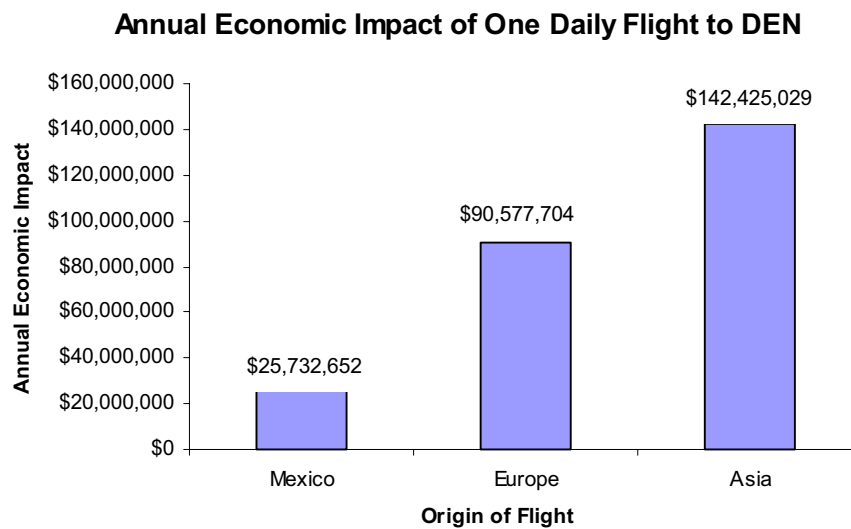


Economic Impact of International Flights on Denver's Economy

SUMMARY

The annual economic impact of a single daily flight to Denver International Airport varies considerably by region of origin. Figure 1 below displays the anticipated impact of one additional daily flight from Mexico, Europe and Asia. The annual benefit of a daily flight from Europe would be 3.5 times greater than one from Mexico; that of a flight from Asia would be 5.5 times as large.

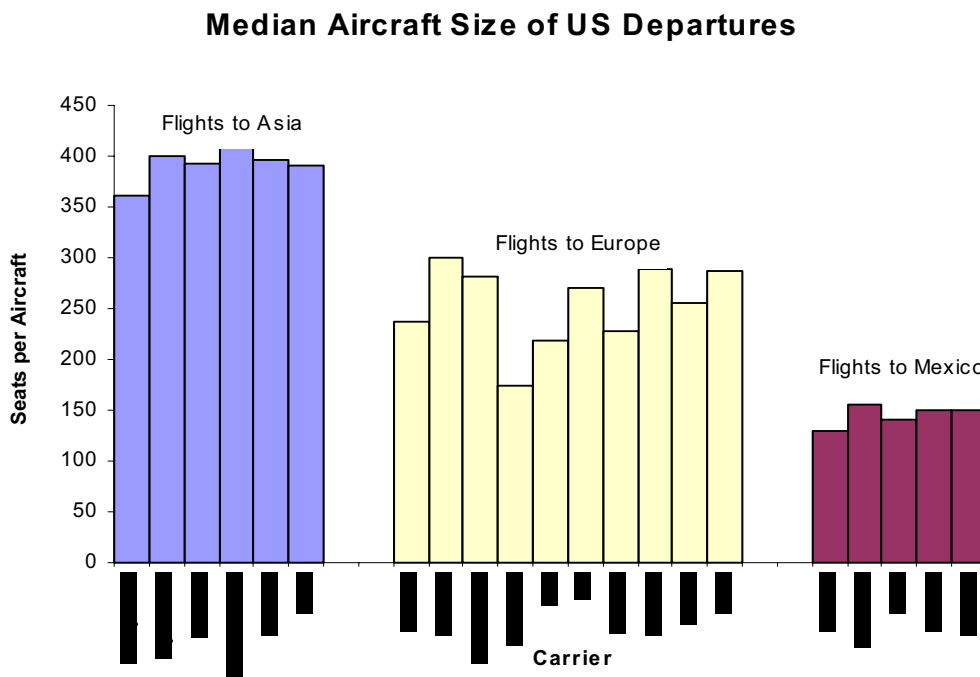
Figure 1



The difference in impact among the regions of origin results from two major factors:

- Carriers serving Asia and Europe use **larger aircraft**

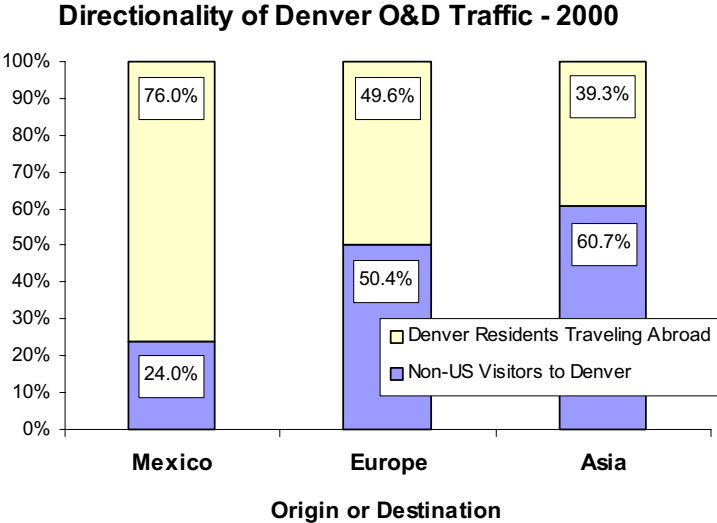
Figure 2



Economic benefits from air carrier expenditures are greater for carriers operating larger aircraft, since they must pay more per flight for airport fees and services. Larger aircraft also accommodate a larger number of visitors, resulting in a correspondingly greater aggregate amount of visitor expenditures in the local region.

- Trip directionality:** Historical point-of-sale data shows that most passengers traveling between Denver and Mexico are actually Denver residents visiting Mexican destinations. In contrast, traffic on flights between Denver and Europe or Asia shows a more favorable ratio of visitors to local residents.

Figure 3



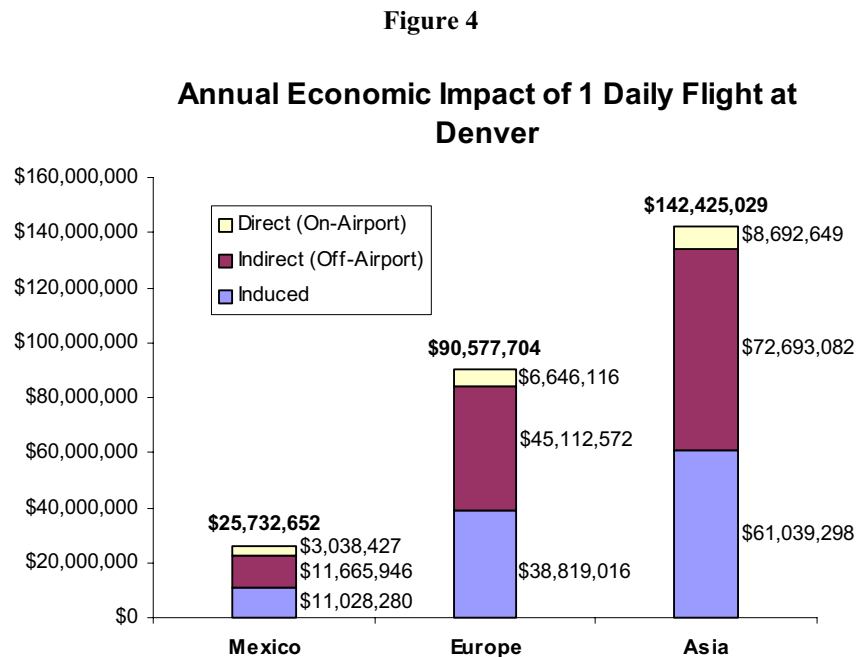
Visitors spend money on lodging, food, and entertainment in the Denver area, contributing a sizable benefit to the local economy. In sum, an additional daily flight from Europe or Asia will bring more visitors to Denver than one from Mexico, because 1) the larger aircraft that would likely be employed would carry more passengers, and 2) because among those passengers, a greater proportion are likely to be visitors to Denver rather than local residents traveling abroad.

The remainder of this memorandum details the calculation of the total economic benefits shown in Figure 1.

METHODOLOGY

To estimate the value of an additional daily flight from Mexico, Europe, and Asia, this study analyzed three components of the total economic impact: a direct impact, an indirect impact, and an induced impact. The direct impact consists of on-airport expenditures by passengers and airlines resulting from a new daily flight, and is the simplest to project. The indirect impact represents off-airport spending, particularly by the visitors brought to Denver by the additional daily flight. Induced impact occurs as these on- and off-airport expenditures are received as income and partially re-spent by Denver residents.

The greatest portion of the total economic benefit results from the indirect impact, as Figure 4 demonstrates below:



This analysis formulated a most-likely scenario in which one new daily flight to Denver is added from Mexico, Europe, and Asia. Consistent with Figure 2, which showed the most common aircraft sizes used to serve US destinations, the scenario employs the following aircraft on an assumed daily service:

- An **Airbus A320** with **150 seats** from **Mexico**
- A **Boeing 777** with **300 seats** from **Europe**
- A **Boeing 747** with **400 seats** from **Asia**

I. DIRECT IMPACT (On-Airport Expenditures)

The estimated direct impact resulting from an additional daily flight by region of origin is shown in Figure 5. The direct impact of a new flight from Europe is projected to be over twice as great as that of a flight from Mexico. A daily flight from Asia will yield a direct impact nearly three times larger. The calculation is described below.

Figure 5



Expenditures made on-airport are divided into two categories, reflecting the airport’s dual nature as a public utility and as a venue for commercial activity. There are compulsory fees and charges set by the airport or the government, paid for the use of the facility. Airlines and passengers also make expenditures for goods and services provided by third parties on a commercial basis.

A. Airport Charges

Airport charges at Denver are levied based on landings, landed weight, on-board passengers and O&D passengers. Following are the operational parameters on which airport charges are based in the most-likely scenario.

Figure 6

Operational Statistics - 1 Additional Daily Flight

	<i>To Denver From:</i>		
	Mexico	Europe	Asia
Aircraft Type:	A-320	B-777	B-747
Seats per Aircraft:	150	300	400
Departures			
Frequencies per Week:	7	7	7
Annual Departures:	365	365	365
Landed Weight			
Weight ('000lbs):	162	650	850
Ann'l Landed Weight ('000lbs):	59,130	237,250	310,250
Passenger Traffic			
Weekly Arriving Seats:	1,050	2,100	2,800
Annual Arriving Seats:	54,750	109,500	146,000
Load Factor:	70%	70%	70%
Arriving On-Board Psgrs:	38,325	76,650	102,200
Local Traffic			
Percent flying to Denver:	85%	80%	70%
Percent flying beyond Denver:	15%	20%	30%
Arriving O&D Psgrs:	32,576	61,320	71,540

Due to greater landed weight and passenger traffic, a flight from Europe or Asia will generate more airport charge revenues than a flight from Mexico over the course of a year:

Figure 7

**Annual Airport Charges Resulting from
1 Additional Daily Frequency**

		To Denver From:					
		Mexico		Europe		Asia	
		Units	Expenditure	Units	Expenditure	Units	Expenditure
Total Airport Charges:			\$2,326,723		\$5,119,140		\$6,784,430
Landing Charges	\$2.909 per 1000lbs	59,130	\$172,009	237,250	\$690,160	310,250	\$902,517
International Facilities Fees							
FIS Fee	\$4.48 per arrv intrn'l psgr	38,325	\$171,696	76,650	\$343,392	102,200	\$457,856
Gate-use Fee	\$1.78 per arrv/dep intrn'l psgr	76,650	\$136,437	153,300	\$272,874	204,400	\$363,832
AGTS & Tunnel Fee	\$0.78 per arrv O&D psgr	32,576	\$25,409	61,320	\$47,830	71,540	\$55,801
Non-Preferential Gate-use	\$1.23 per 1000lbs	59,130	\$72,730	237,250	\$291,818	310,250	\$381,608
APHIS A/C Inspection Fee	\$65.25 per landing	365	\$23,816	365	\$23,816	365	\$23,816
Air Transportation Tax	\$13.20 per arrv/dep intrn'l psgr	76,650	\$1,011,780	153,300	\$2,023,560	204,400	\$2,698,080
Immigration User Fee	\$6.00 per arrv intrn'l psgr	38,325	\$229,950	76,650	\$459,900	102,200	\$613,200
Customs User Fee	\$5.00 per arrv intrn'l psgr	38,325	\$191,625	76,650	\$383,250	102,200	\$511,000
Agricultural Tax	\$3.10 per arrv psgr	38,325	\$118,808	76,650	\$237,615	102,200	\$316,820
Passenger Facility Charge	\$4.50 per dep psgr	38,325	\$172,463	76,650	\$344,925	102,200	\$459,900

Source: IATA Airport and Air Navigation Charges Manual

B. Airport Commercial Expenditures

Airlines and passengers at Denver also make on-airport expenditures for products and services provided on a commercial basis. Ground handling and catering services for in-flight meals represent the major commercial expenditures for airlines (major air carriers do not purchase fuel from the airport). Passengers in the airport terminal spend money on food and beverages, retail and duty-free merchandise, movies, and various other services.

Total annual expenditures on airline catering and ground-handling, as well as consumer expenditures in the terminal, are estimated in the table below. Passenger spend rates were determined by dividing total terminal expenditures by the number of enplaning passengers in 2000. Estimates of catering and ground-handling expense were derived from industry averages.

Figure 8

**Annual Airport Service Expenditures Resulting from
1 Additional Daily Flight**

	<i>To Denver From:</i>		
	Mexico	Europe	Asia
Total Airport Services Expense:	\$711,704	\$1,526,977	\$1,908,219
Aircraft Type:	A-320	B-777	B-747
Catering Expenditure			
Annual Departing Seats:	54,750	109,500	146,000
Catering Factor:	75%	75%	75%
Annual Meals:	41,063	82,125	109,500
Premium Meal Percent:	5%	5%	5%
Premium Meals:	2,053	4,106	5,475
Economy Meals:	39,009	78,019	104,025
Expenditure per			
Premium Meal:	\$8	\$15	\$15
Economy Meal:	\$4	\$8	\$8
Total Catering Expense:	\$172,463	\$685,744	\$914,325
Ground Handling			
Annual Arrivals:	365	365	365
Ground-Handling Fee:	\$850	\$1,050	\$1,050
Total G-H Expense:	\$310,250	\$383,250	\$383,250
Passenger Expenditures at Airport:			
Ann'l On-Board Departing Psgrs:	38,325	76,650	102,200
Spend Rate Per-Enplanement:	\$5.97	\$5.97	\$5.97
Total Psgr Airport Exp:	\$228,991	\$457,983	\$610,644

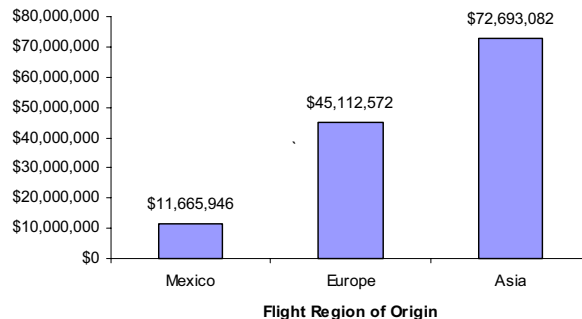
Due to larger aircraft size, greater on-board traffic, and longer flight times (requiring more meals provided per flight), an additional daily flight from Europe or Asia will yield more airport commercial expenditures than one from Mexico.

II. INDIRECT IMPACT (Off-Airport Expenditures)

Off-airport expenditures consist primarily of visitors to the Denver metropolitan area spending money on food, lodging, entertainment, and other services. The visitor expenditure level produced by an additional daily flight is a function of the average spending per visitor from the region of origin, as well as the number of additional visitors that the flight brings to the Denver area each year.

Figure 9

Indirect Impact (Off-Airport Expenditures)



The indirect impact of an additional daily flight from Europe or Asia is several times greater than one from Mexico. The calculation follows in the sub-sections below.

A. Expenditures per visitor

The International Trade Administration of the US Department of Commerce conducts a quarterly in-flight survey of international air passengers. Survey data compiled in 2000 indicate that total trip expenditures by visitors from Mexico, Europe, and Asia are comparable:

Figure 10

**Average Expenditure per Visitor
by Region of Origin**

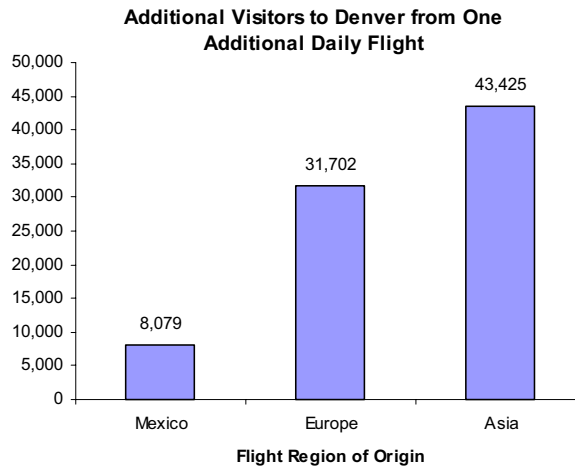
	<i>To Denver From:</i>		
	Mexico	Europe	Asia
Avg. Trip Expenditure per Visitor:			
Transportation in US:	\$216	\$198	\$217
Lodging:	\$333	\$443	\$443
Food and Beverage:	\$243	\$336	\$281
Gifts/Souvenirs:	\$327	\$207	\$396
Entertainment:	\$169	\$147	\$150
Other Spending:	\$156	\$92	\$187
Total per Visitor:	\$1,444	\$1,423	\$1,674

Source: US DOC In-Flight Survey

B. Additional visitors to Denver

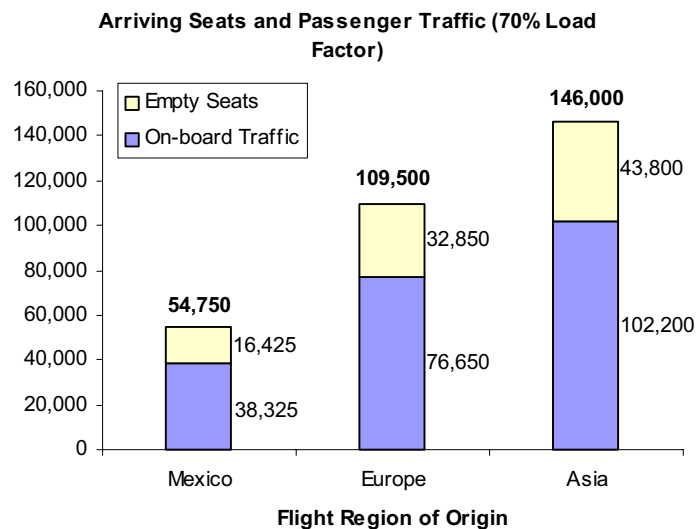
While average expenditures per trip among Mexican, European, and Asian visitors to the US are similar, the number of additional visitors anticipated from a new daily flight is not. An additional flight from Europe is expected to bring nearly four times more visitors to Denver than a flight from Mexico. Over five times as many Asian visitors will arrive in Denver each year.

Figure 11



The number of additional visitors was estimated by first calculating the on-board traffic transported to Denver from the three regions of origin. Aircraft size and weekly frequencies were determined earlier in this analysis by examining current carrier service practices from Mexico, Europe, and Asia. This study assumed a 70% load factor.

Figure 12



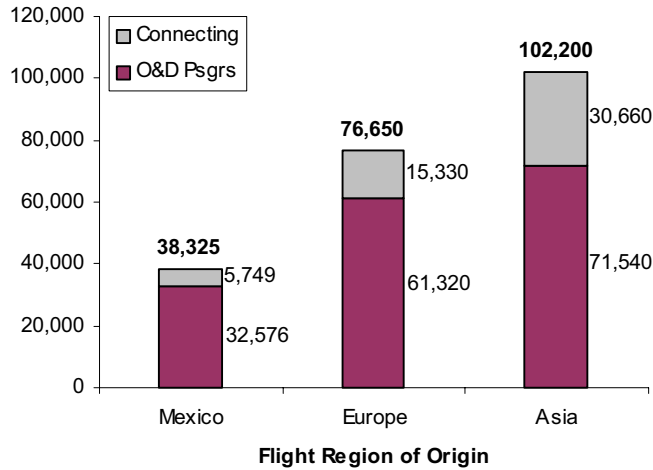
Of these on-board passengers, many are flying to Denver as their final destination. Because Denver functions as a hub for United and Frontier, however, a significant fraction will connect through DEN to points beyond. These connecting passengers may make expenditures in the terminal, as was assumed in Section I: Direct Impact. However, they will not contribute to visitor expenditures in the Denver area and so are removed from consideration of the indirect economic impact.

The percentage of international traffic connecting through Denver was determined with on-board international passenger information, as well as itinerary-level origin-and-destination passenger data. The analysis showed that on-board traffic from Mexico had the lowest connecting percentage at Denver. Only 15% of on-board passengers from Mexico were connecting through Denver, while 85% ended their journey there. 20% of traffic from Europe connected through Denver, while 80% was local or non-connecting.

Because there is currently no passenger traffic coming directly from Asia to Denver, a connecting percentage had to be estimated by comparing Denver to San Francisco, another United hub that has a similar annual passenger volume. SFO's connecting percentage of Asian traffic was 45%, a plurality of which was bound for Las Vegas. Denver's connecting percentage of Asian traffic was estimated to be 30%, somewhat lower than SFO. Asian traffic will prefer not to connect to Las Vegas through Denver, which require back-hauling. With 30% connecting traffic, the local percentage of on-board traffic is therefore 70%.

Figure 13

Arriving Traffic: O&D vs. Connecting

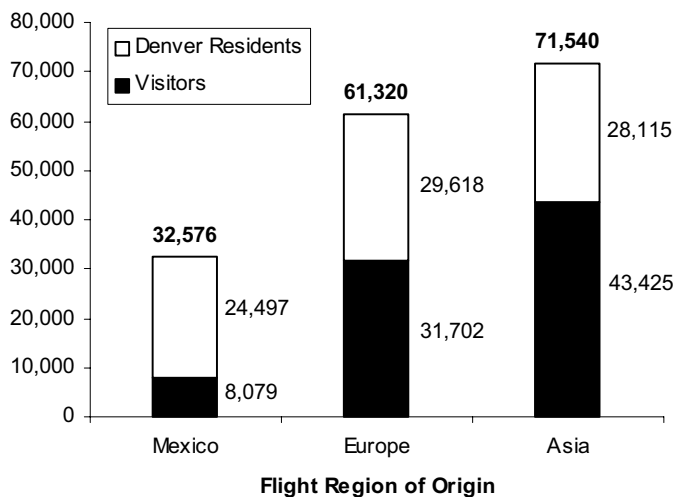


Of these passengers ending their journey at Denver, a portion represents Denver residents returning from abroad, and the rest consists of visitors to the area. Only the visitors contribute to visitor spending and the indirect economic impact of the new daily flight. Travel ‘directionality,’ that is, the percentage of Denver residents versus visitors among the Denver O&D passengers, was calculated with point of sale information from the US DOT’s O&D passenger ticket survey. With this data it is possible to determine the airport at which roundtrip passengers began their journeys.

Among O&D passengers between Denver and Mexico in 2000, only 24% were found to be Mexican visitors to Denver, while 76% were Denver residents visiting Mexico. The O&D travel between Denver and Europe was more balanced, with 48% originating in Denver and 52% in Europe. O&D travel between DEN and Asia was weighed toward visitors, with 39% Denver residents and 61% Asian visitors.

Figure 14

Arriving O&D Traffic: Denver Residents vs. Visitors



Applying these directional percentages to estimated DEN O&D traffic yields the visitor figures shown in Figure 14. Figure 15 below recapitulates the calculation of estimated annual visitors to Denver brought by additional flights from Mexico, Europe, and Asia.

Figure 15

**Annual Visitors to Denver Resulting from
1 Additional Daily Flight**

	<i>To Denver From:</i>		
	Mexico	Europe	Asia
On-Board Traffic			
Aircraft Type:	A-320	B-777	B-747
Seats:	150	300	400
Frequencies per Week:	7	7	7
Weekly Arriving Seats:	1,050	2,100	2,800
Annual Arriving Seats:	54,750	109,500	146,000
Load Factor:	70%	70%	70%
Arriving On-Board Psgrs:	38,325	76,650	102,200
Local (O&D) Traffic			
Percent flying to Denver:	85%	80%	70%
Percent flying beyond Denver:	15%	20%	30%
Arriving Local Psgrs:	32,576	61,320	71,540
Directionality of Local Traffic:			
Percent Originating in Denver:	75.2%	48.3%	39.3%
Percent Originating Abroad:	24.8%	51.7%	60.7%
Visitors to Denver:	8,079	31,702	43,425

Sources: DOT T100 International, Database Products' Gateway and OD1A Datasets

The number of Denver visitors resulting from a new daily flight from Europe or Asia would be nearly four times greater than the number of Mexican visitors. This difference in new visitor traffic would cause a similar asymmetry in the indirect economic impact of the flights:

Figure 16

**Indirect Economic Impact Resulting from
1 Additional Daily Airline Flight**

	<i>To Denver From:</i>		
	Mexico	Europe	Asia
Total Visitor Expenditures:	\$11,665,946	\$45,112,572	\$72,693,082
Annual Visitors to Denver:	8,079	31,702	43,425
Avg. Trip Exp. per Visitor:			
Total per Visitor:	\$1,444	\$1,423	\$1,674

Source: US DOC In-Flight Survey

The indirect impact of a new daily flight from Europe would therefore be about four times greater than that of a flight from Mexico. A flight from Asia would yield visitor expenditures over six times as large.

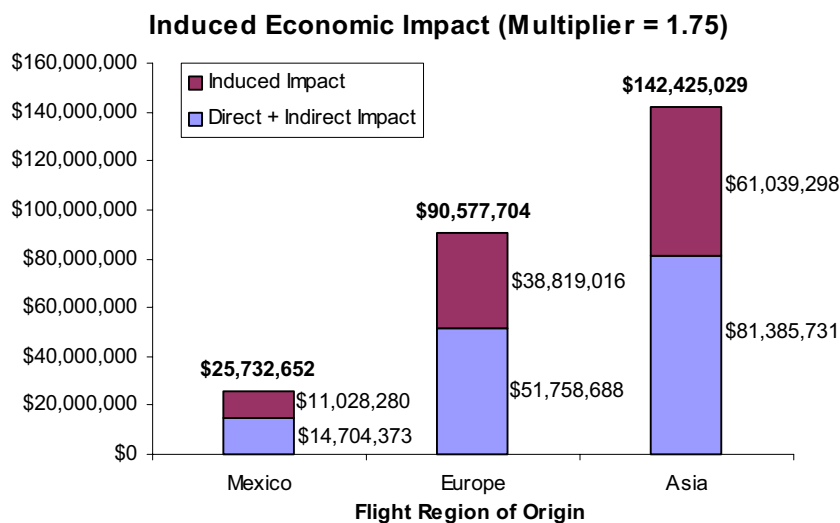
III. INDUCED IMPACT

The induced economic impact occurs as the direct and indirect expenditures described above are received as income by local Denver residents. That income undergoes successive rounds of partial re-spending, enhancing the benefit of the original economic infusion.

The magnitude of the induced impact depends on the fraction of the income, on average, that is re-spent in the Denver area. Some of the income is saved and some of it leaves the Denver area, at which point it escapes the cycle of spending and ceases to contribute to the induced impact. The effect of this cycle is quantified in a ‘multiplier,’ the total economic benefit an area will receive through rounds of spending for each original dollar of new income.

The appropriate multiplier to be used depends upon the industry and metropolitan area of interest, each of which have their own characteristics. Consultation with the Economic Development Research Group indicated that a proper multiplier for the travel and tourism industry in the Denver metropolitan area is 1.75. Thus on average, 43% of every dollar received is re-spent in the Denver area.

Figure 17



For each region of origin, the induced economic impact equals 75% of the direct-plus-indirect impact value, thus preserving pre-existing differences in proportion.

CONCLUSION

The economic impact of additional daily flights from Mexico, Europe, and Asia were found to vary considerably. Figure 18 below recounts the values estimated for the direct, indirect, and induced economic impact, which together amount to the total benefit of a new flight for the Denver metropolitan area.

Figure 18

**Total Economic Impact Resulting from
1 Additional Daily Flight**

	<i>To Denver From:</i>		
	Mexico	Europe	Asia
Direct Impact:	\$3,038,427	\$6,646,116	\$8,692,649
Airport Fees	\$2,326,723	\$5,119,140	\$6,784,430
Airport Services	\$711,704	\$1,526,977	\$1,908,219
Indirect Impact	\$11,665,946	\$45,112,572	\$72,693,082
Total Direct + Indirect	\$14,704,373	\$51,758,688	\$81,385,731
<i>MSA Multiplier</i>	1.75	1.75	1.75
Total Impact	\$25,732,652	\$90,577,704	\$142,425,029
<i>Compared with Mexico Flight</i>	100%	352%	553%

Sources: SH&E Analysis, Economic Development Research Group

All told, the annual benefit of a flight from Europe is over 3.5 times greater than a flight from Mexico, and 5.5 times greater for a flight from Asia.

Two major factors underpinned most of this difference:

- Carriers serving the US from Europe and Asia use larger aircraft than those flying from Mexico. The bigger planes carry more passenger traffic, and contribute more in size- and weight-based airport fees on a per-flight basis.
- Passenger traffic between Denver and Mexico is mostly southbound, that is, Americans visiting Mexico. In contrast, Denver-Europe traffic is evenly balanced, and Denver-Asia travel is weighted toward Asian visitors to Denver. These visitors spend money on lodging, food, and other services and provide a great boon to the local economy.