

The Economic Impact of Detroit Metropolitan Wayne County Airport 2013



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WAYNE COUNTY AIRPORT AUTHORITY



COLLEGE OF BUSINESS
UNIVERSITY OF MICHIGAN-DEARBORN

The Economic Impact of Detroit Metropolitan Wayne County Airport 2013



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Executive Summary

This study documents the importance of Detroit Metropolitan Wayne County Airport (DTW) to the economy of the state of Michigan in general and the metropolitan Detroit region of southeastern Michigan in particular.

Based on the last year's data, Detroit Metropolitan serves about 32 million passengers annually, approximately evenly divided between arrivals and departures. These passengers travel on about 1,200 flights connecting Detroit to almost 150 destinations around the world. Many of these passengers are taking advantage of the important Delta Air Lines hub in Detroit to connect between flights. A second group consists of Michigan residents who use the many daily departures at DTW to reach destinations around the world. Finally, Detroit Metropolitan Airport also makes possible visits to the state of Michigan for about three million people. These visitors bring business connections, and provide support for the tourism and hospitality industries in Michigan. A passenger survey conducted at the airport as part of this study allows this economic impact to be measured.

Both through the immediate economic impact of air transportation and through the effects of visitors spending money in Michigan, Detroit Metropolitan Airport currently has an annual economic impact of about \$10.2 billion, including \$3 billion in incomes to workers and businesses in the area. This economic activity is responsible for 86,000 jobs and almost \$300 million in state and local tax collections. This includes the jobs of the 18,000 people who work at the airport itself.

Total Economic Impact	\$10.198 billion
Earnings Impact	\$3.095 billion
Jobs Impact	86,308
State and Local Taxes Generated	\$305 million

In addition to the standard measures of economic impact shown above, Detroit Metropolitan Airport is a vital link connecting Michigan businesses to their customers around the world. Based on our passenger survey, DTW brought about 295,000 business travelers to Michigan who said their trip would likely result in placing an order to purchase Michigan goods and services and another 365,000 business travelers from Michigan went around the country and world on trips designed to generate orders for Michigan goods and services. The air cargo businesses operating at the airport then provide a means to ship these goods.

This report also documents the economic impact of the Capital Improvement Plan which the Wayne County Airport Authority has put in place to ensure that DTW remains a modern

airport. Not included directly in the table above, this Capital Improvement Plan is likely to have an economic impact in the current fiscal year (FY2014) of \$380 million and support (directly or indirectly) almost 3,000 jobs.

The study outlines the nature of economic impact and the different ways to measure it, and then explains how economic impact was calculated for air transportation, visitors to Michigan, and the Capital Improvement Plan. The data involved in the study comes from the airport itself, airline reports to the federal government, and the survey mentioned above.

This study was conducted by a team from the University of Michigan-Dearborn College of Business. The market survey team was coordinated by Nicole Mangis and surveys were conducted by Victoria Grady, Chelsea Smallish, and Paula Tijerina. Wayne County Airport Authority photos in this report are by Vito Palmisano, with the exception of the photo on the Air Cargo page which was by Jeff Ellis. Paula Tijerina designed the cover.

We thank everyone at the airport and the Wayne County Airport Authority for cooperating with this study and also thank the 1630 passengers who took the time to answer our questions so that we could all learn more about the importance of the Detroit airport to the Michigan economy.

What is Economic Impact?

Detroit Metropolitan Wayne County Airport, Michigan's largest airport by passenger count brings economic benefit to the area both through air travel itself and by the visitors those airplanes bring to the area. This report documents the importance of the airport to the ten-county Metropolitan Detroit Air Trade Area and to the state of Michigan as a whole.

Direct and Induced Impact

Anything which affects the economy of an area will have both direct and induced impacts on the economy. For example, consider a program to encourage homebuilding and suppose that it leads to the construction and sale of 10 new homes in a city. The value of these new homes (aside from the land value, which existed before the program) is the **direct economic impact** of the program.

Much of this economic impact will accrue as incomes to people in the area community. For example, many of the construction workers will live in the community. If a real estate agent sells the homes, then the commission income accrues to area residents. Supplies may be sourced from area businesses, in which case the owners and workers of these companies will experience positive impact.

At the same time, some of the impact will escape the immediate area. For example, the pipes, nails, and paint used to construct the homes will generate income where those supplies are produced. This may or may not be in the same area where the construction occurs.

These workers and others participating in the businesses who experience increased incomes are likely to spend a substantial fraction of their increased incomes within the geographic area where they live. This spending creates additional revenues for the businesses in the area, and additional incomes for people associated with area businesses. This is called the **induced impact** of the home building. For example, the construction workers may use their additional income to buy a car from an area dealership. Of course, not all of this induced impact will affect the area economy. If the workers use their added income to travel to another region, then the impact would be outside the area where they live. There can be many rounds of induced impact as people spend the additional incomes they earn, and thereby create additional impact for the businesses they purchase from.

Measures of Economic Impact

A given amount of direct spending has an economic impact which can be measured in several ways for a given area. Including both the direct and induced impacts of this spending can generate the total **economic impact** (or “demand impact”) in terms of the total demand for goods and services in the area. Including the induced impact means that the total economic impact will be more than the initial spending. This is called the **multiplier effect**, and the **multiplier** itself refers to the ratio between the total economic impact and the direct effect that began the process. To take the example above, suppose the homes had a direct impact of \$2 million. If the spending of the construction workers and others associated with producing the homes resulted in a total induced effect of a further \$1 million, then the total economic impact would be \$3 million and the multiplier would be 1.5.

Two other measures of economic impact are included in our analysis. The share of the total demand impact which results in incomes to people within the area is called **earnings impact**. Earnings impact can include wages and salaries for area workers, as well as profits to owners and investors in area businesses. Earnings impact is driven by the demand impact, but some area purchases will eventually become income to distant suppliers rather than area residents. The overall economic impact number will therefore be higher than the earnings number.

Another way to measure this impact is in terms of the jobs supported by the economic impact. Income to area workers is a part of the earnings impact discussed above, but it is also possible to estimate **jobs impact** in terms of the number of jobs created within the area.

Regardless of the type of analysis, the measure of economic impact will depend on the area being analyzed. A larger geographic area will encompass more of the businesses benefiting from the direct and induced economic impacts of any event. Economic impact also depends on the industry involved. First, some industries have more suppliers in the area than other industries. For example, in Michigan, demand for cars may be met in large part by local producers, whereas demand for tropical fruit would not be met locally. Second, industries which are more labor-intensive will generally have a larger jobs impact than industries which are more capital-intensive. For example, \$1 million spent on restaurant jobs creates the need for more workers than \$1 million spent on steel. Economic impacts must therefore be estimated separately for each industry.

The economic impacts in this analysis have been calculated with the aid of the Regional Input-Output Measuring System (RIMS II) constructed by the Bureau of Economic Analysis at the United States Department of Commerce. This system provided multipliers to calculate total economic impact, earnings impact, and jobs impact for a variety of industries.

Sources of Airport Economic Impact

The economic impact of Detroit Metropolitan Wayne County Airport analyzed by this study includes both the impact associated with the transportation activities themselves as well as the impact of the people that the airport brings to Michigan.

Analysis of the **transportation impact** includes both the passenger and cargo travel at Detroit Metropolitan Airport. Data on passenger volumes and destinations can be used to estimate the direct spending associated with the travel, and the multipliers above can then estimate the benefits this has to the area economy. Similarly, cargo shipments from the airport represent spending for air freight which has direct and induced benefits to the region.

For example, in a world where all flights were nonstop, a plane which carries 300 passengers from Detroit to London where the average ticket price is \$500 each way would represent \$150,000 in spending on air transportation per flight¹. The RIMS analysis described briefly above and in more detail in the appendix would enable us to estimate the total economic impact (including induced impact), income effects, and jobs supported by that activity.

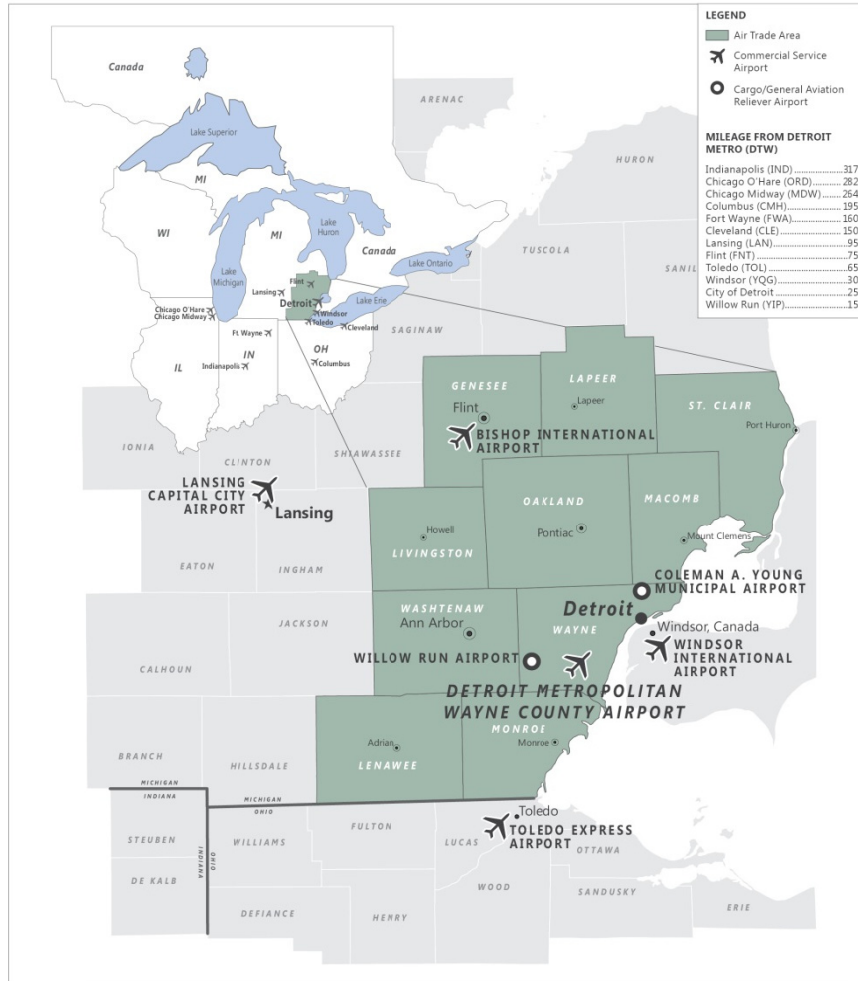
The **visitor impact** is the economic effect of the people who live outside the area but who use DTW to visit Detroit and other places in Michigan. The presence of a major airport such as DTW makes visiting Michigan a viable option for both business travelers and tourists. The money they spend while here generates economic impact. This visitor spending includes not only travel-related expenses such as ground transportation, hotels and restaurants but also any other purchases they make while in Michigan.

Visitor impact, like transportation impact, has an induced impact that the RIMS multipliers enable us to estimate. Money spent, for example, at a local restaurant creates added income for the workers and owners of that restaurant. The people associated with that restaurant are likely to spend some of that income locally, which represents the beginning of the induced impact.

Two geographic areas are covered by this analysis. First is the ten-county metropolitan Detroit Air Trade Area shown on the map on the next page. The second is the entire state of Michigan. Michigan impact outside the Air Trade Area will result primarily from people who use Detroit Metropolitan Airport to visit Michigan outside the Detroit area. This will include people who fly into Detroit and use ground transportation to their destination but also people who connect through Detroit to one of Michigan's smaller airports.

¹ Since many DTW passengers take connecting flight, the exact methodology used in this study needs to look at revenue attributable to the flight segments involving DTW only. Details are provided in the next section.

As the rest of this study will describe, passenger travel data, visitor surveys, and multiplier data are used to calculate the total visitor impact for both the state as a whole and the ten-county metropolitan Detroit Air Trade Area shown on the map below.



Transportation Impact

Air Passengers

Domestic (U.S.) Passengers Enplaned	14.4 million
International Passengers Enplaned	1.6 million
Total Passengers Enplaned	16.0 million
<hr/>	
Total Cargo Shipments (Incoming plus Outgoing)	449 million pounds

The most obvious form of economic impact associated with Detroit Metropolitan Airport is the 32 million passengers who arrive or depart over the course of the year. Of the 16 million passengers who boarded flights in 2012, approximately 1.6 million were on flights which will took them directly from Michigan to a foreign country, while 14.4 million passengers were on planes which will take them to destinations throughout the United States.

Data from the Bureau of Transportation Statistics shows that the average domestic flight segment departing from Detroit is 745 miles and the average international flight segment departing Detroit is 4127 miles.

To estimate the economic activity of this air travel, an estimate of the total expenditure is needed. According to the Federal Aviation Administration, the average airline revenue associated with transporting one passenger one mile was 14.00 cents for domestic flights and 14.68 cents for international flights. Combining this information yields an estimated expenditure of \$2.49 billion for air passenger travel on airplanes departing Detroit Metropolitan Airport.



Air Cargo

The area economy benefits not only from the people who travel through Detroit Metropolitan Airport, but also from the fact that approximately 450 million pounds of air freight is shipped through the airport during the year in addition to 30 million pounds of air mail. This enables area businesses and consumers to obtain the goods they



need quickly and conveniently as well as providing a way for Michigan businesses to ship high-value goods to customers around the country and around the world. Approximately one third of the cargo being shipped out of DTW is loaded on international flights.

Based on an estimated cargo yield of 36 cents per ton-mile for international shipments and 74.9 cents per ton-mile for domestic shipments, the estimated value of air freight services at Detroit Metropolitan Airport is currently \$92 million per year.

Economic Impact of Transportation

Using the RIMS multipliers and the figures calculated above, we can see that for air transportation, the effect on the state of Michigan economy is \$5 billion in economic impact, with \$1.7 billion in earnings supporting 35,000 jobs. This impact is concentrated in the ten-county area so while the table below represents estimates for the ten-county Air Trade Area there are not meaningful differences between these numbers and the effects for the state as a whole.

Economic Impact of Air Transportation

Estimated Direct Expenditure	\$2.582 billion
Economic Impact of Air Transportation	\$5.125 billion
Income Impact of Air Transportation	\$1.669 billion
Jobs Impact of Air Transportation	35,640



Visitor Impact

Arrivals at Detroit

Arrivals at Detroit Metropolitan by Passenger Type

	Percentage	Number of Passengers
DTW As Home Airport	33%	5.3 million
DTW As Destination Airport	18%	2.9 million
DTW As Connecting Airport	49%	7.8 million

In the twelve months ending June 2013, Detroit Metropolitan Airport served about 32.2 million passengers, almost evenly split between arrivals and departures. To estimate the economic impact from people who use DTW as a way to visit the area for business or pleasure, it is necessary to learn more about these 16 million arrivals.

The Bureau of Transportation Statistics provides enough data to estimate the first step: determining how many of these passengers are making use of the many connections through Detroit, how many are using Detroit as a “home airport” where their itinerary begins and ends, and how many are using Detroit as a “destination airport”. It is this last group that has the greatest measured impact as the purpose of their trip is likely to visit Michigan.

The results are shown in the table at the top of this page. Bureau of Transportation Statistics data is used to estimate the percentage of passengers in each classification and Wayne County Airport Authority data provides the total number of passengers. Based on numbers for 2012 and early 2013, DTW brings in almost three million passengers annually who use Detroit as a way to visit the region.

In addition, planes departing Detroit carry some passengers to one of Michigan’s other airports. In many cases, these are passengers returning to their homes across Michigan. For about 200,000 passengers, however, these flights are departing Detroit to visit another part of the state. In total, then, Detroit Metropolitan Airport is the means by which 3.1 million people visit part of the state of Michigan over the course of the year.

Passenger Survey

To determine the economic impact that these 3.1 million passengers have on the state of Michigan through their spending, a passenger survey was conducted at the departure gates of Detroit Metropolitan Airport. 1630 passengers were interviewed in both main terminals of the airport in July and August, 2013.

Delta Air Lines operates a major hub at Detroit Metropolitan Airport and is responsible for the most flights at the airport. Due to the hub, Delta passengers at Detroit differ from passengers of other airlines, principally in that Delta passengers are more likely to be connecting between flights. Where required, then, the passenger survey results have been weighted to match the actual percentages of passengers who are connecting, visiting Michigan, and using DTW as their home airport.

The questions asked in the survey are included in an appendix. The survey was conducted by surveyors inviting passengers to participate on a tablet computer. Based on answers to early questions, the software asked only some of the remaining questions.



Types of Travelers

Detroit Metropolitan Airport serves passengers from across the country and around the world. Based on our passenger survey weighted to match the connecting, visiting, and local populations mentioned earlier, the distribution of residency is as follows:

	Percentage
Michigan Resident	22%
United States Resident (outside Michigan)	66%
International Resident	12%

Of Michigan residents using DTW to travel outside the state, 39% are traveling for business and 61% are traveling for pleasure. This means roughly two million Michigan business travelers use DTW to represent Michigan's economic interests every year. About 18% of these business travelers, or about 365,000 people, are traveling to arrange the sale of Michigan products or services.

The people visiting Michigan using DTW are about equally split between business travelers (51%) and non-business travelers. About 20% of the business visitors, or about 295,000 people, report that their trip is likely to have led to their business placing an order to purchase goods or services from a Michigan business.

	Business Travelers to Michigan	Leisure Travelers to Michigan	All Visitors
Average Stay	4.1 days	6.3 days	5.3 days
Median Stay	3 days	5 days	4 days

Visitors overall report a median stay in Michigan of 4 days and a mean stay in excess of five days. Leisure travelers report a stay about two days longer than business travelers.

Staying in Detroit area?	Percentage
Yes	67%
No	33%

To distinguish economic impact within the ten-county Air Trade Area from impact elsewhere in Michigan, those visiting Michigan were asked whether they were staying within "about an hour" of the airport, a radius which approximates the Air Trade Area. As shown above, two-thirds of visitors are staying in the Detroit area.

Visitor Spending

In order to calculate economic impact, our team asked passengers about their spending in a number of categories.

	Percent Reporting Spending	Average Spending (of those reporting spending)
Lodging	59%	\$558
Ground Transportation	62%	\$271
Dining	88%	\$171
Entertainment	35%	\$216
Retail	41%	\$244
Other	61%	\$297

Spending was similar for those reporting visits to metropolitan Detroit and elsewhere in Michigan. On the other hand, business travelers did differ materially from leisure travelers. Business travelers were more likely to report spending in lodging and ground transportation, while leisure travelers were more likely to report spending on entertainment and retail purchases. The table below shows the percentage of business and leisure visitors² to Michigan reporting spending on each category.

	Business	Leisure
Lodging	77%	42%
Ground Transportation	76%	54%
Dining	93%	88%
Entertainment	26%	45%
Retail	32%	54%
Other	56%	68%

² Residents of Michigan visiting another part of Michigan are excluded from the business/leisure classifications in this section.

Average spending *amongst those reporting spending* in each category, however, was not substantially different in most cases:

	Business	Leisure
Lodging	\$521	\$547
Ground Transportation	\$226	\$289
Dining	\$175	\$163
Entertainment	\$187	\$208
Retail	\$190	\$264
Other	\$341	\$217



Visitor Impact in Metropolitan Detroit

	Direct Spending	Total Impact	Earnings Impact	Jobs Impact
Lodging	\$566	\$1,092	\$334	12,145
Ground Transportation	\$289	\$568	\$146	3,638
Dining	\$261	\$528	\$161	7,911
Entertainment	\$134	\$265	\$85	4,292
Retail	\$171	\$168	\$54	2,006
Other	\$298	\$538	\$114	3,682
Total	\$1,719	\$3,158	\$893	33,674

Dollar amounts are in millions

Combining the passenger and survey data above shows that approximately 1.9 million people visit the metropolitan Detroit Air Trade Area during the year, and with the survey data above we can estimate the amount of spending in each category that these 1.9 million visitors contribute to the Detroit area economy. These numbers can then be used with the RIMS multipliers to estimate each of the types of economic impact.

As shown in the table above, visitors to the Detroit area currently are spending at an annual rate of about \$1.7 billion, which including the induced effects has a total economic impact on the area of \$3.2 billion. Of this, almost \$900 million accrues as earnings to area workers and business investors, and 33,000 jobs are supported by the spending of visitors.

Visitor Impact in Michigan

	Direct Spending	Total Impact	Earnings Impact	Jobs Impact
Lodging	\$876	\$1,681	\$510	17,289
Ground Transportation	\$449	\$864	\$221	5,082
Dining	\$398	\$831	\$249	11,292
Entertainment	\$199	\$391	\$125	5,876
Retail	\$268	\$261	\$83	2,902
Other	\$483	\$854	\$179	5,344
Total	\$2,674	\$4,881	\$1,367	47,784

Dollar amounts are in millions

Visitor impact for the state of Michigan as a whole is naturally somewhat larger than for the ten-county Air Trade Area, primarily due to visitors who visit Michigan outside of Detroit and the southeast part of the state.

Visitors to the state spend almost \$2.7 billion after arriving through Detroit Metropolitan Airport, which has a \$4.9 billion impact on the Michigan economy. \$1.4 billion is earned as income by Michigan residents, all of which represents almost 48,000 jobs being supported throughout the state of Michigan.

Connecting Passenger Impact

About 8 million passengers connected through Detroit Metropolitan Airport over the past year. While they do not spend long in the region, they do take advantage of the many shops and restaurants in the airport itself during their stay. Based on our survey data and passenger data from 2012 and 2013, we estimate connecting passengers are currently spending \$95 million per year. This spending supports economic impact of \$193 million, \$59 million in earnings to Michigan residents, and about 2,884 jobs. These impacts all accrue to the Air Trade Area and can be added to each of the totals above for visitor impact.



Capital Improvement Impact

Economic Impact of Capital Improvement (FY2014)

Estimated Direct Expenditure	\$173 million
Economic Impact of CIP	\$380 million
Income Impact of CIP	\$120 million
Jobs Impact of CIP	2,952

Detroit Metropolitan Airport is managed with a view not only to the present benefits to the area but also with proper consideration for the future. The Wayne County Airport Authority has authorized as part of its Fiscal Year 2014 Budget a Capital Improvement Plan committing almost \$600 million over several years towards maintaining and advancing Detroit Metro. Of this amount, \$173 million is to be expended during Fiscal Year 2014 (which began on October 1, 2013).



A summary of the spending for the current fiscal year (FY2014) and overall is as follows:

	FY2014 Spending (millions)	Total Cost (millions)
Airfield	\$62	\$363
Cargo, Hangar & Commercial Development	2	13
Power Plant & Electrical Distribution Systems	14	39
Fleet & Equipment	7	28
Parking Decks & Lots	14	30
Bridges & Roadways	4	13
Security & Communications	8	26
Support Facilities	28	35
Demolitions	22	32
Terminals	6	9
Water Mains & Storm Water System	5	9
Detroit Metropolitan Airport Total	\$173	\$595

Using the RIMS multipliers as described in more detail in the Appendix it can be seen that the current fiscal year investments will have an economic impact of \$380 million, with income impact adding \$120 million to area residents' earnings and supporting 2,952 jobs. Most importantly, of course, these investments maintain Detroit Metropolitan Airport to benefit the residents and economy of Michigan for the years to come.

Total Economic Impact



Economic Impact for Detroit Metropolitan Air Trade Area

Combining the transportation impact and visitor impacts found in the previous section shows the total economic impact generated by Detroit Metropolitan Airport.

	Direct Spending	Total Impact	Earnings Impact	Jobs Impact
Air Transportation Impact	\$2,582	\$5,125	\$1,669	35,640
Visitor Impact	\$1,719	\$3,158	\$893	33,674
Connector Impact	\$95	\$193	\$59	2,884
Total	\$4,396	\$8,476	\$2,621	72,198

Dollar amounts in millions

For the ten county area including metropolitan Detroit there is a total economic impact of \$8.5 billion, which supports 72,000 jobs and earnings to these workers and business owners in the state of \$2.6 billion.



Economic Impact for the State of Michigan

	Direct Spending	Total Impact	Earnings Impact	Jobs Impact
Air Transportation Impact	\$2,582	\$5,125	\$1,669	35,640
Visitor Impact	\$2,674	\$4,881	\$1,367	47,784
Connector Impact	\$95	\$193	\$59	2,884
Total	\$5,351	\$10,198	\$3,095	86,308

Dollar amounts in millions

For Michigan as a whole, the benefits are even greater, with economic impact of \$10.2 billion supporting 86,000 jobs and generating \$3 billion of income to state residents. This level of earnings is associated with \$305 million in state and local taxes, including income taxes, property taxes, sales taxes, and other state and local taxes.

Appendices

Sources

The methodologies used here to calculate economic impact are similar to those used in other economic impact reports for airports, including the 2006 study for Detroit Metropolitan Airport itself. Some examples of other economic impact reports include the 2009 study of the Port of Seattle (which includes the Seattle-Tacoma airport), the 2011 study of the Long Beach airport, the 2013 study of the San Francisco airport, and the 2013 study of the Cincinnati airport. Many of these economic reports are currently available online at:

- Seattle-Tacoma International Airport: <https://www.portseattle.org/Supporting-Our-Community/Economic-Development/Pages/default.aspx>
- Long Beach Airport: <http://www.lgb.org/information/statistics/default.asp>
- San Francisco International Airport: <http://www.flysfo.com/media/press-releases/sfo-announces-economic-impact-study-fiscal-year-results>
- Cincinnati/Northern Kentucky International Airport: <http://www.northernkentuckyusa.com/Portals/tried/Files/News/CVG%20Economic%20Impact%20Report.pdf>

Passenger counts and aggregate cargo weights are available at the Wayne County Airport Authority website. The WCAA posts its monthly passenger and cargo information at <http://www.wcaa.us/About/FactsFigures/AviationStatistics.aspx>. Total passenger and freight volumes have been calculated for the twelve months ended June 2013. Information about the capital improvement plans for the Detroit airport can also be found in the budgets of the Wayne County Airport Authority at <http://www.wcaa.us/About/FactsFigures/FinancialInformation.aspx>.

The United States government has a variety of transportation statistics available through the Bureau of Transportation Statistics. The Bureau of Transportation Statistics is a part of the Research and Innovative Technology Administration within the Department of Transportation and its data can be found at <http://www.transtats.bts.gov>. Form 41 Traffic data maintained by the Bureau of Transportation Statistics can be used to calculate the average distance of a passenger flight and a shipment of air freight, and the fraction of passengers who are on international flights³. Flight information for calendar year 2012 has been used to calculate these distances and proportions.

Form DB1B data, also available from the Bureau of Transportation Statistics, contains a 10% sample of domestic ticket information. The data is anonymized but has enough information to estimate the fractions of passengers at Detroit who are visitors to Michigan, local residents flying

³ The data reported by the airport lists a slightly smaller fraction of international passengers. This is largely because the airports classify Canadian who have pre-cleared before entering the U.S. as domestic passengers.

out of Detroit, and those connecting flights. Note that the overall pattern is being estimated using only domestic data. Also, obvious one-way tickets are discarded in estimating the totals since it is impossible to tell on a one-way ticket whether the arrival at Detroit is the outbound or inbound part of the passenger's itinerary. The DB1B data also show those flying out of Detroit to visit one of Michigan's regional airports. Ticket information for the twelve months ended March 2013 was used to analyze these passenger patterns.

The estimate of the percentage of incomes which are collected as state and local taxes in Michigan was taken from the Tax Foundation at <http://www.taxfoundation.org>.

The jobs impact, earnings impact, and total economic impact has been calculated with the aid of Regional Input-Output Measuring System (RIMS II) data. The data was made available through the U.S. Department of Commerce's Bureau of Economic Analysis, although the program was suspended at the beginning of Fiscal Year 2014 due to the federal budget sequester. Information about the program is posted at <http://blog.bea.gov/category/regional/rims/>.

The Federal Aviation Administration's *FAA Aerospace Forecast* for Fiscal Years 2013-2033 contains information about the revenue yields per passenger mile used in this study. It is available at http://www.faa.gov/about/office_org/headquarters_offices/apl/aviation_forecasts/aerospace_forecasts/2013-2033/media/2013_Forecast.pdf. Estimates of the revenue earned per ton-mile of air freight shipments were taken from the industry group Airlines for America at <http://www.airlines.org>.

Questionnaire

A questionnaire was administered in July and August of 2013. 1630 passengers were interviewed using tablet computers in the gate areas of the airport. Before being used to calculate economic impact, survey responses were weighted to match the known proportions of connecting passengers, passengers using DTW as a home airport, and passengers using DTW as a destination airport.

Only adults were surveyed but passenger counts will include children. To correct for this, the assumption has been made that 15% of the overall passengers are children who spent no money on their own.

Not all questions were asked of each passenger; early questions designed to establish the nature of the passenger's trip determined which questions were appropriate. The question order shown here is not necessarily the order questions were posed to passengers.

1. Do you reside in Michigan?
2. (version A) The reason why you are at Detroit Metropolitan Airport (DTW) today is:
 - a. Starting/Finishing a trip within Michigan
 - b. Starting/Finishing a trip for pleasure outside Michigan
 - c. Starting/Finishing a trip for business outside Michigan
2. (version B) The reason why you are at Detroit Metropolitan Airport (DTW) today is:
 - a. Starting/Finishing a trip to the state of Michigan
 - b. Connecting planes, but not staying in Michigan
 - c. You live outside Michigan, but are using DTW as a home airport
3. Is this trip is likely to have led to your business placing an order to purchase goods or services from a Michigan business?
 - a. This is not a business trip
 - b. No orders will result from this business trip
 - c. Yes, please estimate the value of the order(s):
4. A primary goal of this trip is/was to arrange the sale of Michigan products or services.
 - a. Yes, estimated domestic sale value:
 - b. Yes, estimated domestic sale value:
 - c. No
5. Will/was the majority of your time on this trip spent within about an hour of Detroit Metropolitan Airport (DTW)?
6. As part of your visit/trip, you stayed or plan to stay how many days in Michigan?⁴

⁴ The longest allowed answer for this question was "10 or more days"; these have been coded as 14 day stays.

7. While in the airport today, how much do you expect to spend on food, beverages, gifts, or other products? ⁵
8. During your trip, did/will you spend money on (select all that apply):
 - a. Lodging (e.g. hotels, motels)
 - b. Ground travel (e.g. rental car & gas, public transport, taxis)
 - c. Restaurants or other dining expenses
 - d. Entertainment (e.g. concerts, museums, sporting events, movies, other)
 - e. Retail merchandise (e.g. clothes, gifts)
9. During your visit/trip, approximately how much money - IN TOTAL - do you think you spent/will spend in Michigan on lodging (e.g. hotels, motels)?⁶
10. During your visit/trip, approximately how much money - IN TOTAL - do you think you spent/will spend in Michigan on ground travel (e.g. rental car & gas, public transport, taxis)?
11. During your visit/trip, approximately how much money - IN TOTAL - do you think you spent/will spend in Michigan on restaurants or other dining expenses (including business meals with customers that you might have paid for)?
12. During your visit/trip, approximately how much money - IN TOTAL - do you think you spent/will spend in Michigan on entertainment (e.g. concerts, museums, sporting events, movies, other)?
13. During your visit/trip, approximately how much money - IN TOTAL - do you think you spent/will spend in Michigan on retail merchandise (e.g. clothes, gifts)?
14. During your visit/trip, approximately how much money - IN TOTAL - do you think you spent/will spend in Michigan on other items?
15. Do you reside in the United States?

⁵ This question had a series of ranges available; each was treated as the midpoint of the range with the exception of the top option (“\$50 or more”), which was treated as \$75

⁶ The maximum allowed answer for each category was \$2,000

Details of Multiplier Analysis

Direct spending information has been converted to overall economic impact, as described earlier, with the aid of multipliers provided as part of the Regional Input-Output Multiplier Study (RIMS II). For this study, RIMS multiplier data was acquired from the Bureau of Economic Analysis for both the ten-county Air Trade Area and for the state of Michigan as a whole. The multipliers in this study were computed using the latest data available for detailed industry analysis, specifically 2002 national benchmark input-output data and 2010 regional data.

Multipliers vary based on the geographic area covered and the industry involved. Therefore, each spending category about passengers and others associated with Detroit Metropolitan Airport has had to be classified in one of the RIMS industries, as follows:

Spending Category	RIMS Industry	NAICS Code
Air Transportation (passenger and cargo)	Air transportation	481000
Expenses at Airport (connecting passengers)	Food services and drinking places	722000
Lodging	Hotels and Motels, including casino hotels	7211A0
Ground Transportation	Auto equipment rental & leasing	532100
Dining	Food services and drinking places	722000
Entertainment	Other amusement and recreation industries	713B00
Retail ⁷	Retail Trade	4A0000
Other	Other Personal Services	812900

⁷ The RIMS methodology calls for the special case of retail trade that the cost of goods sold be excluded for goods manufactured outside the region before applying the multipliers. We do not have information about cost of goods sold for the retailers our survey respondents purchased from. Since these visitors are likely to have purchased at least some retail goods produced locally and/or with high margins the reported numbers assume 50% of retail sales can be counted as local value added.

Similarly, for the Capital Improvement Plan, each category was assigned to an industry:

Spending Category	RIMS Industry	NAICS Code
Airfield	Construction	230000
Cargo, Hangar & Commercial Development	Construction	230000
Power Plant & Electrical Distribution Systems	Power, distribution, and specialty transformer manufacturing	335311
Fleet & Equipment	Light truck and utility vehicle manufacturing	336112
Parking Decks & Lots	Construction	230000
Bridges & Roadways	Construction	230000
Security & Communications	Other communications equipment manufacturing	334290
Support Facilities	Construction	230000
Demolitions	Construction	230000
Terminals	Construction	230000
Water Mains & Storm Water System	Water, sewage and other systems	221300

For each industry and geographic area, RIMS provides three multipliers:

1. The **output multiplier** converts dollars of direct spending to estimated total dollars of output. This is the number which is the total economic impact presented in this study.
2. The **earnings multiplier** converts dollars of direct spending to an estimate of total dollars of income accruing to people in the region.
3. The **employment multiplier** converts dollars of direct spending to an estimate of total jobs supported by the output generated by the direct spending.

The employment number requires as an input an estimate of spending in 2010 dollars. Since the bulk of the numbers in this study are 2013 dollars, the 2013 spending has been converted to its equivalent in 2010 purchasing power using the Consumer Price Index. Based on values for the CPI in 2010 and 2013, the measured 2013 spending levels have been multiplied by a factor of 0.933 to convert them to 2010 dollars.

In the sections on air transportation and the capital improvement plan, since the bulk of the expenditure occurs at the airport and will have most of its impact within the ten-county M Detroit area, the ten-county multipliers have been used to estimate total impact for the state and the air trade area. In the section on visitor impact, the multipliers and estimated spending levels for metropolitan Detroit have been used to calculate impact for the Air Trade Area. Similarly, the multipliers and estimated spending levels for the entire state have been used to calculate impact for the state. Since some visitors use DTW to visit areas in Michigan outside of metropolitan Detroit, spending levels will be higher for the state as a whole than for the ten-county Air Trade Area alone.

