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# **Impacts of Continental Airlines Operations on the New York- New Jersey Regional Economy**

Prepared for Continental Airlines



**NERA**

Economic Consulting

## **Project Team**

David Harrison, Project Director

David Nagler, Project Manager

Matthew Miller

Samuel Grausz

Andrew Foss

NERA Economic Consulting  
200 Clarendon Street, 11th Floor  
Boston, Massachusetts 02116  
Tel: +1 617 927 4500  
Fax: +1 617 927 4501  
[www.nera.com](http://www.nera.com)

## Contents

Contents.....	i
List of Figures.....	iii
List of Tables.....	iv
Acknowledgements.....	v
About the Project Director .....	vi
Executive Summary .....	vii
I. Introduction.....	1
A. Overview of Study .....	1
1. Study Objectives.....	1
2. Study Methodology and Data.....	2
3. Outline of Report.....	3
B. Background.....	3
1. Continental Airlines.....	3
2. Newark Liberty International Airport.....	4
3. LaGuardia Airport .....	4
4. Continental Operations in the New York City Area .....	5
5. Continental Star Alliance Participation .....	6
II. Overall Regional Economic Contributions of Continental’s New York/New Jersey Operations.....	8
A. Current Regional Contributions .....	8
1. Current Contributions .....	8
2. Sources of Current Contributions.....	9
3. Current Contributions by Sub-region .....	10
4. Current Contributions per Unit of Aviation Activity .....	11
a. Contributions per Aircraft Operation.....	11
b. Contributions per Passenger.....	11
5. Current Contributions by Sector .....	12
6. Current Contribution by Occupation .....	13
B. Future Regional Contributions.....	15
1. Future Contributions.....	15
2. Future Contributions by Sub-region .....	16
3. Future Contributions by Sector .....	16
4. Future Contributions by Occupation .....	17
III. Methodology.....	19
A. Background.....	19
B. The REMI Model.....	19
C. Modeling the Contributions of Continental’s New York City-Area Operations.....	20

1. Basic Methodology.....	20
2. Inputs for Continental Airlines Contributions .....	21
3. Measuring Long-Term Contributions.....	22
D. Input Data for Continental’s Operations in the New York City Area.....	23
1. Continental Employment .....	23
2. Intermediate Demand.....	24
3. Passenger Expenditures .....	25
a. Number of Passengers.....	25
b. Types of Passengers.....	25
c. Location of Visitor Expenditure .....	26
4. Level and Type of Expenditure .....	26
5. Aggregate Expenditures.....	27
6. REMI Model Inputs.....	27
References .....	29
Appendix A. Continental Economic Contributions to the Newark Region. ....	30
Appendix B. Continental Economic Contributions to the Rest of New Jersey Region.....	37
Appendix C. Continental Economic Contributions to New York City. ....	44
Appendix D. Continental Economic Contributions to the Rest of New Jersey Region. ....	51
Appendix E. Background on the REMI Model. ....	58

**List of Figures**

Figure 1. Continental revenue passengers in the New York City area. ....	6
Figure 2. Sources of current employment contributions of Continental Airlines. ....	10
Figure 3. Current employment contributions of Continental Airlines by occupation. ....	14
Figure 4. Current occupational contributions of Continental Airlines as a percentage of regional total. ....	14
Figure 5. Contributions of Continental Airlines to employment and population, 2008-2030. ....	15
Figure 6. Long-run contributions of Continental Airlines to gross regional product and personal income. ....	16
Figure 7. Percentage shares of employment contributed by Continental Airlines in 2030 by occupation. ....	18
Figure 8. Illustration of REMI modeling methodology. ....	21

**List of Tables**

Table 1. Star Alliance members serving Liberty and/or LaGuardia.....	7
Table 2. Current contributions of Continental Airlines to the New York/New Jersey regional economy.....	8
Table 3. Sources of current economic contributions by Continental Airlines. ....	9
Table 4. Current Continental contributions by sub-region.....	11
Table 5. Current employment contributions of Continental Airlines by sector. ....	13
Table 6. Current employment contributions by Continental Airlines by occupation.....	13
Table 7. Continental contributions in 2030 by sub-region.....	16
Table 8. Continental employment contributions in 2030 by sector.....	17
Table 9. Continental employment contributions in 2030 by occupation. ....	18
Table 10. Assumed distribution of Continental passengers at Liberty. ....	26
Table 11. Average spending per trip by passenger type and spending category.....	27

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This study was requested and supported by Continental Airlines, Inc. (“Continental”) to provide an evaluation of the effects of Continental’s New York City-area operations on the New York/New Jersey regional economy. The study was conducted by NERA Economic Consulting (“NERA”), an international firm of about 600 staff members in more than 20 offices across North America, Europe and the Pacific Rim. NERA specializes in the application of economics to complex issues of business and public policy and has extensive experience in economic impact assessment. The study was directed by Dr. David Harrison, a Senior Vice President at NERA who leads the firm’s work in the area of regional economic analysis.

We would like to acknowledge the assistance of officials at Continental without whom this study would not have been possible. These individuals provided data on Continental’s operations and other important information. Responsibility for the analyses and conclusions of the report, however, and any errors or omissions it might contain, rests solely with the study’s authors.

## About the Project Director

David Harrison, Jr., is a Senior Vice President of NERA Economic Consulting in its Boston office. Dr. Harrison has directed numerous economic impact studies. These studies include analyses related to many types of projects and policies—including energy facilities and other infrastructure projects, airports and airlines, major retail and commercial developments, and environmental regulations—in areas that include France, Spain, the European Union, Africa, the Bahamas, Illinois, California, New Jersey, Ohio, Florida, Hawaii, New York, Massachusetts, Maine, and New Hampshire. He has served as a consultant to numerous public and private organizations.

Before joining NERA, Dr. Harrison was an Associate Professor at the John F. Kennedy School of Government at Harvard University, where he taught in microeconomics, regional economic development, energy and environmental policy, and other areas. He earlier served as Senior Staff Economist on the President's Council of Economic Advisors, where his areas of responsibility included economic development policy and energy and environmental policy. He is the author or co-author of two books as well as many articles in professional journals. Dr. Harrison received a Ph.D. in Economics from Harvard University, a M.Sc. in Economics from the London School of Economics, and a B.A. in Economics from Harvard College.

## Executive Summary

Continental retained NERA Economic Consulting (“NERA”) to develop quantitative estimates of the economic contribution of Continental’s New York City-area operations to the New York/New Jersey region. This study presents the results of NERA’s analyses using a state-of-the-art economic model developed by Regional Economic Models, Inc. (“REMI”) and customized to the New York/New Jersey region.

The results presented in this study indicate that Continental’s operations currently contribute over 110,000 jobs to the New York/New Jersey region as well as \$5.9 billion in personal income and \$6.3 billion in gross regional product. These contributions will grow in the future as Continental’s operations expand in response to increased demand for air travel. By 2030, Continental’s operations are projected to contribute 128,000 jobs to New York/New Jersey employment, \$11 billion to the region’s personal income, and \$12 billion in gross regional product.

As significant as they are, the economic impacts reported in this study do not measure the full economic impact of Continental’s presence in the New York/New Jersey region. Many important economic effects of the airline’s presence in the community are not measured, even with a state-of-the-art economic model. The study measures the effects of Continental’s aviation employment and passenger expenditures, including the multiplier effects of these initial changes as they create economic activity throughout the regional economy. However, the model does not measure other important effects of Continental’s operations. These include: making the New York/New Jersey region a more attractive location for businesses to relocate or expand their operations; the reductions in the cost of doing business associated with access to air travel; and the effects of Continental’s substantial promotional activities both locally and internationally.

### A. Continental Airlines and the New York City Area

Continental Airlines is one of the leading global air carriers, transporting approximately 63 million passengers per year to about 270 global destinations. Continental’s hub at Newark Liberty International Airport (“Liberty”) is a major connecting complex for its operations, which are the largest of any airline’s in the New York City area. In 2008, Continental carried about 24 percent of the New York City area’s total number of air passengers. Continental served about 22 percent of the region’s international passengers, approximately twice the share of any other individual carrier.

As of March 2009, Continental and its regional partners served 146 non-stop destinations with 412 flights per day from Liberty, making Continental Airlines the largest airline at Liberty by both metrics. Together with its regional partners, Continental transported 70 percent of all revenue passengers at Liberty in 2008. Continental also handled more than 120,000 tons of revenue freight at Liberty in 2008, making it the largest freight handler among the airport’s passenger airlines. Continental has significant, though much smaller, operations at LaGuardia Airport (“LaGuardia”), where it ranked among the fifteen largest carriers (by passenger count) in 2008. From LaGuardia, Continental and its partners operated 16 flights per day as of March 2009.

Continental's Liberty operations serve as a gateway to Continental's international route system to Europe, Asia, and Latin America. Continental's Newark Liberty hub currently provides daily or near-daily nonstop service to 24 European destinations, seven Canadian cities, eight Central American/Caribbean destinations, plus Bogota, Sao Paulo, Beijing, Delhi, Hong Kong, Mumbai, Shanghai, and Tokyo. Continental's Liberty service represents the only scheduled nonstop service from the New York City area to several important domestic and international destinations. Continental supplements its extensive Liberty operations with frequent nonstop service from LaGuardia to the airline's hubs in Houston and Cleveland.

## **B. Continental Star Alliance Participation**

Continental's entry into Star Alliance on October 27, 2009 will increase the airline's contribution to the local economy by facilitating travel to the New York/New Jersey region and providing additional connecting opportunities. Continental is the 25<sup>th</sup> member of the Star Alliance, which offers 18,900 flights a day to 983 cities in 169 countries, and it will become the first member of the Star Alliance with a major hub (serving both domestic and international passengers) in the New York City area. Star Alliance offers a variety of benefits to customers in terms of connectivity and rewards, including code sharing on selected flights, collection and redemption of frequent flier miles/points across loyalty programs, enhanced flight connections, faster transfer times in terminals, and the ability to book award travel on multiple carriers on a single ticket. Continental will join nine other Star Alliance carriers that serve Liberty and/or LaGuardia.

## **C. Need for Economic Impact Study**

Continental Airlines views its current operations as an important contributor to the New York/New Jersey economy. Continental's management decided that it would be beneficial to have a state-of-the-art, independent economic impact study of its operations in the region. Such a study would allow interested parties to see the nature and extent of Continental's economic contributions in the Newark area, New York City, and the remainder of the New York/New Jersey region.

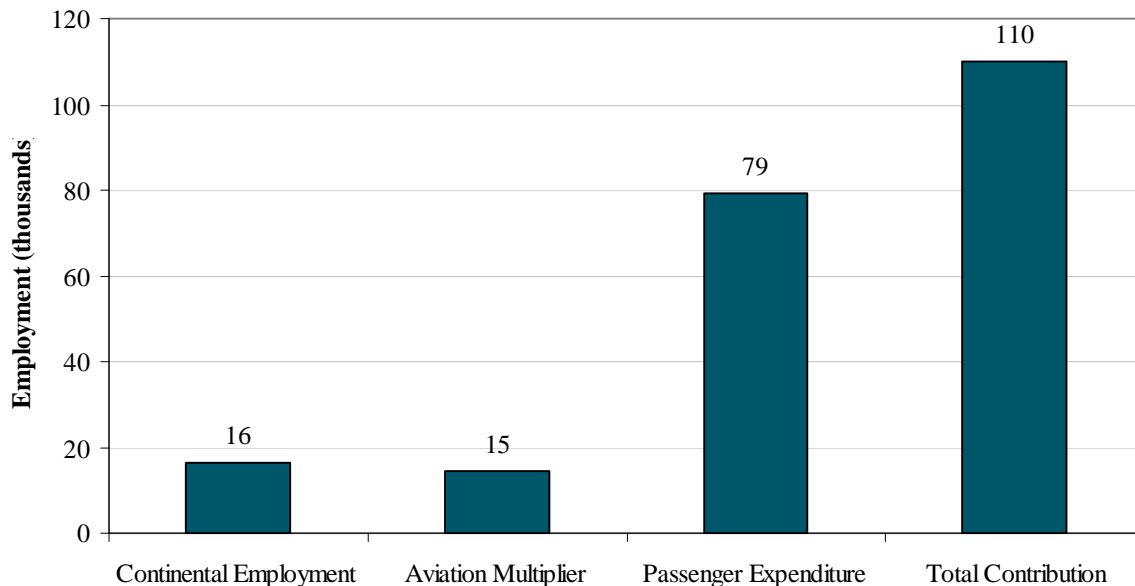
NERA, one of the foremost global economic research organizations with extensive experience in transportation and regional economics, was selected by Continental to conduct the study. NERA's work is performed by more than 600 staff members in eleven offices in North America as well as fourteen overseas offices, and the firm is widely recognized for its independence and objectivity. Using a state-of-the-art computer model tailored to the local economy as well as extensive data from Continental and outside sources, NERA researchers developed an assessment of Continental's current and future economic impacts on the New York/New Jersey region. This assessment includes the direct contributions made by Continental employees and passengers as well as the multiplier effects of increased spending on the regional economy. The result is one of the most complete and detailed studies ever done concerning how an airline's operations contribute to a regional economy.

## D. Current Economic Contributions of Continental Airlines Operations to the New York/New Jersey Region

NERA's analyses show that over 110,000 jobs in a region that consists of New York State and New Jersey are attributable to Continental's operations in the New York City area and related passenger expenditures. Figure ES-1 summarizes the current contributions of Continental Airlines' New York City-area operations to the region's employment. These jobs are categorized into three basic types.

- § **Continental direct employment creates 16,000 jobs.** These are jobs held by employees of Continental and its partners in the region.
- § **Aviation multiplier effects create 15,000 jobs.** These are jobs created by Continental's expenditures in the local economy on the goods and services needed to support its aviation (and cargo) operations. This category also includes jobs created by expenditures made by employees of Continental and the local firms from which Continental procures goods and services.
- § **Continental visitor expenditures create 79,000 jobs.** These are jobs resulting from the expenditures of visitors brought to the New York/New Jersey region by Continental. In this category are jobs at hotels, restaurants, department stores, and other places where Continental's passengers spend money, as well as the multiplier effects of this spending as it creates economic activity throughout the local economy.

**Figure ES-1. Current employment contributions of Continental Airlines operations in the New York/New Jersey region.**



Source: NERA calculations using the REMI model as explained in text.

Continental Airlines employment and visitor expenditures also lead to increases in other measures of the local economy. Table ES-1 shows the breakdown of the contributions of Continental Airlines to population, personal income (defined as the income of all residents of the region) and gross regional product (defined as the value of the output of goods and services produced in the region), as well as employment.

**Table ES-1. Sources of economic contributions of Continental Airlines operations in the New York/New Jersey region.**

<b>Contribution Category</b>	<b>Continental Employment</b>	<b>Aviation Multiplier</b>	<b>Passenger Expenditure</b>	<b>Total Contribution</b>
Employment	16,238	14,602	79,360	110,200
Population	10,859	15,454	93,652	119,964
Personal Income (billion 2008\$)	\$0.75	\$1.06	\$4.12	\$5.93
GRP (billions 2008\$)	\$1.17	\$1.66	\$3.45	\$6.27

Source: NERA calculations using the REMI model as explained in text.

The cumulative effect of the contributions of Continental Airlines, Continental Express and Continental Connection is substantial for all of these measures of the regional economy.

- § Continental contributes over 110,000 jobs to New York/New Jersey region.
- § Continental contributes almost 120,000 people to the New York/New Jersey population.
- § Continental contributes \$5.9 billion in personal income to the New York/New Jersey region.
- § Continental contributes \$6.3 billion in gross regional product to the New York/New Jersey region.

### **1. Current Contributions by Area**

Although Continental's operations in the region are centered at Newark Liberty, and, to a lesser extent, at LaGuardia (in New York City), Continental's economic contributions extend to the entire region, including the rest of New Jersey and the rest of New York State. As Table ES-2 shows, Continental's contributions are fairly evenly divided among three areas (the Newark region, the rest of New Jersey, and New York City), with the remainder of New York State accruing roughly half the employment of the other three regions. Although the Newark area, as the location of Newark Liberty International Airport, receives the most contributions, New York City, the rest of New Jersey, and the rest of New York State benefit from a substantial contribution in all four of the economic measures presented.

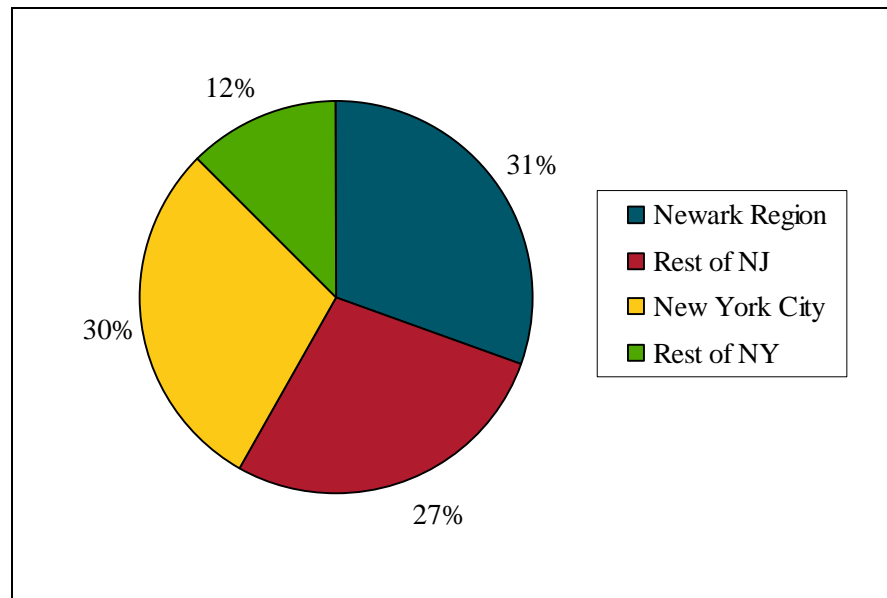
**Table ES-2. Current Continental Airlines contributions by sub-region.**

	New Jersey			New York			Total
	Newark Region	Rest of NJ	Total	New York City	Rest of NY	Total	
Employment	33,822	30,049	63,871	32,588	13,741	46,329	110,200
Population	23,400	43,064	66,464	32,586	20,913	53,500	119,964
Personal Income (billions 2008\$)	\$1.40	\$1.82	\$3.21	\$1.67	\$1.05	\$2.72	\$5.93
GRP (billions 2008\$)	\$2.73	\$1.40	\$4.13	\$1.43	\$0.71	\$2.14	\$6.27

Source: NERA calculations using the REMI model as explained in text.

Note: Dollar values expressed in billions of 2008 dollars.

Figure ES-2 presents the sub-regional breakdown of Continental's employment contributions graphically. The Newark area receives 31 percent of the employment contribution, while the rest of New Jersey receives 27 percent. New York City and the remainder of New York State receive 30 and 12 percent, respectively. Note that although this study was limited to New York and New Jersey, Continental's operations also contribute to the economies of other nearby states, such as Connecticut and Pennsylvania.

**Figure ES-2. Current Continental employment contributions by sub-region.**

Source: NERA calculations using the REMI model as explained in text.

## 2. Average Current Contributions of Continental Airlines Operations

In 2008, Continental (with its regional partners) provided service to roughly 25 million passengers in the New York City area. Continental Airlines had about 300,000 total operations—takeoffs and landings—in the area in 2008. It is instructive to calculate the *average* contribution each of these operations made to regional employment and personal income, taking into account direct effects as well as multiplier effects. On average, each Continental operation:

§ Added about \$19,000 in personal income to the New York/New Jersey area; and

§ Produced 0.36 jobs, or about one local job for every three operations.

Additionally, the average contribution to the region can be examined in terms of passenger activity:

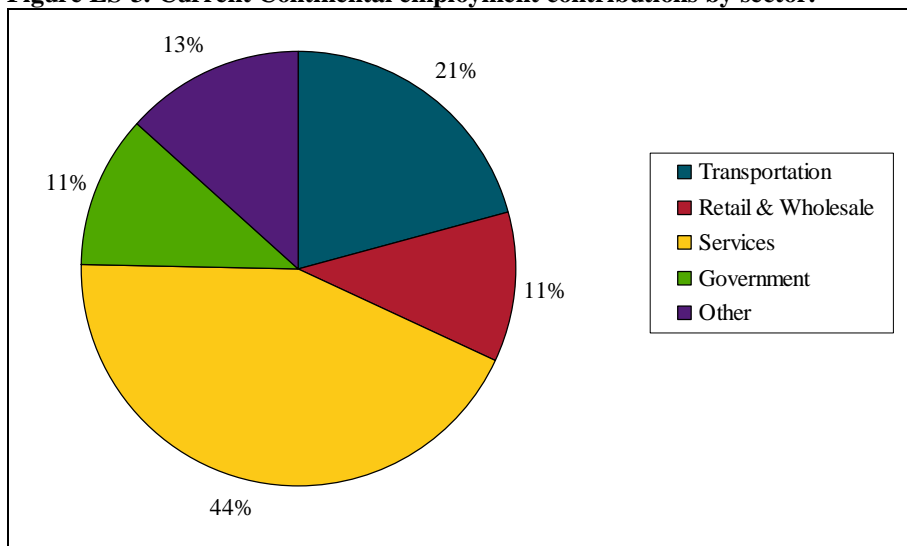
§ Every 100 passengers aboard a Continental flight arriving at Liberty or LaGuardia led to about \$23,000 in local personal income;

§ Every 100 overnight visitors who arrive at Liberty or LaGuardia on Continental led to almost \$204,000 in personal income; and

### 3. Current Contributions to Economic Sectors

The economic contributions of Continental Airlines lead to jobs in a wide range of categories in the local economy. Figure ES-3 shows that 44 percent of the jobs are in the services sector. Transportation accounts for one-fifth of the employment contribution, receiving 21 percent. The remaining jobs are about evenly distributed between the retail & wholesale, government, and “other” sectors.

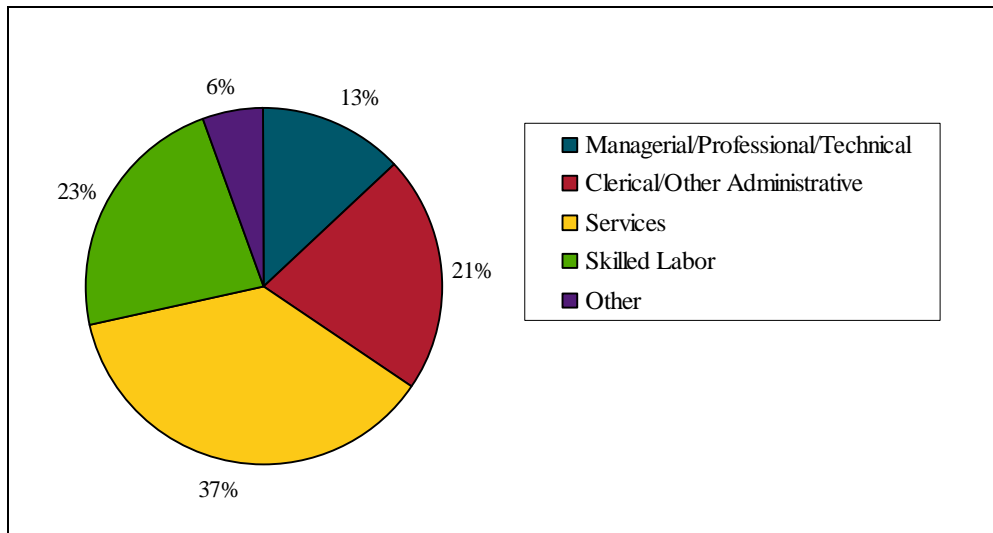
**Figure ES-3. Current Continental employment contributions by sector.**



Source: NERA calculations using the REMI model as explained in text.

### 4. Current Contributions to Occupational Groups

The contributions of Continental also create jobs in a wide range of occupational groups. Figure ES-4 shows the percentage contributions to five broad occupational categories. Services jobs account for the largest percentage, about 37 percent of the total. About one-eighth of the jobs are in the category of managerial, professional, and technical fields.

**Figure ES-4. Current Continental employment contributions by occupational category.**

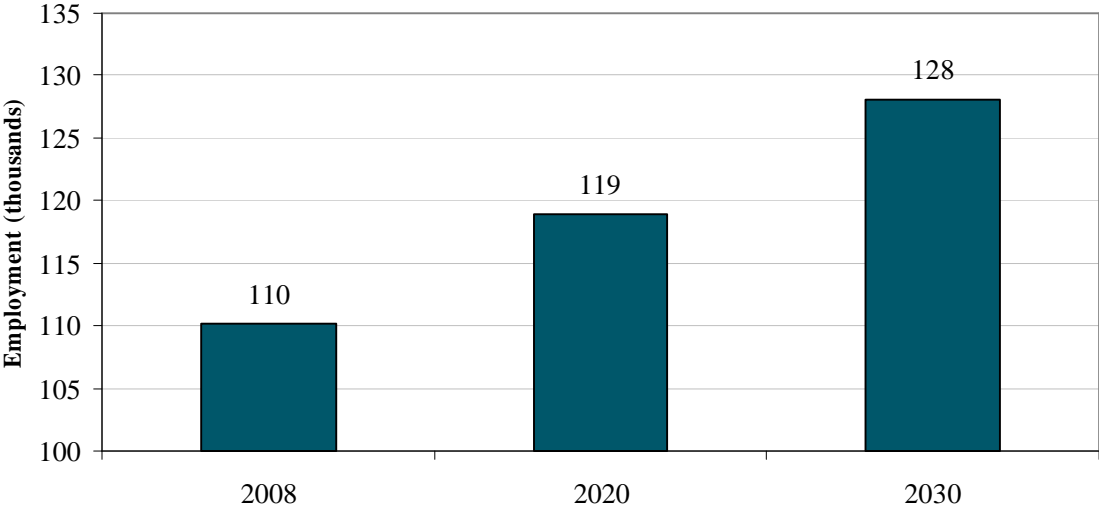
Source: NERA calculations using the REMI model as explained in text.

### **E. Future Contributions of Continental Airlines Operations**

The economic contributions of Continental's operations to the New York/New Jersey region will further develop as demand for air travel increases over the long term. Increased demand for air travel will lead to expanded Continental employment in the area. All of these new employees will spend money in the region, increasing the number of people employed throughout the economy. Additional air travelers will spend more money in the economy, creating an increasing number of jobs in all sectors and occupational groups. The multiplier effect will expand these initial effects throughout the local economy.

Figure ES-5 shows estimates of the increasing contributions that growing Continental Airlines operations will make to New York/New Jersey employment over a period from 2008 to 2030.

Figure ES-5. Future Continental employment contributions.



Source: NERA calculations using the REMI model as explained in text.

Continental’s contribution rises from about 110,000 jobs in 2008 to 119,000 jobs in 2020 then to about 128,000 jobs by 2030. The future contributions to regional income and gross regional product are equally substantial.

- § Continental Airlines operations will account for \$11 billion in personal income by 2030.
- § Continental Airlines operations will account for \$12 billion in gross regional product by 2030.

## I. Introduction

The activity of Continental Airlines in the New York City area generates substantial gains for the New York/New Jersey regional economy. The airline is one of the largest private sector employers in the Newark region, and numerous other businesses throughout the New York/New Jersey are supported in part by Continental's aviation operations. Some businesses are retained directly by Continental Airlines for services related to Continental's operations, while other businesses have been established or expanded to serve the millions of passengers that the airline brings to the region. In short, the New York/New Jersey regional economy is broadly linked to the current flight operations of Continental Airlines. On October 27, 2009, Continental joined the Star Alliance, creating the first major Star Alliance hub in the New York City area and leading to an expected increase in the airline's contribution to the local economy by facilitating travel to the New York/New Jersey region and providing additional connecting opportunities.

NERA Economic Consulting ("NERA") was retained by Continental to conduct an objective and independent evaluation of the economic impact of Continental's New York City operations, including its major hub at Newark Liberty International Airport ("Liberty") as well as its smaller operations at LaGuardia Airport ("LaGuardia"). Continental specified only that NERA conduct a detailed assessment, with rigorous analytical techniques and sound economic theory, and use a state-of-the-art regional economic model. This study presents the results of our evaluation of the economic contributions of Continental Airlines operations in the New York City area to the New York/New Jersey region.

This chapter begins with an overview of the study and its major objectives, followed by background on Continental Airlines and its operations in the New York City area.

### A. Overview of Study

This section provides a brief overview of the study's objectives, its methodology, and an outline of the remainder of the report.

#### 1. Study Objectives

The objective of this study is to quantify the contribution of Continental to the economy of the New York/New Jersey region. Although the economic impacts of Continental's operations reach beyond New York and New Jersey, for the purposes of this study we limit our examination to the specified region. We present estimates for two time periods:

1. *Current Contributions of Continental Operations in the New York City Area.* We estimate for 2008 the impact of Continental's operations on employment and other economic indicators in the New York/New Jersey region.
2. *Future Contributions of Continental Operations in New York City Area.* We estimate how much the economic contribution will grow over the period between 2008 and 2030.

Even using a state-of-the-art economic model, it is infeasible to quantify all of the economic contributions of Continental Airlines operations. The methodology developed in this report consists of measuring the tangible economic gains from the operations of Continental Airlines in the New York City area. These gains consist of the jobs related to economic activity linked to Continental's operations and the resulting expenditures of its passengers. The quantifiable gains also include the economic linkages that multiply initial jobs and expenditures. Continental employees and employees of businesses who provide goods and services to the airline spend money on local goods and services. These expenditures create additional employment and local spending, again leading to more jobs and greater local expenditure. This process is limited because a fraction of expenditures goes to expenses incurred outside the region. (For example, when an airport employee buys an automobile, only part of the expenditure is reflected in income to regional residents; much of the purchase amount goes to workers and other suppliers located where the automobile is manufactured). This multiplier effect is important in measuring the full contributions of airline activities to the regional economy, typically accounting for one-half to two-thirds of the overall contribution.

In addition to these quantifiable benefits, airlines affect regional economies in other ways that are more difficult to measure. An airline with an extensive route system is likely to help attract to an area more firms that value national and international accessibility. New or expanded airline route systems also may play a catalytic role in the development (or redevelopment) of an area. Improvements in ground transportation, both highways and public transportation, to serve the airport and airlines may attract additional businesses. The presence of businesses, in turn, is likely to stimulate residential development and associated stores and services.

As the airline with the largest hub operation in the New York City area, Continental plays a significant role in these other, non-quantifiable benefits. Continental serves a large number of destinations, both directly and through connections, and because of its hub operations it can serve these destinations with more frequent flights than a non-hub airline. Its entry into Star Alliance will provide travelers with additional options in terms of destinations and schedules. This additional flexibility and choice in travel increases the region's attractiveness as a business location, and similarly helps existing businesses to be more competitive.

## **2. Study Methodology and Data**

The study methodology is based on a detailed model of the regional economy. NERA uses a state-of-the-art model developed by Regional Economic Models, Inc. ("REMI") to describe the current economy with and without Continental operations in the New York City area.<sup>1</sup> By comparing the economy with and without Continental's operations, NERA is able to estimate what Continental operations contribute to the regional economy. These comparisons are dynamic because the REMI model provides forecasts of how the regional economy will perform in the future. Using these forecasts, NERA is able to estimate the current and the future contributions of Continental operations in the New York City area. A detailed discussion of this methodology is provided in Chapter III.

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<sup>1</sup> Additional background on the REMI model is contained in Appendix E.

NERA's analysis reflects detailed information provided by Continental on its New York City-area operations. The REMI model uses a highly detailed dataset on the New York/New Jersey regional economy in its simulation. We also rely on data from the Port Authority of New York and New Jersey ("Port Authority") and the New York Convention and Visitors Bureau (NYC & Company). This information includes data on the number and type of passenger carried by Continental and detailed information on visitor expenditure patterns. These data are discussed in more detail in Chapter III.

### **3. Outline of Report**

The remainder of this report is organized as follows. The remaining sections of this chapter provide general background information on Continental, Liberty, LaGuardia, Continental's operations in the New York City area, and the Star Alliance. Chapter II presents our estimates of the overall contributions of Continental Airlines operations to the New York/New Jersey region, including current and future contributions. Chapter III presents the methodology and input data used in this analysis. Appendices provide detailed results for each individual region (the Newark area, New Jersey as a whole, New York City, and New York State) and additional details regarding the methodology.

## **B. Background**

This section provides background information on Continental Airlines, Liberty, LaGuardia, Continental's New York City operations, and the Star Alliance.

### **1. Continental Airlines**

Continental Airlines is the world's fifth-largest air carrier. Together with Continental Express and Continental Connection, it transports approximately 63 million passengers per year to more than 260 destinations worldwide. Continental employs more than 43,000 people in the United States and other nations, and operates U.S. hubs in Houston, New York/Newark, and Cleveland (Continental 2009a).

Continental began operations on July 15, 1934 with a route from Pueblo, Colorado to El Paso, Texas with stops in Las Vegas, Santa Fe and Albuquerque, New Mexico. As the U.S. airline industry expanded in the ensuing decades, Continental grew significantly, gradually expanding its route system and adding jet service (in 1959) and Boeing 747 wide body aircraft service (in 1970).

Continental struggled, however, in the 1980s and early 1990s, and at several points its existence was in jeopardy. The airline underwent two Chapter 11 bankruptcy filings, the first lasting from 1983 to 1986 and the second from 1990 to 1993. In 1995, Continental implemented a turnaround plan designed to improve its operational performance and working environment for employees and to achieve sustained profitability. The plan helped to spark period of significant growth and profitability for the company and was regarded by observers as among the most successful corporate turnarounds in the history of the U.S. aviation industry (Brelis 2001).

Like most of the airline industry, Continental was negatively affected by the downturn in economic conditions following the September 11, 2001 terrorist attacks. In the years following the attacks, Continental launched a significant expansion of its international route network, adding service from Liberty, for example, to destinations including Geneva, Edinburgh, Oslo, Stockholm, Beijing, and Delhi. The carrier reported an annual profit of \$343 million for the year 2006. In recent years, Continental has not been immune to the difficult conditions (including fuel price volatility and economic uncertainty) that the airline industry continues to confront. On June 19, 2008, Continental announced its intention to join Star Alliance (Continental 2008); it earned government approval and joined Star in October 2009 (Continental 2009b).

## **2. Newark Liberty International Airport**

Newark Liberty International Airport, located in New Jersey's Essex and Union counties about 16 miles from midtown Manhattan, opened in 1928. Through much of the 1930's, it was the world's busiest airport, serving more than 30,000 passengers in 1931 (Hough 1999). Its airline service was temporarily discontinued in 1942, as it served as headquarters of the Atlantic Overseas Air Technical Service Command during World War II. In the ensuing decades, air traffic at Newark increased substantially, as expansions to terminals and infrastructure were put in place. In 1996, a \$120 million international arrivals facility opened, roughly doubling the airport's international capacity at the time and cementing its status as a major international airport for the New York City area (Port Authority 2009).

In the mid-1990's Continental established a fully-functional hub at Liberty and laid the groundwork for further infrastructure upgrades. At Terminal C, the airline launched its Global Gateway project, highlighted by the December 2001 opening of Concourse C3. Continental also completed a major international arrivals facility, further increasing the airport's international passenger processing capability by 1,500 passengers per hour (Port Authority 2009).

Liberty has been operated by the Port Authority of New York and New Jersey ("Port Authority"), since 1948. In recent years, the Port Authority has launched improvements to the airport's regional accessibility, including AirTrain Newark service that connects Liberty directly to Amtrak and NJ Transit lines with links to New York City, Philadelphia, and locations throughout New Jersey (Port Authority 2009).

In 2008, Liberty served over 35 million passengers, making it the twelfth busiest airport in the United States and the twenty-third busiest in the world (Port Authority 2009).

## **3. LaGuardia Airport**

LaGuardia Airport is in the borough of Queens in New York City. Its first commercial service launched in December 1939. It was leased to the Port Authority in 1947; the Port Authority is under agreement to operate the facility through 2050. Today, LaGuardia offers scheduled nonstop service primarily to destinations in eastern North America. It served over 23 million passengers in 2008, making it the twenty-first busiest airport in the country (Port Authority 2009).

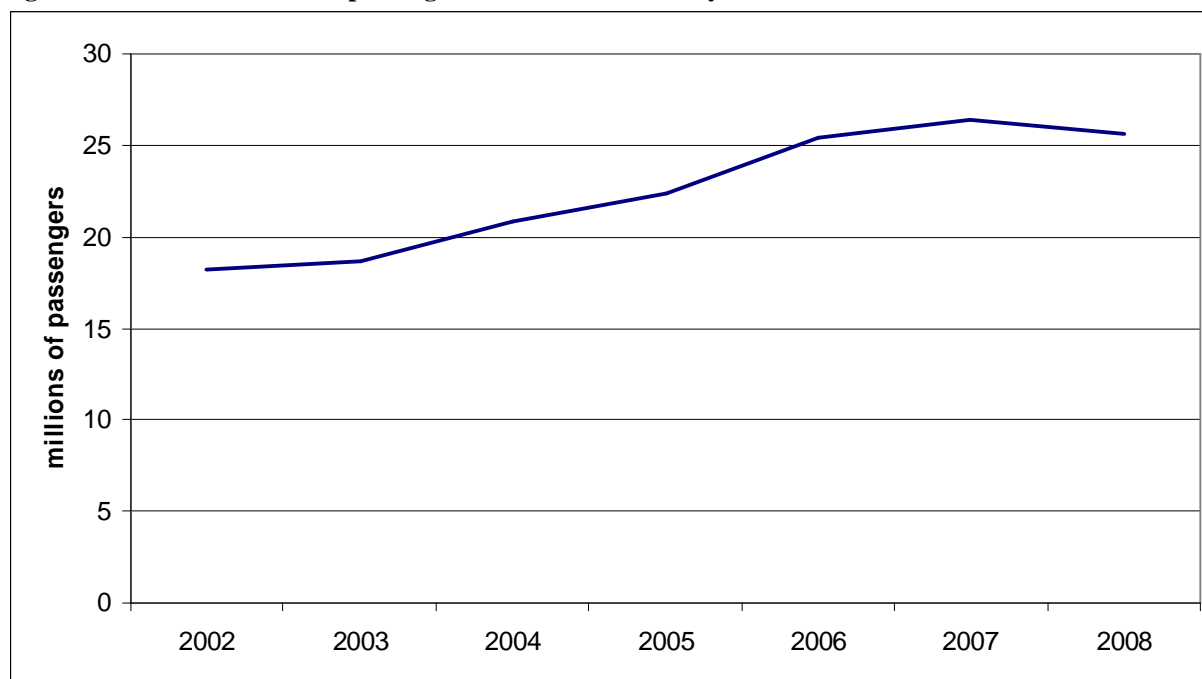
#### 4. Continental Operations in the New York City Area

In the 1990's, Continental established a fully-functional major hub in the New York City area at Liberty. Today, Continental's Liberty hub is the largest commercial airline hub in the New York City area. As of March 2009, Continental and its regional partners served 146 non-stop destinations with 412 flights per day from Liberty (Continental 2009c), making Continental Airlines the largest airline at Liberty. Together with its regional partners, Continental transported 70 percent of all revenue passengers at Liberty in 2008 (Port Authority 2009).

Continental's Liberty operations serve as a gateway to Continental's international route system to Europe, Asia, and Latin America. Continental's Newark hub currently provides daily or near-daily nonstop service to 24 European destinations, seven Canadian cities, eight Central American/Caribbean destinations, plus Bogota, Sao Paulo, Beijing, Delhi, Hong Kong, Mumbai, Shanghai, and Tokyo (Continental 2009d). Continental's Liberty operations provide the only scheduled nonstop service from the New York City area to several important destinations.

Continental has significant, though much smaller, operations at LaGuardia, where it ranked among the fifteen largest carriers (by passenger count) in 2008 (Port Authority 2009). From LaGuardia, Continental and its partners operated 16 flights per day as of March 2009, with service to the airline's hubs in Houston and Cleveland (Continental 2009c).

Figure 1 displays Continental's total revenue passenger count in the New York City area between 2002 and 2008. In 2002, Continental transported approximately 18 million revenue passengers in the New York City area. By 2008, its passenger count had increased to roughly 26 million.

**Figure 1. Continental revenue passengers in the New York City area.**

Source: Port Authority 2009 and Port Authority annual traffic reports for previous years.

## 5. Continental Star Alliance Participation

Continental's entry into the Star Alliance on October 27, 2009 will increase the airline's contribution to the local economy by facilitating travel to the New York City area and providing additional connecting opportunities. Continental will become the 25<sup>th</sup> member of the Star Alliance, which offers 18,900 flights a day to 983 cities in 169 countries, and it will become the first member of the Star Alliance with a major hub in the New York City area. The Star Alliance offers a variety of benefits to customers in terms of connectivity and rewards, including code sharing on selected flights, collection and redemption of frequent flier miles/points across loyalty programs, enhanced flight connections, faster transfer times in terminals, and the ability to book award travel on multiple carriers on a single ticket. Continental will join nine other Star Alliance carriers that serve Liberty and/or LaGuardia.

Table 1 lists the Star Alliance member carriers that serve Liberty and/or LaGuardia.

**Table 1. Star Alliance members serving Liberty and/or LaGuardia.**

	<b>Liberty</b>	<b>LaGuardia</b>
Air Canada	X	X
Continental Airlines	X	X
LOT Polish Airlines	X	
Lufthansa	X	
SAS Scandinavian Airlines	X	
Singapore Airlines	X	
Swiss	X	
TAP Portugal	X	
United	X	X
U.S. Airways	X	X

Note: An “X” indicates that a carrier serves the indicated airport.

Source: Port Authority (2009) and Star Alliance (2009).

Seven foreign Star Alliance carriers serve Liberty. Continental’s entry into the Star Alliance will facilitate the usage of these carriers’ international networks by Continental passengers, and will enable passengers of the foreign carriers to more easily connect to Continental’s domestic U.S. and international networks at Liberty.

## II. Overall Regional Economic Contributions of Continental's New York/New Jersey Operations

This chapter provides estimates of the contributions of Continental's New York City-area operations to the overall New York/New Jersey regional economy. Section A discusses the current contributions of Continental's New York City-area operations and Section B lists the future contributions of those operations. Both sections provide details by sub-region, industry sector, and occupational group.

### A. Current Regional Contributions

This section presents estimates of the current contributions of Continental to the New York/New Jersey regional economy, reflecting the year 2008. The data and methodology behind these estimates are provided in Chapter III and in several appendices.

#### 1. Current Contributions

NERA's analysis using the REMI model indicates that Continental operations in the New York City generate substantial gains for the local economy. Table 2 shows the current contributions of Continental's New York City-area operations in four impact categories:

- § Employment;
- § Population;
- § Gross regional product; and
- § Personal income.

**Table 2. Current contributions of Continental Airlines to the New York/New Jersey regional economy.**

Employment (jobs)	110,200
Population (number of residents)	119,964
Gross Regional Product (billions 2008\$)	\$6.27
Personal Income (billions 2008\$)	\$5.93

Note: All values are in 2008 dollars

Source: REMI model and NERA calculations as explained in text.

These results indicate that Continental's New York City-area operations contribute substantially to the regional economy. Continental activity generates over 110,000 jobs in the New York/New Jersey economy and attracts nearly 120,000 people to reside in the region. Its operations also contribute \$6.27 billion to gross regional product and \$5.93 billion to personal income in the New York/New Jersey region.

## 2. Sources of Current Contributions

The *overall* quantified contributions of Continental can be disaggregated into three categories:

1. Contributions sustained by Continental's *direct* air transportation employment of residents in New York and New Jersey.
2. *Multiplier* effects spurred by Continental employment and operations and perpetuated by interdependence between aviation and other industrial sectors.
3. Contributions that result from *expenditures by visitors* traveling to the New York/New Jersey region by Continental, including additional multiplier effects from these expenditures.

Table 3 shows the contributions of Continental operations disaggregated into the three categories above. Continental direct employment provides 16,238 employees. We estimate that the multiplier effects related to aviation activity result in an additional 14,602 regional jobs. Our results indicate that the long-run contribution of passenger expenditure to the regional economy is 79,360 jobs.

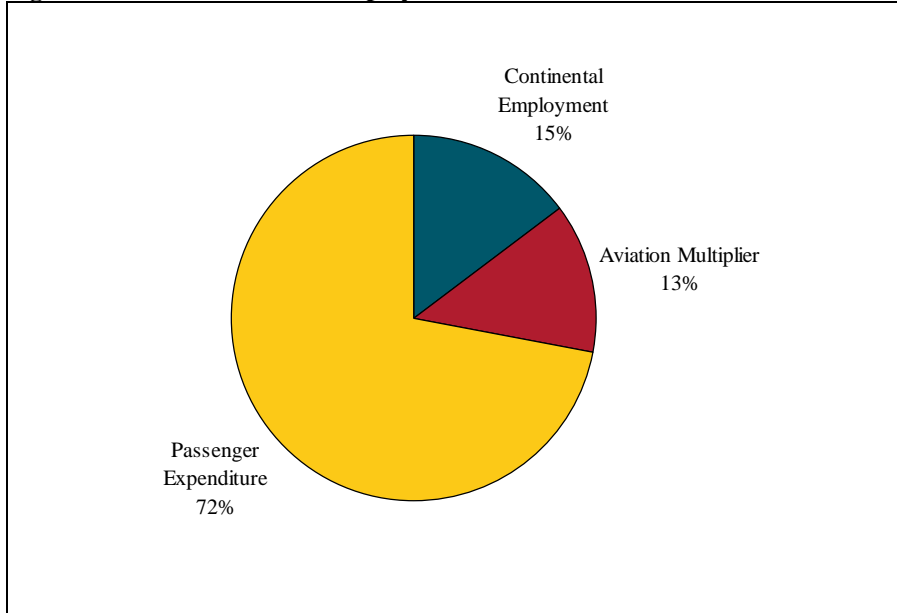
**Table 3. Sources of current economic contributions by Continental Airlines.**

<b>Contribution Category</b>	<b>Continental Employment</b>	<b>Aviation Multiplier</b>	<b>Passenger Expenditure</b>	<b>Total Contribution</b>
Employment	16,238	14,602	79,360	110,200
Population	10,859	15,454	93,652	119,964
Personal Income (billion 2008\$)	\$0.75	\$1.06	\$4.12	\$5.93
GRP (billions 2008\$)	\$1.17	\$1.66	\$3.45	\$6.27

Source: REMI model and NERA calculations as explained in text.

Figure 2 depicts the sources of employment contributions in percentage terms. Continental direct employment accounts for 15 percent of the overall employment contribution, while multiplier effects from those operations result in an additional 13 percent of the employment impact. There is thus roughly one job created through the aviation multiplier effect for each Continental employee. Passenger expenditures make up the most significant portion of the employment contribution, accounting for 72 percent of the aggregate estimate.

**Figure 2. Sources of current employment contributions of Continental Airlines.**



Source: NERA calculations as explained in text.

As further described in the next chapter, the implied multiplier ratio for Continental employment (i.e., the ratio of the second column of Table 3 to its first column for “Employment”) is smaller than it would otherwise be since we exclude employees who do not reside in the New York/New Jersey region from the “multiplier effects” calculated by the REMI model. That is, while Continental New York City-area employees who live in the region would extensively contribute to regional economic activity, we assume that employees not living in the area do not contribute to regional economic impacts beyond the creation of direct employment positions in the region. This assumption tends to understate Continental’s impacts since such employees do contribute to the region’s economy when they travel to and make purchases in the region; it also implies that the ratio in Table 3 of total aviation employment effects to direct Continental employment (about 1.9) is understated.

### **3. Current Contributions by Sub-region**

This section presents the economic impacts of Continental’s New York City-area operations on four geographic sub-regions: (i) the Newark area (comprising Essex, Morris, Sussex, Union, and Hunterdon counties in New Jersey); (ii) the rest of New Jersey (all New Jersey counties except those in the Newark region); (iii) New York City (New York, Kings, Queens, Bronx, and Richmond counties in New York State); and (iv) the rest of New York State (all New York State counties except those in New York City). Appendices provide detailed results for each of these sub-regions. We have limited our analyses to the New York/New Jersey region, though it is important to note that Continental’s impacts extend elsewhere, in particular to Pennsylvania and Connecticut. The inclusion of these areas would increase Continental’s overall contributions.

Table 4 presents the results for the four sub-regions. Newark, New York City, and the rest of New Jersey all receive roughly comparable employment contributions from Continental operations. Population impacts are most pronounced for the “rest of New Jersey” region,

reflecting the fact that many Continental Liberty employees, and those indirectly supported by the airline’s operations, reside in New Jersey municipalities outside the Newark area. Overall, all areas accrue substantial gains in all impact categories from the presence of Continental in the New York City area.

**Table 4. Current Continental contributions by sub-region.**

	New Jersey			New York			Total
	Newark Region	Rest of NJ	Total	New York City	Rest of NY	Total	
Employment	33,822	30,049	63,871	32,588	13,741	46,329	110,200
Population	23,400	43,064	66,464	32,586	20,913	53,500	119,964
Personal Income (billions 2008\$)	\$1.40	\$1.82	\$3.21	\$1.67	\$1.05	\$2.72	\$5.93
GRP (billions 2008\$)	\$2.73	\$1.40	\$4.13	\$1.43	\$0.71	\$2.14	\$6.27

Note: All dollar values expressed in 2008 dollars.

Source: REMI model and NERA calculations as explained in text.

#### 4. Current Contributions per Unit of Aviation Activity

Results thus far have concentrated on the overall impacts of Continental on the regional economy. In order to provide concrete examples of the importance of Continental’s New York City-area operations, this section presents estimates of the *average* contributions by aircraft operations, arriving passengers, and overnight visitors.

##### a. Contributions per Aircraft Operation

One measure of Continental’s overall level of activity is the number of annual aircraft operations. In 2008, Continental performed about 300,000 takeoffs and landings (operations) in the New York City area. For each operation, our results indicate that:

§ Over \$19,000 is added to personal income in the region; and

§ 0.36 jobs are supported.

The second figure indicates that, on average, for every three Continental flights in the New York City area, one regional job is generated.

##### b. Contributions per Passenger

Another useful metric is the contribution per Continental passenger. This allows us to assess the impact that each additional visitor arriving on Continental has on the local economy. We consider two passenger breakdowns. First, we measure the average impact of each passenger. This metric assigns an economic value to each Continental passenger arriving in or departing from the New York City area. It is also useful to estimate on average how much each overnight visitor contributes economically, given that overnight visitors account for the majority of passenger expenditures; we present this information as well.

For every 100 Continental passengers arriving in the New York City area, our modeling indicates that:

- § \$23,000 is added to personal income in the region; and
- § 0.43 person-years of employment are generated.

For every overnight visitor arriving in the New York City area on a Continental flight, we estimate that:

- § \$204,000 is added to personal income in the region; and
- § 3.80 person-years of employment are supported.

## **5. Current Contributions by Sector**

All sectors of the economy gain in some capacity from Continental's widespread contribution to the regional economy. These impacts, however, are most concentrated within certain sectors. This section provides further information on the impacts on individual sectors of the economy.

Table 5 presents our results by sector. The first column lists the total number of jobs in each sector in the New York/New Jersey region. The second column shows the amount of employment in each sector attributable to Continental's operations. The third column provides the percentage share of Continental's overall employment contribution attributable to each sector. Accommodation and food services receive the largest proportion of the employment contribution, consistent with the fact that many Continental passengers utilize the region's lodging services and purchase food in the area (either in the terminal or at local restaurants or grocers). Employment in accommodation and food services is 32,371, or 29.4 percent of the total employment contribution. The transportation sector itself also accrues a significant portion of the contribution: 22,830 jobs, or 20.7 percent of the aggregate employment impact. Retail trade and entertainment sectors also receive noteworthy proportions of the employment contribution—nearly 20 percent in total—reflecting the significance of passenger expenditures to the overall impacts.

**Table 5. Current employment contributions of Continental Airlines by sector.**

<b>Sector</b>	<b>2008 Total</b>	<b>2008 Estimated Contribution</b>	<b>Percent Share of Contribution</b>
Transportation and Warehousing	556,908	22,830	20.7%
Retail Trade	1,621,197	11,021	10.0%
Wholesale Trade	642,946	1,263	1.1%
Professional and Technical Services	1,325,668	2,455	2.2%
Management of Companies and Enterprises	212,399	128	0.1%
Administrative and Waste Services	906,963	2,846	2.6%
Educational Services	547,043	1,146	1.0%
Health Care and Social Assistance	2,122,931	5,944	5.4%
Accommodation and Food Services	959,320	32,371	29.4%
Other Services, except Public Administration	897,418	3,068	2.8%
Forestry, Fishing, Related Activities, and Other	31,114	24	0.0%
Mining	14,663	11	0.0%
Utilities	54,427	223	0.2%
Construction	746,021	3,204	2.9%
Manufacturing	888,433	647	0.6%
Information	412,478	710	0.6%
Finance, Insurance and Real Estate	1,784,839	524	0.5%
Arts, Entertainment, and Recreation	413,048	9,418	8.5%
State Government	408,859	6,253	5.7%
Local Government	1,518,937	6,113	5.5%
<b>Total</b>	<b>16,065,613</b>	<b>110,200</b>	<b>100%</b>

Note: Sums of components may not match totals due to rounding.

Source: REMI model and NERA calculations as explained in text.

## 6. Current Contribution by Occupation

The contribution to employment is well-distributed across occupations, increasing the availability of various types of jobs throughout the region. Table 6 presents our results for five broad occupational groups. The largest occupational contribution from Continental's operations is in services, accounting for 37 percent of the total. Skilled labor and clerical/other administrative collectively accrue 44 percent of the aggregate contribution.

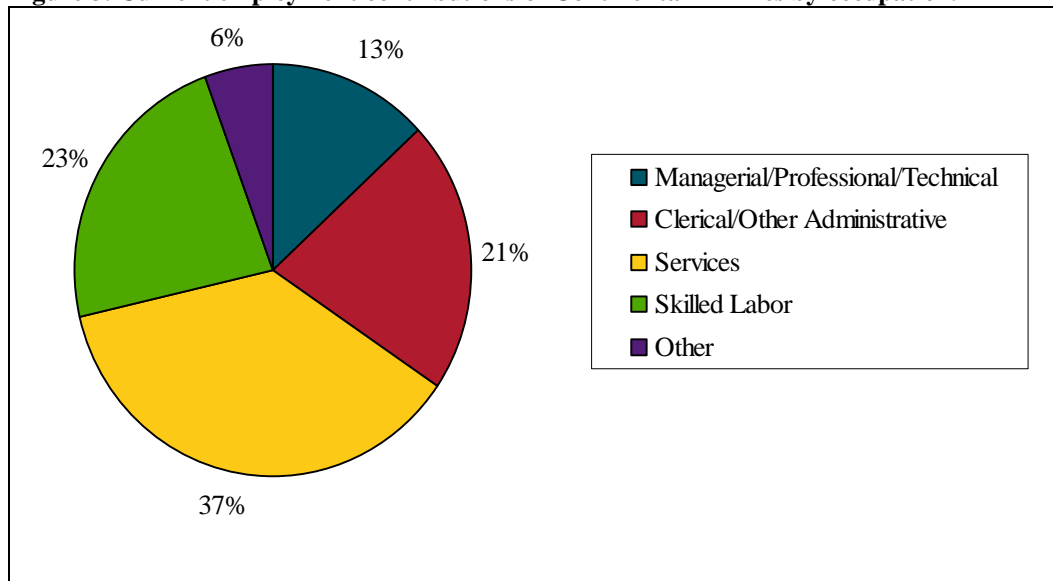
**Table 6. Current employment contributions by Continental Airlines by occupation.**

<b>Occupation</b>	<b>2008 Estimated Contribution</b>	<b>Percent Share of Contribution</b>
Managerial/Professional/Technical	14,508	13%
Clerical/Other Administrative	23,603	21%
Services	40,577	37%
Skilled Labor	25,336	23%
Other	6,176	6%

Source: REMI model and NERA calculations as explained in text.

Figure 3 presents the distribution across occupations in graphical form.

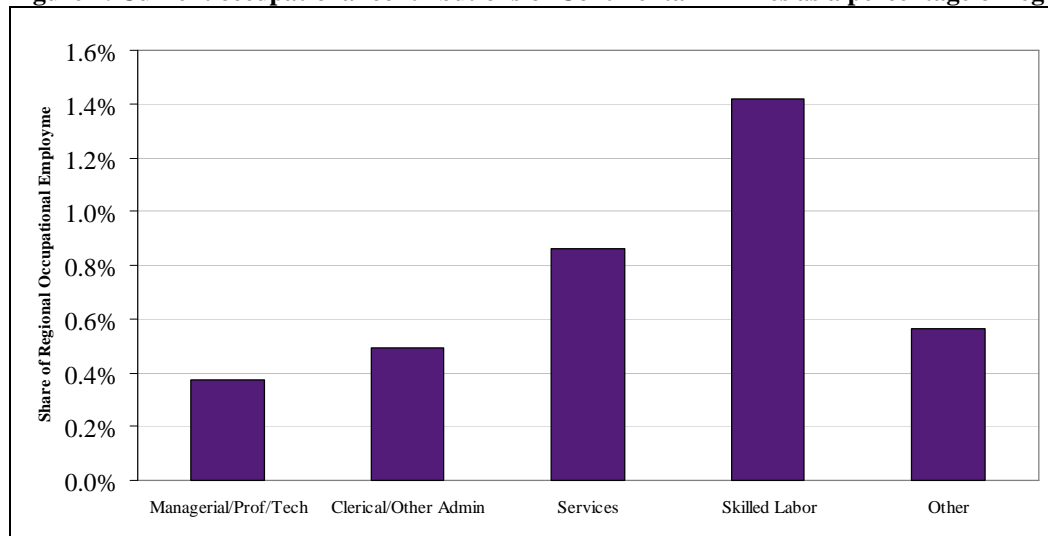
**Figure 3. Current employment contributions of Continental Airlines by occupation.**



Source: REMI model and NERA calculations as explained in text.

Figure 4 presents the ratio of Continental’s occupational employment contribution to the total employment for that occupation in the New York/New Jersey region. Nearly one percent of the region’s service employment is supported by Continental’s operations, while over 1.4 percent of all skilled labor jobs are accounted for by Continental’s activities.

**Figure 4. Current occupational contributions of Continental Airlines as a percentage of regional total.**



Source: REMI model and NERA calculations as explained in text.

## B. Future Regional Contributions

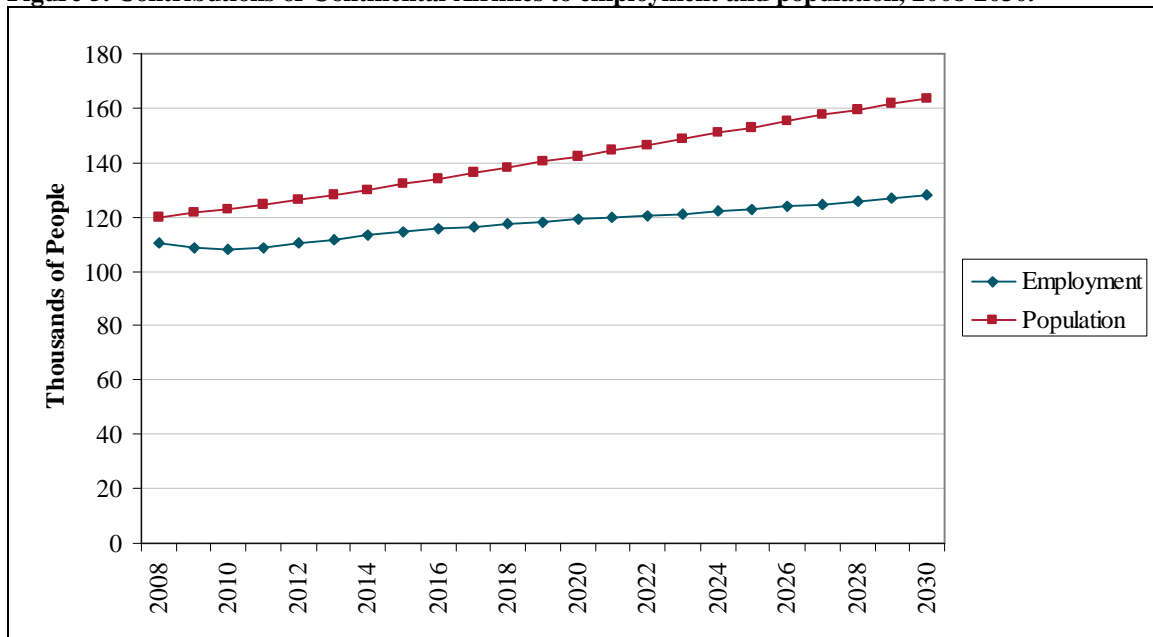
This section reports the forecasted future contributions of Continental's New York City-area operations to the New York/New Jersey regional economy. The economic impacts attributable to Continental grow with economic progress and expected increases in the scale of Continental operations.

This section provides the details of our estimated future Continental contributions, using 2030 as a representative year. Section 1 presents the aggregate contributions; Section 2 presents our forecasts, disaggregated by sub-region; Section 3 presents our estimates by industrial sector; and Section 4 presents the implications of the results by occupation. The data and methodology underlying these forecasts are explained in detail in Chapter III.

### 1. Future Contributions

The economic contributions of Continental's operations in the New York City area are projected to increase over time. Figure 5 presents our estimates of the long-run contributions of New York City-area Continental operations to employment and population in the New York/New Jersey region from 2008-2030. Continental's impact on employment rises from 110,000 in 2008 to 128,000 in 2030, while its impact on population reaches almost 164,000 in 2030, an increase of 44,000 from its 2008 level of 120,000.

**Figure 5. Contributions of Continental Airlines to employment and population, 2008-2030.**

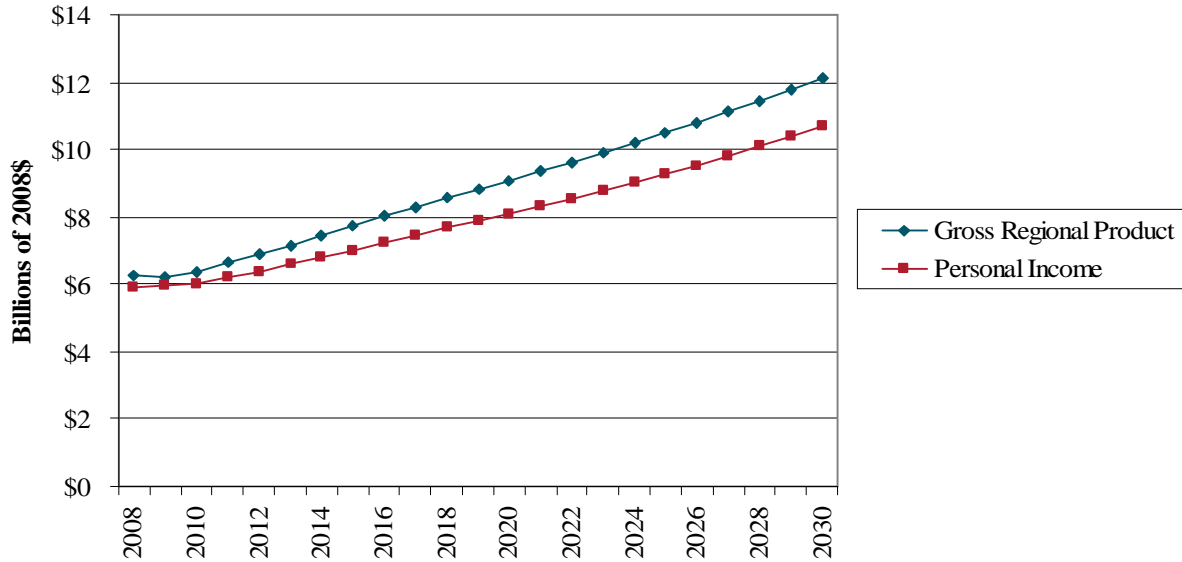


Source: NERA calculations as explained in text.

Figure 6 displays our estimates of Continental's contribution to gross regional product and personal income from 2008-2030. The contributions of Continental's operations to gross regional product rise from \$6.3 billion in 2008 to \$12.2 billion in 2030, an increase of almost 100 percent

in just over 20 years. The impact on personal income increases from \$5.9 billion in 2008 to \$10.7 in 2030.

**Figure 6. Long-run contributions of Continental Airlines to gross regional product and personal income.**



Source: NERA calculations as explained in text.

These contributions are based upon underlying regional and aviation-sector growth assumptions that are embedded in the REMI model, in conjunction with forecasts from Continental of its passenger and operations levels from 2009-2014.

## 2. Future Contributions by Sub-region

This section presents the long-run contributions of Continental operations in the New York City area by sub-region. As above, we use 2030 as the representative future year. Table 7 presents the results for each sub-region.

**Table 7. Continental contributions in 2030 by sub-region.**

	New Jersey			New York			Total
	Newark Region	Rest of NJ	Total	New York City	Rest of NY	Total	
Employment	34,508	34,813	69,321	42,827	15,909	58,735	128,055
Population	30,767	58,584	89,351	47,275	27,092	74,367	163,706
Personal Income (billions 2008\$)	\$2.49	\$3.25	\$5.74	\$3.15	\$1.82	\$4.98	\$10.72
GRP (billions 2008\$)	\$4.96	\$2.61	\$7.57	\$3.25	\$1.32	\$4.58	\$12.15

Note: Dollar values are in 2008 dollars.

Source: REMI model and NERA calculations as explained in text.

## 3. Future Contributions by Sector

Table 8 presents future contributions to employment by Continental's operations in 2030. The distribution of the employment impacts is similar to the 2008 estimates, though the future values

are larger. Accommodation and food services still receive the largest portion of the employment impacts, with 36,350 jobs attributable to Continental’s operations.

**Table 8. Continental employment contributions in 2030 by sector.**

<b>Sector</b>	<b>2030 Total</b>	<b>2030 Estimated Contribution</b>	<b>Percent Share of Contribution</b>
Transportation and Warehousing	700,583	23,635	18.5%
Retail Trade	1,604,071	10,839	8.5%
Wholesale Trade	478,701	934	0.7%
Professional and Technical Services	1,866,914	3,437	2.7%
Management of Companies and Enterprises	209,042	125	0.1%
Administrative and Waste Services	1,144,284	3,569	2.8%
Educational Services	861,726	1,794	1.4%
Health Care and Social Assistance	3,451,705	9,606	7.5%
Accommodation and Food Services	1,083,825	36,350	28.4%
Other Services, except Public Administration	1,149,711	3,907	3.1%
Forestry, Fishing, Related Activities, and Other	24,866	19	0.0%
Mining	12,220	9	0.0%
Utilities	49,768	203	0.2%
Construction	766,691	3,273	2.6%
Manufacturing	617,077	447	0.3%
Information	345,446	591	0.5%
Finance, Insurance and Real Estate	2,203,258	886	0.7%
Arts, Entertainment, and Recreation	627,075	14,212	11.1%
State Government	464,655	7,063	5.5%
Local Government	1,789,060	7,156	5.6%
<b>Total</b>	<b>19,450,677</b>	<b>128,055</b>	<b>100%</b>

Note: Sums of components may not match total due to rounding.

Source: REMI model and NERA calculations as explained in text.

#### **4. Future Contributions by Occupation**

Table 9 presents 2030 employment contribution results disaggregated by occupation. As with the current contribution, services receive the largest proportion of the employment contribution at 38% (48,067 jobs). Skilled labor and clerical/administrative jobs account for 43 percent of the 2030 total, with approximately 56,000 combined jobs.

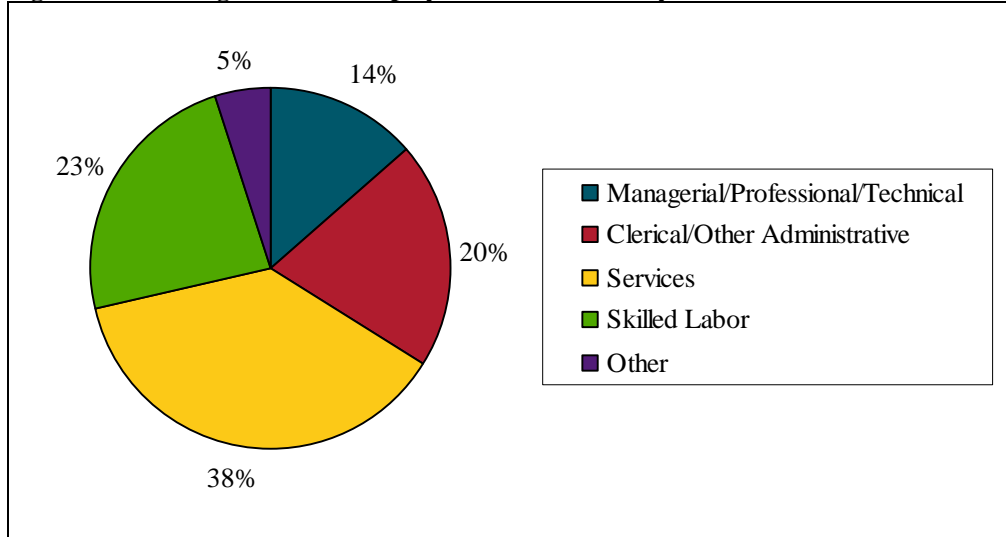
**Table 9. Continental employment contributions in 2030 by occupation.**

<b>Occupation</b>	<b>2030 Estimated Contribution</b>	<b>Percent Share of Contribution</b>
Managerial/Prof/Tech	17,383	14%
Clerical/Other Administrative	26,090	20%
Services	48,067	38%
Skilled Labor	30,079	23%
Other	6,437	5%
<b>Total</b>	<b>128,056</b>	<b>100%</b>

Source: NERA calculations as explained in text.

Figure 7 displays these results in graphical form.

**Figure 7. Percentage shares of employment contributed by Continental Airlines in 2030 by occupation.**



Source: NERA calculations as explained in text.

### III. Methodology

This chapter provides a detailed description of the methodology and data we use to model the economic impacts of Continental's operations in the New York City area. The chapter is organized as follows. Section A provides basic background information on the impact categories discussed in this study, Section B provides an overview of the REMI model, and Section C details how the model was used to estimate economic impacts. Section D presents our input assumptions.

#### A. Background

There are various methods of classifying the impacts of an airline's operations on a regional economy. In presenting the results, we distinguish between three types of economic impacts:

1. *Continental employment impacts* are the impacts associated with Continental's direct employment in the air transportation industry. Most direct employees work at Liberty (and, to a lesser extent, LaGuardia).
2. *Aviation multiplier impacts* are associated with firms that provide goods and services to Continental in support of its aviation and cargo operations. These services include runway equipment, terminal and in-flight food services, and so forth. This category also includes impacts associated with purchases made by employees of Continental and by employees of the firms from which Continental procures goods and services.
3. *Passenger expenditure impacts* are those contributions attributed to the expenditures of visitors transported to the New York/New Jersey region by Continental flights. These consumer expenditures generate demand for lodging, food, and entertainment, as well as spread through the regional economy to spur demand in numerous other sectors.

Our assessment of these three impact categories is conducted using a sophisticated regional economic model that is able to disaggregate the impacts at many levels. The specifics of the model are discussed in the next section.

#### B. The REMI Model

The model we used was developed by Regional Economic Models, Inc. ("REMI") and modified by NERA for use in this study. The REMI model is a state-of-the-art regional model that provides a detailed characterization of the regional economy.<sup>2</sup> The REMI model has been in use since 1980 and has undergone frequent enhancements and modifications to ensure that it reflects current economic theory as well as the latest available data on its modeling regions. The model has earned widespread acclaim for its rigorous application of regional economic theory, and has been used in many studies, including of energy facilities, corporate relocations, airport and airline operations, and government regulations. REMI regularly publishes detailed

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<sup>2</sup> Appendix E provides a more complete description of the REMI model.

documentation (see, e.g., REMI 2009) of the econometric and theoretical underpinnings that drive the model.

The core of the REMI model is a set of input-output (“I/O”) relationships among different industries. These relationships show how industries are related to one another, in terms of both inputs and outputs. Thus, they allow one to estimate how changes in one industry will affect demand for other industries (those that provide inputs to the industry in question). In addition, I/O models can be used to trace the effects that result from changes in the incomes of workers in the affected industries.

The REMI model goes well beyond the standard I/O relationships to incorporate other important feedback effects. The model includes demographic components, because the population of an area over the long run depends in part on the available economic opportunities. Changes in population in turn have feedback effects on the local economy, affecting the demand for housing and other goods. Other feedback effects include changes in wages as the result of changes in economic activity. If employment increases, for example, wages will tend to rise, affecting the competitive position of the region relative to other areas. At the same time, the model incorporates so-called agglomeration effects, which dictate that, if many firms in a given industry sector cluster in a specific region, the entire industry benefits through improved access to labor and other inputs.

The REMI model used for these analyses was prepared specifically for this study. It was compiled in September 2009, with version 1.1 of REMI’s PI+ application, and includes historical data through 2007. Our simulations incorporate the results of the model over the period from 2008 to 2030. The model was customized to analyze the particular issues addressed in this study—namely the impacts of Continental’s New York City-area operations on the New York/New Jersey regional economy.

### **C. Modeling the Contributions of Continental’s New York City-Area Operations**

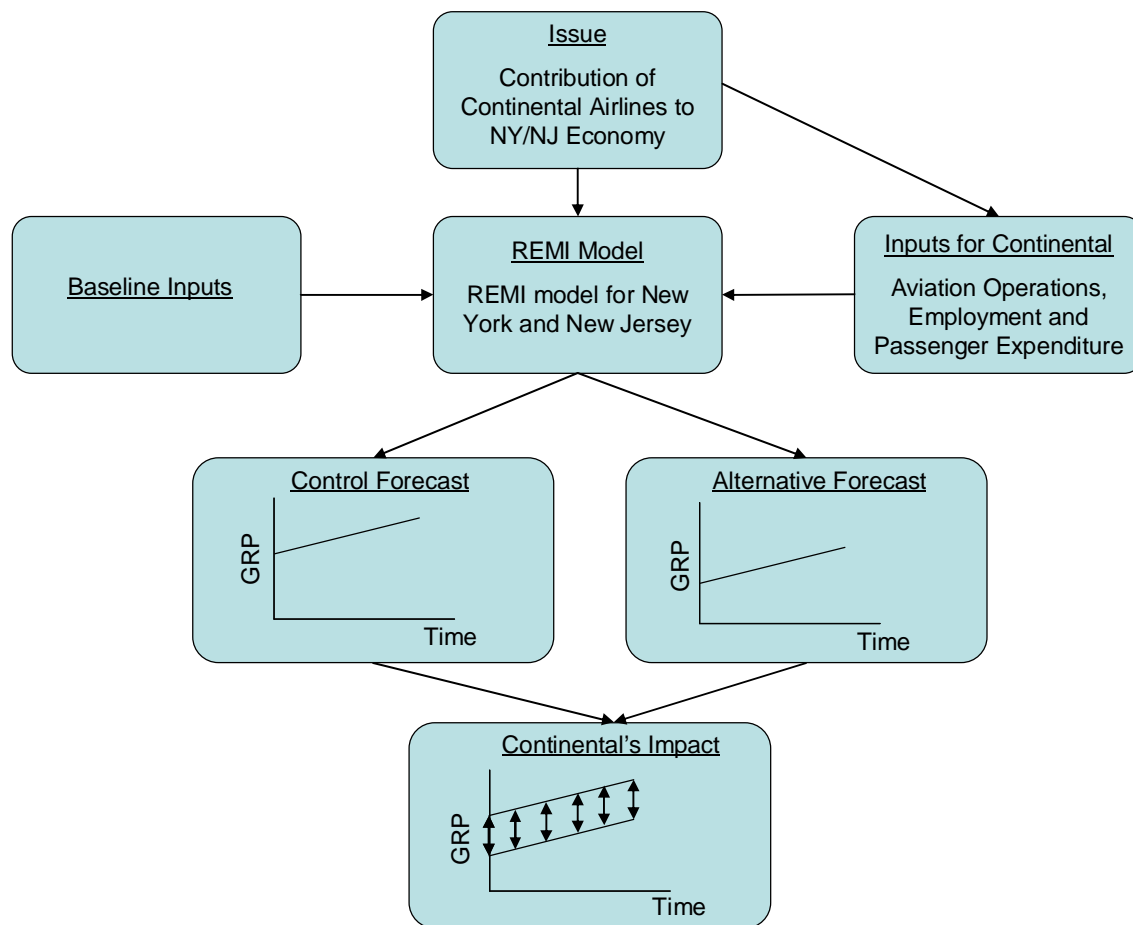
This section first outlines the general methodology employed in this study. It then discusses the particular methodologies used to estimate specific components of the analysis, such as Continental’s future contributions.

#### **1. Basic Methodology**

Figure 8 contains a depiction of the basic methodology. The utility of REMI in modeling economic impacts is based on its ability to dynamically estimate the trajectory of economic and demographic variables under various scenarios. Measuring the contributions of Continental’s operations to the New York/New Jersey economy involved two steps. First, it was necessary to conduct a control case forecast of the economy under ‘current conditions using a set of control inputs. This control case reflects current conditions, including the operations and economic activity attributable to Continental. The control inputs used in these baseline projections include principle economic variables such as employment, population, personal income, and gross regional product.

Second, to estimate Continental’s contribution we developed an alternative case that removed all components of Continental’s economic impacts, including its employment, induced intermediate industry demand and passengers’ expenditures. This step is represented in the right portion of Figure 8. Running the model with these reductions allows us to estimate the long-run dynamics of the regional economy in the absence of Continental’s operations.

**Figure 8. Illustration of REMI modeling methodology.**



## 2. Inputs for Continental Airlines Contributions

There are three major components of Continental’s economic contribution. Descriptions of the three inputs, and their respective data sources, are described below:

1. *Continental employment.* Data regarding the aviation and cargo employment at Continental in the New York City area were provided by Continental, both for its own operations and those of its regional partner airlines. Continental employment positions in the New York/New Jersey region occupied by individuals living outside the region were counted in this category, but the associated multiplier effects associated with these employees were not included in the subsequent modeling.

2. *Intermediate demand.* Continental's flight and cargo operations require that the airline purchase a diverse assortment of goods and services, including related to runway and terminal maintenance, in-flight food service, jet fuel, ground transportation, and communication systems. This intermediate industrial demand generates employment in other industries, which then propagates throughout the economy. We use vendor sales data provided by Continental to estimate intermediate demand. We supplement the Continental data with I/O data for several major inputs for which specific Continental vendor data was unavailable.
3. *Passenger expenditures.* Visitors who arrive in the New York City area on Continental consume goods and services from local firms. Passenger data were provided by Continental. Expenditure data related to tourism were obtained from the New York Convention and Visitors Bureau (NYC & Company). Passenger characteristic information—in particular the distribution of passenger origins—was based on a Port Authority air passenger survey.

The modeling results for the case in which Continental activities were removed were obtained from REMI model runs involving modification of policy variables reflecting the above three major effects. The specific methodologies are discussed in greater detail later in this chapter.

### **3. Measuring Long-Term Contributions**

The principle objective of this study is to estimate the *long-term* contributions of Continental's New York City area-operations to the local economy. The initial REMI model results for 2008, however, reflect the short-run impacts of the removal of Continental's activity. For example, a reduction in employment in the area would lead to a subsequent reduction in the local population. But these population changes would accumulate over many years. To focus on these long-term contributions, we forecast results to 2030, allowing over 20 years of adjustment in economic variables.

However, the 2030 results also cannot be used to directly estimate the potential 2008 impacts, since they also reflect projected economic and population growth over the period. We thus performed the following steps to estimate Continental's *long-run* contribution in 2008:

1. Develop a control case forecast from 2008 to 2030.
2. Develop an alternative forecast—based on removal of Continental's operations from the control case inputs—from 2008 to 2030.
3. Compute the percentage effects on the regional economy in 2030 due to the elimination of Continental activity in the New York City region.
4. Apply the 2030 percentage impacts to the 2008 control case economic values to calculate the long-term effect in 2008 of the current Continental operations in the New York City area.

Steps 3 and 4 remove the effects of economic and population growth by using the percentage value of the contribution in 2030. That is, they assign an impact in 2008 that is independent of the future growth of the economy. For example, if Continental’s contribution to employment is ten percent in 2030 and the regional employment is one million in 2008, the result of Step 4 would be an estimate of 100,000 jobs in 2008.

A small adjustment to this basic methodology is required to achieve consistency in the detailed sub-region- and sector-specific long-term results. For these detailed results, we initially apply the same methodology as for the overall regional results. For example, to estimate Continental’s long-term impact on employment in the Newark sub-region in 2008, we apply the 2030 percentage change in Newark sub-region employment to the 2008 Newark employment level. However, each sub-region’s share of overall New York-New Jersey employment (and GRP, income, and population) is slightly different in 2030 than it is in 2008. Since the relative “weights” to which the sub-regions’ 2030 percentages are applied are slightly different in 2008, summing the sub-regional changes yields slightly different results than an identical calculation performed for the overall New York/New Jersey region. To avoid inconsistency, we scale the sub-regional results such that their sum equals the overall regional sum for each metric, thus maintaining the same distribution of Continental gains across sub-regions. An identical adjustment is performed for the economic sector- and occupation-specific results, since the relative importance of different industries and occupational groups also changes between 2008 and 2030. In all cases, the magnitude of the scaling necessary to achieve consistency is small.

## **D. Input Data for Continental’s Operations in the New York City Area**

This section describes the input data used in our analysis of the regional economic contributions of Continental. As discussed above, there are three sets of inputs: (1) Continental air transportation sector employment; (2) intermediate industrial demand; and (3) passenger expenditures.

### **1. Continental Employment**

There are three components to our Continental employment inputs. All three are based on employment data provided from Continental.

1. *Liberty Continental employment.* We used the number of Continental employees who reside in the region as the input for REMI’s air transportation employment variable for the Newark modeling subregion. The REMI expenditure profiles generally reflect employees who live (and thus consume goods and services) in one of the four regions considered in the study. To avoid overstating Continental’s impacts, Continental employees who reside outside of the New York/New Jersey region were not included in the REMI modeling inputs, but were added *ex post* to reflect actual Continental employment levels in the New York/New Jersey region.<sup>3</sup>

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<sup>3</sup> This assumption underestimates the aggregate impacts, as employees who live outside the region will consume some goods and services within the region and thus contribute to local economic activity.

2. *Liberty partner airline employment.* Continental provided data on employment at regional airlines with which it is partnered at Liberty. This number was added to the Newark area air transportation employment variable.
3. *LaGuardia employment.* We used information from Continental on the total number of available seats on Continental and partner airline flights at Liberty and LaGuardia to compute a proportion comparing the size of total Continental operations at each airport. We used this ratio in conjunction with the number of Liberty employees who live in New York/New Jersey to estimate the number of LaGuardia employees who live in the region. We did not take into account any LaGuardia employees who live outside the region.

The three components of Continental's direct employment in the New York City area were input into REMI as changes to the industry employment policy variable for the air transportation sector. Continental and partner airline employment at Liberty were included as adjustments to the variable for the Newark sub-region, while LaGuardia values were incorporated as New York City sub-region inputs.

## 2. Intermediate Demand

The REMI model's default response to changes in industry employment, such as those described in the previous section, is to assume a corresponding increase in the overall size of the industry, including with respect to related effects such as intermediate inputs and capital investment. For this study, Continental provided detailed information on its operations for these types of effects. Since we incorporated this detailed Continental data, we nullified many of the model's default responses to avoid double-counting. Following are the specific types of inputs that we used in the REMI modeling.

1. *Intermediate demand from Continental purchase data.* We included detailed data from Continental on the purchases that it makes at Liberty, including, for example, on food services, cabin cleaning services, snow removal, interrupted trips expenses, and utilities. We used REMI intermediate demand variables for the industry sectors corresponding to these inputs. For years for which specific data were available, we also used Continental forecasts of capital expenditures at Liberty, using the intermediate demand variable for the construction sector. We used a scaling factor to estimate corresponding expenditures at LaGuardia.
2. *Intermediate demand for purchases not represented in Continental data.* The Continental data excluded certain purchases (e.g., jet fuel). We thus reviewed the REMI model's default input-output assumptions for the air transportation sector and included intermediate demand amounts for industries with high I/O coefficients<sup>4</sup> that

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<sup>4</sup> An I/O coefficient is the entry in an input-output table that assigns a value representing the interconnectedness of two industries. Specifically, an entry designates the amount of output from one industry required per dollar of another industry's final demand product. Therefore, a high I/O coefficient indicates that output of the industry in question (e.g., air transportation) is heavily dependent on the inputs it receives from the specific industry that completes the entry pair (e.g., petroleum).

were not already represented in the Continental data. We applied these to Liberty, and used a scaling factor to estimate corresponding expenditures at LaGuardia.

3. *Nullification of intermediate demand induced by employment.* As noted, the above-described employment assumptions, by default, would have caused REMI to use its built-in information on the intermediate industries from which the aviation industry purchases. Since we incorporated specific vendor information from Continental, we nullified all intermediate demand induced by Continental employment in order to avoid overstating Continental's effects.
4. *Nullification of investment induced by employment.* As noted, for certain years, our data also included specific forecasts of Continental capital expenditures. For these years, we nullified the REMI model's default investment response. For years for which Continental data were unavailable, we did not perform this nullification, allowing REMI to apply capital investment based on its default assumptions.

### **3. Passenger Expenditures**

The final component of our REMI inputs relates to passenger expenditures. Our estimates of the aggregate expenditures by Continental passengers in the New York/New Jersey region were determined using four different sets of passenger-specific data: number of passengers, types of passengers, location of expenditures, and levels of expenditures. This section explains these four data types and how they were used in computing the aggregate visitor expenditures.

#### **a. Number of Passengers**

Aggregate expenditure estimates depend heavily on the actual number of passengers traveling on Continental to the New York City area. Forecasts of passenger counts were provided by Continental from 2009-2014. These values were then projected to 2030 at the REMI growth rate for the air transportation sector in Newark. However, the overall passenger number reflects both departures and arrivals. We divided the overall passenger count by two to approximate the number of arriving passengers.

#### **b. Types of Passengers**

Estimation of passenger expenditures requires determination of the composition of the passenger base. First, it is necessary to distinguish between passengers who are returning residents and those who are visitors. We did not include expenditure estimates for passengers who are returning residents, since the extent of their spending in the region is assumed to be the same in total regardless of whether or not they travel. Connecting passengers are also excluded from our visitor expenditure analysis, as their expenditure in the area takes place primarily at retailers and restaurants in the terminal, and terminal tenant sales are included in the demand inputs described in the previous step.

Among visitors, spending behavior varies according to whether the visitor is an international or domestic traveler. Data on the percentage breakdown of Continental passengers in the New York

City area were provided by Continental.<sup>5</sup> A further important decomposition among passenger types is between those travelers who are overnight visitors and those who visit for one day. Table 10 presents the percentage breakdown of local passenger types at Liberty estimated in a Port Authority (1998) study that provided the most recent available suitable data on passenger breakdowns. Applying this distribution to the overall arriving passenger count allows us to determine the number of Continental passengers in each category.

**Table 10. Assumed distribution of Continental passengers at Liberty.**

<b>Category of Passenger</b>	<b>Domestic</b>	<b>International</b>
Overnight Visitors	32.7%	36.1%
Non-Overnight Visitors	14.1%	5.7%
Returning Residents	53.3%	58.2%
	100%	100%

Note: These values represent the proportion of the specified passenger category to the overall local passenger base (excluding connecting passengers). Returning resident values are presented for completeness, though they are not used in the analysis.

Source: Port Authority (1998)

### **c. Location of Visitor Expenditure**

Not all of the visitor expenditures are concentrated in one particular sub-region, nor are they distributed uniformly across the New York/New Jersey region in its entirety. Many visitors to the region travel to New York City, while others visit various regions of New Jersey or the rest of New York State. We assume that the visitors procure goods and services in the sub-region that serves as the origin of their trip. While this assumption will not hold true in all cases, it is nonetheless a reasonable reflection of visitor spending patterns and should not be expected to bias the results. Data on trip originations are included in Port Authority (1998). Note that the distribution includes information on both domestic and international trip origins.

## **4. Level and Type of Expenditure**

The categorization of passengers presented above allows us to determine the number of passengers of a given type. This step involves calculating aggregate expenditure levels for each passenger category. An expenditure profile from New York Convention and Visitors Bureau (1998 and 1999) provides average international and domestic spending in New York City. The overall spending value is disaggregated by spending category—lodging, shopping, eating/drinking, transportation, entertainment, recreation, and other—such that each category is assigned an amount spent per day by visitor type. While this represents the most up-to-date suitable information on the distribution of expenditures, more recent information is available on aggregate expenditure levels. Data in NYC & Company (2008a and 2008b) indicate that visitor spending in the New York City area has increased. We compute a ratio of 2008 spending to 1997 spending in real dollars for both domestic and international visitors. We use this ratio to adjust the categorical spending values to 2008 levels. For non-overnight trips, spending by category for each trip was simply the scaled value. For overnight trips, the scaled value was multiplied by the

<sup>5</sup> Passengers arriving from Canada were treated as U.S. domestic travelers for the purposes of the visitor expenditure analysis.

average length of the trip (varying by domestic or international). Table 11 presents the resulting estimate of spending per trip by passenger type and spending category.

**Table 11. Average spending per trip by passenger type and spending category.**

	<u>Domestic</u>		<u>International</u>	
	<u>Non-Overnight</u>	<u>Overnight</u>	<u>Non-Overnight</u>	<u>Overnight</u>
Lodging	\$0	\$620	\$0	\$797
Shopping	\$73	\$507	\$97	\$652
Eating/Drinking	\$34	\$303	\$46	\$390
Transportation	\$28	\$212	\$37	\$273
Entertainment/Recreation	\$22	\$187	\$30	\$241
Other	\$8	\$85	\$11	\$109
<b>Total</b>	<b>\$165</b>	<b>\$1,914</b>	<b>\$220</b>	<b>\$2,461</b>

Note: All values are in 2008 dollars.

Source: New York Convention and Visitors Bureau (1998 and 1999), NYC & Company (2008a and 2008b), and NERA calculations as explained in text.

## 5. Aggregate Expenditures

The calculation of aggregate expenditures follows the outline of the data described above. The specific steps are as follows.

1. Determine the number of overall Continental passengers in New York City area. Divide that number by two to approximate the number of arriving passengers.
2. Determine the number of international passengers and domestic passengers.
3. Using the location of trip origin distribution, calculate the number of international and domestic passengers in each sub-region.
4. Using the relative shares of non-overnight and overnight visitors, compute the number of non-overnight and overnight visitors in each sub-region. The result of this step is the number of passengers per sub-region in each of the following four categories: domestic non-overnight visitor, domestic overnight visitor, international non-overnight visitor, and international overnight visitor.
5. Apply the appropriate expenditure profile to each passenger type category. The result is an aggregate expenditure amount for lodging, shopping, eating/drinking, transportation, and entertainment/recreation in each sub-region.

From these steps we obtained aggregate expenditure inputs by category and region.

## 6. REMI Model Inputs

We identified REMI industry sectors corresponding to each category<sup>6</sup> of activity for which the Port Authority study provided information (e.g., REMI’s “Accommodation” sector for lodging),

<sup>6</sup> The “other” category was distributed proportionally across other consumption categories since there is no comparable “other” industry to which to allocate the expenditure in REMI.

and applied the aggregate expenditures for each sector in each sub-region using REMI's "Exogenous Final Demand" variable.

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## Appendix A. Continental Economic Contributions to the Newark Region.

This appendix provides estimates of the economic contributions of Continental's New York City-area operations to the Newark region, defined as the five New Jersey counties of Essex, Morris, Sussex, Union, and Hunterdon. Section A discusses the current contributions of Continental's operations and Section B describes future contributions. Both sections provide estimates by sector and occupational group.

### A. Current Contributions

This section provides estimates of the current contributions of Continental Airlines to the Newark economy. Section 1 provides the Newark contributions, Section 2 presents the results by economic sector, and Section 3 presents the impacts for occupational groups.

#### 1. Current Contributions in Newark

Our analyses show that Continental Airlines' New York City-area operations contribute substantially to the Newark economy. Table A-1 shows the current (2008) contributions of Continental's New York City-area operations to Newark in four impact categories:

- § employment;
- § population;
- § gross regional product; and
- § personal income.

**Table A-1. Current contributions of Continental Airlines to the Newark region.**

Employment	33,822
Population	23,400
Personal Income (billions 2008\$)	\$1.40
GRP (billions 2008\$)	\$2.73

Source: REMI model and NERA calculations as explained in text.

The operations of Continental Airlines in the New York City area contribute about 34,000 jobs to the Newark economy and are responsible for about 23,000 of the 2 million people currently living in the region. The contributions of Continental Airlines to the regional economy also are reflected in dollar measures. We estimate that Continental Airlines contributes \$1.40 billion to personal income and \$2.73 billion to gross regional product.

As noted previously, it is clear that an airline plays an important role not only in developing and supporting the larger regional economy, but also in encouraging and shaping economic activity in more localized areas around the airport itself. The estimates presented here do not capture the other contributions of Continental Airlines to the local economy.

## 2. Current Contributions in the Newark Region by Sector

Table A-2 presents the sector results for Newark. The first column shows the total number of jobs in broad industrial categories in the region. The second column shows the estimated number of jobs in each industry group attributed to Continental Airlines. The third column shows the percentage of Continental’s total contribution that occurs in that sector. Not surprisingly, given that the Newark region is the site of Continental’s hub operations at Newark Liberty International Airport, “transportation and warehousing” is the industry sector with the largest employment contribution by Continental (about 38 percent).

**Table A-2. Employment contributions by Continental Airlines in the Newark region by sector.**

	Contribution	Share of Total
Transportation and Warehousing	12,696	37.5%
Retail Trade	2,450	7.2%
Wholesale Trade	223	0.7%
Professional and Technical Services	563	1.7%
Management of Companies and Enterprises	(21)	-0.1%
Administrative and Waste Services	858	2.5%
Educational Services	124	0.4%
Health Care and Social Assistance	1,229	3.6%
Accommodation and Food Services	5,921	17.5%
Other Services, except Public Administration	631	1.9%
Forestry, Fishing, Related Activities, and Other	3	0.0%
Mining	1	0.0%
Utilities	39	0.1%
Construction	1,080	3.2%
Manufacturing	(16)	0.0%
Information	91	0.3%
Finance, Insurance and Real Estate	(477)	-1.4%
Arts, Entertainment, and Recreation	1,104	3.3%
State and Local Government	7,323	21.7%
<b>Total</b>	<b>33,822</b>	<b>100%</b>

Source: REMI Model and NERA calculations as explained in text.

## 3. Current Contributions in the Newark Region by Occupational Group

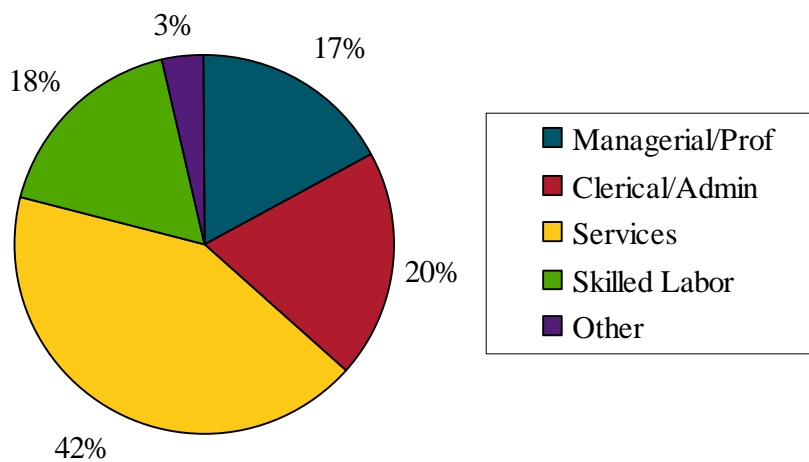
Table A-3 presents our Newark results for six broad occupational groupings and Figure A-1 shows the results in graphical form. The largest contribution of Continental Airlines is in service occupations (42 percent). The clerical/administrative occupations (20 percent), skilled labor (18 percent), and managerial/professional/ technical (17 percent) occupations also see large contributions.

**Table A-3. Current employment contributions of Continental Airlines in Newark by occupation.**

	Contribution	Share of Total
Managerial/Prof	5,788	17%
Clerical/Admin	6,607	20%
Services	14,253	42%
Skilled Labor	5,993	18%
Other	1,181	3%

Source: REMI model and NERA calculations as explained in text.

**Figure A-1. Current employment contributions of Continental Airlines in Newark by occupational group.**



Source: NERA calculations as explained in text.

## B. Future Contributions

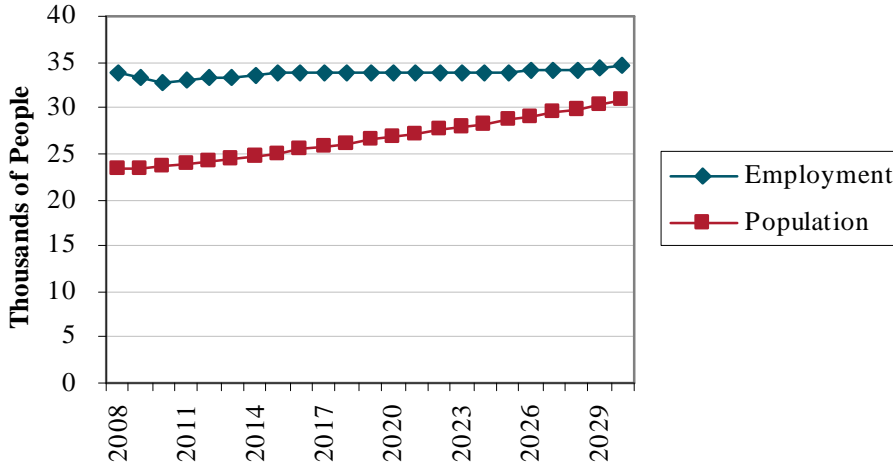
This section reports the contributions that Continental Airlines will make to the economy of Newark in the future. Over time, the regional economy will grow and thus increase the demand for air travel. More aviation-related employees will be hired, and the local economy will expand. Additional Continental passengers will spend more money in Newark, further increasing the contributions. Section 1 provides the overall contributions, Section 2 presents the results by economic sector, and Section 3 presents the implications for occupational groups.

### 1. Future Contributions to the Newark Region

The regional economic contributions of Continental Airlines are projected to grow over time. Figure A-2 shows our estimates of the long-run contributions that Continental will make to employment and population from 2008 to 2030. The Continental employment contribution rises

from 33,800 jobs in 2008 to 34,500 jobs in 2030. The population contribution is estimated to be 23,400 in 2008, rising to 30,800 in 2030.

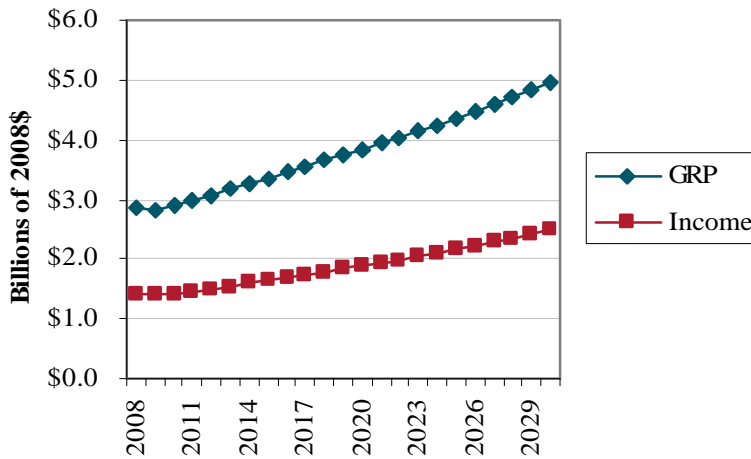
**Figure A-2. Contributions of Continental Airlines to Newark employment and population, 2008-2030.**



Source: NERA calculations as explained in text.

Figure A-3 shows the long-run contributions of Continental to gross regional product and personal income over the same period. We estimate that the contributions of Continental Airlines to gross regional product rise from \$2.73 billion in 2008 to \$4.96 billion in 2030. The contribution to personal income is projected to increase from \$1.40 billion in 2008 to \$2.49 billion in 2030.

**Figure A-3. Contributions of Continental Airlines to GRP and income in Newark region, 2008-2030.**



Source: NERA calculations as explained in text.

These contributions are based upon underlying regional and aviation-sector growth assumptions that are embedded in the regional model used in this study, as well as information from Continental on its expected growth.

## 2. Future Contributions in the Newark Region by Sector

Table A-4 shows the results by sector for the year 2030. The first column shows the total number of jobs in broad industry categories for the region. The second column shows the estimated number of jobs in each industry group that are attributable to Continental Airlines in 2030. The third column shows the percentage of Continental’s total contribution occurring in each sector. As with the 2008 results, transportation-industry jobs are the greatest source of Continental’s employment contribution to the Newark region.

**Table A-4. Employment contributions of Continental Airlines in Newark in 2030 by sector.**

	<b>Contribution</b>	<b>Share of Total</b>
Transportation and Warehousing	10,544	30.6%
Retail Trade	2,366	6.9%
Wholesale Trade	158	0.5%
Professional and Technical Services	752	2.2%
Management of Companies and Enterprises	(19)	-0.1%
Administrative and Waste Services	1,038	3.0%
Educational Services	191	0.6%
Health Care and Social Assistance	1,905	5.5%
Accommodation and Food Services	6,305	18.3%
Other Services, except Public Administration	800	2.3%
Forestry, Fishing, Related Activities, and Other	3	0.0%
Mining	0	0.0%
Utilities	35	0.1%
Construction	1,058	3.1%
Manufacturing	(12)	0.0%
Information	74	0.2%
Finance, Insurance and Real Estate	(535)	-1.5%
Arts, Entertainment, and Recreation	1,731	5.0%
State and Local Government	8,113	23.5%
<b>Total</b>	<b>34,508</b>	<b>100%</b>

Source: REMI model and NERA calculations as explained in text.

### **3. Future Contributions in the Newark Region by Occupational Group**

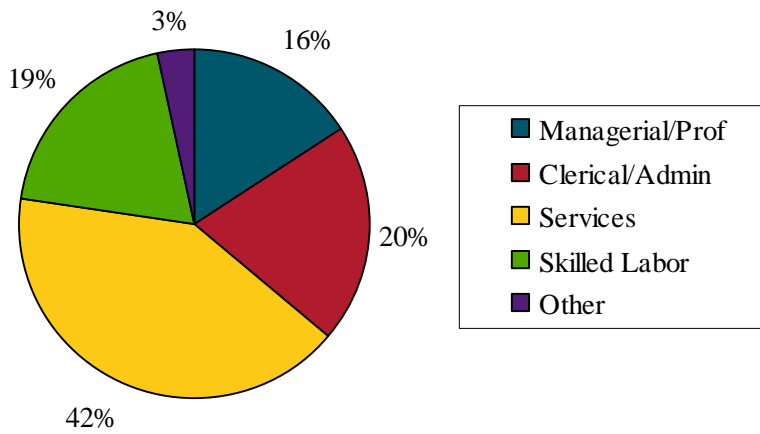
Table A-5 shows the 2030 results for six large occupational groups. Figure A-4 shows the results in graphical form. The largest occupational group affected is services; clerical and administrative occupations account for the second-largest share.

**Table A-5. Employment contributions of Continental Airlines in Newark in 2030 by occupation.**

	Contribution	Share of Total
Managerial/Prof	5,449	16%
Clerical/Admin	6,996	20%
Services	14,216	41%
Skilled Labor	6,702	19%
Other	1,144	3%

Source: REMI model and NERA calculations as explained in text.

**Figure A-4. Shares of 2030 Continental employment in the Newark region by occupation.**



Source: NERA calculations as explained in text.

## Appendix B. Continental Economic Contributions to the Rest of New Jersey Region.

This appendix provides estimates of the economic contributions of Continental's New York City-area operations to the Rest of New Jersey region, defined as the entire state of New Jersey except for the five counties (Essex, Morris, Sussex, Union, and Hunterdon) that comprise the Newark region. Section A discusses the current contributions of Continental's operations and Section B describes future contributions. Both sections provide estimates by sector and occupational group.

### A. Current Contributions

This section provides estimates of the current contributions of Continental Airlines to the regional economy. Section 1 provides the contributions, Section 2 presents the results by economic sector, and Section 3 presents the impacts for occupational groups.

#### 1. Current Contributions in the Rest of New Jersey Region

Our analyses show that Continental Airlines' New York City-area operations contribute substantially to the local economy. Table B-1 shows the current (2008) contributions of Continental's New York City-area operations to the Rest of New Jersey region in four impact categories:

- § employment;
- § population;
- § gross regional product; and
- § personal income.

**Table B-1. Current contributions of Continental Airlines to the Rest of New Jersey region.**

Employment	30,049
Population	43,064
Personal Income (billions 2008\$)	\$1.82
GRP (billions 2008\$)	\$1.40

Source: REMI model and NERA calculations as explained in text.

The operations of Continental Airlines in the New York City area contribute about 30,000 jobs to the Rest of New Jersey region's economy and are responsible for about 43,100 of the 6.7 million people currently living in the region. The contributions of Continental Airlines to the regional economy also are reflected in dollar measures. We estimate that Continental Airlines contributes \$1.82 billion to personal income and \$1.40 billion to gross regional product.

As noted previously, it is clear that an airline plays an important role not only in developing and supporting the larger regional economy, but also in encouraging and shaping economic activity

in more localized areas around the airport itself. The estimates presented here do not capture the other contributions of Continental Airlines to the local economy.

## 2. Current Contributions in the Rest of New Jersey Region by Sector

Table B-2 presents the sector results for the Rest of New Jersey region. The first column shows the total number of jobs in broad industrial categories in the region. The second column shows the estimated number of jobs in each industry group attributed to Continental Airlines. The third column shows the percentage of Continental’s total contribution that occurs in that sector. “Accommodation and food services” is the industry sector with the largest employment contribution by Continental (about 39 percent of the total).

**Table B-2. Employment contributions by Continental Airlines in the Rest of New Jersey region by sector.**

	Contribution	Share of Total
Transportation and Warehousing	2,683	8.9%
Retail Trade	4,269	14.2%
Wholesale Trade	438	1.5%
Professional and Technical Services	653	2.2%
Management of Companies and Enterprises	51	0.2%
Administrative and Waste Services	913	3.0%
Educational Services	241	0.8%
Health Care and Social Assistance	1,841	6.1%
Accommodation and Food Services	11,599	38.6%
Other Services, except Public Administration	953	3.2%
Forestry, Fishing, Related Activities, and Other	11	0.0%
Mining	2	0.0%
Utilities	61	0.2%
Construction	949	3.2%
Manufacturing	290	1.0%
Information	190	0.6%
Finance, Insurance and Real Estate	440	1.5%
Arts, Entertainment, and Recreation	2,002	6.7%
State and Local Government	2,464	8.2%
<b>Total</b>	<b>30,049</b>	<b>100%</b>

Source: REMI model and NERA calculations as explained in text.

## 3. Current Contributions in the Rest of New Jersey Region by Occupational Group

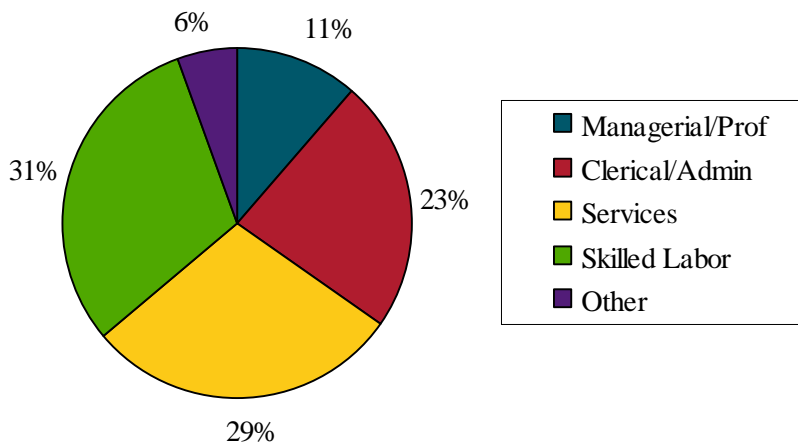
Table B-3 presents our Rest of New Jersey results for six broad occupational groupings and Figure B-1 shows the results in graphical form. The largest contribution of Continental Airlines is in skilled labor (30 percent). The services (29 percent) clerical/administrative (23 percent) occupations also see large contributions.

**Table B-3. Current employment contributions of Continental in the Rest of New Jersey by occupation.**

	Contribution	Share of Total
Managerial/Prof	3,452	11%
Clerical/Admin	6,977	23%
Services	8,805	29%
Skilled Labor	9,108	30%
Other	1,707	6%

Source: REMI model and NERA calculations as explained in text.

**Figure B-1. Current employment contributions in the Rest of New Jersey by occupational group.**



Source: NERA calculations as explained in text.

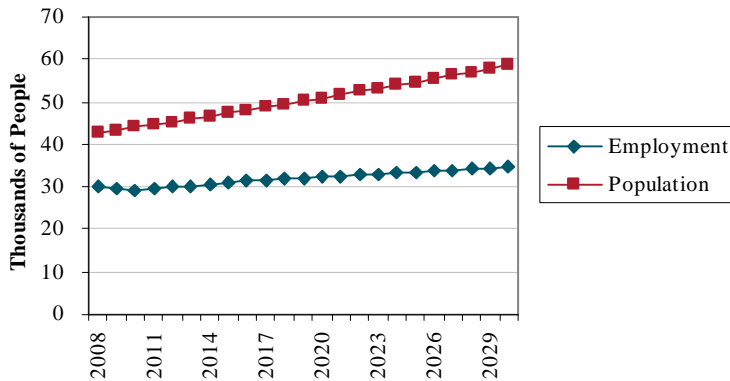
## B. Future Contributions

This section reports the contributions that Continental Airlines will make to the economy of the Rest of New Jersey region in the future. Over time, the regional economy will grow and thus increase the demand for air travel. Additional Continental passengers will spend more money in the region, further increasing the contributions. Section 1 provides the overall contributions, Section 2 presents the results by economic sector, and Section 3 presents the implications for occupational groups.

### 1. Future Contributions to the Rest of New Jersey Region

The regional economic contributions of Continental Airlines are projected to grow over time. Figure B-2 shows our estimates of the long-run contributions that Continental will make to employment and population from 2008 to 2030. The Continental employment contribution rises from 30,000 jobs in 2008 to 34,800 jobs in 2030. The population contribution is estimated to be 43,100 in 2008, rising to 58,600 in 2030.

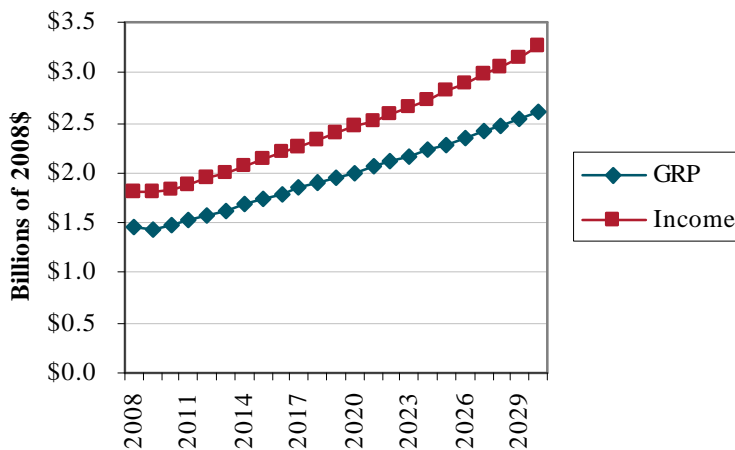
**Figure B-2. Contributions of Continental Airlines to employment and population in the Rest of New Jersey region, 2008-2030.**



Source: NERA calculations as explained in text.

Figure B-3 shows the long-run contributions of Continental to gross regional product and personal income over the same period. We estimate that the contributions of Continental Airlines to gross regional product rise from \$1.40 billion in 2008 to \$2.61 billion in 2030. The contribution to personal income is projected to increase from \$1.82 billion in 2008 to \$3.25 billion in 2030.

**Figure B-3. Contributions of Continental Airlines to GRP and income in the Rest of New Jersey region, 2008-2030.**



Source: NERA calculations as explained in text.

These contributions are based upon underlying regional and aviation-sector growth assumptions that are embedded in the regional model used in this study, as well as information from Continental on its expected growth.

## 2. Future Contributions in the Rest of New Jersey Region by Sector

Table B-4 shows the results by sector for the year 2030. The first column shows the total number of jobs in broad industry categories for the region. The second column shows the estimated number of jobs in each industry group that are attributable to Continental Airlines in 2030. The third column shows the percentage of Continental's total contribution occurring in each sector. As with the 2008 results, accommodation and food service jobs are the greatest source of Continental's employment contribution in the Rest of New Jersey region.

**Table B-4. Employment contributions of Continental in the Rest of New Jersey Region in 2030 by sector.**

	Contribution	Share of Total
Transportation and Warehousing	3,475	10.0%
Retail Trade	4,158	11.9%
Wholesale Trade	317	0.9%
Professional and Technical Services	883	2.5%
Management of Companies and Enterprises	49	0.1%
Administrative and Waste Services	1,127	3.2%
Educational Services	368	1.1%
Health Care and Social Assistance	2,811	8.1%
Accommodation and Food Services	12,805	36.8%
Other Services, except Public Administration	1,208	3.5%
Forestry, Fishing, Related Activities, and Other	10	0.0%
Mining	2	0.0%
Utilities	57	0.2%
Construction	927	2.7%
Manufacturing	200	0.6%
Information	154	0.4%
Finance, Insurance and Real Estate	606	1.7%
Arts, Entertainment, and Recreation	3,147	9.0%
State and Local Government	2,509	7.2%
<b>Total</b>	<b>34,812</b>	<b>100%</b>

Source: REMI model and NERA calculations as explained in text.

## 3. Future Contributions in the Rest of New Jersey Region by Occupational Group

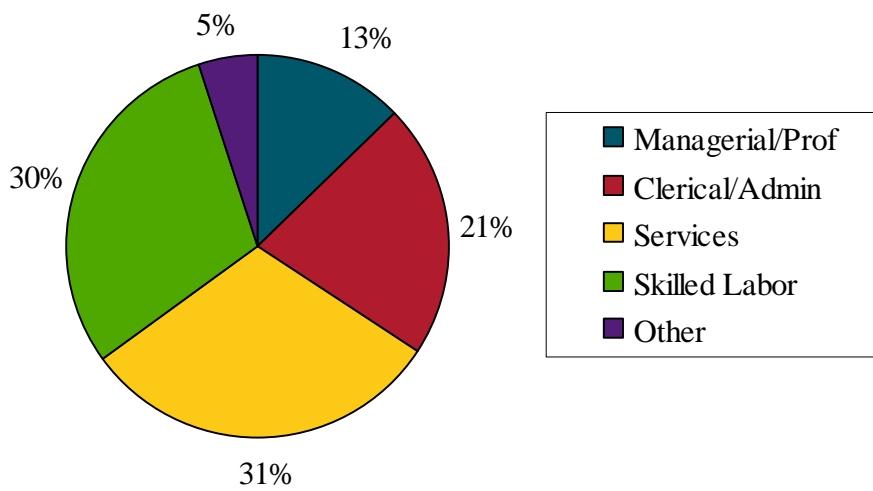
Table B-5 shows the 2030 results for six large occupational groups. Figure B-4 shows the results in graphical form. The largest occupational group affected is services; skilled labor occupations account for the second-largest share.

**Table B-5. Employment contributions of Continental in the Rest of New Jersey in 2030 by occupation.**

	Contribution	Share of Total
Managerial/Prof	4,429	13%
Clerical/Admin	7,420	21%
Services	10,752	31%
Skilled Labor	10,511	30%
Other	1,702	5%

Source: REMI model and NERA calculations as explained in text.

**Figure B-4. Shares of 2030 Continental employment in the Rest of New Jersey region by occupation.**



Source: NERA calculations as explained in text.

## Appendix C. Continental Economic Contributions to New York City.

This appendix provides estimates of the economic contributions of Continental's New York City-area operations to the five counties (New York, Kings, Queens, Bronx, and Richmond counties in New York State) that comprise New York City. Section A discusses the current contributions of Continental's operations and Section B describes future contributions. Both sections provide estimates by sector and occupational group.

### A. Current Contributions

This section provides estimates of the current contributions of Continental Airlines to the New York City economy. Section 1 provides the New York City contributions, Section 2 presents the results by economic sector, and Section 3 presents the impacts for occupational groups.

#### 1. Current Contributions in New York City

Our analyses show that Continental Airlines' New York City-area operations contribute substantially to the New York City economy. Table C-1 shows the current (2008) contributions of Continental's New York City-area operations to New York City in four impact categories:

- § employment;
- § population;
- § gross regional product; and
- § personal income.

**Table C-1. Current contributions of Continental Airlines to New York City.**

Employment	32,588
Population	32,586
Personal Income (billions 2008\$)	\$1.67
GRP (billions 2008\$)	\$1.43

Source: REMI model and NERA calculations as explained in text.

The operations of Continental Airlines in the New York City area contribute about 32,600 jobs to the New York City economy and are responsible for roughly the same number of people living in the region; current total regional employment and population measure about 4.9 million and 8.9 million respectively. The contributions of Continental Airlines to the regional economy also are reflected in dollar measures. We estimate that Continental Airlines contributes \$1.67 billion to personal income and \$1.43 billion to gross regional product.

As noted previously, it is clear that an airline plays an important role not only in developing and supporting the larger regional economy, but also in encouraging and shaping economic activity in more localized areas around the airport itself. The estimates presented here do not capture the other contributions of Continental Airlines to the local economy.

## 2. Current Contributions in New York City by Sector

Table C-2 presents the sector results for New York City. The first column shows the total number of jobs in broad industrial categories in the region. The second column shows the estimated number of jobs in each industry group attributed to Continental Airlines. The third column shows the percentage of Continental’s total contribution that occurs in that sector. Not surprisingly, given the importance of New York City as a tourism destination for Continental passengers in the region, “accommodation and food services” is the industry sector with the largest employment contribution due to Continental operations (about a third of the total).

**Table C-2. Employment contributions by Continental Airlines in New York City by sector.**

	Contribution	Share of Total
Transportation and Warehousing	6,333	19.4%
Retail Trade	2,239	6.9%
Wholesale Trade	385	1.2%
Professional and Technical Services	728	2.2%
Management of Companies and Enterprises	59	0.2%
Administrative and Waste Services	547	1.7%
Educational Services	577	1.8%
Health Care and Social Assistance	1,875	5.8%
Accommodation and Food Services	10,795	33.1%
Other Services, except Public Administration	928	2.8%
Forestry, Fishing, Related Activities, and Other	(2)	0.0%
Mining	4	0.0%
Utilities	54	0.2%
Construction	471	1.4%
Manufacturing	171	0.5%
Information	283	0.9%
Finance, Insurance and Real Estate	(59)	-0.2%
Arts, Entertainment, and Recreation	5,706	17.5%
State and Local Government	1,492	4.6%
<b>Total</b>	<b>32,588</b>	<b>100%</b>

Source: REMI model and NERA calculations as explained in text.

## 3. Current Contributions in New York City by Occupational Group

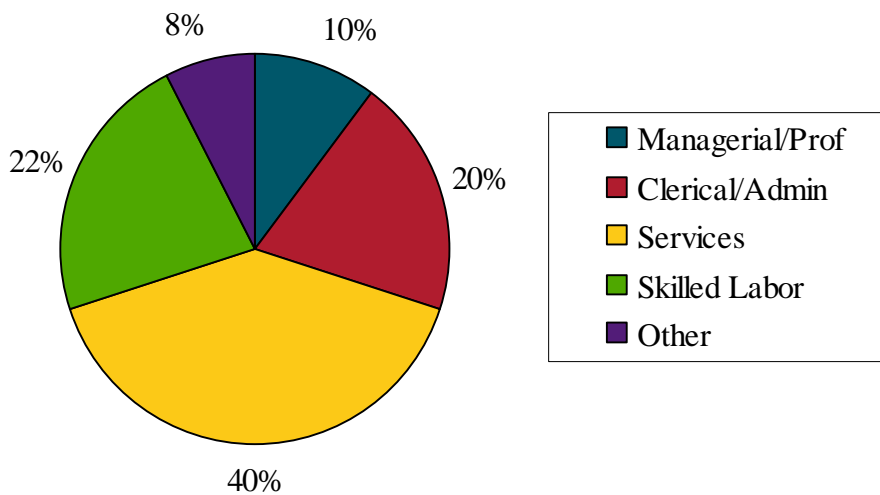
Table C-3 presents our New York City results for six broad occupational groupings and Figure C-1 shows the results in graphical form. The largest contribution of Continental Airlines is in service occupations (40 percent). The clerical/administrative occupations (20 percent) and skilled labor (22 percent) occupations also see large contributions.

**Table C-3. Current employment contributions of Continental Airlines in New York City by occupation.**

	Contribution	Share of Total
Managerial/Prof	3,315	10%
Clerical/Admin	6,426	20%
Services	13,081	40%
Skilled Labor	7,279	22%
Other	2,487	8%

Source: REMI model and NERA calculations as explained in text.

**Figure C-1. Current employment contributions of Continental Airlines in New York City by occupational group.**



Source: NERA calculations as explained in text.

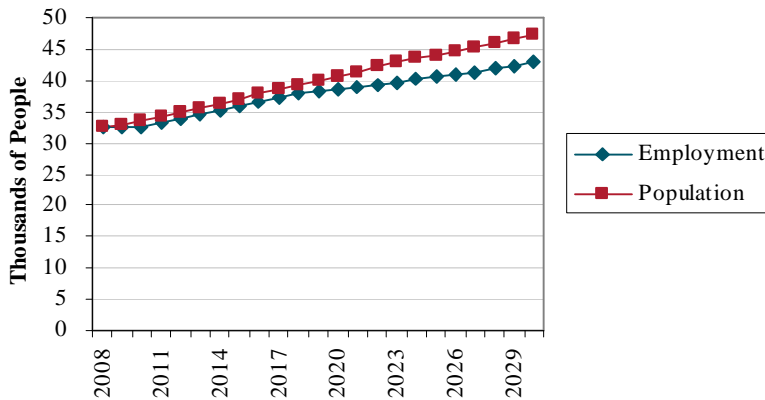
## B. Future Contributions

This section reports the contributions that Continental Airlines will make to the economy of New York City in the future. Over time, the regional economy will grow and thus increase the demand for air travel. Additional Continental passengers will spend more money in New York City, further increasing the contributions. Section 1 provides the overall contributions, Section 2 presents the results by economic sector, and Section 3 presents the implications for occupational groups.

### 1. Future Contributions to the New York City Economy

The regional economic contributions of Continental Airlines are projected to grow over time. Figure C-2 shows our estimates of the long-run contributions that Continental will make to employment and population from 2008 to 2030. The Continental employment contribution rises from 32,600 jobs in 2008 to 42,800 jobs in 2030. The population contribution is estimated to be 32,600 in 2008, rising to 47,300 in 2030.

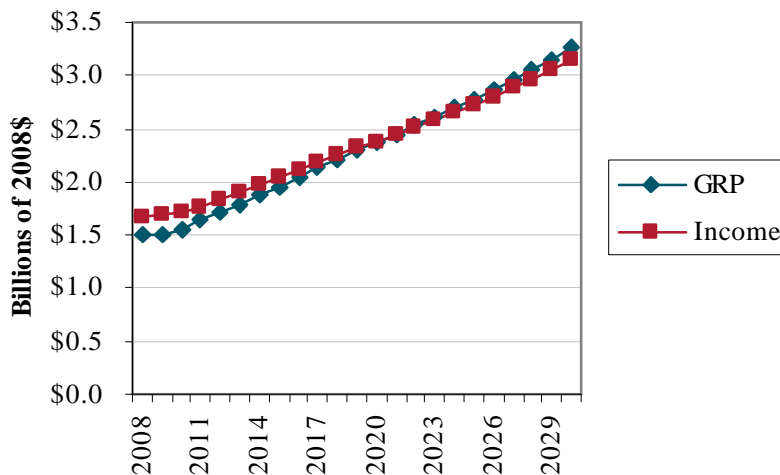
**Figure C-2. Contributions of Continental Airlines to New York City employment and population, 2008-2030.**



Source: NERA calculations as explained in text.

Figure C-3 shows the long-run contributions of Continental to gross regional product and personal income over the same period. We estimate that the contributions of Continental Airlines to gross regional product rise from \$1.43 billion in 2008 to \$3.25 billion in 2030. The contribution to personal income is projected to increase from \$1.67 billion in 2008 to \$3.15 billion in 2030.

**Figure C-3. Contributions of Continental Airlines to GRP and income in New York City, 2008-2030.**



Source: NERA calculations as explained in text.

These contributions are based upon underlying regional and aviation-sector growth assumptions that are embedded in the regional model used in this study, as well as information from Continental on its expected growth.

## 2. Future Contributions in New York City by Sector

Table C-4 shows the results by sector for the year 2030. The first column shows the total number of jobs in broad industry categories for the region. The second column shows the estimated number of jobs in each industry group that are attributable to Continental Airlines in 2030. The third column shows the percentage of Continental's total contribution occurring in each sector. As with the 2008 results, accommodation and food service jobs are the greatest source of Continental's employment contribution to New York City.

**Table C-4. Employment contributions of Continental Airlines in New York City in 2030 by sector.**

	Contribution	Share of Total
Transportation and Warehousing	8,176	19.1%
Retail Trade	2,352	5.5%
Wholesale Trade	292	0.7%
Professional and Technical Services	1,137	2.7%
Management of Companies and Enterprises	59	0.1%
Administrative and Waste Services	763	1.8%
Educational Services	986	2.3%
Health Care and Social Assistance	3,370	7.9%
Accommodation and Food Services	13,520	31.6%
Other Services, except Public Administration	1,224	2.9%
Forestry, Fishing, Related Activities, and Other	(1)	0.0%
Mining	3	0.0%
Utilities	53	0.1%
Construction	588	1.4%
Manufacturing	107	0.2%
Information	247	0.6%
Finance, Insurance and Real Estate	(59)	-0.1%
Arts, Entertainment, and Recreation	8,122	19.0%
State and Local Government	1,889	4.4%
<b>Total</b>	<b>42,828</b>	<b>100%</b>

Source: REMI model and NERA calculations as explained in text.

## 3. Future Contributions in New York City by Occupational Group

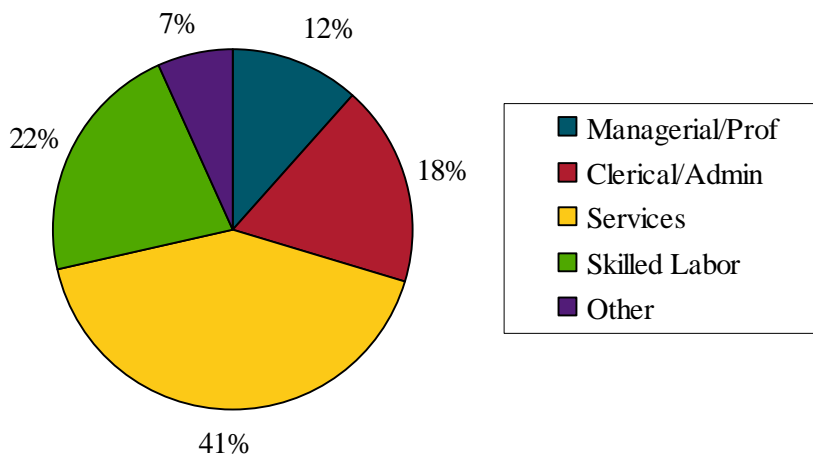
Table C-5 shows the 2030 results for six large occupational groups. Figure C-4 shows the results in graphical form. The largest occupational group affected is services; skilled labor occupations account for the second-largest share.

**Table C-5. Employment contributions of Continental Airlines in New York City in 2030 by occupation.**

	Contribution	Share of Total
Managerial/Prof	4,948	12%
Clerical/Admin	7,813	18%
Services	17,770	41%
Skilled Labor	9,448	22%
Other	2,850	7%

Source: REMI model and NERA calculations as explained in text.

**Figure C-4. Shares of 2030 Continental employment in New York City by occupation.**



Source: NERA calculations as explained in text.

## Appendix D. Continental Economic Contributions to the Rest of New Jersey Region.

This appendix provides estimates of the economic contributions of Continental's New York City-area operations to the Rest of New York region, defined as the entire state of New York except for the five counties (New York, Kings, Queens, Bronx, and Richmond) that comprise New York City. Section A discusses the current contributions of Continental's operations and Section B describes future contributions. Both sections provide estimates by sector and occupational group.

### A. Current Contributions

This section provides estimates of the current contributions of Continental Airlines to the regional economy. Section 1 provides the contributions, Section 2 presents the results by economic sector, and Section 3 presents the impacts for occupational groups.

#### 1. Current Contributions in the Rest of New York Region

Our analyses show that Continental Airlines' New York City-area operations contribute substantially to the local economy. Table D-1 shows the current (2008) contributions of Continental's New York City-area operations to the Rest of New York region in four impact categories:

- § employment;
- § population;
- § gross regional product; and
- § personal income.

**Table D-1. Current contributions of Continental Airlines to the Rest of New York region.**

Employment	13,741
Population	20,913
Personal Income (billions 2008\$)	\$1.05
GRP (billions 2008\$)	\$0.71

Source: REMI model and NERA calculations as explained in text.

The operations of Continental Airlines in the New York City area contribute about 13,700 jobs to the Rest of New York region's economy and are responsible for about 20,900 of the 11 million people currently living in the region. The contributions of Continental Airlines to the regional economy also are reflected in dollar measures. We estimate that Continental Airlines contributes \$1.05 billion to personal income and \$710 million to gross regional product.

As noted previously, it is clear that an airline plays an important role not only in developing and supporting the larger regional economy, but also in encouraging and shaping economic activity

in more localized areas around the airport itself. The estimates presented here do not capture the other contributions of Continental Airlines to the local economy.

## 2. Current Contributions in the Rest of New York Region by Sector

Table D-2 presents the sector results for the Rest of New York region. The first column shows the total number of jobs in broad industrial categories in the region. The second column shows the estimated number of jobs in each industry group attributed to Continental Airlines. The third column shows the percentage of Continental’s total contribution that occurs in that sector. “Accommodation and food services” is the industry sector with the largest employment contribution by Continental (about 25 percent of the total).

**Table D-2. Employment contributions by Continental Airlines in the Rest of New York region by sector.**

	Contribution	Share of Total
Transportation and Warehousing	1,154	8.4%
Retail Trade	2,002	14.6%
Wholesale Trade	218	1.6%
Professional and Technical Services	501	3.6%
Management of Companies and Enterprises	35	0.3%
Administrative and Waste Services	529	3.8%
Educational Services	164	1.2%
Health Care and Social Assistance	963	7.0%
Accommodation and Food Services	3,424	24.9%
Other Services, except Public Administration	526	3.8%
Forestry, Fishing, Related Activities, and Other	10	0.1%
Mining	4	0.0%
Utilities	66	0.5%
Construction	729	5.3%
Manufacturing	211	1.5%
Information	138	1.0%
Finance, Insurance and Real Estate	661	4.8%
Arts, Entertainment, and Recreation	744	5.4%
State and Local Government	1,662	12.1%
<b>Total</b>	<b>13,741</b>	<b>100%</b>

Source: REMI model and NERA calculations as explained in text.

## 3. Current Contributions in the Rest of New York Region by Occupational Group

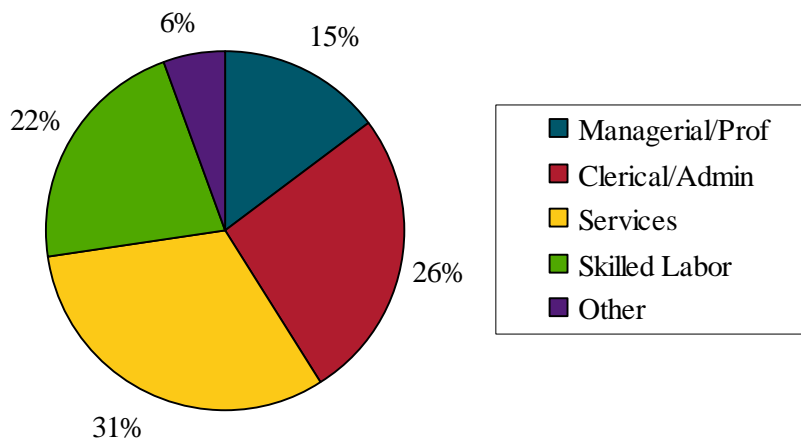
Table D-3 presents our Rest of New York results for six broad occupational groupings and Figure D-1 shows the results in graphical form. The largest contribution of Continental Airlines is in services (32 percent). The clerical/administrative (26 percent) skilled labor (22 percent) occupations also see large contributions.

**Table D-3. Current employment contributions of Continental in the Rest of New York by occupation.**

	Contribution	Share of Total
Managerial/Prof	2,027	15%
Clerical/Admin	3,624	26%
Services	4,334	32%
Skilled Labor	2,996	22%
Other	761	6%

Source: REMI model and NERA calculations as explained in text.

**Figure D-1. Current employment contributions in the Rest of New York by occupational group.**



Source: NERA calculations as explained in text.

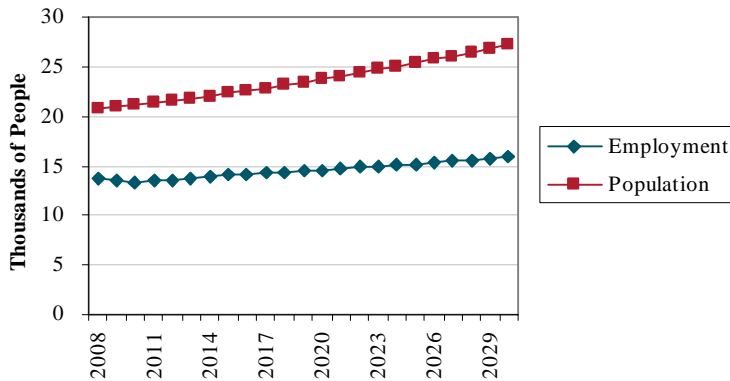
## B. Future Contributions

This section reports the contributions that Continental Airlines will make to the economy of the Rest of New York region in the future. Over time, the regional economy will grow and thus increase the demand for air travel. Additional Continental passengers will spend more money in the region, further increasing the contributions. Section 1 provides the overall contributions, Section 2 presents the results by economic sector, and Section 3 presents the implications for occupational groups.

### 1. Future Contributions to the Rest of New York Region

The regional economic contributions of Continental Airlines are projected to grow over time. Figure D-2 shows our estimates of the long-run contributions that Continental will make to employment and population from 2008 to 2030. The Continental employment contribution rises from 13,700 jobs in 2008 to 15,900 jobs in 2030. The population contribution is estimated to be 20,900 in 2008, rising to 27,100 in 2030.

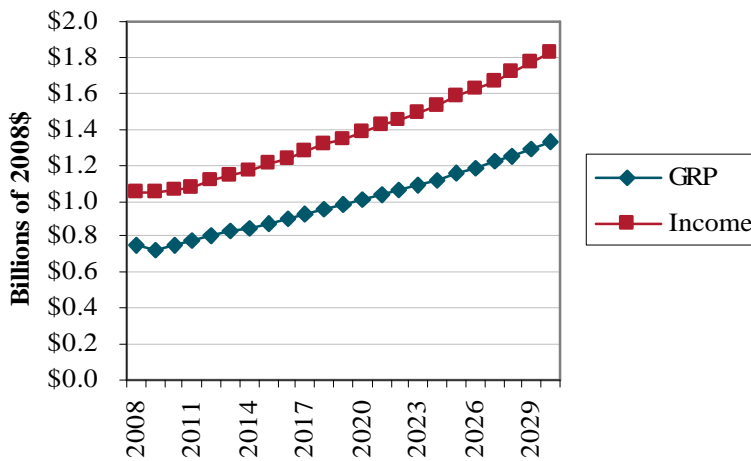
**Figure D-2. Contributions of Continental Airlines to employment and population in the Rest of New York region, 2008-2030.**



Source: NERA calculations as explained in text.

Figure D-3 shows the long-run contributions of Continental to gross regional product and personal income over the same period. We estimate that the contributions of Continental Airlines to gross regional product rise from \$710 million in 2008 to \$1.3 billion in 2030. The contribution to personal income is projected to increase from \$1.05 billion in 2008 to \$1.82 billion in 2030.

**Figure D-3. Contributions of Continental Airlines to GRP and income in the Rest of New York region, 2008-2030.**



Source: NERA calculations as explained in text.

These contributions are based upon underlying regional and aviation-sector growth assumptions that are embedded in the regional model used in this study, as well as information from Continental on its expected growth.

## 2. Future Contributions in the Rest of New York Region by Sector

Table D-4 shows the results by sector for the year 2030. The first column shows the total number of jobs in broad industry categories for the region. The second column shows the estimated number of jobs in each industry group that are attributable to Continental Airlines in 2030. The third column shows the percentage of Continental's total contribution occurring in each sector. As with the 2008 results, accommodation and food service jobs are the greatest source of Continental's employment contribution in the Rest of New York region.

**Table D-4. Employment contributions of Continental in the Rest of New York Region in 2030 by sector.**

	Contribution	Share of Total
Transportation and Warehousing	1,439	9.0%
Retail Trade	1,964	12.3%
Wholesale Trade	168	1.1%
Professional and Technical Services	667	4.2%
Management of Companies and Enterprises	36	0.2%
Administrative and Waste Services	641	4.0%
Educational Services	249	1.6%
Health Care and Social Assistance	1,519	9.6%
Accommodation and Food Services	3,720	23.4%
Other Services, except Public Administration	675	4.2%
Forestry, Fishing, Related Activities, and Other	8	0.0%
Mining	4	0.0%
Utilities	58	0.4%
Construction	699	4.4%
Manufacturing	151	0.9%
Information	116	0.7%
Finance, Insurance and Real Estate	873	5.5%
Arts, Entertainment, and Recreation	1,212	7.6%
State and Local Government	1,707	10.7%
<b>Total</b>	<b>15,906</b>	<b>100%</b>

Source: REMI model and NERA calculations as explained in text.

## 3. Future Contributions in the Rest of New York Region by Occupational Group

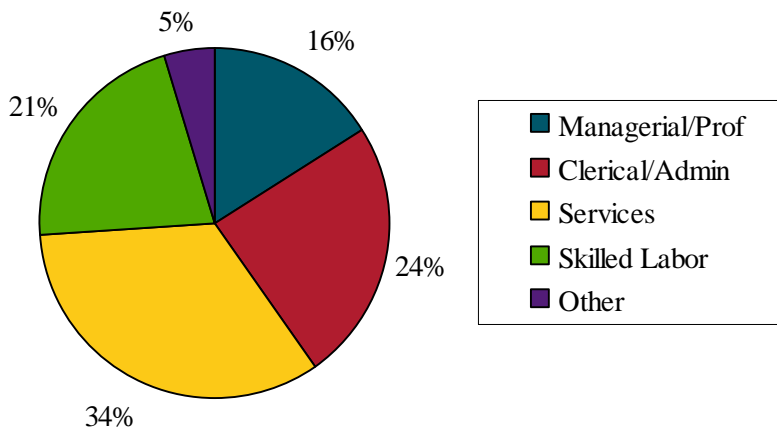
Table D-5 shows the 2030 results for six large occupational groups. Figure D-4 shows the results in graphical form. The largest occupational group affected is services; clerical and administrative occupations account for the second-largest share.

**Table D-5. Employment contributions of Continental in the Rest of New York in 2030 by occupation.**

	Contribution	Share of Total
Managerial/Prof	2,556	16%
Clerical/Admin	3,861	24%
Services	5,329	34%
Skilled Labor	3,418	21%
Other	741	5%

Source: REMI model and NERA calculations as explained in text.

**Figure D-4. Shares of 2030 Continental employment in the Rest of New York region by occupation.**



Source: NERA calculations as explained in text.

## Appendix E. Background on the REMI Model.

*This overview is based on text prepared by Regional Economic Models, Inc. More detailed information is available from REMI.<sup>7</sup>*

REMI Policy Insight+ (PI+) is a structural economic forecasting and policy analysis model. It integrates input-output, computable general equilibrium, econometric, and economic geography methodologies. The model is dynamic, with forecasts and simulations generated on an annual basis and behavioral responses to compensation, price, and other economic factors.

The model consists of thousands of simultaneous equations with a structure that is relatively straightforward. The exact number of equations used varies depending on the extent of industry, demographic, demand, and other detail in the specific model being used. The overall structure of the model can be summarized in five major blocks: (1) Output and Demand, (2) Labor and Capital Demand, (3) Population and Labor Supply, (4) Compensation, Prices, and Costs, and (5) Market Shares.

The Output and Demand block consists of output, demand, consumption, investment, government spending, exports, and imports, as well as feedback from output change due to the change in the productivity of intermediate inputs. The Labor and Capital Demand block includes labor intensity and productivity as well as demand for labor and capital. Labor force participation rate and migration equations are in the Population and Labor Supply block. The Compensation, Prices, and Costs block includes composite prices, determinants of production costs, the consumption price deflator, housing prices, and the compensation equations. The proportion of local, inter-regional, and export markets captured by each region is included in the Market Shares block.

Models can be built as single region, multi-region, or multi-region national models. A region is defined broadly as a sub-national area, and could consist of a state, province, county, or city, or any combination of sub-national areas.

Single-region models consist of an individual region, called the home region. The rest of the nation is also represented in the model. However, since the home region is only a small part of the total nation, the changes in the region do not have an endogenous effect on the variables in the rest of the nation.

Multiregional national models also include a central bank monetary response that constrains labor markets. Models that only encompass a relatively small portion of a nation are not endogenously constrained by changes in exchange rates or monetary responses.

The following sub-sections describe the five blocks of the REMI model in more depth.

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<sup>7</sup> See [http://www.remi.com/index.php?page=documentation&hl=en\\_US](http://www.remi.com/index.php?page=documentation&hl=en_US).

## **A. Block 1: Output and Demand**

This block includes output, demand, consumption, investment, government spending, import, commodity access, and export concepts. Output for each industry in the home region is determined by industry demand in all regions in the nation, the home region's share of each market, and international exports from the region.

For each industry, demand is determined by the amount of output, consumption, investment, and capital demand on that industry. Consumption depends on real disposable income per capita, relative prices, differential income elasticities, and population. Input productivity depends on access to inputs because a larger choice set of inputs means it is more likely that the input with the specific characteristics required for the job will be found. In the capital stock adjustment process, investment occurs to fill the difference between optimal and actual capital stock for residential, non-residential, and equipment investment. Government spending changes are determined by changes in the population.

## **B. Block 2: Labor and Capital demand**

The Labor and Capital Demand block includes the determination of labor productivity, labor intensity, and the optimal capital stocks. Industry-specific labor productivity depends on the availability of workers with differentiated skills for the occupations used in each industry. The occupational labor supply and commuting costs determine firms' access to a specialized labor force.

Labor intensity is determined by the cost of labor relative to the other factor inputs, capital and fuel. Demand for capital is driven by the optimal capital stock equation for both non-residential capital and equipment. Optimal capital stock for each industry depends on the relative cost of labor and capital, and the employment weighted by capital use for each industry. Employment in private industries is determined by the value added and employment per unit of value added in each industry.

## **C. Block 3: Population and Labor Supply**

The Population and Labor Supply block includes detailed demographic information about the region. Population data is given for age, gender, and ethnic category, with birth and survival rates for each group. The size and labor force participation rate of each group determines the labor supply. These participation rates respond to changes in employment relative to the potential labor force and to changes in the real after-tax compensation rate. Migration includes retirement, military, international, and economic migration. Economic migration is determined by the relative real after-tax compensation rate, relative employment opportunity, and consumer access to variety.

## **D. Block 4: Compensation, Prices, and Costs**

This block includes delivered prices, production costs, equipment cost, the consumption deflator, consumer prices, the price of housing, and the compensation equation. Economic geography

concepts account for the productivity and price effects of access to specialized labor, goods, and services.

These prices measure the price of the industry output, taking into account the access to production locations. This access is important due to the specialization of production that takes place within each industry, and because transportation and transaction costs of distance are significant. Composite prices for each industry are then calculated based on the production costs of supplying regions, the effective distance to these regions, and the index of access to the variety of outputs in the industry relative to the access by other uses of the product.

The cost of production for each industry is determined by the cost of labor, capital, fuel, and intermediate inputs. Labor costs reflect a productivity adjustment to account for access to specialized labor, as well as underlying compensation rates. Capital costs include costs of non-residential structures and equipment, while fuel costs incorporate electricity, natural gas, and residual fuels.

The consumption deflator converts industry prices to prices for consumption commodities. For potential migrants, the consumer price is additionally calculated to include housing prices. Housing prices change from their initial level depending on changes in income and population density.

Compensation changes are due to changes in labor demand and supply conditions and changes in the national compensation rate. Changes in employment opportunities relative to the labor force and occupational demand change determine compensation rates by industry.

## **E. Block 5: Market Shares**

The consumption deflator converts industry prices to prices for consumption commodities. For potential migrants, the consumer price is additionally calculated to include housing prices. Housing prices change from their initial level depending on changes in income and population density. Compensation changes are due to changes in labor demand and supply conditions and changes in the national compensation rate. Changes in employment opportunities relative to the labor force and occupational demand change determine compensation rates by industry.

# NERA

Economic Consulting

NERA Economic Consulting  
200 Clarendon St, 11th Floor  
Boston, Massachusetts 02116  
Tel: +1 617 927 4500  
Fax: +1 617 927 4501  
[www.nera.com](http://www.nera.com)