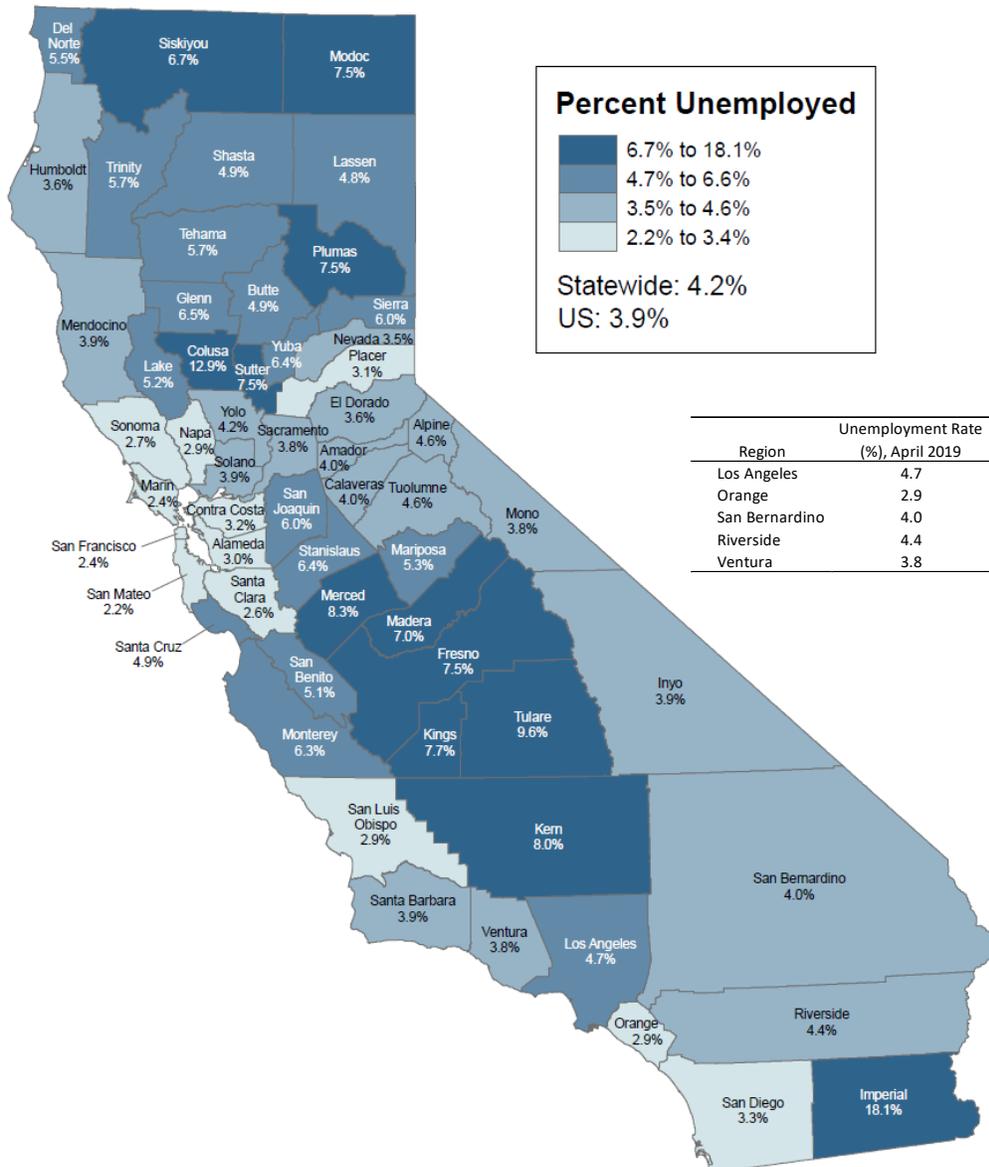


Source: Unison Consulting and U.S. Census Bureau, Population Division.

3.2 Labor Market

The county unemployment rates in the study region are close to the California state unemployment rate (Figure 3-4). Orange County’s unemployment rate (2.9 percent) is considerably lower than the state unemployment rate (4.2 percent), while Los Angeles County’s unemployment rate (4.7 percent) is slightly higher. The remaining counties in the study region fall between Orange County and Los Angeles County in unemployment rates: Ventura (3.8 percent), San Bernardino (4.0 percent), and Riverside (4.4 percent).

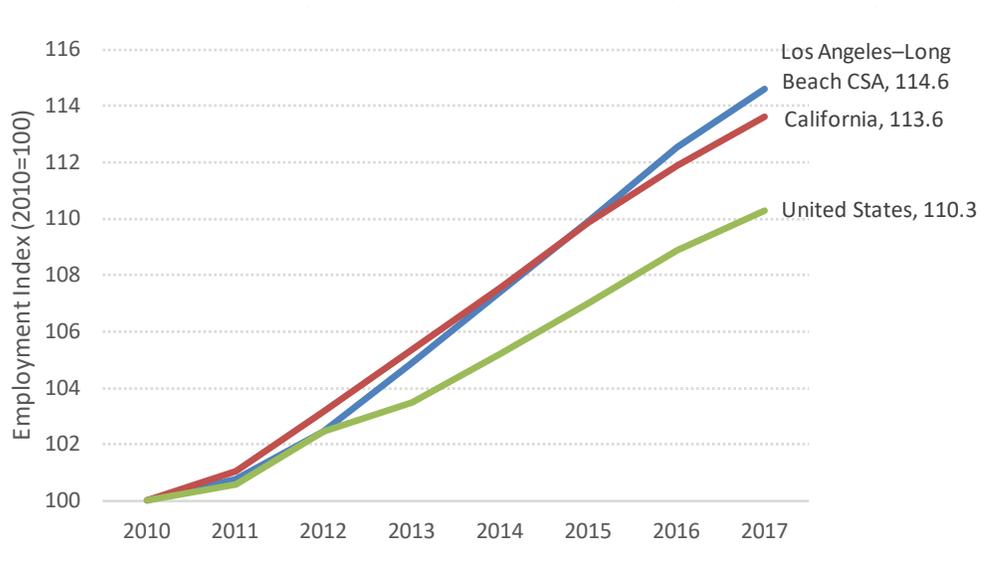
Figure 3-4: California Counties’ Unemployment Rates, April 2019



Source: Local Area Unemployment Statistics (LAUS), Labor Market Division, California Employment Development Department.

As of 2017, total employment in all industries in the Los Angeles-Long Beach CSA was 8.2 million, representing 45 percent of California’s total employment. From 2010 to 2017, employment in the study region grew at a slightly higher rate (14.6 percent) than in California (13.6 percent) or the United States (10.3 percent) (Figure 3-5).

Figure 3-5: Total Employment, 2010-2017

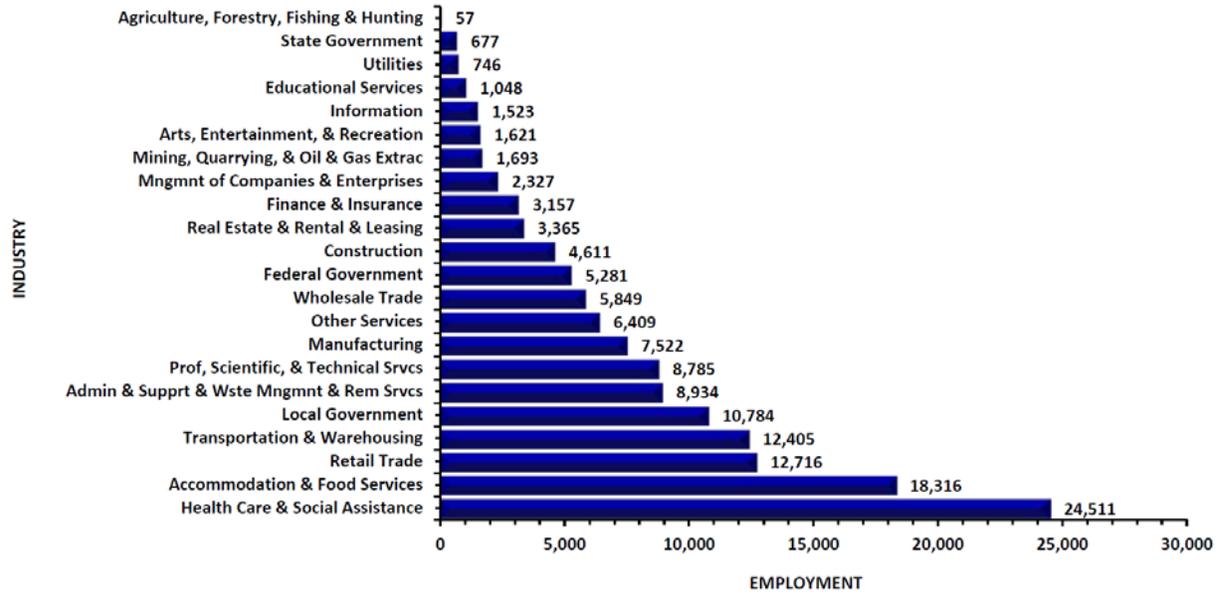


Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages.

According to labor market data from the State of California Employment Development Department, the unemployment rate in the City of Long Beach was 5.7 percent in August 2017, higher than the unemployment rate in Los Angeles County (4.8 percent) and California (5.1 percent) during the same month.⁷ In 2015, total employment in the City of Long Beach was 142,337, with the largest concentration of 24,511 jobs in health care & social assistance (Figure 3-6).

⁷ Long Beach Pacific Gateway Report, accessed on June 25, 2019.

Figure 3-6: City of Long Beach Annual Average Employment in 2015



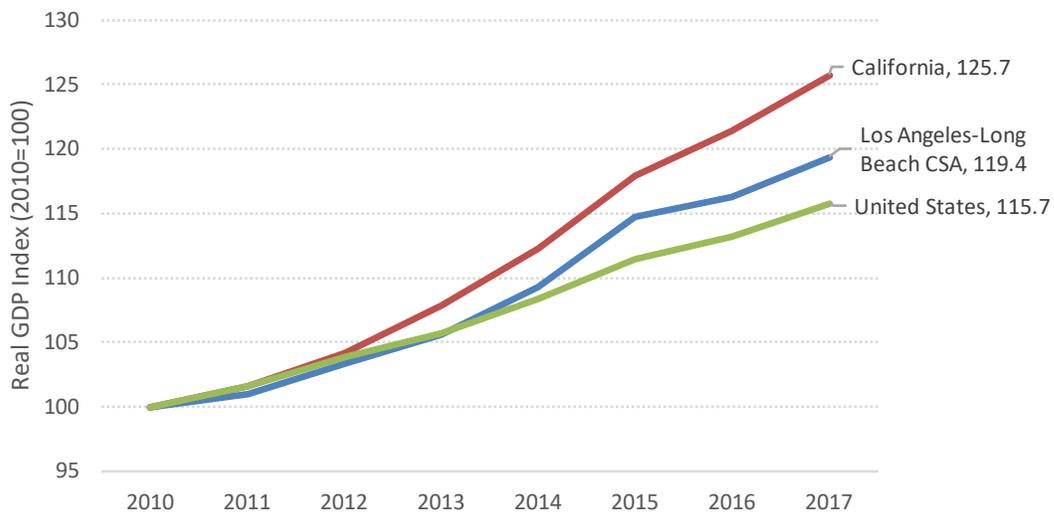
Sources: Graph from the Long Beach Pacific Gateway Report using data from Quarterly Census of Employment and Wages compiled by the State of California Employment Development Department.

3.3 Gross Domestic Product

GDP measures the total value of all goods and services produced within a geographic area. In 2017 the Los Angeles-Long Beach CSA produced a GDP of \$1.08 trillion (in 2009 dollars), 45 percent of California’s real GDP.

The growth in GDP measured in constant dollars (real GDP) indicates overall economic growth. As shown in Figure 3-7, the Los Angeles-Long Beach CSA’s real GDP grew faster (19.9 percent) than the U.S. real GDP (15.7 percent), but slower than California’s GDP (25.7 percent) from 2010 to 2017.

Figure 3-7: Growth in Real Gross Domestic Product, 2010-2017

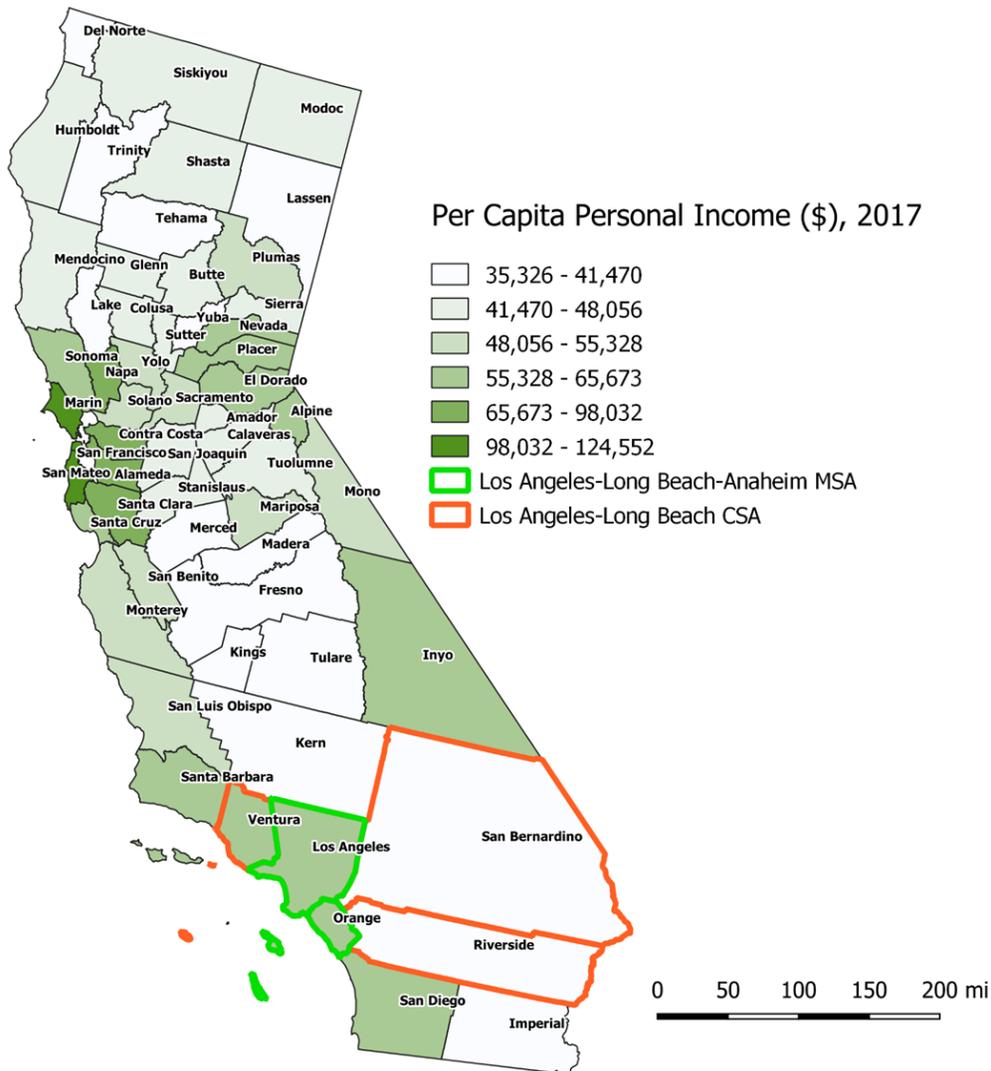


Source: U.S. Bureau of Economic Analysis estimates of real GDP in 2009 dollars.

3.4 Per Capita Personal Income

Los Angeles, Orange, and Ventura are among the more affluent counties in California in terms of per capita personal income (Figure 3-8 and Figure 3-9). In 2017, the per capita personal income in Los Angeles County was \$58,419; in Orange County, \$65,400; and in Ventura County, \$59,178. In contrast, Riverside and San Bernardino had among the lowest per capita personal incomes in the state of \$39,261 and \$38,816, respectively. The state average per capita personal income was \$59,796.

Figure 3-8: California Counties' Per Capita Personal Incomes (\$), 2017



Source: U.S. Bureau of Economic Analysis. Per capita personal income was computed using Census Bureau midyear population estimates. Estimates reflect county population estimates available as of March 2018.

Figure 3-9: Per Capita Personal Income by County in the Study Region, 2017



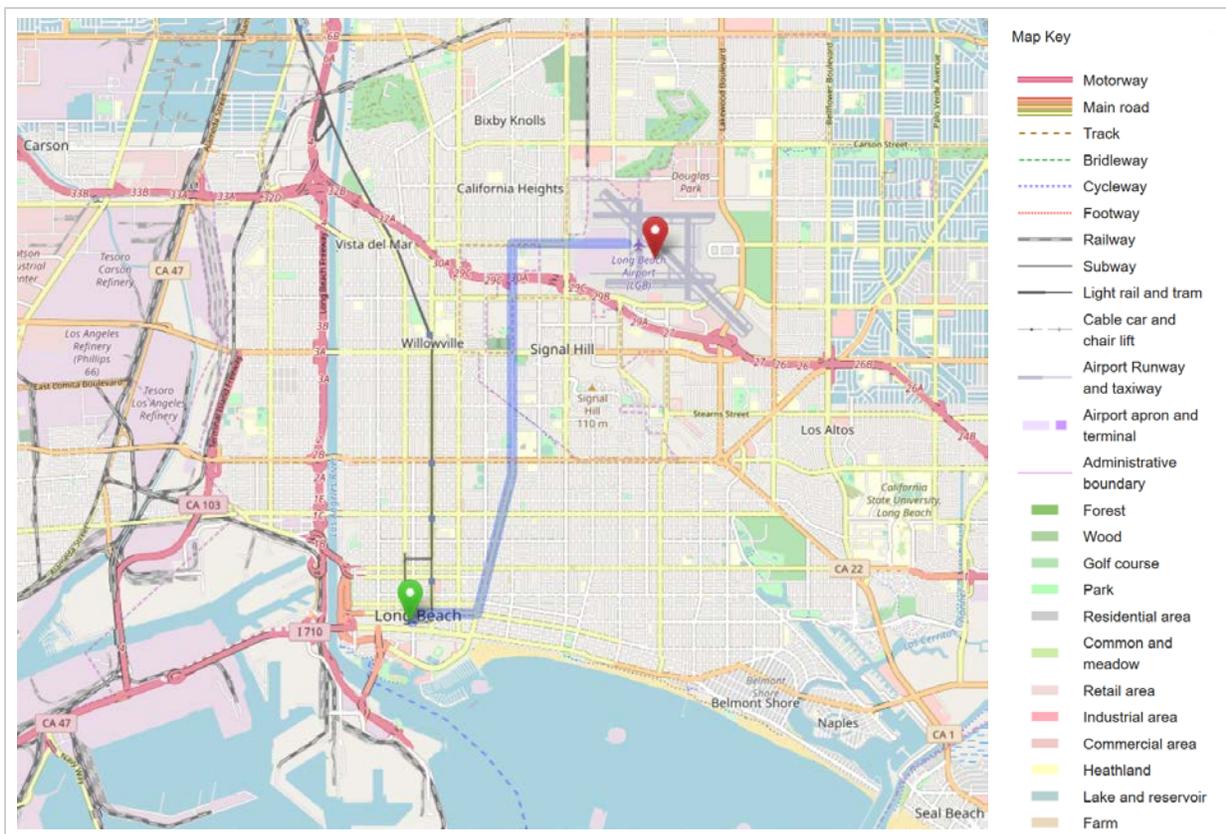
Source: U.S. Bureau of Economic Analysis. Per capita personal income was computed using Census Bureau midyear population estimates. Estimates reflect county population estimates available as of March 2018.

All five counties in the study region generated a combined total personal income of \$108.6 billion in 2017, accounting for 8.4 percent of the state total.

Section 4 Overview of the Airport

Long Beach Airport is classified as a small-hub airport⁸ based on its share of U.S. total enplanements. Based on total passengers in calendar year 2017,⁹ LGB was the ninth largest airport in California and the 66th largest airport in the United States. The airport occupies a 1,166-acre site approximately 3 miles northeast of downtown Long Beach. Highway access to the airport is provided by Interstate Highways 405, 710 and 605 (Figure 4-1).

Figure 4-1: Location of Long Beach Airport Relative to Downtown Long Beach



Source: Open Street Maps.

⁸ By the FAA classification of airports, a small hub airport has less than a 0.25 percent share but at least a 0.05 percent share of annual U.S. enplanements.

⁹ Based on CY2017 passenger traffic data compiled by ACI-NA.

4.1 Aviation Activity

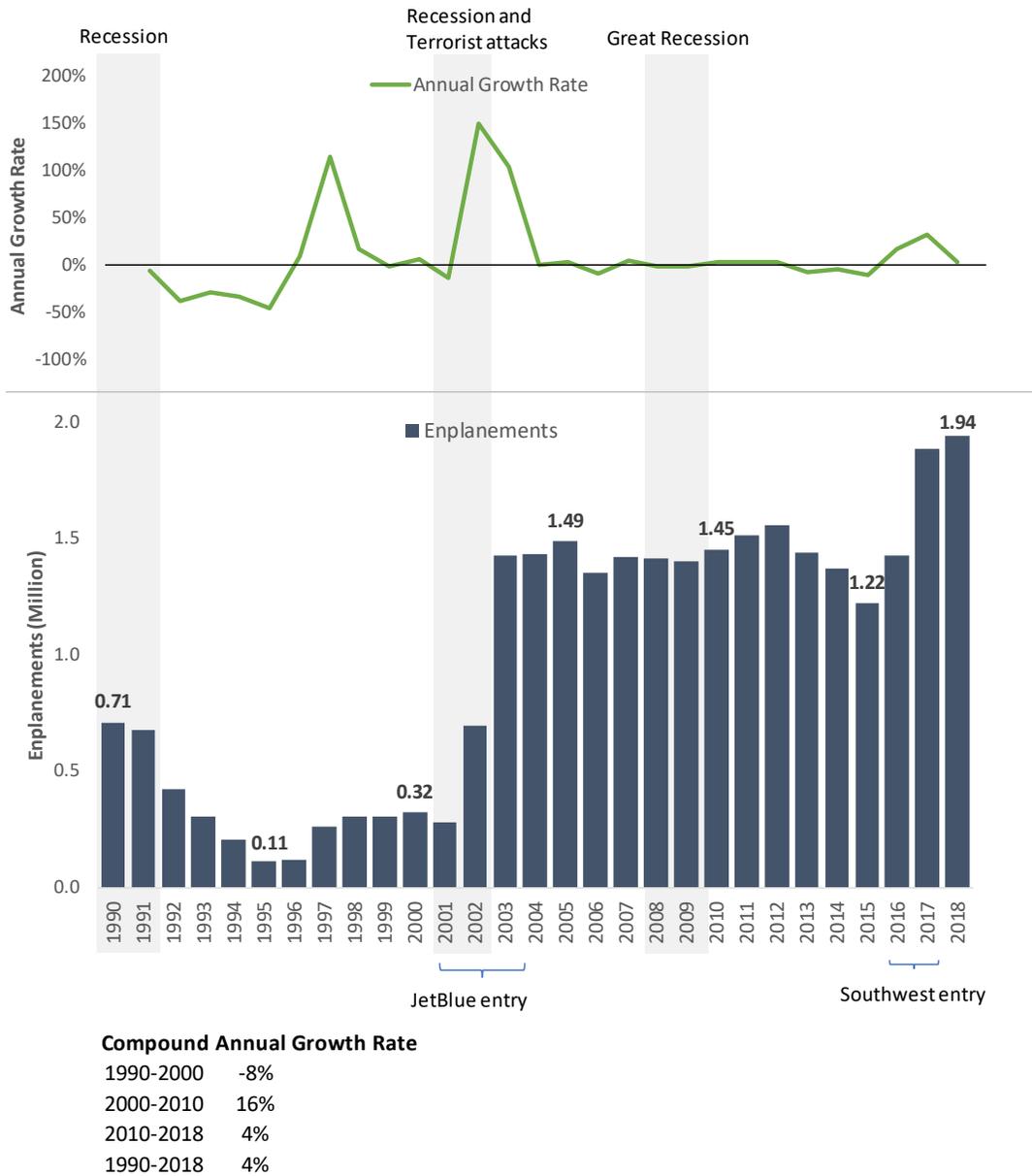
Aviation activity consists of commercial aviation activity, general aviation, and military operations. As one of the busiest general aviation airports in the world, general aviation operations accounted for 83 percent of total operations at LGB in 2018. Commercial aviation activity consists of scheduled and nonscheduled passenger and all-cargo carrier service. At LGB, passenger service accounts for 97 percent of commercial aircraft operations.

4.1.1 Passenger Airline Service

Before becoming a regional hub airport, LGB's passenger traffic peaked in 1990 with just over 700 thousand annual passenger enplanements (Figure 4-2). Enplanements declined the following year and through 1995 due to an economic recession and the impacts of Long Beach City's noise ordinance proceedings. Traffic trends at LGB improved in the latter half of the 1990's, bolstered by economic growth and the settlements reached in the City's noise ordinance litigations.

Figure 4-2 also shows passenger enplanements dipping in 2001 amidst the economic recession and the terrorist attacks of September 11, 2001. JetBlue's entry at LGB in 2001 helped rebound and expand the Airport's traffic levels, increasing enplanements five-fold between 2001 and 2003. LGB's enplanements fluctuated slightly over the following decade, before declining in 2013 as U.S. airlines responded to weak air travel demand and high fuel prices with system-wide cuts in domestic seat capacity. This trend was reversed as the airline industry ended capacity rationalization and Southwest began service at LGB in 2016. Enplanements at LGB rebounded that year and grew by 32 percent in 2017. Increasing another 3 percent in 2018, LGB posted a record 1.94 million enplanements in 2018.

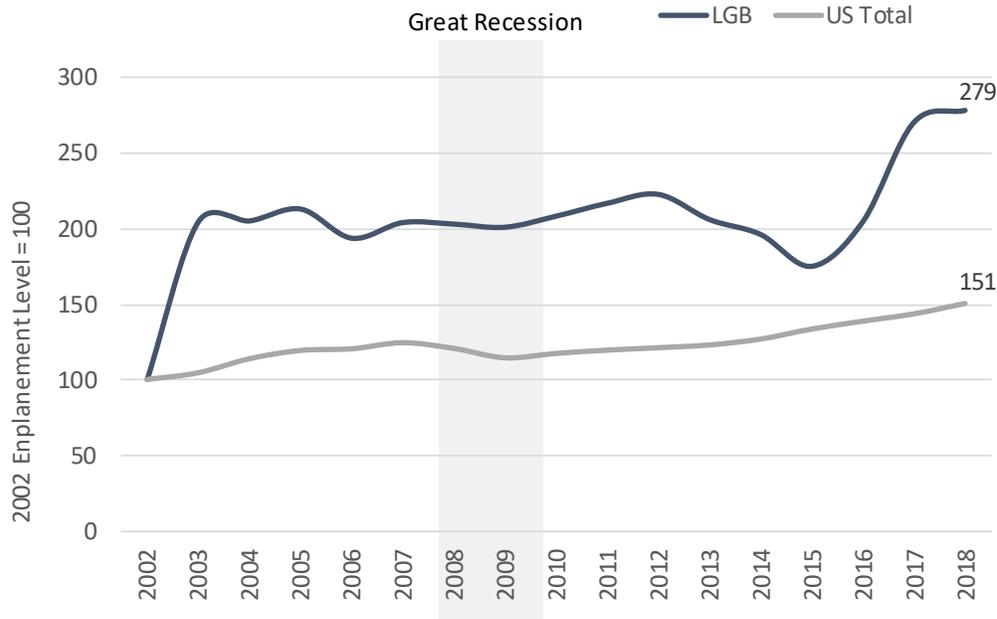
Figure 4-2: LGB Enplanement Trends, 1990-2018



Source: LGB records and U.S. Bureau of Transportation Statistics.

Figure 4-3 compares the growth in enplanements at LGB and in the nation from 2002 to 2018. During this period, LGB enplanements grew at an annual rate of 7 percent, more than twice the rate of growth nationwide (3 percent).

Figure 4-3 Enplanement Growth at LGB and in the Nation, 2002-2018



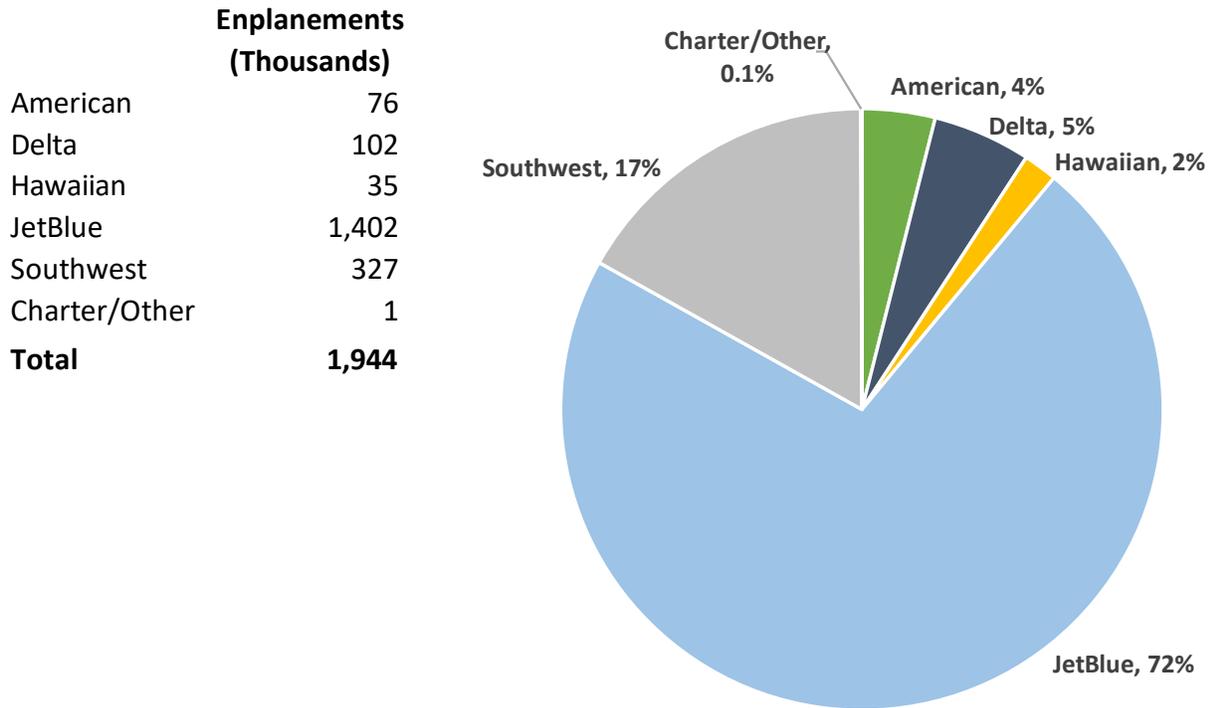
Compound Annual Growth Rate

	<u>LGB</u>	<u>US Total</u>
2002-2010	10%	2%
2010-2018	4%	3%
2002-2018	7%	3%

Source: LGB records and U.S. Bureau of Transportation Statistics.

JetBlue accounted for the largest share of passenger enplanements at LGB in 2018 (72 percent), followed by Southwest (17 percent). American, Delta, and Hawaiian, together, accounted for 11 percent of enplanements in 2018, while the remaining carriers at LGB made up less than 1 percent (Figure 4-4).

Figure 4-4 LGB Enplanements by Airline, 2018



Source: LGB records.

Passenger service accounts for the predominant share of aircraft landings (Figure 4-5). Its shares increased slightly between 2001 and 2009, as all-cargo service decreased. The shares of passenger service and all-cargo service have remained constant over the past decade:

Passenger service

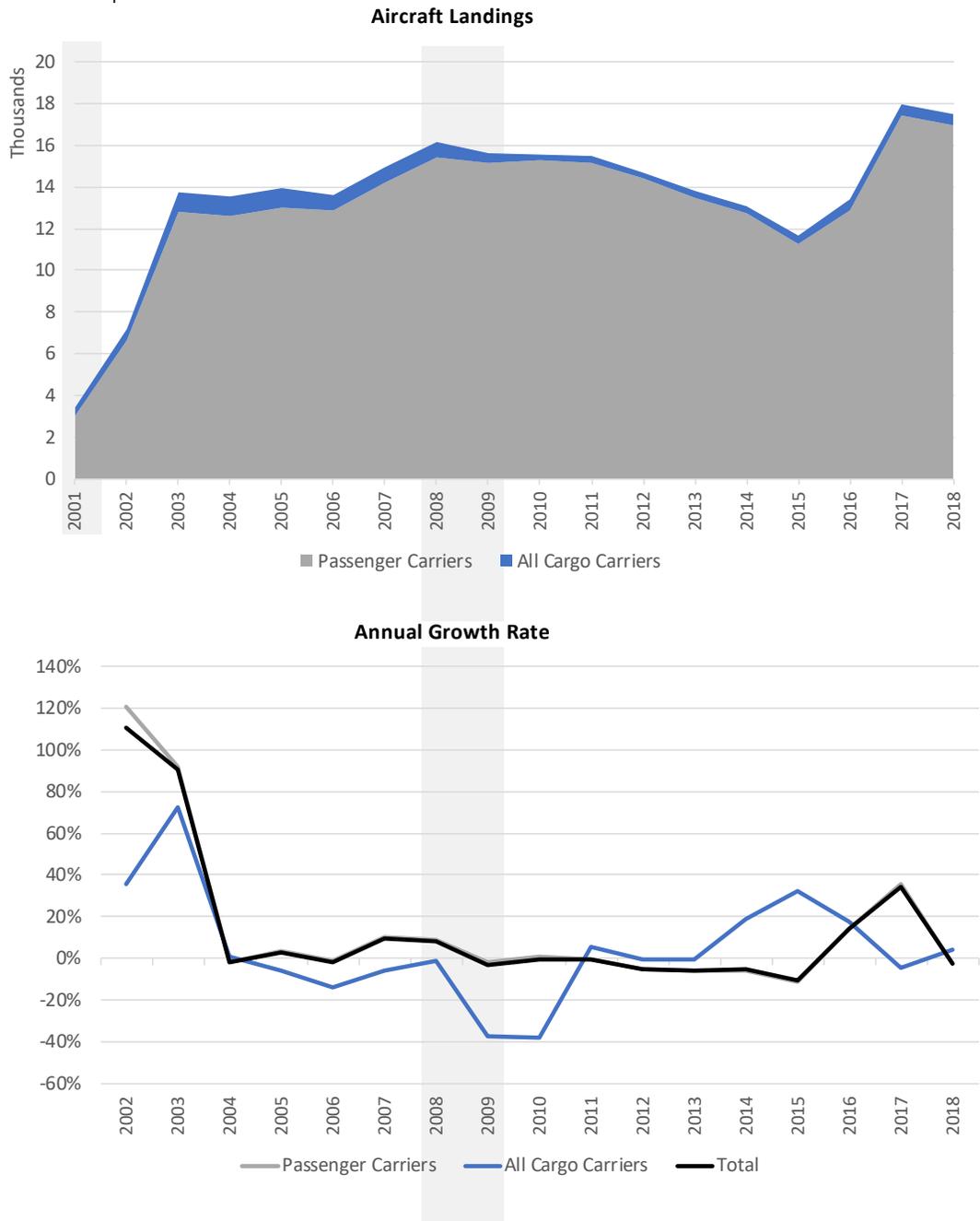
- Passenger service increased in share of aircraft landings from 88 percent in 2001 to 97 percent in 2009. Its share has remained around 97 percent through 2018.
- Passenger aircraft landings increased 11 percent per year from 2002 to 2018.

All-cargo service

- All-cargo service decreased in share of aircraft landings from 12 percent in 2001 to 3 percent in 2009. Its share has remained around 3 percent through 2018.
- All-cargo aircraft landings increased 2 percent per year, on average, from 2002 to 2018.

Figure 4-5 LGB Aircraft Landings, FY 2000-2017

US recession periods in shaded areas



Compound Annual Growth Rate

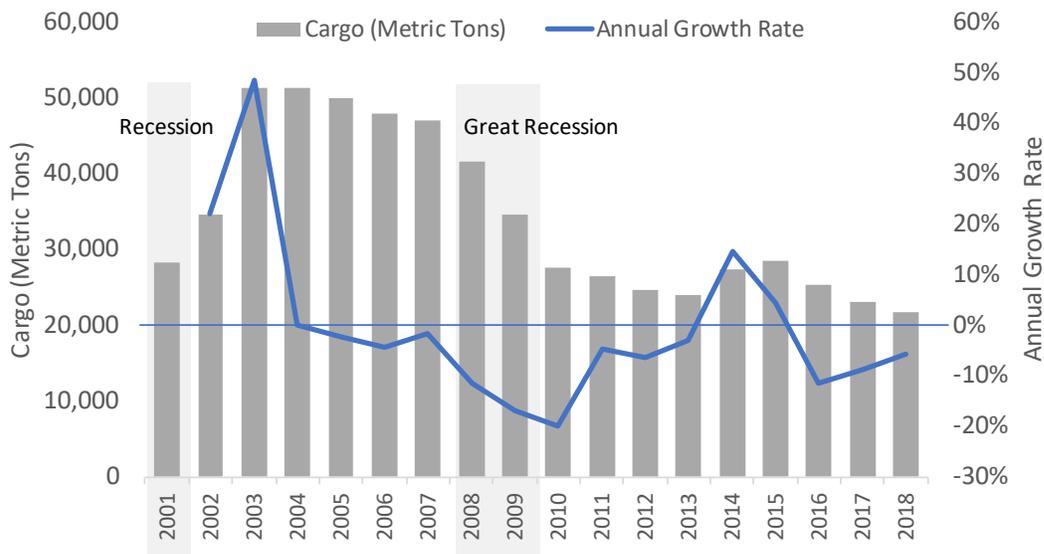
	<u>Passenger</u>	<u>All-Cargo</u>	<u>Total</u>
2002-2010	11%	-8%	10%
2010-2018	1%	1%	1%
2002-2018	6%	6%	6%

Source: LGB records and U.S. Bureau of Transportation Statistics.

4.1.2 Air Cargo Service

Cargo traffic at LGB, comprising belly freight, mail, and cargo carried by all-cargo carriers, has been decreasing since 2004, from around 51,000 metric tons to 22,000 metric tons in 2018 (Figure 4-6). Cargo tonnage decreased 1.6 percent annually, on average, over 17 years from 2001 to 2018.

Figure 4-6 LGB Cargo Trends, 2001-2018



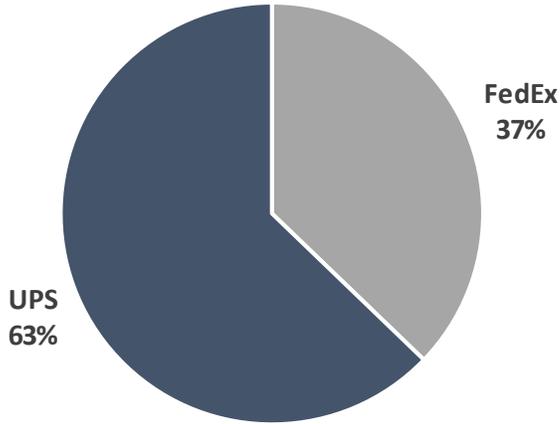
Compound Annual Growth Rate

2001-2010	-0.3%
2010-2018	-3.0%
2001-2018	-1.6%

Source: LGB records and U.S. Bureau of Transportation Statistics.

The largest cargo integrators in the world, FedEx Express and UPS Airlines, operate at LGB. Together they accounted for all of the all-cargo carrier traffic at LGB in 2018 (Figure 4-7).

Figure 4-7 LGB Cargo Tonnage by All-Cargo Airline, 2018

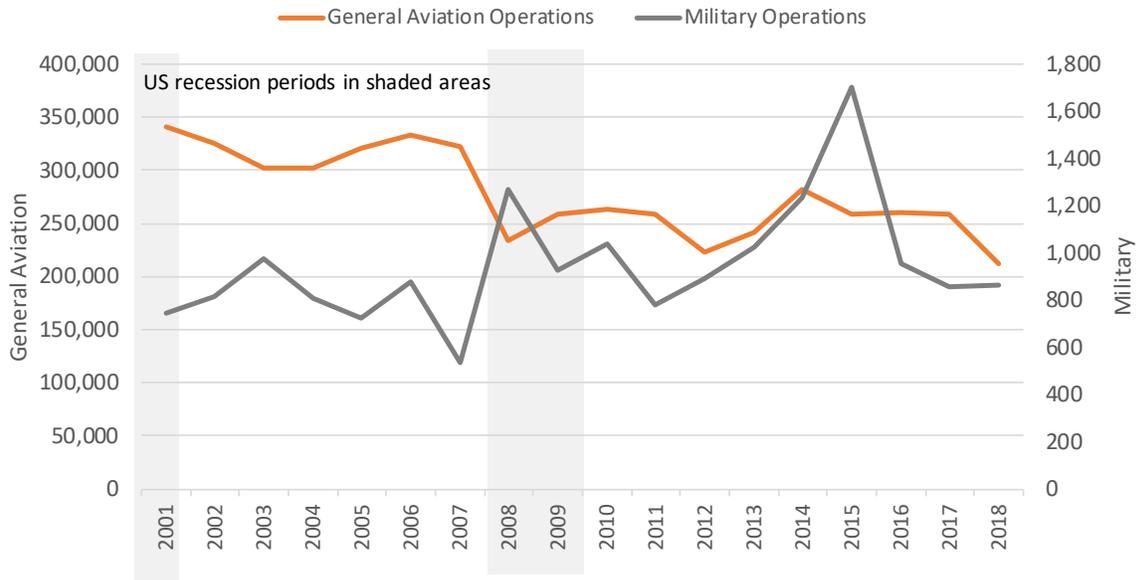


Source: LGB records.

4.1.3 Noncommercial Aircraft Operations

Figure 4-8 shows the trends in noncommercial aircraft operations, consisting of general aviation and military operations. Primarily reflecting the dominant general aviation trends at LGB, noncommercial aircraft operations decreased over the years. Both general aviation and military operations together decreased 2.7 percent annually, on average, between 2001 and 2018.

Figure 4-8: Noncommercial Aircraft Operations at LGB, 2001-2018



Compound Annual Growth Rate

	<u>General Aviation</u>	<u>Military</u>	<u>Noncommercial (GA + Military)</u>
2001-2010	-2.8%	3.8%	-2.8%
2010-2018	-2.7%	-2.3%	-2.7%
2001-2018	-2.7%	0.9%	-2.7%

Source: Federal Aviation Administration Air Traffic Activity System (ATADS).

4.2 Other Services and Related Activities

A variety of enterprises do business at LGB (Figure 4-9). Some provide services directly to passengers and other end-users, while others provide support services to airlines and the airport administration.

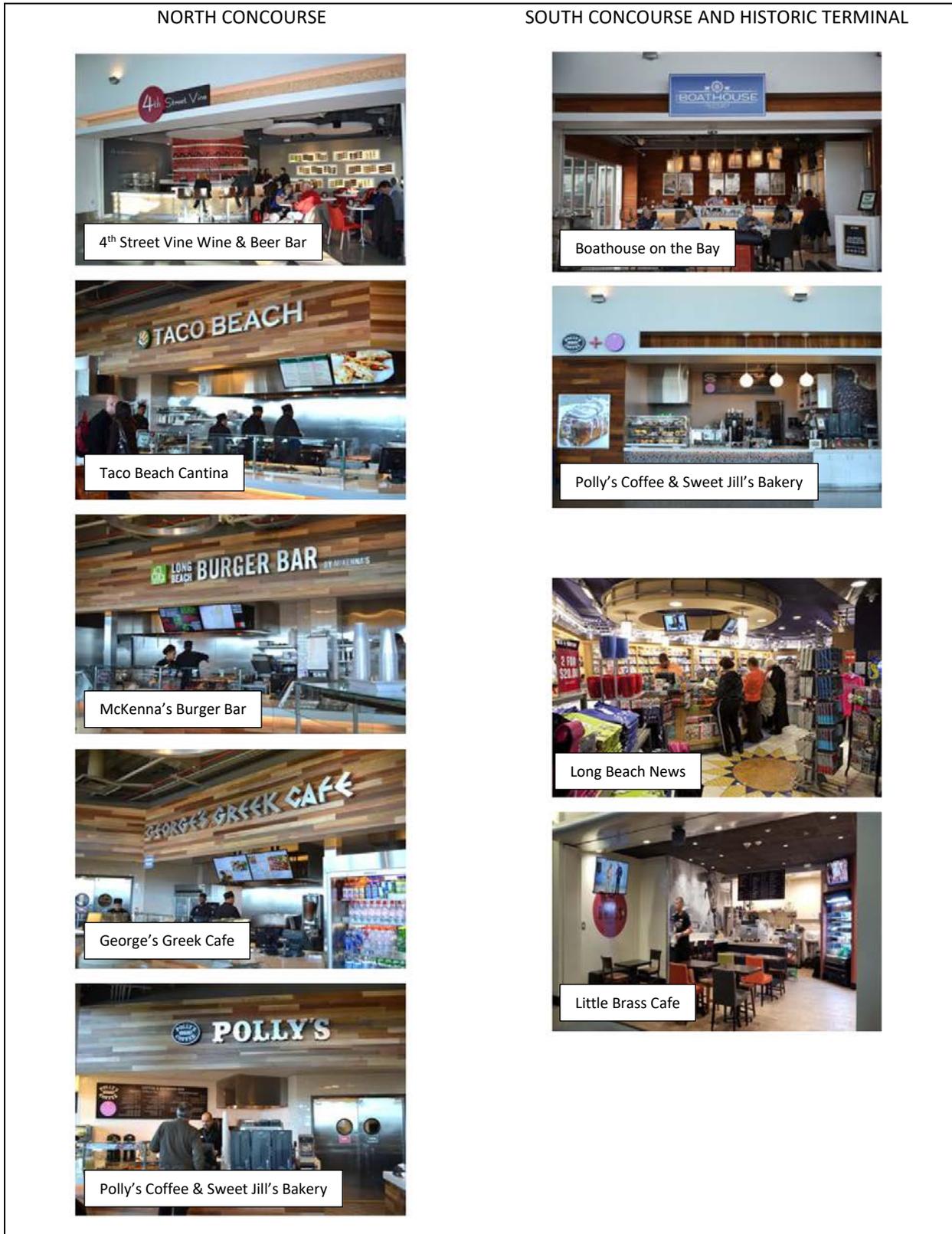
Figure 4-9: Non-Airline Service Providers at LGB

<p style="text-align: center;">Ground Transportation</p> <ul style="list-style-type: none"> • Rental cars • Transportation network companies (TNCs) • Taxicabs and limousines • Shuttle services • Public transit 	<p style="text-align: center;">Terminal Concessions</p> <ul style="list-style-type: none"> • Food and beverage • News, magazines and books • Retail merchandise • Passenger services • Luggage cart rental • ATM services • Advertising
<p style="text-align: center;">Public Agencies</p> <ul style="list-style-type: none"> • Airport Administration • Transportation Security Administration • Federal Aviation Administration • Federal Bureau of Investigation • U.S. Department of Agriculture 	<p style="text-align: center;">Aircraft Ground Services and General Aviation Services</p> <ul style="list-style-type: none"> • Jet fueling • Aircraft maintenance and repair • Baggage handling • Aircraft ground equipment • Fixed-based operators (FBOs) • Other general aviation services

Ground Transportation. Passengers have a variety of choices for ground transportation to and from the airport. LGB is served by all major rental car brands and TNCs. Taxis are available at the taxi stand outside the terminal. A long list of other ground transportation providers (reservation-only shuttle services, limousines, and luxury sedans) are also authorized to pick up passengers at the airport. For those who use private transportation, the airport has parking facilities to serve different types of customers, although parking facilities are used largely by local residents whose spending does not bring new money into the regional economy. The airport is on public transit bus routes.

Terminal Concessions. Inside the terminals are restaurants, retail stores, and other businesses providing various services to passengers (Figure 4-10).

Figure 4-10: LGB Food & Beverage and Retail Concessions



Source: Long Beach Airport website, accessed on June 26, 2019.

Public Agencies. Various public agencies maintain staff at the airport to provide support services such as security screening, air traffic control, customs inspection, immigration processing, and mail.

Aircraft Ground Services. A number of companies provide aircraft ground services including baggage handling, cargo handling, aircraft fueling, and aircraft maintenance and repair.

General Aviation Services. Fixed-base operators (FBOs) provide aircraft maintenance, fuel, hangar, and other services to general aviation users.

Other Support Services. Vendors, contractors, and consultants provide various services ranging from custodial services to professional services.

Following the U.S. BEA guidelines for economic impact analysis using RIMS II multipliers, only those businesses and enterprises that directly serve final users (passengers and other end-users) are counted in estimating the initial changes in final demand. Additionally, when using Type II multipliers that include both indirect and induced multiplier effects, only the portion of revenues coming from visiting passengers or customers based outside the study region is counted as initial final demand change, because local consumption spending by those working and residing in the study region is already captured by induced multiplier effects.

Indirect multiplier effects include the activities of businesses and government entities that provide supplies and services to businesses that directly serve passengers and end-users. They include the services provided by the airport administration, which derives its revenues from airlines, concessionaires, and other tenants at the airport, but they do not include the services of government agencies that derive funding from the federal or state budget.

4.3 Capital Outlays

Millions of dollars are expended annually to maintain, renovate, expand, and build new facilities at the airport. Table 4-1 shows the airport's current capital improvement program (CIP), consisting of projects scheduled for implementation from FY2018 to FY2024. These projects are estimated to cost a total of \$157.8 million, or an average of \$22.5 million annually.

Table 4-1: LGB Capital Improvement Program

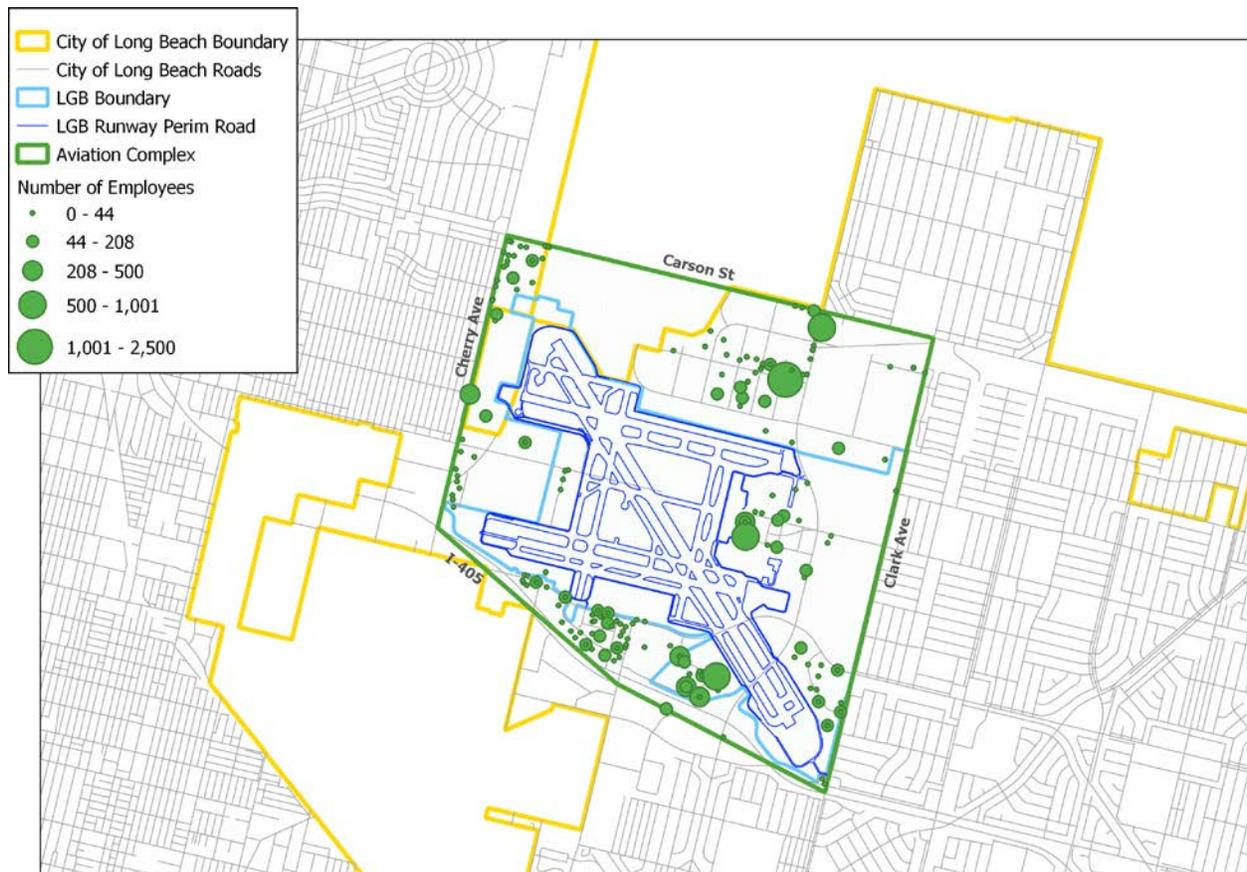
Project	Total Capital Outlay (\$M)	Timeline
Terminal Area Improvement Program Phase II		
New Ticketing Lobby	7.9	FY18-20
In-Line Baggage Screening Facility	12.4	FY18-20
Baggage Claim Area Improvements	9.4	FY18-19
Roadway and Signage Improvements	5.2	FY18-20
Ground Transportation Center	4.0	FY20-22
Terminal Renovation	8.0	FY18-21
Meet and Greet Plaza	4.3	FY20-21
Car Rental Facility: Rental Car Counters	3.6	FY18-21
Car Rental Facility: Vehicle Storage	4.1	FY19-22
Car Rental Facility: Quick Turnaround	12.5	FY20-23
Project Contingencies/Allowances	6.5	FY19-23
Subtotal	77.9	
Airfield & Other Capital Improvement Projects		
As-needed Terminal Area Improvements and Repairs	10.0	FY19-23
Taxiway D Pavement Removal	3.6	FY18-19
Runway 16L-34R Conversion to Taxiway C	16.6	FY19-20
Taxiway L North of Lakewood Reconstruction	8.6	FY20-21
Taxiway F Realignment & Reconstruction	11.2	FY21-22
Taxiway D Realignment & Reconstruction	3.8	FY21-22
Runway 16R-34L Conversion to Taxiway B	4.9	FY23-24
Taxiway C Rehabilitation	11.2	FY23-24
As-needed Airside/Airfield Improvements Repairs	10.0	FY19-23
Subtotal	79.9	
Total Airport Capital Improvement Projects	157.8	FY18-24

Source: Airport records.

4.4 The LGB Aviation Complex

The airport has been instrumental in attracting business agglomeration in its vicinity. Section 1 defined the LGB Aviation Complex as the area north of Interstate 405 and south of Carson Street, bordered by Clark Avenue and Cherry Avenue, again shown below in Figure 4-11. Many businesses of varying staff sizes have located around the airport. These businesses include not only those businesses that have clear linkages with the economic activities that take place on-airport, but also a variety of other businesses that stand to benefit from agglomeration economies. There are two types of agglomeration economies: localization economies and urbanization economies. Localization economies are benefits enjoyed by firms within the same industry sector from locating at the same place. Urbanization economies are benefits enjoyed by firms across different industry sectors just by locating within a cluster. Urbanization economies can be derived from sharing facilities like building, parking, and other common areas, or from sharing customers.

Figure 4-11: The LGB Aviation Complex



Source: Unison Consulting, Inc., and InfoUSA.

Table 4-2 shows the number of business establishments, totaling 441, within the LGB Aviation Complex, excluding those that operate within the airport premises to provide services to

passengers and other airport users. The 441 business establishments cover a variety of industries. The largest concentrations are in the following industries:

- Professional, scientific, and technical services (73 business establishments)
- Real estate and rental and leasing (54 business establishments)
- Health care and social assistance (52 business establishments)

Table 4-2: Number of Business Establishments Around LGB Within the Aviation Complex

Industry	# of Business Establishments
Accommodation and Food Services	20
Admin, Support, Waste Mgmt. & Remediation	24
Arts, Entertainment, and Recreation	8
Construction	20
Educational Services	16
Finance and Insurance	35
Health Care and Social Assistance	52
Information	12
Management of Companies and Enterprises	2
Manufacturing	18
Mining, Quarrying, and Oil and Gas Extraction	1
Other Services (except Public Administration)	35
Professional, Scientific, and Technical Services	73
Real Estate and Rental and Leasing	54
Retail Trade	31
Transportation and Warehousing	19
Wholesale Trade	21
Total	441

The individual business establishments are listed in Appendix A.

Source: Unison Consulting, Inc., and InfoUSA.

Of the 441 business establishments, 82 have clear linkages with aviation. The City of Long Beach has a rich history in aerospace manufacturing dating back to the Douglas Aircraft Company, which opened a manufacturing facility near the airport—later called Douglas Park—during World War II. The Douglas Aircraft Company merged with McDonnell Aircraft in 1967 to form McDonnell Douglas, which later merged with Boeing in 1997. The Boeing Company continued to operate the aircraft manufacturing facility to produce the C-17 Globemaster III cargo aircraft until 2015. The Boeing plant has since closed, but other aviation and aerospace companies continue to operate in and around LGB today. These include Gulfstream, which performs maintenance and service on several

models of its jets, and Virgin Orbit, which was formed in 2017 to provide launch service for small satellites. Virgin Orbit is located at the former Boeing plant site, Douglas Park.

Of the 441 business establishments, 28 rent space in LGB-owned office buildings and industrial facilities. Gulfstream Aerospace Corporation is the airport's largest leaseholder.

Section 5 Economic Impact on the Study Region

The airport is a powerful economic engine. To carry out its primary role of facilitating air transportation, the airport generates various economic activities that bring revenues and create jobs inside and outside the airport (*direct impact*). These economic activities create multiplier effects as businesses purchase inputs from other businesses (*indirect impact*) and their employees spend their earnings on various services and retail purchases (*induced impact*). In the process, they generate more business revenues and support jobs far beyond the airport's boundaries.

This section quantifies the economic impact of LGB and surrounding business establishments (LGB Aviation Complex) on the five-county economic impact region consisting of Los Angeles, Orange, San Bernardino, Riverside, and Ventura. We first identified the economic activities at the airport that bring new money into the region. These economic activities include business operations that generate revenue from nonlocal customers, public services funded by state or federal budgets, purchases made by visitors, and capital outlays. We then quantified the contribution of these economic activities to the initial change in final demand, also called direct impact, in fiscal year 2018. Then we estimated their multiplier effects, including indirect and induced impacts, using the U.S. BEA RIMS II multipliers.

To recognize the important role of LGB in attracting business agglomeration, the scope of the economic impact study is expanded to cover all business entities within the LGB Aviation Complex, defined as the area north of Interstate 405 and south of Carson Street, bordered by Clark Avenue and Cherry Avenue, following the scope of previous economic impact studies for LGB.¹⁰ Recognizing that the broader scope departs from the standard scope of airport economic impact studies, this study clearly identifies the economic impact derived from the provision and use of aviation services, and the economic impact generated by the other businesses that have located within the defined boundaries of the LGB Aviation Complex. Results are first reported for LGB alone and then for the entire LGB Aviation Complex, which includes LGB and surrounding business establishments.

¹⁰ Lisa M. Grobar, *The Economic Impact of the Long Beach Airport in 2011*, July 23, 2012.

For the study period, the overall economic impact of LGB from the provision of aviation services, the use of aviation services, and the airport's CIP outlays is estimated at \$1.6 billion in output (Figure 5-1). Output, which represents gross business revenues, is the broadest measure of economic impact. Value added is a component of output, and represents the contribution to GDP; it is the portion of output left after subtracting the cost of intermediate inputs. LGB's value added impact is estimated at \$882 million, 55 percent of its total output impact. Of the value added, \$456 million represents the annual earnings impact supporting 10,388 jobs in the study region.

The economic impact of the broader Aviation Complex, including LGB, is estimated at \$8.6 billion in output, \$4.9 billion in value added and \$2.5 billion in annual earnings supporting nearly 45,934 jobs in the study region (Figure 5-2).

Figure 5-1: Total Economic Impact of LGB on the Study Region

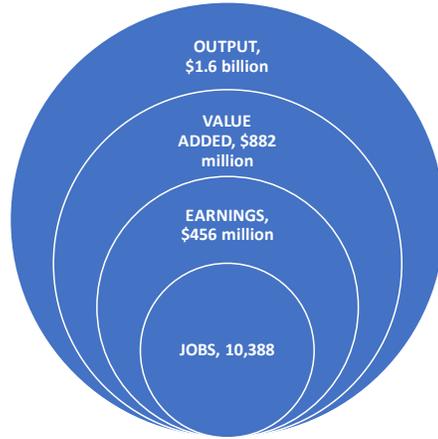
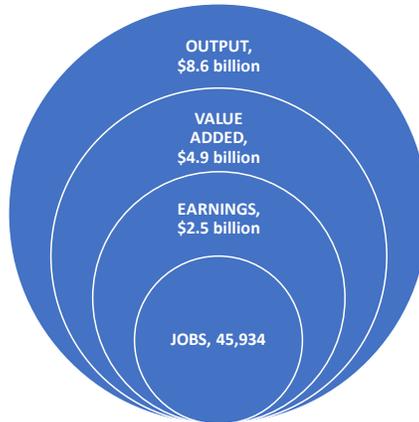


Figure 5-2: Total Economic Impact of the LGB Aviation Complex on the Study Region



5.1 Components of Economic Impact

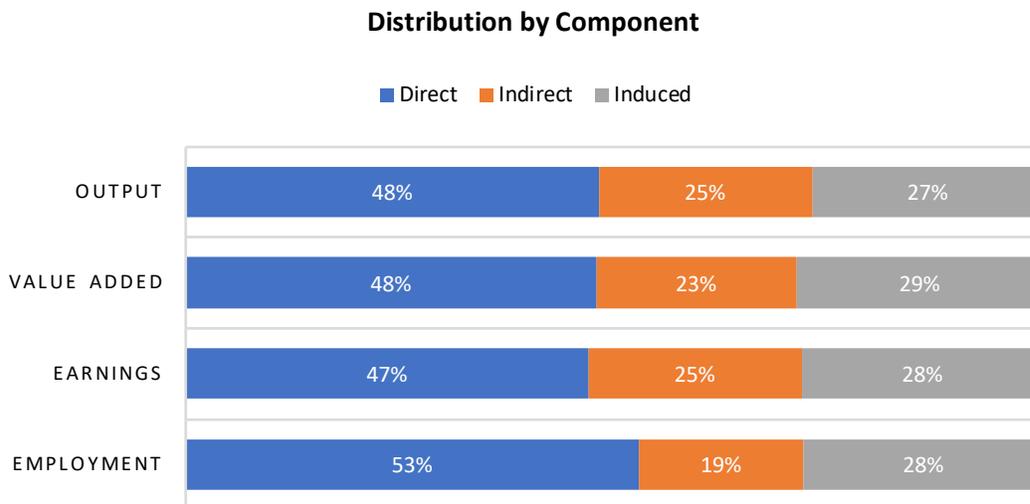
Overall economic impact consists of:

- Economic activities resulting directly from the final sale of air transportation, goods and other services (*direct impact*).
- Multiplier effects resulting from businesses purchasing intermediate inputs from other businesses within the study region (*indirect impact*).
- Multiplier effects resulting from the employees' households spending their earnings on purchases of goods and services within the study region (*induced impact*).

Figure 5-3 shows the contribution of each component to the airport's total economic impact. The direct impact accounts for the largest contribution to total economic impact, ranging from 47 percent to 53 percent depending on the measure. For each measure, the ratio of total impact to direct impact gives an indication of the overall multiplier: 2.1 for output, value added, and earnings, and 1.9 for employment.

Figure 5-3 Components of the Different Measures of LGB's Economic Impact

Component	Employment (Jobs)	Earnings (Million \$)	Value Added (Million \$)	Output (Million \$)
Direct	5,481	214	422	779
Indirect	1,999	114	206	402
Induced	2,908	129	254	437
Total	10,388	456	882	1,618



Details may not add to total due to rounding.

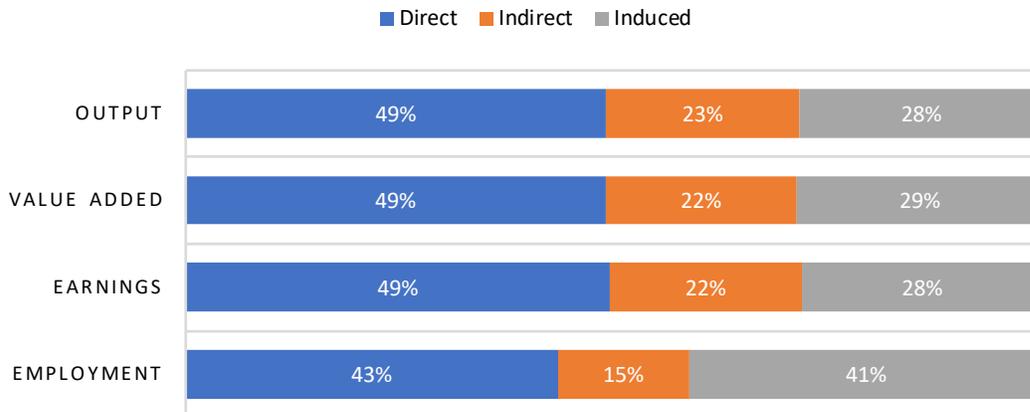
Figure 5-4 shows the share of direct, indirect and induced impacts from the total economic impact of the entire LGB Aviation Complex, which covers LGB and surrounding business establishments. The surrounding business establishments are distinguished between aviation related and non-aviation related. Aviation related establishments are identified as those relying on air transportation and have located near LGB for quick access to air transportation. Non-aviation related establishments produce a range of goods and services that are not related to air transportation.

The direct impact continues to account for the largest share of the total economic impact of the entire LGB Aviation Complex, ranging from 43 percent to 49 percent depending on the measure. For each measure, the ratio of total impact to direct impact gives an indication of the overall multiplier: 2.0 for output, value added, and earnings, and 2.3 for employment.

Figure 5-4: Components of the Different Measures of the Aviation Complex's Economic Impact

Component	Employment (Jobs)	Earnings (Million \$)	Value Added (Million \$)	Output (Million \$)
LGB				
Direct	5,481	214	422	779
Indirect	1,999	114	206	402
Induced	2,908	129	254	437
Subtotal	10,388	456	882	1,618
Aviation Complex (Aviation Related)				
Direct	2,148	200	416	788
Indirect	1,617	107	175	374
Induced	2,731	121	239	410
Subtotal	6,496	428	829	1,572
Aviation Complex (Non-Aviation Related)				
Direct	12,274	849	1,584	2,648
Indirect	3,453	350	723	1,169
Induced	13,323	471	930	1,599
Subtotal	29,050	1,670	3,237	5,417
LGB and Aviation Complex				
Direct	19,903	1,263	2,421	4,215
Indirect	7,069	570	1,104	1,945
Induced	18,962	721	1,423	2,447
Total	45,934	2,554	4,948	8,607

Distribution by Component



Details may not add to total due to rounding.

5.2 Sources of LGB's Economic Impact

An airport's economic impact comes from three sources:

- Business and government entities that provide air transportation and other services at the airport (*airport services*)
- Local spending of nonresident passengers (*visitor spending*)
- Capital outlays for airport maintenance, rehabilitation, and development (*capital outlay*)

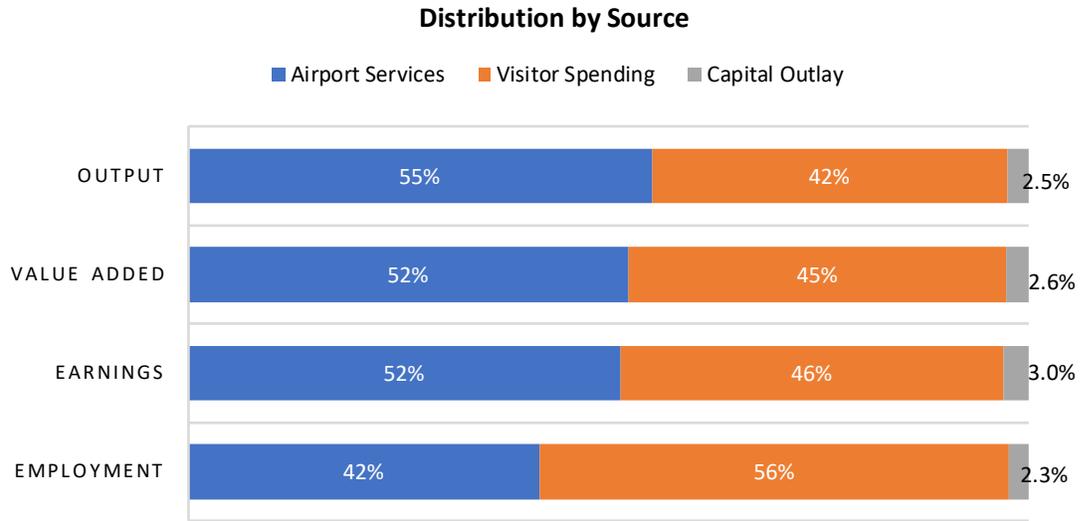
In estimating the contributions of airport services and passenger spending generated by LGB to the five-county regional economy, we count only the portion of business revenues based outside the region and the jobs supported by this portion of revenues. Only payments made by out-of-towners bring new money into the regional economy. Revenues generated from customers from within the region do not represent new money, because these are moneys that would have otherwise been spent on other purchases within the region. The local spending of visitors all count as new money.

Figure 5-5 shows the relative contributions of each source to each measure of LGB's total economic impact. Of the three sources of airport economic impact, visitor spending makes the largest contribution in terms of jobs (5,804 jobs or 56 percent of the airport's total employment impact). Airport services make the largest contribution in terms of earnings (\$235 million or 52 percent of the airport's total earnings impact), value added (\$463 million or 52 percent of the airport's total value added impact), and output (\$893 million or 55 percent of the airport's total output impact).

Table 5-1 shows the economic impact coming from each source, broken down into the component direct, indirect and induced impacts. Figure 5-6 deconstructs the airport's total output impact to show the contributions of the three sources of economic impact (airport services, visitor spending, and capital outlay) and the three components of economic impact (direct, indirect, and induced impacts).

Figure 5-5: Sources of LGB's Economic Impact

Source	Employment (Jobs)	Earnings (Million \$)	Value Added (Million \$)	Output (Million \$)
Airport Services	4,348	235	463	893
Visitor Spending	5,804	208	396	685
Capital Outlay	236	13	23	40
Total	10,388	456	882	1,618



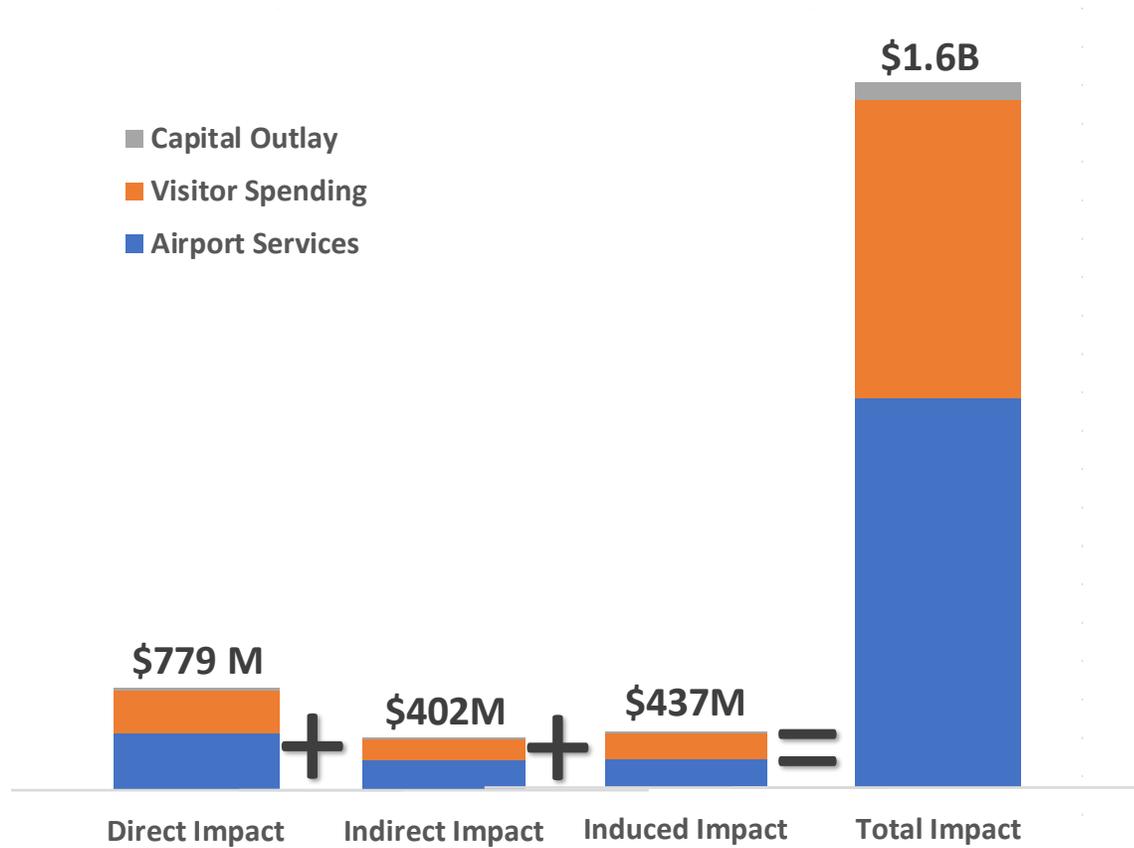
Details may not add to total due to rounding.

Table 5-1: LGB' Economic Impact by Source and by Component

Measure and Source	Components			Total
	Direct	Indirect	Induced	
Employment (Number of Jobs)				
Airport Services	1,726	1,124	1,499	4,348
Visitor Spending	3,651	829	1,324	5,804
Capital Outlay	105	46	85	236
Total	5,481	1,999	2,908	10,388
Earnings (In Million \$)				
Airport Services	103	66	66	235
Visitor Spending	104	46	59	208
Capital Outlay	7	2	4	13
Total	214	114	129	456
Value Added (In Million \$)				
Airport Services	223	108	131	463
Visitor Spending	191	90	116	396
Capital Outlay	8	7	8	23
Total	422	206	254	882
Output (In Million \$)				
Airport Services	432	235	225	893
Visitor Spending	328	157	199	685
Capital Outlay	19	9	13	40
Total	779	402	437	1,618

Details may not add to total due to rounding.

Figure 5-6: Sources and Components of LGB's Total Output Impact



Details may not add to total due to rounding.

5.2.1 Details: Economic Impact of Airport Services

Grouped under *airport services* are airlines, concessionaires, FBOs, and other enterprises that provide services and sell goods to airport users within the airport. Together they contribute the largest share to the airport's economic impact in terms of output (55 percent), value added (52 percent), and earnings (52 percent), and the second largest share to the airport's employment impact (42 percent). They create multiplier effects by employing local residents, buying supplies from local businesses, and by contracting out various support services to local businesses.

Airport services are grouped into four categories: air transportation, ground transportation, terminal concessions, and other services. Our approaches to estimating the initial final demand changes (direct impact) for the services under each category are described below.

Air Transportation

Passenger air transportation. The initial change in final demand is based on an estimate of airline revenue derived from visitors. Only airline revenue from visitors counts as new money for the purpose of the study. Visitors account for 34.2 percent of O&D traffic, and O&D traffic accounts for

95.9 percent of total enplanements, based on Unison’s estimates using the U.S. Department of Transportation DB1B Market Data. The average fare of each visitor itinerary is estimated at \$202.15, also based on the U.S. Department of Transportation DB1B Market Data.

Calculation of airline revenue from visitors:	
Total enplanements, 12 months ending September 2018	2,006,201
O&D enplanements (95.9% of total enplanements)	1,923,699
Nonresident O&D (visitors) (34.2% of O&D enplanements)	658,544
Average fare (round-trip or one-way for open jaw)	\$202.15
Estimated airline revenue from visitors (# of visitors x average fare)	\$133,123,181

Air cargo. The initial change in final demand is based on airline revenue from enplaned cargo. We assume that all enplaned cargo represents exports, ultimately paid for by cargo recipients. The weighted average cargo yield per pound for the airport is estimated at \$3.36, based the average cargo yields for FedEx and UPS calculated using data from the U.S. Bureau of Transportation Statistics. The weights are based on the relative shares of the carriers of all-cargo tonnage at the airport.

Calculation of airline revenue from enplaned cargo:	
For 12-months ending September 2018 (FY2018)	All-Cargo
Enplaned freight (pounds)	46,222,063
Enplaned mail (pounds)	0
Total enplaned cargo (pounds)	46,222,063
Cargo yield per pound	\$3.36
Estimated airline revenue (enplaned cargo pounds x cargo yield per pound)	\$155,095,107

Aviation support and general aviation services. This category includes freight forwarders and the FBOs at the airport. The revenue of freight forwarders is estimated as 40 percent of airline revenue from enplaned cargo. For FBOs and other general aviation services, their contribution to the initial change in final demand is based on number of employees, counting 50 percent as the share supported by revenues attributable to customers based outside the study region. FBOs and other general aviation services on-airport are estimated to employ a total of 143 people, based on InfoUSA business data.

Ground Transportation

Rental car services. Rental car customers consist primarily of visitors, and the revenues they bring to rental car companies at the airport represent new money to the study region. The initial change in final demand from rental car services is based on 100 percent of rental car companies’ gross revenues from their LGB operations for the 12-month period through September 2018 totaling \$32.4 million.

Airport ground transportation. The initial change in final demand is based on estimates of visitor spending on ground transportation used to get to the airport using data from Unison’s passenger survey at LGB conducted in March 2019.

Calculation of visitor spending on ground transportation using airport passenger survey data:				
Ground Access Mode	O&D Visitors	Avg. One-Way Fare per Visitor	Avg. Two-Way Fare per Visitor	Gross Fare Revenue - Visitor Trips Only
TNCs	658,544	\$5.25	\$10.50	\$6,912,579
Taxi/Limo	658,544	\$2.08	\$4.15	\$2,733,456
Public transit	658,544	\$0.03	\$0.07	\$44,866
Estimated gross revenue from visitors (# of visitors x avg. two-way fare per visitor)				\$9,690,900

Estimates of the average one-way fare per visiting passenger are derived from the passenger survey responses.

Calculation of avg. 1-way fare to the airport using sample data from the passenger survey:		
Expanded sample of visitors (respondent + travel party)	1,277	100%
Visitors who reported taking a taxi	129	10.1%
Visitors who reported amount spent	112	
Total spending on taxi	\$2,301	
Avg. spending per visitor who reported amount spent	\$20.54	
Weighted avg. spending per visitor	\$2.08	
Visitors who reported taking a TNC	472	37.0%
Visitors who reported amount spent	436	
Total spending on TNC	\$6,191	
Avg. spending per visitor who reported amount spent	\$14.20	
Weighted avg. spending per visitor	\$5.25	
Visitors who reported taking public transit	12	0.9%
Visitors who reported amount spent	8	
Total spending on public transit	\$29	
Avg. spending per visitor who reported amount spent	\$3.63	
Weighted avg. spending per visitor	\$0.03	

Terminal Concessions

Terminal concessions include restaurants, general merchandise stores, and other services. Airport records of concessionaire gross revenues provided the basis for estimating their contribution to the initial change in final demand. For the 12-month period ending September 2018, terminal concessions earned gross revenues of \$16.7million. For general merchandise sales, only the retail margin counts toward the initial change in final demand. Gross revenues were prorated by the combined traffic share (37 percent) of O&D visitors and connecting traffic to count only the portion of revenues coming from visitors.

Other Services

This category consists of airport services provided by public entities that derive funding from federal or state budget:

- Transportation Security Administration (TSA)
- Federal Aviation Administration (FAA)
- Federal Bureau of Investigation (FBI)
- U.S. Department of Agriculture (USDA)

We estimated the contribution of these services to the initial change in final demand based on the number of employees assigned at the airport.

Summary of Economic Impact from Airport Services

Table 5-2 to Table 5-5 summarize the airport’s economic impact from airport services. Figure 5-7 shows the distribution of economic impact from airport services by category. Air transportation services accounted for the largest share—from 74 to 83 percent depending upon the measure.

Table 5-2: LGB Airport Services Employment Impact

Source	Employment (Number of Jobs)			
	Direct	Indirect	Induced	Total
Air transportation				
Passenger	267	325	398	990
Air cargo	312	378	463	1,153
Aviation support	497	230	352	1,078
Subtotal	1,076	933	1,213	3,221
Ground transportation				
Rental car	132	86	102	320
Others	209	25	52	286
Subtotal	341	111	154	606
Terminal concessions				
Food & beverage	99	17	29	145
Merchandise	22	4	7	33
Others	0	1	0	1
Subtotal	121	22	36	179
Other services	188	58	96	342
Total	1,726	1,124	1,499	4,348

Details may not add to total due to rounding.

Table 5-3: LGB Airport Services Earnings Impact

Source	Earnings (Million \$)			Total
	Direct	Indirect	Induced	
Air transportation				
Passenger	25.2	19.6	17.6	62.3
Air cargo	29.4	22.8	20.5	72.6
Aviation support	27.2	12.5	15.6	55.2
Subtotal	81.7	54.8	53.7	190.2
Ground transportation				
Rental car	6.7	4.8	4.5	16.0
Others	4.2	1.6	2.3	8.1
Subtotal	10.9	6.4	6.8	24.1
Terminal concessions				
Food & beverage	2.3	0.9	1.3	4.5
Merchandise	0.5	0.2	0.3	1.1
Others	0.0	0.0	0.0	0.1
Subtotal	2.9	1.2	1.6	5.7
Other services	7.6	3.3	4.3	15.1
Total	103.1	65.7	66.3	235.1

Details may not add to total due to rounding.

Table 5-4: LGB Airport Services Value Added Impact

Source	Value Added (Million \$)			
	Direct	Indirect	Induced	Total
Air transportation				
Passenger	64.9	30.1	34.7	129.8
Air cargo	75.6	35.1	40.5	151.2
Aviation support	41.8	22.9	30.8	95.5
Subtotal	182.3	88.2	106.0	376.4
Ground transportation				
Rental car	19.5	9.4	8.9	37.8
Others	4.9	2.5	4.5	12.0
Subtotal	24.5	11.8	13.4	49.8
Terminal concessions				
Food & beverage	3.8	1.8	2.5	8.1
Merchandise	1.0	0.5	0.6	2.1
Others	0.1	0.0	0.0	0.1
Subtotal	4.9	2.3	3.2	10.4
Other services	11.6	6.0	8.4	26.1
Total	223.3	108.3	131.0	462.6

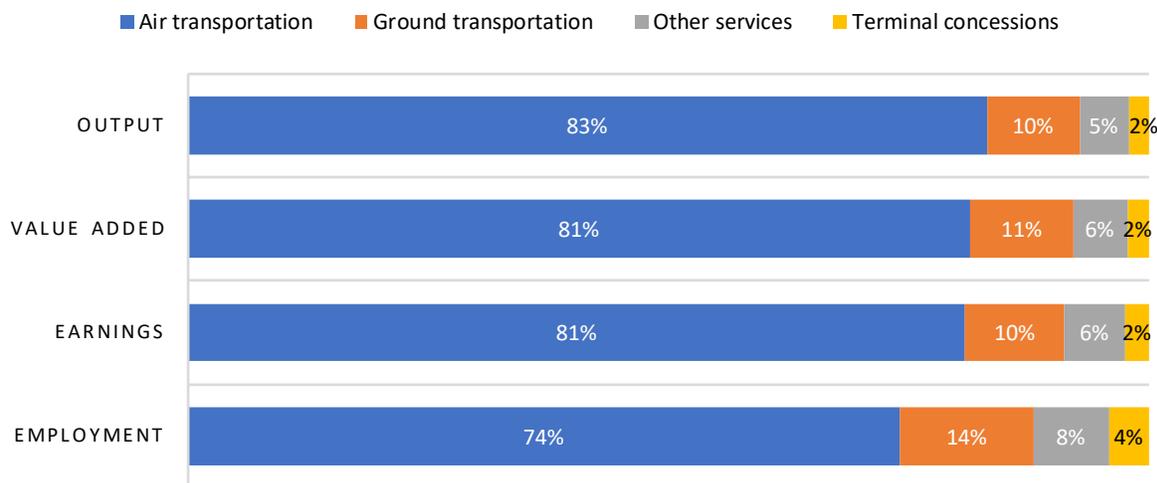
Details may not add to total due to rounding.

Table 5-5: LGB Airport Services Output Impact

Source	Output (Million \$)			
	Direct	Indirect	Induced	Total
Air transportation				
Passenger	133.1	73.4	59.7	266.2
Air cargo	155.1	85.5	69.6	310.2
Aviation support	72.5	40.2	52.9	165.6
Subtotal	360.7	199.1	182.2	742.1
Ground transportation				
Rental car	32.4	15.0	15.3	62.7
Others	9.7	5.9	7.8	23.4
Subtotal	42.1	20.9	23.1	86.1
Terminal concessions				
Food & beverage	6.9	3.5	4.3	14.8
Merchandise	1.7	0.8	1.0	3.5
Others	0.1	0.0	0.1	0.2
Subtotal	8.7	4.3	5.4	18.5
Other services	20.6	11.1	14.5	46.1
Total	432.1	235.4	225.2	892.8

Details may not add to total due to rounding.

Figure 5-7: Economic Impact of LGB Airport Services, Contribution by Service Category



Rounded percentages may not add exactly to 100 percent.

5.2.2 Details: Economic Impact of Visitor Spending

Southern California is a popular visitor destination, and LGB serves as one of the gateways for the visitors coming to the study region. For the 12-month period through September 2018, the airport had more than 2 million commercial passenger enplanements. Of these, about 658,500 were visitors, assuming a 34.2 percent visitor share of O&D passenger traffic and a 95.9 percent O&D share of total passenger traffic. Additionally, transient general aviation (GA) operations are estimated to have brought in another 71,000 visitors, assuming 50 percent of itinerant general aviation operations were transient and each operation carried 2.84 passengers on average.¹¹

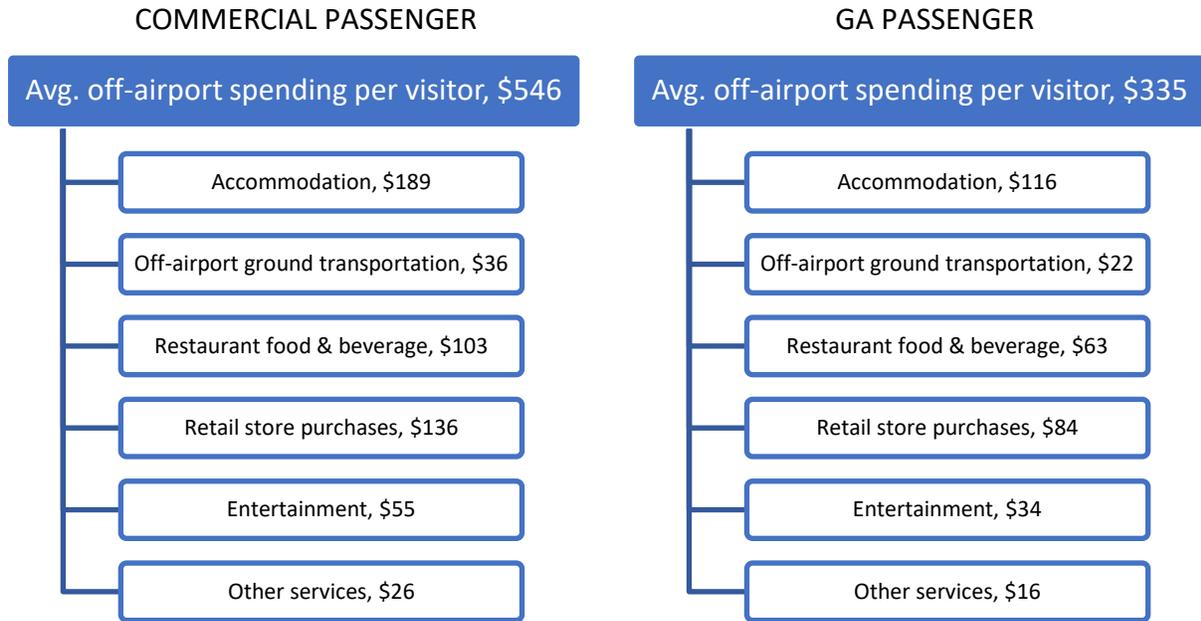
Visitors bring new money into the regional economy. They provide revenues to various local enterprises when they stay in hotels, pay for ground transportation, eat at restaurants, shop, and pay for entertainment and various other services. The revenues, in turn, support jobs that provide income to local households.

Unison Consulting and ANIK International conducted a passenger survey at LGB to determine how much visitors, who use commercial passenger service at LGB, spend outside the airport during their stay. The survey obtained a sample size of 1,200-1,300 visitors, counting all members of each respondent's travel party. The survey responses provided the basis for estimating off-airport spending per commercial passenger for various expense categories, as shown on Figure 5-8.

Based on estimated commercial passenger spending, we derived estimates of off-airport spending for transient GA passengers. Findings from economic impact studies for other airports involving both commercial service and general aviation show GA passengers spending approximately 61 percent of the amounts spent by commercial service passengers. Figure 5-8 also shows the estimates of average off-airport spending per transient GA passenger.

¹¹ This average number of passengers (2.84) per itinerant general aviation operation was used in PWC's study, *Contribution of General Aviation to the U.S. Economy in 2013*, and the FAA June 2014 study, *The Economic Impact of Civil Aviation on the U.S. Economy*.

Figure 5-8: Average Off-Airport Spending per Visitor - LGB Passenger



Details may not add to total due to rounding.

Source: Unison Consulting, Inc., and ANIK International, LGB Passenger Survey, March 2019.

Table 5-6 to Table 5-9 summarize the economic impact from visitor spending. Figure 5-9 shows the distribution of the economic impact of visitor spending by expense category. Accommodation expenses generated the largest economic impact, closely followed by restaurant food & beverage.

Table 5-6: LGB Visitor Spending Employment Impact

Source	Employment (Number of Jobs)			
	Direct	Indirect	Induced	Total
Visitor spending				
Accommodation	1,006	303	482	1,791
Food & beverage	1,033	179	301	1,513
Retail purchases	517	98	165	780
Entertainment	379	130	154	663
Ground transportation	548	67	136	751
Miscellaneous services	168	52	86	306
Total	3,651	829	1,324	5,804

Details may not add to total due to rounding.

Table 5-7: LGB Visitor Spending Earnings Impact

Source	Earnings (Million \$)			Total
	Direct	Indirect	Induced	
Visitor spending				
Accommodation	37.6	16.7	21.3	75.7
Food & beverage	24.0	9.9	13.3	47.2
Retail purchases	13.1	5.5	7.3	25.9
Entertainment	11.0	6.3	6.8	24.2
Ground transportation	11.2	4.2	6.0	21.4
Miscellaneous services	6.8	2.9	3.8	13.5
Total	103.7	45.5	58.6	207.8

Details may not add to total due to rounding.

Table 5-8: LGB Visitor Spending Value Added Impact

Source	Value Added (Million \$)			Total
	Direct	Indirect	Induced	
Visitor spending				
Accommodation	80.3	35.5	42.2	157.9
Food & beverage	39.7	18.6	26.3	84.6
Retail purchases	24.8	11.9	14.4	51.0
Entertainment	22.4	12.3	13.5	48.2
Ground transportation	13.0	6.5	11.9	31.4
Miscellaneous services	10.4	5.4	7.5	23.3
Total	190.6	90.1	115.8	396.5

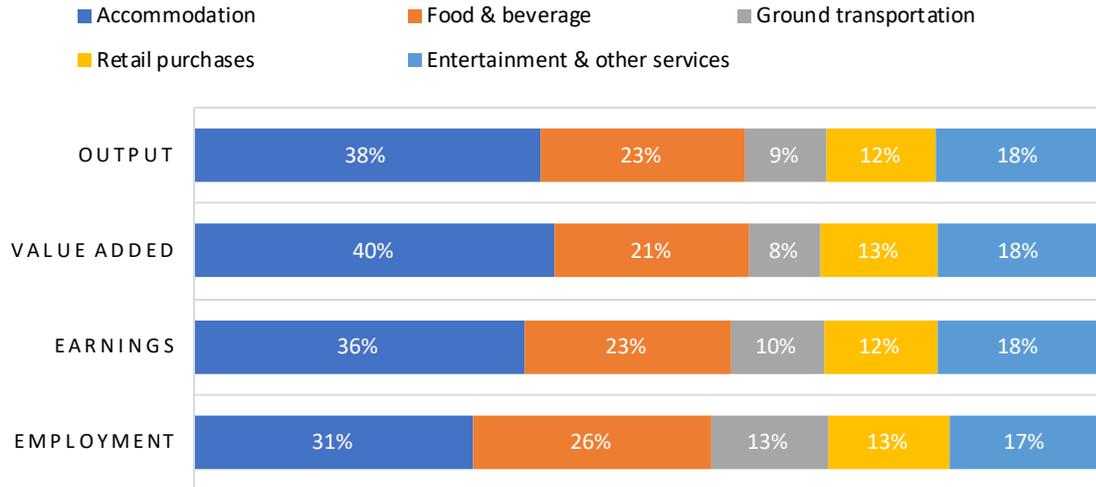
Details may not add to total due to rounding.

Table 5-9: LGB Visitor Spending Output Impact

Source	Output (Million \$)			Total
	Direct	Indirect	Induced	
Visitor spending				
Accommodation	132.7	55.8	72.5	260.9
Food & beverage	72.6	36.9	45.3	154.7
Retail purchases	40.3	18.0	24.8	83.1
Entertainment	38.7	21.2	23.1	83.1
Ground transportation	25.5	15.6	20.5	61.5
Miscellaneous services	18.4	9.9	12.9	41.2
Total	328.2	157.3	199.1	684.6

Details may not add to total due to rounding.

Figure 5-9: Economic Impact of LGB Visitor Spending, Contribution by Expense Category



Rounded percentages may not add exactly to 100 percent.

5.2.3 Details: Economic Impact of LGB Capital Outlay

The Department of Aviation maintains a multi-year CIP for major maintenance, rehabilitation, and expansion of airport facilities. Table 5-10 to Table 5-13 summarize the economic impact of LGB capital outlays on the study region, based on the average CIP outlay per year. Figure 5-10 shows the distribution by type of capital spending. Construction accounted for the largest share of capital outlay and generated the largest economic impact.

Table 5-10: LGB Capital Outlay Employment Impact

Source	Employment (Number of Jobs)			
	Direct	Indirect	Induced	Total
Capital Outlay				
Construction	76	33	60	169
Professional services	26	11	23	60
Vehicles and equipment*	3	2	2	7
Total	105	46	85	236

*Includes only the wholesale trade margin.
Details may not add to total due to rounding.

Table 5-11: LGB Capital Outlay Earnings Impact

Source	Earnings (Thousand \$)			
	Direct	Indirect	Induced	Total
Capital Outlay				
Construction	5,013	1,764	2,663	9,440
Professional services	1,990	616	1,024	3,630
Vehicles and equipment*	220	88	121	429
Total	7,223	2,468	3,809	13,499

*Includes only the wholesale trade margin.
Details may not add to total due to rounding.

Table 5-12: LGB Capital Outlay Value Added Impact

Source	Value Added (Thousand \$)			
	Direct	Indirect	Induced	Total
Capital Outlay				
Construction	7,365	3,253	5,259	15,876
Professional services	0	3,986	2,023	6,009
Vehicles and equipment*	441	199	239	879
Total	7,806	7,438	7,520	22,764

*Includes only the wholesale trade margin.
Details may not add to total due to rounding.

Table 5-13: LGB Capital Outlay Output Impact

Source	Output (Thousand \$)			
	Direct	Indirect	Induced	Total
Capital Outlay				
Construction	13,526	6,588	9,043	29,157
Professional services	4,509	1,954	3,478	9,940
Vehicles and equipment*	698	282	411	1,391
Total	18,732	8,824	12,932	40,489

*Includes only the wholesale trade margin.
Details may not add to total due to rounding.

Figure 5-10: Economic Impact of LGB Capital Outlay, Contribution by Outlay Category



Rounded percentages may not add exactly to 100 percent.

5.3 Economic Impact of Other Business Establishments in the LGB Aviation Complex

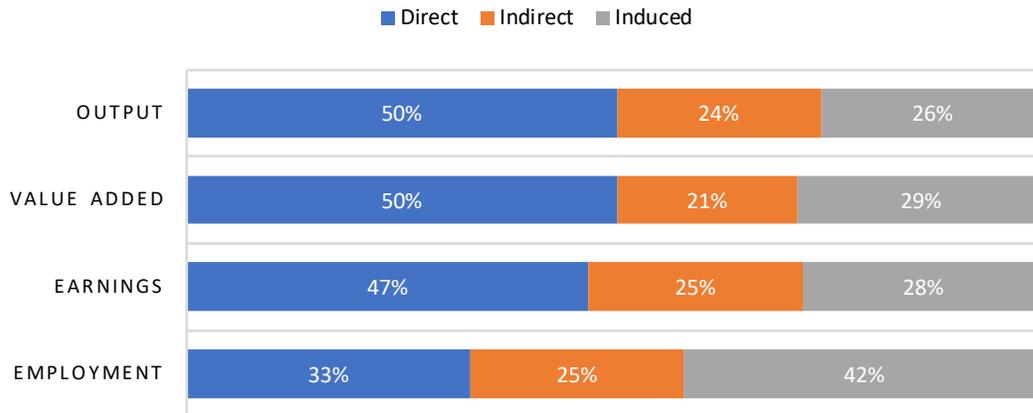
Following the scope of previous economic impact studies for the airport, this study assessed the economic impact of other business establishments around LGB within the defined boundaries of the LGB Aviation Complex. These business establishments were categorized as aviation related and non-aviation related. Using InfoUSA business data for the City of Long Beach, we identified 441 business establishments located around LGB, within the defined area for the LGB Aviation Complex. Of these 441 business establishments, 82 are aviation related and 359 are non-aviation related. Of these 441 business establishments, 28 rent space in LGB-owned office buildings and industrial facilities.

Figure 5-11 summarizes the economic impact of the 82 other aviation related business establishments around LGB, and Figure 5-12 summarizes the economic impact of the 359 non-aviation related business establishments around LGB within the defined LGB Aviation Complex.

Figure 5-11: Economic Impact of Other Aviation Related Business Establishments in the LGB Aviation Complex

Component	Employment (Jobs)	Earnings (Million \$)	Value Added (Million \$)	Output (Million \$)
Direct	2,148	200	416	788
Indirect	1,617	107	175	374
Induced	2,731	121	239	410
Total	6,496	428	829	1,572

Distribution by Component

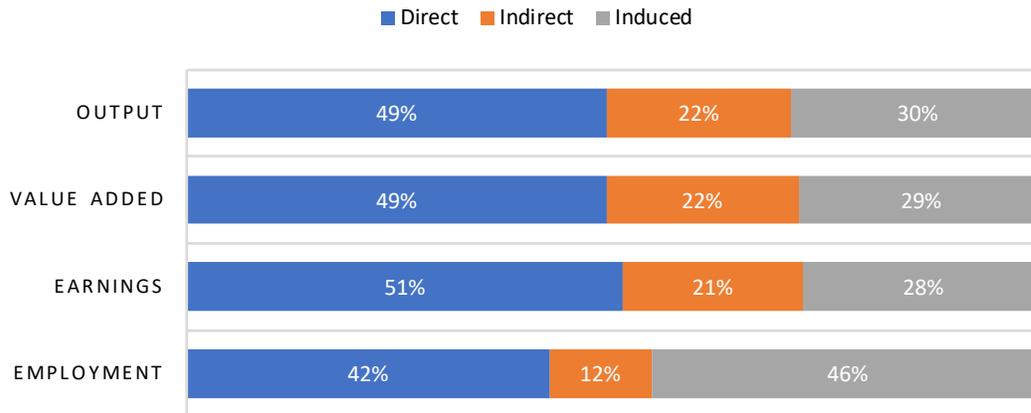


Details may not add to total due to rounding.

Figure 5-12: Economic Impact of Other Non-Aviation Related Business in the LGB Aviation Complex

Component	Employment (Jobs)	Earnings (Million \$)	Value Added (Million \$)	Output (Million \$)
Direct	12,274	849	1,584	2,648
Indirect	3,453	350	723	1,169
Induced	13,323	471	930	1,599
Total	29,050	1,670	3,237	5,417

Distribution by Component



Details may not add to total due to rounding.

5.4 Economic Impact by Industry Sector

Various industry sectors in the study region benefit from the economic activity generated by the airport and surrounding businesses. Table 5-14 shows the industry distribution of economic impact from LGB alone, with the transportation and warehousing industry enjoying the largest share. Table 5-15 shows the industry distribution of economic impact from the surrounding business establishments, and Table 5-16 shows the industry distribution of economic impact from the entire LGB Aviation Complex (LGB and surrounding business establishments), with the durable goods manufacturing industry enjoying the largest shares.

Table 5-14: Industry Distribution of the Economic Impact of LGB on the Study Region

Industry Sector	Employment (Jobs)		Earnings (\$M)		Value Added (\$M)		Output (\$M)	
	Total	Share	Total	Share	Total	Share	Total	Share
Agriculture, forestry, fishing, and hunting	20	0.2%	0.7	0.1%	0.8	0.1%	2.2	0.1%
Mining	16	0.2%	1.0	0.2%	4.4	0.5%	6.4	0.4%
Utilities	26	0.2%	3.3	0.7%	11.9	1.3%	22.3	1.4%
Construction	140	1.3%	9.2	2.0%	13.4	1.5%	24.9	1.5%
Durable goods manufacturing	85	0.8%	5.6	1.2%	10.3	1.2%	25.9	1.6%
Nondurable goods manufacturing	228	2.2%	18.8	4.1%	32.8	3.7%	114.9	7.1%
Wholesale trade	196	1.9%	14.2	3.1%	30.4	3.5%	44.9	2.8%
Retail trade	1,074	10.3%	31.5	6.9%	59.8	6.8%	91.4	5.6%
Transportation and warehousing	2,316	22.3%	122.4	26.8%	225.3	25.6%	468.1	28.9%
Information	113	1.1%	10.0	2.2%	24.7	2.8%	42.6	2.6%
Finance and insurance	283	2.7%	19.4	4.3%	38.0	4.3%	72.7	4.5%
Real estate and rental and leasing	763	7.3%	27.2	6.0%	108.2	12.3%	160.1	9.9%
Professional, scientific, and technical services	350	3.4%	27.2	5.9%	38.6	4.4%	61.5	3.8%
Management of companies and enterprises	74	0.7%	8.5	1.9%	12.3	1.4%	20.5	1.3%
Administrative and waste management services	454	4.4%	16.8	3.7%	23.9	2.7%	36.9	2.3%
Educational services	104	1.0%	3.7	0.8%	4.9	0.6%	8.0	0.5%
Health care and social assistance	431	4.1%	21.8	4.8%	29.0	3.3%	48.5	3.0%
Arts, entertainment, and recreation	506	4.9%	14.8	3.3%	30.0	3.4%	52.1	3.2%
Accommodation	1,076	10.4%	40.2	8.8%	89.8	10.2%	141.9	8.8%
Food services and drinking places	1,442	13.9%	33.5	7.3%	53.4	6.1%	101.3	6.3%
Other services	646	6.2%	26.0	5.7%	39.3	4.5%	70.8	4.4%
Households	44	0.4%	0.6	0.1%	0.6	0.1%	0.0	0.0%
Total Economic Impact	10,388	100.0%	456.4	100.0%	881.9	100.0%	1,617.8	100.0%

Details may not add to total due to rounding.

Table 5-15: Industry Distribution of the Economic Impact of Surrounding Business Establishments on the Study Region

Industry Sector	Employment (Jobs)		Earnings (\$M)		Value Added (\$M)		Output (\$M)	
	Total	Share	Total	Share	Total	Share	Total	Share
Agriculture, forestry, fishing, and hunting	81	0.2%	2.8	0.1%	3.5	0.1%	8.8	0.1%
Mining	27	0.1%	1.7	0.1%	7.2	0.2%	10.4	0.1%
Utilities	105	0.3%	13.5	0.6%	48.8	1.2%	91.1	1.3%
Construction	509	1.4%	33.8	1.6%	49.1	1.2%	91.1	1.3%
Durable goods manufacturing	3,551	10.0%	354.1	16.9%	704.1	17.3%	1,456.6	20.8%
Nondurable goods manufacturing	864	2.4%	56.7	2.7%	101.4	2.5%	309.6	4.4%
Wholesale trade	3,848	10.8%	279.1	13.3%	599.5	14.7%	883.5	12.6%
Retail trade	3,451	9.7%	123.9	5.9%	230.1	5.7%	335.7	4.8%
Transportation and warehousing	1,620	4.6%	85.6	4.1%	134.5	3.3%	259.1	3.7%
Information	1,761	5.0%	171.0	8.2%	431.1	10.6%	705.6	10.1%
Finance and insurance	1,399	3.9%	98.7	4.7%	195.4	4.8%	369.6	5.3%
Real estate and rental and leasing	3,091	8.7%	100.7	4.8%	437.1	10.7%	628.8	9.0%
Professional, scientific, and technical services	3,471	9.8%	270.6	12.9%	384.0	9.4%	611.7	8.8%
Management of companies and enterprises	410	1.2%	48.6	2.3%	70.1	1.7%	115.5	1.7%
Administrative and waste management services	2,246	6.3%	84.0	4.0%	119.7	2.9%	184.2	2.6%
Educational services	1,052	3.0%	37.7	1.8%	49.3	1.2%	80.6	1.2%
Health care and social assistance	3,510	9.9%	191.0	9.1%	258.1	6.3%	422.2	6.0%
Arts, entertainment, and recreation	633	1.8%	18.6	0.9%	37.5	0.9%	65.0	0.9%
Accommodation	543	1.5%	20.4	1.0%	45.5	1.1%	71.8	1.0%
Food services and drinking places	1,571	4.4%	36.9	1.8%	58.8	1.4%	111.2	1.6%
Other services	1,607	4.5%	65.5	3.1%	98.6	2.4%	177.2	2.5%
Households	197	0.6%	2.8	0.1%	2.8	0.1%	0.0	0.0%
Total Economic Impact	35,546	100.0%	2,097.7	100.0%	4,066.3	100.0%	6,989.0	100.0%

Details may not add to total due to rounding.

Table 5-16: Industry Distribution of the Economic Impact of the LGB Aviation Complex (LGB and Surrounding Business Establishments) on the Study Region

Industry Sector	Employment (Jobs)		Earnings (\$M)		Value Added (\$M)		Output (\$M)	
	Total	Share	Total	Share	Total	Share	Total	Share
Agriculture, forestry, fishing, and hunting	101	0.2%	3.5	0.1%	4.3	0.1%	10.9	0.1%
Mining	43	0.1%	2.8	0.1%	11.6	0.2%	16.8	0.2%
Utilities	131	0.3%	16.8	0.7%	60.7	1.2%	113.3	1.3%
Construction	649	1.4%	43.0	1.7%	62.5	1.3%	116.0	1.3%
Durable goods manufacturing	3,637	7.9%	359.7	14.1%	714.4	14.4%	1,482.4	17.2%
Nondurable goods manufacturing	1,092	2.4%	75.5	3.0%	134.2	2.7%	424.5	4.9%
Wholesale trade	4,044	8.8%	293.2	11.5%	629.9	12.7%	928.3	10.8%
Retail trade	4,525	9.9%	155.3	6.1%	289.9	5.9%	427.1	5.0%
Transportation and warehousing	3,936	8.6%	208.0	8.1%	359.9	7.3%	727.2	8.4%
Information	1,874	4.1%	181.0	7.1%	455.8	9.2%	748.2	8.7%
Finance and insurance	1,682	3.7%	118.2	4.6%	233.4	4.7%	442.2	5.1%
Real estate and rental and leasing	3,854	8.4%	127.9	5.0%	545.2	11.0%	788.9	9.2%
Professional, scientific, and technical services	3,821	8.3%	297.8	11.7%	422.6	8.5%	673.2	7.8%
Management of companies and enterprises	484	1.1%	57.1	2.2%	82.4	1.7%	136.0	1.6%
Administrative and waste management services	2,700	5.9%	100.7	3.9%	143.7	2.9%	221.1	2.6%
Educational services	1,156	2.5%	41.4	1.6%	54.2	1.1%	88.6	1.0%
Health care and social assistance	3,941	8.6%	212.8	8.3%	287.1	5.8%	470.7	5.5%
Arts, entertainment, and recreation	1,139	2.5%	33.4	1.3%	67.5	1.4%	117.0	1.4%
Accommodation	1,619	3.5%	60.6	2.4%	135.4	2.7%	213.7	2.5%
Food services and drinking places	3,013	6.6%	70.5	2.8%	112.2	2.3%	212.5	2.5%
Other services	2,253	4.9%	91.5	3.6%	137.9	2.8%	248.0	2.9%
Households	240	0.5%	3.4	0.1%	3.4	0.1%	0.0	0.0%
Total Economic Impact	45,934	100.0%	2,554.2	100.0%	4,948.2	100.0%	8,606.9	100.0%

Details may not add to total due to rounding.

5.5 State and Local Tax Revenue Impact

The economic activities arising from the operation of the airport generate tax revenues that help fund local government services and public infrastructure. Taxes, however, represent a transfer of income from businesses and individuals to the government. They do not represent additional economic impact.

Estimates of the state and local tax revenue contributions are presented in Table 5-17 for the economic impact of LGB alone, Table 5-18 for the economic impact of surrounding business establishments, and Table 5-19 for the economic impact of the entire LGB Aviation Complex (LGB and surrounding business establishments). These estimates are based on the airport's total value added impact—a measure of the airport's contribution to GDP—and data on state and local government tax revenues.

Table 5-17: Economic Impact of LGB - Contribution to State and Local Tax Revenue

	As Percent of GDP		Tax Revenue Impact (Million \$)		
	Contribution (Value Added)		State	Local	Total
	State	Local	State	Local	Total
All Taxes	5.83%	3.14%	51.40	27.67	79.07
Property	0.09%	2.21%	0.83	19.45	20.29
Sales and gross receipts	2.00%	0.71%	17.67	6.23	23.90
General sales	1.47%	0.49%	12.98	4.36	17.34
Selective sales	0.53%	0.21%	4.69	1.87	6.57
Motor fuel	0.19%	0.00%	1.66	0.00	1.66
Alcoholic beverage	0.01%	0.00%	0.12	0.00	0.12
Tobacco products	0.03%	0.00%	0.28	0.00	0.28
Public utilities	0.03%	0.12%	0.24	1.04	1.27
Other selective sales	0.27%	0.09%	2.40	0.84	3.24
Individual income	3.03%	0.00%	26.74	0.00	26.74
Corporate income	0.37%	0.00%	3.28	0.00	3.28
Motor vehicle license	0.15%	0.00%	1.32	0.02	1.35
Other taxes	0.18%	0.22%	1.56	1.96	3.52

Details may not add to total due to rounding.

Source: Unison's estimates using the economic impact estimates and data from the U.S. Bureau of Census and the U.S. Bureau of Economic Analysis.

Table 5-18: Economic Impact of Surrounding Business Establishments - Contribution to State and Local Tax Revenue

	As Percent of GDP		Tax Revenue Impact (Million \$)		
	Contribution (Value Added)		State	Local	Total
	State	Local	State	Local	Total
All Taxes	5.83%	3.14%	237.00	127.59	364.59
Property	0.09%	2.21%	3.84	89.70	93.54
Sales and gross receipts	2.00%	0.71%	81.47	28.73	110.21
General sales	1.47%	0.49%	59.83	20.10	79.93
Selective sales	0.53%	0.21%	21.64	8.63	30.28
Motor fuel	0.19%	0.00%	7.63	0.00	7.63
Alcoholic beverage	0.01%	0.00%	0.56	0.00	0.56
Tobacco products	0.03%	0.00%	1.28	0.00	1.28
Public utilities	0.03%	0.12%	1.09	4.77	5.87
Other selective sales	0.27%	0.09%	11.07	3.86	14.93
Individual income	3.03%	0.00%	123.29	0.00	123.29
Corporate income	0.37%	0.00%	15.12	0.00	15.12
Motor vehicle license	0.15%	0.00%	6.10	0.11	6.21
Other taxes	0.18%	0.22%	7.18	9.05	16.23

Details may not add to total due to rounding.

Source: Unison's estimates using the economic impact estimates and data from the U.S. Bureau of Census and the U.S. Bureau of Economic Analysis.

Table 5-19: Economic Impact of the LGB Aviation Complex - Contribution to State and Local Tax Revenue

	As Percent of GDP		Tax Revenue Impact (Million \$)		
	Contribution (Value Added)		State	Local	Total
	State	Local	State	Local	Total
All Taxes	5.83%	3.14%	413.88	200.74	614.61
Property	0.09%	2.21%	4.67	109.15	113.82
Sales and gross receipts	2.00%	0.71%	99.14	34.97	134.11
General sales	1.47%	0.49%	72.81	24.46	97.27
Selective sales	0.53%	0.21%	26.34	10.50	36.84
Motor fuel	0.19%	0.00%	9.29	0.00	9.29
Alcoholic beverage	0.01%	0.00%	0.68	0.00	0.68
Tobacco products	0.03%	0.00%	1.56	0.00	1.56
Public utilities	0.03%	0.12%	1.33	5.81	7.14
Other selective sales	0.27%	0.09%	13.47	4.69	18.17
Individual income	3.03%	0.00%	150.03	0.00	150.03
Corporate income	0.37%	0.00%	18.40	0.00	18.40
Motor vehicle license	0.15%	0.00%	7.42	0.13	7.56
Other taxes	0.18%	0.22%	8.73	11.02	19.75

Details may not add to total due to rounding.

Source: Unison's estimates using the economic impact estimates and data from the U.S. Bureau of Census and the U.S. Bureau of Economic Analysis.

5.6 Summary

In addition to the airport's important role in facilitating air transportation, Long Beach Airport contributes to the region's economy by creating economic activity, jobs, and incomes. Various economic activities take place at LGB, generating revenues for businesses, jobs for the local workforce, and incomes for households in the study region. These economic activities create multiplier effects within the entire regional economy, generating total economic impacts much greater than those that occur within the airport.

The estimated total economic impact of the provision and use of air transportation at LGB on its service area—the five-county region consisting of the California counties of Los Angeles, Orange, San Bernardino, Riverside, and Ventura—are valued \$1.6 billion in output. Of this amount, \$882 million represents value added—LGB's contribution to the region's GDP. Of the value added, \$456 million represents total annual earnings from 10,388 jobs that LGB generates on airport and throughout the region.

The total economic impacts estimated for the broader LGB Aviation Complex (LGB and surrounding businesses) on the five-county study region are valued at \$8.6 billion in total output. Value added, representing the contribution the region's GDP, is estimated at \$4.9 billion. Of this amount, \$2.5 billion is contributed by annual earnings from 45,934 jobs generated by the LGB Aviation Complex.

The economic impact generates local and state tax revenues, estimated to total nearly \$79.1 million from the provision and use of air transportation at LGB, or \$614.6 million from the economic activity generated by the entire LGB Aviation Complex (LGB and surround businesses). Taxes, however, represent income transfers and do not count as additional economic impact.

APPENDIX A: Listing of Surrounding Business Establishments by Industry

Accommodation and Food Services

Awesome Sushi
California Fish Grill
Carl Karcher Enterprises
Courtyard By Marriott Long
Del Taco
Dunkin'
Fantastic Burgers
Flame Broiler
Georgies Place
Groundwork Coffee Co
Habit Burger Grill
Holiday Inn
In-N-Out Burger
Jersey Mike's Subs
Marriott-Long Beach
MOD Pizza
Starbucks
Trimana Restaurant
Wingstop
Yellow Fever

Admin, Support, Waste Mgmt. & Remediation

A & J Protoble Restrooms
AAA-Automobile Club-Southern
Advisor Business Solutions
American City Pest & Termite
Anthelion Helicopters
Apple One Employment Svc
Bugs Or Us
Business Jet Traveler
Ca Car Carrier Shipping
Chung & Assoc
Claims Management Plus
Cleantime Janitorial-Bldg
Coast Tickets
Copy Place
Cuba Travel Svc
E 2 Manage Tech
Executives Unlimited Inc
Kelly Services
Medical Professionals Corp
Miles Investigations Inc
Msrc
Randstad USA
Staffmark
Work Force Outsourcing Long

Arts, Entertainment, and Recreation

ESI Event Solutions Intl
Fitness Center
Grit Cycle
LA Fitness
Shop Racing Extinction
Skylinks Golf Course
Soccer Event Specialists Inc
Veteran's Memorial Stadium

Construction

21st Century Electric
Barney's Hole Digging Svc Inc
Bremco Construction Co
City Light & Power Inc
Crest Woodworks
Hallmark Construction Inc
Herzog Contracting Corp
Long Beach Learning Ctr
Milco National Constructors
Million Air North Inc
Norm Wilson & Sons Inc
Paragon Steel
Pcl Construction Inc
Power Pro Plumbing
Priority Construction
Reasonable Rates Plumbing
Seventh Street Development
Sound Property Development
Taylor Bros Inc
Upgrade Electric Inc

Educational Services

AAA-Auto Club Driving School
Aces High Aviation
Airline Transport Pro
American Gymnastics Academy
Angel City Flyers
Aviator
Devry University
Embry-Riddle Aeronautical Univ
Employed Security Svc Ctr Inc
Long Beach Flight Schools
Long Beach Unified Sch Dist
Miss Renee's Tutoring
Ra Yoga LLC
Rainbow Air
Sky Creation
Universal Technical Inst

Finance and Insurance

Ais Auto Insurance
Allstate Financial Svc
Allstate Insurance
Allstate Insurance Co
Allstate Insurance Tarek Khttb
American Financial Group
Ameriprise Financial
Associated Pacific Insurance
B Palmer Insurance Svc Inc
B Sam Auto Loans LLC
Bankers Life & Casualty Co
Brennan & Assoc
Cain Brothers
Capital Group Inc
Capital Investment
Carlos Getino-Ameriprise Fncl

Citywide Home Loans
Curt Kurtz-Ameriprise Fncl Svc
Engle Martin & Assoc
Farmers Insurance
Farmers Insurance-Brian Lee
Farmers Insurance-Jade Pham
Farmers Insurance-Robert
Farmers Insurance-Susana Rios
Hans Mortgage Group-First
Lbl Mortgage
Lendmark Financial Svc
Loandepot
Long Beach Mortgage & Realty
National Planning Corp
Palmer Insurance Agency
Sedgwick Claims Mgmt Svc Inc
U.S. Bank Branch
Uhs Insurance Agency
United Business Bank

Health Care and Social Assistance

Abortion Aid
Advanced Medical Management
Alpha Covenant Inc
Angel Connection Nursing Svc
Bixby Knolls Home Health LLC
Carlos Arguedas MD Inc
Childnet Youth & Home
Childrens Home Society Of Ca
Columbia Pediatrics
Da Vita El Dorado Dialysis
David Presby
Fariba Gharai MD
Fusion Hair
Gail Desilets Lmft
Goldstone Vision Ctr
Hadas Skupsky MD
Health Care Partners
Laser Skin Care Ctr
Long Beach Care Ctr
Long Beach Endodontix
Long Beach Physical
Malwinder S Singha MD
Marumoto & Assoc
Mbioteq LLC
Memorial Care Outpatient
Memorialcare Medical Group
Muthukumar Vaidyaraman MD
Nazanin N Nekonejad
Optimal Hospice Care
Pacific Shores Medical Group
Parkcrest Early Childhood Sch
Pediatric Medical Ctr
Precision Rehabilitation
Richard Vanderplas
Royal Majesty Home Care Inc

(Continued)

SCAN Health Plan	Other Services (except Public Administration)	Greg Shanfeld
Sklar Center For Restorative	ABM Parking Svc	Gunn Jerkens Advertising
Sklar Center For Women's	ACA	Gunn Jerkens Marketing Comms
South Pacific Rehabilitation	Airport Plaza Owners Assn	H&R Block
Southland Neurologic Assoc Inc	Alcoholics Anonymous	Hfs Concepts 4
Stephanie M Price PT	Alternative Therapeutic Sltns	Holmes Lofstrom
Synergy Homecare	Bellflower Smog 3	Insight Examination Svc
US Renal Care	Cherry Hill Car Wash	IQA Solutions Inc
Van Quoc Pham DO	Church Of Long Beach	Jamison Services Inc
Vascular & General	Craftsman Collision USA	Jda Inc Retail Ready Design
Vascular & General Surg Assoc	Disabled Resources Ctr	Jon Cicchetti Landscape Arch
Vera Marie Bell PHD	Ecover Us	Lallande Law
Verizon Internal	Electric Car Sales & Svc	Lanzone Morgan LLP
Victoria Foley Podiatric Med	Elements Behavioral Health	Law Offices Of David M Zeligs
Victoria M Foley Dpm	Erwin's Custom Interiors	Law Offices Of Mark R Leeds
West Coast Dialysis Ctr Inc	IHS Automotive	Lawrence Taylor Law Offices
William M Turner Jr	In Club LLC	Lbcc-Goldman Sachs 10 000 Sm
Information	Kong Co	Leal & Trejo Apc
Continental Data Graphics	Kong Co Lic	Long Beach Nonprofit Prtnrshp
Disys	Lions Sight & Hearing	Los Metro Shore Ground Svc
Graffiti Tracker Inc	Long Beach Christian Flwshp	M C-2
Linq3	Long Beach Valet	Menke Law Firm
Plane Fax Inc	Lotus House	Mitchell Aerospace Research
PSAV Presentation Svc	M Industrial Mechanical Inc	Mitt Romney
S A A S Enterprises Inc	National Cleaners & Laundry	Moffatt & Nichol
Spectrum	National Satellite Ctr	Mt Desert Is Biological Lab
Spike Chunsoft Inc	Pacific West Assn Of Realtors	Myers
Sprint	Pet Set	Onisko & Scholz LLP
T-Mobile	Professional Nail	Orion Environmental Inc
Verizon Communications Inc	Promises Treatment Ctr	P2S Engineering Inc
Management of Companies and Enterprises	Skylinks Mens Club	Polk Direct
Hardin Holdings Inc	Southwest HVAC Inc	Purple Communications Inc
White Buffalo Holdings LLC	Supercuts	Purple Language Svc Co
Manufacturing	Teamsters Local 848 All	Qxnow
3 G Indl Maching	Theelements	Recon Refractory Svc
Air Source Industries	Transport Solutions Inc	Rg Vanderweil LLP
Benson Industries	Professional, Scientific, and Technical Services	Sbdc
Boeing North Amer Fitns Inc	Abilityfirst	Scan Foundation
Dasco Machine	Access Legal Group A Plc	SCS Engineers
Epson America Inc	Aero Aviation LLC	Scs Engineers/S C S Field Svc
Gulfstream Aerospace Corp	Aeroplex Aviation	Simonglover Inc
H & Y Rebar	Aim Forum	Stantec Consulting
Hamilton Sundstrand	Allan B Weiss & Assoc	Stonesifer & Chong LLP
Integrated Polymer Solutions	Antea Group	Thomas Law Firm
Keystone Engineering Co	Asbury & Assoc	Thorsteinson Law Group
Leviton Manufacturing Co Inc	Bond Consulting Svc	Trans Pacific Container Svc
Metco Industries Inc	C2 G Intl LLC	Tredway Lumsdaine & Doyle LLP
Performance Plus Tire-Auto	California Elder Law Ctr	Triple C-The A & E Group
Redbarn Pet Products Inc	Cdg	Twining Laboratories
Sps Technologies LLC	Cranemorley Inc	Twining Youssef Ryan
Virgin Orbit	David J Givot Law Office Plc	Urban Science Application
West Coast Metalcraft-Cstm	E2 Managetech Inc	Vanderweil Engineers
Mining, Quarrying, and Oil and Gas Extraction	Essentia Management Svc	Vanguard Logistics
Gammaloy Limited	Gold & Witham	Wertz & Co
	Greenleaf Strategic Conslnts	Yocis & Cox

(Continued)

Real Estate and Rental and Leasing

5000 Spring LLC
Action Library Media Svc
Aerolease Long Beach
Airport Plaza LLC
Allen & Calo & Assoc
America West Properties Inc
Anderson Jeff
AP - Donald Douglas, LLC, dba The Abbey Company
B & I Equipment Rental
BCC Equipment Leasing Corp
Betts Realty Group Inc
Brahma Properties, LLC
Chelsea Rose Property LLC
Cushman & Wakefield Inc
Don Temple Stge-U Store & Lock
Don Temple U-Stores & Lock
E-Z Rent-A-Car
Handy Storage
Healthtrust
Innervision Technology Rlctn
International City Escrow Inc
Jfi Jets
Josh Montgomery Real Est Agent
Judy Norman Sharp
KATO Group
Keller Williams Realty
Kilroy Realty
Lee & Assoc Coml Real Est
Lomco
Long Beach Airport Hangar Owner LLC
Long Beach Aviation Building
Long Beach U-Store & Lock
Los Angeles Property LLC
Luz Lavarias
Madrona Real Estate, LLC
Marna Brennan
Msci 2007-Hq12 Office 4900
Munco Inc
Nest Sc Group
Nexjet Corp
Olen Commercial Realty Corp
Phillip Dominguez
Premier Business Ctr
Q4G Properties, LP (Parcel J-6B)
Real Property Mgmt Long Beach
Relax The Back Corp
Stacey Garcia
Stepp Commercial
Storage Etc Long Beach
Tarbell Realtors
U-Haul Neighborhood Dealer
Victoria Posthuma AGT
Wahlberg Group
Western Realty

Retail Trade

365 By Whole Foods Market
A I Craft Co LTD
A-1 Express Shuttle
At Garage Door Repair
C2o Pure Coconut Water LLC
Caruso Ford
Casey Crow Collective
For Eyes Optical Co
GNC
Ld Products Inc
Long Beach Lincoln Mercury Inc
Lululemon Athletica
Mydyer
Nordstrom Rack
Obagi
Ocr Aviation LLC
Omaha Airplane
Orbit Aviation LLC
Pacific Air Ctr
Pacific Executive Charter
Paradies Shops
Ralphs
Royal 4 Systems
Timmons Subaru
Timmons Volkswagen-Long Beach
TJ Maxx
Tsr
TSR Inc
Ulta Beauty
Waltzman Plastic
Xoodlz

Transportation and Warehousing

A & A Towing
Administrative Service Co-Op
Aerial Promotions Inc
Air 360 Helicopters
Alameda Corridor Trnsprtn Auth
California Cartage Co LLC
Catalina Flying Boats Air
Chozen Trucking Co
Cinema Aircraft
Fliteserv
Logistics Freight Network Inc
Metropolitan Stevedore Co
Midnite Air Corp
MNX Global Logistics
Norman Krieger Inc
Onpoint Worldwide
Savage Services
Secured Transportation
Terminal II Jet Ctr

Wholesale Trade

Airgas West Div
Certified Tire & Svc Ctr
Collateral Liquidators
CPS Security
Deering Industries
Ecamsecure
Estorgas Collision Repair A
EVC Inc
Exp Recon
Haveco Inc
Human Touch
Interface Security Systems
Jeteffect
Mssp
Orange County Pro Automtv
S D C R Long Beach
Sdcr Business Systems
Shimadzu Precision Instr Inc
Total Equipment Rental Inc
Turbo Air Inc
United Pacific

APPENDIX B: U.S. BEA RIMS II Multipliers (Type II)

RIMS II Multipliers (2007/2016)
Table 2.5 Total Multipliers for Output, Earnings, Employment, and Value Added by Industry Aggregation
Los Angeles-Long Beach, CA Combined Statistical Area (Type II)

INDUSTRY	Multiplier					
	Final Demand				Direct Effect	
	Output/1/ (dollars)	Earnings/2/ (dollars)	Employment/3/ (jobs)	Value-added/4/ (dollars)	Earnings/5/ (dollars)	Employment/6/ (jobs)
1. Farms	1.8800	0.5611	15.3034	0.8662	1.8915	1.6414
2. Forestry, fishing, and related activities	2.0438	0.8934	23.8576	1.2391	1.5263	1.4085
3. Oil and gas extraction	1.4619	0.2960	5.3209	0.9655	1.8233	2.0492
4. Mining, except oil and gas	1.7558	0.3754	8.5068	0.9818	2.3436	1.9673
5. Support activities for mining	1.8090	0.5004	8.4565	1.1337	1.9228	2.4853
6. Utilities*	1.6786	0.3454	5.3157	0.9219	2.3505	4.3563
7. Construction	2.1557	0.6979	13.0700	1.1738	1.8832	2.2257
8. Wood product manufacturing	1.9825	0.4920	11.0277	0.8232	2.3393	2.0986
9. Nonmetallic mineral product manufacturing	2.0434	0.4849	9.1478	0.9642	2.4808	2.7246
10. Primary metal manufacturing	1.9639	0.4202	7.8241	0.7565	2.6280	2.9163
11. Fabricated metal product manufacturing	2.0411	0.4925	9.5002	0.9369	2.3532	2.5198
12. Machinery manufacturing	2.0806	0.5582	9.5212	0.9570	2.1942	2.7809
13. Computer and electronic product manufacturing	1.9637	0.5361	7.9205	1.0705	2.1056	3.4047
14. Electrical equipment and appliance manufacturing	1.9336	0.4427	8.0262	0.8924	2.3809	2.7206
15. Motor vehicles, bodies and trailers, and parts manufacturing	2.0097	0.4418	8.0211	0.7698	2.6830	3.0865
16. Other transportation equipment manufacturing	1.9762	0.5111	7.9964	0.9679	2.2132	3.1720
17. Furniture and related product manufacturing	2.0947	0.5392	11.4461	0.9732	2.2916	2.1898
18. Miscellaneous manufacturing	2.0581	0.5484	10.1101	1.0575	2.2734	2.5723
19. Food and beverage and tobacco product manufacturing	2.0242	0.4347	9.0277	0.7992	2.7977	2.7282
20. Textile mills and textile product mills	1.9738	0.4935	11.2632	0.8293	2.2623	2.0214
21. Apparel and leather and allied product manufacturing	2.2349	0.7380	19.3812	1.1353	2.0180	1.7396
22. Paper manufacturing	1.8811	0.4305	7.7652	0.7988	2.3605	2.7443
23. Printing and related support activities	2.1063	0.6017	13.0465	1.0753	2.1710	2.1249
24. Petroleum and coal products manufacturing	1.4323	0.2664	3.5702	0.5057	1.7642	3.0119
25. Chemical manufacturing	1.8684	0.4300	6.6108	0.8593	2.4161	3.5823
26. Plastics and rubber products manufacturing	1.9738	0.4249	8.1632	0.8203	2.6194	2.6579
27. Wholesale trade	1.9927	0.6148	10.9915	1.2592	1.9482	2.4081
28. Motor vehicle and parts dealers	1.9501	0.7059	14.2309	1.3289	1.6414	1.7823
29. Food and beverage stores	2.0723	0.6870	20.0813	1.2933	1.8172	1.5251
30. General merchandise stores	2.0614	0.6418	20.2481	1.2653	1.9753	1.5078
31. Other retail	2.1042	0.6646	18.3944	1.2879	1.9316	1.6261
32. Air transportation	2.0000	0.4683	7.7792	0.9748	2.4744	3.7014
33. Rail transportation	1.9956	0.5053	8.0052	1.0596	2.2294	3.2918
34. Water transportation	2.2154	0.4925	8.7536	0.9598	3.3527	4.8306
35. Truck transportation	2.3432	0.6857	13.2303	1.1677	2.2664	2.4914
36. Transit and ground passenger transportation*	2.4154	0.8403	30.8560	1.2332	1.9192	1.3694
37. Pipeline transportation	1.9297	0.5672	8.3643	1.0446	1.9499	3.2466
38. Other transportation and support activities*	2.2851	0.7621	15.5588	1.3175	2.0327	2.1720

(Continued)

RIMS II Multipliers (2007/2016)
Table 2.5 Total Multipliers for Output, Earnings, Employment, and Value Added by Industry Aggregation
Los Angeles-Long Beach, CA Combined Statistical Area (Type II)

INDUSTRY	Multiplier					
	Final Demand				Direct Effect	
	Output/1/ (dollars)	Earnings/2/ (dollars)	Employment/3/ (jobs)	Value-added/4/ (dollars)	Earnings/5/ (dollars)	Employment/6/ (jobs)
39. Warehousing and storage	2.2241	0.7345	17.5204	1.3189	1.9359	1.8503
40. Publishing industries, except internet (includes software)	1.9936	0.5429	8.8400	1.2025	2.2227	3.4657
41. Motion picture and sound recording industries	2.1051	0.4731	10.0471	1.1813	2.8530	2.9975
42. Broadcasting and telecommunications	2.0856	0.5496	9.2497	1.2065	2.2711	3.2274
43. Data processing, internet publishing, and other information services	2.0912	0.5732	9.1859	1.1740	2.3379	4.3174
44. Federal Reserve banks, credit intermediation, and related activities	2.1524	0.6127	10.4618	1.2255	2.3090	3.2931
45. Securities, commodity contracts, and investments	2.4961	0.7768	15.4837	1.2602	2.3970	2.5523
46. Insurance carriers and related activities	2.0439	0.5534	9.6641	1.1572	2.1962	2.7696
47. Funds, trusts, and other financial vehicles	2.7448	0.6863	21.3677	1.1412	4.5524	2.0297
48. Real estate	1.7322	0.3673	10.1637	1.1341	2.4241	1.9012
49. Rental and leasing services and lessors of intangible assets	1.9356	0.4932	10.3211	1.1671	2.3889	2.4185
50. Professional, scientific, and technical services	2.2048	0.8052	14.0150	1.3327	1.8243	2.3523
51. Management of companies and enterprises	2.2314	0.7841	11.6378	1.3211	1.8864	3.0690
52. Administrative and support services	2.1763	0.8336	21.8120	1.3536	1.7340	1.5637
53. Waste management and remediation services	2.0965	0.5628	10.8085	1.0848	2.3100	2.6777
54. Educational services	2.2734	0.8252	21.9287	1.3557	1.7690	1.5996
55. Ambulatory health care services	2.2572	0.8200	15.7058	1.3580	1.8121	2.0724
56. Hospitals	2.2722	0.8015	14.6105	1.2888	1.8965	2.2992
57. Nursing and residential care facilities	2.2449	0.8303	22.3455	1.3527	1.7436	1.5673
58. Social assistance	2.3040	0.8657	32.2161	1.3603	1.7559	1.3577
59. Performing arts, spectator sports, museums, and related activities	2.2439	0.6742	17.9951	1.3261	2.2710	1.9531
60. Amusements, gambling, and recreation industries	2.0457	0.5737	17.8317	1.1609	2.1110	1.5779
61. Accommodation	1.9667	0.5702	14.1249	1.1904	2.0115	1.7802
62. Food services and drinking places	2.1316	0.6509	21.8086	1.1661	1.9684	1.4645
63. Other services*	2.2391	0.7330	17.4008	1.2661	1.9919	1.8214
64. Households	1.3346	0.3930	9.2888	0.7761	0.0000	0.0000

Region Definition: Los Angeles, CA; Orange, CA; Riverside, CA; San Bernardino, CA; Ventura, CA

*Includes Government enterprises.

1. Each entry in column 1 represents the total dollar change in output that occurs in all industries for each additional dollar of output delivered to final demand by the industry corresponding to the entry.

2. Each entry in column 2 represents the total dollar change in earnings of households employed by all industries for each additional dollar of output delivered to final demand by the industry corresponding to the entry.

3. Each entry in column 3 represents the total change in number of jobs that occurs in all industries for each additional 1 million dollars of output delivered to final demand by the industry corresponding to the entry. Because the employment multipliers are based on 2016 data, the output delivered to final demand should be in 2016 dollars.

4. Each entry in column 4 represents the total dollar change in value added that occurs in all industries for each additional dollar of output delivered to final demand by the industry corresponding to the entry.

5. Each entry in column 5 represents the total dollar change in earnings of households employed by all industries for each additional dollar of earnings paid directly to households employed by the industry corresponding to the entry.

6. Each entry in column 6 represents the total change in number of jobs in all industries for each additional job in the industry corresponding to the entry.

NOTE.--Multipliers are based on the 2007 Benchmark Input-Output Table for the Nation and 2016 regional data. Industry List B identifies the industries corresponding to the entries.

SOURCE.--Regional Input-Output Modeling System (RIMS II), Regional Product Division, Bureau of Economic Analysis.



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