The Impacts of Major Airline Mergers on Network Consolidation and Traffic Performance

By

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ABSTRACT

In response to the many challenges faced by US airlines in the past decade, merger activity has increased significantly. By combining their networks, airlines commonly aim to not only realize cost synergies but also achieve revenue synergies as well through increased network coverage. In practical terms, this means that the combined airline can cut its total capacity without reducing traffic as it benefits from a larger network and more connecting options via its hubs.

The objective of this thesis is to find evidence to confirm this effect based on recent merger activity by comparing both capacity and traffic data before and after the integration period. Particular emphasis is placed on the changing role of hubs to highlight capacity and traffic shifts in a combined network.

Two of the most recent major mergers, Delta-Northwest and United-Continental, exhibit how the networks of previously independent carriers were consolidated to achieve the above-mentioned synergies. Delta concentrated capacity at its largest hub in Atlanta and a small number of additional hubs while other hubs experienced a significant downsizing. Additionally, the airline also eliminated a large number of point-to-point services that were bypassing the hubs in order to maximize the use of its hubs. United and Continental, on the other hand, engaged in fairly minor capacity redistribution instead of sweeping reductions. Both carriers increased the share of capacity operated by regional partners and grew capacity between most of the hubs as well.

Over the same time frame, however, both of the combined airlines lost passengers compared to their pre-merger levels. While exogenous factors like the recent recession and operational issues played a role, network strategies at both airlines also affected traffic. Delta was unable to recover most of the passengers it lost on the eliminated point-to-point services. For United, the shift towards more international capacity indicates a displacement of domestic traffic by international connecting passengers. Although both carriers had not returned to their pre-merger traffic levels by the end of the integration period, Delta's 2012 performance suggests that network integration and consolidation can have positive effects in the long run.

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1. MERGERS IN THE US AIRLINE INDUSTRY: HISTORY AND OBJECTIVES

"Our combined airline will have the most comprehensive network in the industry with 370 destinations. As the world's premier airline, we will have an unmatched scope and scale that will allow us to generate more revenue and operate the combined carrier more efficiently."
- Jeff Smisek, Continental Airlines Chairman and CEO,
- Announcing the merger with United Airlines (Mason 2010)

"The combination of Delta and Northwest will create a stronger company with route systems that complement each other and will provide an opportunity to offer travelers a global network that neither airline independently could offer."
- Richard Anderson, Delta Airlines CEO,
Testifying before the House Judiciary Committee (2008)

The February 2013 announcement by American Airlines and US Airways to merge and form the world's largest airline by passenger traffic marked another major step towards consolidation in the US airline industry. According to the Economist, it might be "the last big airline merger allowed to happen in America" and place the roughly 80% of the US domestic market in the hands of the four largest carriers. (The Economist 2013) Prior to American and US, the industry had already seen four major mergers in the past decade: Delta-Northwest, United-Continental, Southwest-AirTran and US Airways-America West. All of these mergers shared the common objective of increasing the airlines' competitiveness in the same way Jeff Smisek and Richard Anderson envisioned for their respective companies in 2008 and 2010.

Historically, this is not the first wave of mergers in the US airline industry. According to Airlines for America, the first merger dates back to 1930, when Western Air Express and Standard Airlines merged. (Airlines for America 1) The first major wave took place between 1967 and 1972, when a total of 9 mergers were concluded. In the aftermath of deregulation, 1985-1993 saw by far the most extensive phase of industry consolidation with a total of 15 mergers and acquisitions. This period culminated in the collapse of Pan American World Airways ("Pan Am") and its subsequent breakup and mergers with Delta and United. 2001 marked another major point in this process when the bankrupt TWA merged with American. The timeline shows that major periods of industry consolidation generally occurred in the context of substantial changes to the operating environment of the industry. Deregulation had a clear

impact on the industry structure and led to the disappearance of old industry leaders and the reemergence of new dominant players.

The current wave of mergers follows a very similar pattern given that the last decade has brought drastic changes to the US airline industry. Low cost carriers, Internet distribution, rising fuel costs and security threats have all contributed to what has likely been one of the most tumultuous phases in the industry's history. Between 2001 and 2011, a total of 41 US airlines ceased operations or entered bankruptcy protection including US Airways (2002 & 2004), United (2004), Northwest (2005), Delta (2005) and American (2011). (Airlines for America 2) Mergers have again become a strategic response for airlines to increase their competitiveness in the aftermath of a difficult period with lasting effects on the industry.

Like in most merger scenarios, the companies involved aim to benefit from operational and cost synergies while increasing revenues by offering customers better and broader services. These come in the form of more destinations served, more available nonstop or connecting frequencies and more extensive frequent flyer programs. As far as costs are concerned, the logic is derived from economies of scale. If airlines are able to bundle their traffic at consolidated hubs, they can employ larger aircraft on the same legs. Aircraft with larger seat counts have lower unit costs, primarily because fixed costs can be divided by a larger number of units of production (ASMs). (Wei & Hansen) As far as handling costs are concerned, the potential size of cost savings depends on the network structure of the two carriers. As Iatrou and Oretti point out, ground activities can only be combined at airports served by both carriers. (Iatrou & Oretti, p. 120) In the case of American and US Airways, for example, the limited network overlap might have strategic advantages, but might lead to limited cost synergies. Whether personnel costs for the flight and cabin crew can be reduced depends to a large degree on a successful integration of the two workforces. Unions can effectively block this process and force the airline to maintain separate work forces. (Iatrou & Oretti, p. 117) US Airways provides an example for this as separate labor contracts are still maintained for the original US Airways pilots and those that used fly for America West. (Harty &

Sloan) On the other hand, back office expenses for marketing, sales, procurement and overhead can be reduced when overlap is eliminated. When the United-Continental merger was announced, estimates of potential cost savings ranged around $1b per year.

Revenue effects, on the other hand, also represent a form of economies of scale and scope realized through a larger number of connecting options, more destinations and enhanced frequent flyer programs. (Flint) In many cases where the networks are complimentary rather than overlapping, these effects can be larger than those achieved through cost synergies. When Air France and KLM merged in 2004, the two CEOs emphasized that cost savings where not the primary motivation but to "bring in traffic from beyond the local market and maintain a global reach". (Airline Business) The underlying premise is that a larger airline will be able to attract more passengers than two smaller independent carriers as it can instantly serve a larger number of O-D city pairs.

In the case of DL and NW, for instance, Richard Anderson pointed out in 2008 that despite being America's "premiere carrier to Asia", it would be virtually impossible for Northwest to copy Delta's strength in Europe, the Middle East and Latin America. (House Judiciary Committee) By combining the resources, the airlines aimed to become a key player in all of these markets. Through integration, airlines can go as far as creating what Goetz calls "fortress hubs" where a certain carrier controls over 60% of traffic and thus gains significant influence over fares. (Goetz) Also on the revenue side, airlines can create a better experience for the passenger through integration. In turn, this may contribute to increasing traffic or, potentially, fares. Carlton, Landes and Posner mention the ability to offer more convenient schedules, reduce walking distance between connecting flights and better coordination in the case of delays as examples for these operational effects. (Carlton & Posner, p. 68)

Ultimately, the airlines will seek to benefit from cost synergies and revenue effects simultaneously. By combining their networks, it should be feasible to drop unprofitable services and downsize redundant hubs without reducing the overall quality of service. Quality of service, in this

context, represents a collection of choice parameters that influence a passenger's decision for a specific itinerary. The available capacity between a city pair represents a basic but effective measure of service quality as more service provides passengers with more choice concerning their itineraries or available fares. Parameters such as the number of connecting points, elapsed time and individual carrier characteristics also factor into this decision. (Clark) For the purpose of this analysis, however, it will be assumed that capacity, measured in terms of aircraft size and frequencies, represents the key determinant of market share.

This analysis is an effort to establish a link between how airline networks have changed over the course of mergers and how the airline performed in terms of traffic over the same time period. As the objective of airline mergers is to realize cost synergies and revenue effects at the same, the assumption to be tested is that the merged carriers have consolidated their network by shifting or reducing capacity while improving or at least maintaining their traffic performance.

2. METHODOLOGY

The assumption introduced in Part 1 will be tested by comparing the situation of the independent airlines shortly before the merger announcement with that of the combined carrier after the merger's conclusion. A single operating certificate generally marks the point in time from which the FAA considers the merged carrier to be a single entity so the second set of data will be based on a point in time after this date.

Supply and demand will be analyzed separately for each case before the results will be brought together in a brief conclusion. Airline supply equals the total available capacity an airline offers in a particular market or, for the purposes of this study, its entire network. Available seat miles (ASM) represent the commonly used measure of capacity. But the analysis will also include the number of frequencies and total seats offered by each airline in order to differentiate between changing aircraft sizes, distances and frequencies.[1] Since US carriers utilize small regional partners to serve many of the smaller spoke cities in their network, using only flights operated by the mainline carriers would fall short of delivering a comprehensive picture of the network.

2.1 The Supply Side – Analyzing changes in capacity

After briefly quantifying the aggregate changes in capacity across the network, particular emphasis will be placed on how the role of the individual hubs has changed during the integration of the airlines. As the two cases to be analyzed involve traditional legacy carriers who rely significantly on hub-and-spoke networks, this structure will deliver the best overview of how strategies have shifted during the merger. For each hub, change will be measured according to the following metrics:

- Total capacity offered in terms of ASMs
- Domestic and international capacity by geographic region

[1] The data analyzed in this report is sourced from Innovata LLCs Schedule Reference Service (SRS) and the US DOT 10% Ticket Sample Database. Both the SRS and DOT data were accessed through the Diio Mi Market Intelligence portal

- Number of flights and seats offered
- Number of nonstop destinations available
- Intra-hub capacity
- Capacity shares of mainline and regional carriers

In order to determine the viability of the hubs in a combined network, their geographic position relative to the other hubs will also be taken into consideration. As Toh and Higgins point out, smaller hubs that are too close to the larger ones cannot be competitive. They use the example of St Louis, which in TWA's network was "sandwiched" between Chicago and Dallas. (Toh & Higgins) Considering that most US airlines already operate multi-hub networks, a merged carrier will start out with a large number of hubs with substantial geographic overlap. Based on these considerations and the above-mentioned metrics, a brief conclusion will evaluate which hubs will likely be phased out over time.

2.2 The Demand Side – How has traffic changed over the same period of time?

To determine how any changes in capacity can be related to demand, the second part of the analysis will focus on the combined airline's traffic performance compared to what each airline carried before the merger. Naturally, actual traffic does not reflect the true demand in a market as passengers may be spilled from a flight that does not offer enough capacity. Nonetheless, overall traffic performance can reflect how capacity changes have affected demand as well as the relative attractiveness of the service. The underlying assumption of this analysis states that airlines can consolidate their networks and shift capacity without negative repercussions on their traffic performance. So a relatively constant or increasing number of passengers over the same period of time would support this hypothesis.

The data will be compared based on the same points in time that were used in the previous section. As opposed to the schedule data, traffic data is not available as a comprehensive data set covering

all airlines and regions. Instead, the analysis will use the 10% ticket sample collected by the US DOT for domestic markets. This represents the most reliable source of information about traffic performance in the United States. Since this data is only available for domestic flights, the analysis will focus on these markets. To relate this data to the hub-level analysis in the previous section, the demand analysis will focus on differentiating local from connecting passengers. The primary emphasis will be placed on geographical patterns to show how traffic to and from different parts of the country has changed and relate these changes to the capacity changes identified in the previous section.

The analysis will also contain another approach to infer what kind of markets lost or gained passengers. Markets can be differentiated by whether nonstop service was dropped, added or whether the kind of service did not change. While this method does not account for changing frequencies, it will provide insights into which of these changes had the most significant impact on traffic.

Lastly, the demand side analysis will examine how the top 1,000 domestic O-D markets before the merger have changed over the course of the merger. This part of the analysis will differentiate between city pairs involving one or two hubs and non-hub markets and take a closer look at how capacity cuts in point-to-point markets by-passing the hubs have affected traffic.

2.3 Conclusion – Bringing everything together

In the conclusion, the results of both analyses will be combined to evaluate whether the underlying assumption advanced in part 1 holds true. Complications will potentially arise from different external circumstances such as the general economic climate during the merger. The analysis will attempt to account for such factors, but it should be noted that the findings of this study might nonetheless be biased due to these influences.

3. THE DELTA-NORTHWEST MERGER

3.1 The Supply Side - Consolidation and re-alignment of DL-NW hubs during the merger

The first case study that to be analyzed is the merger between Delta Airlines and Northwest Airlines. This merger represents the most suitable starting point as it initiated the most recent consolidation process within the US airline industry and because it has been fully concluded at this point. Both carriers officially announced Delta's acquisition of its rival Northwest in April of 2008. (Isidore) The merger was officially concluded in January 2010 when the new Delta Airlines emerged as a single entity. (Mouawad 2011) Based on this timeframe, the analysis of the changing route structure was performed by comparing schedule snapshots from May 2007 and May 2010. For this purpose, all flights marketed by either of the two carriers were considered including all regional partners that were flying on behalf of Delta or Northwest.

Figure 3-1 shows the aggregate total capacity of all flights marketed by Delta and Northwest in terms of available seat miles. Overall, capacity decreased by roughly 1.2b ASMs (or 6%) from 2007 to 2010, but virtually all of these cuts occurred in domestic markets while international capacity remained nearly constant. This represents a first hint at a network consolidation strategy designed to reduce overlap in domestic markets and take advantage of the revenue and cost synergies explained in part 1.

Figure 3-1: Total Network ASMs in May (marketed by DL & NW)

In order to better understand these effects, it is useful to look deeper into the two airlines' network structure. As traditional legacy carriers, both Delta and Northwest organize their network around a hub-and-spoke system with multiple hub locations. This analysis will focus on the hubs in Atlanta (ATL), Cincinnati (CVG), Detroit (DTW), Memphis (MEM), Minneapolis-St. Paul (MSP), New York-JFK (JFK) and Salt Lake City (SLC), which have been identified as primary domestic hubs for Delta and Northwest. New York-LaGuardia (LGA), will also be considered due to substantial capacity buildup at this airport. (Delta Airlines)

Under the assumption that a combined carrier will seek to rationalize its network, exploit potential synergies and promote economies of scale, the focus will be placed on how the role of the major hubs has changed. Naturally, large network carriers also tend to operate point-to-point services outside its major hubs. For the purpose of this analysis, however, these services will not be considered as hub-and-spoke networks offer a higher potential for synergies. During the integration of the two airlines, these eight primary hubs have changed substantially with regards to their strategic positioning within the combined network. As expected, capacity has been moved between these hubs to achieve better centralization and meet new geographic priorities. To simplify, these adjustments can be grouped into three broad categories:

1. **Strengthened primary hubs**
    a. ATL – Primary hub in the combined network
    b. JFK – International gateway geared towards larger aircraft
    c. LGA – Access point to New York City for domestic markets
2. **Downsizing and strategic re-alignment of smaller hubs**
    a. SLC - Reduced domestic hub with long-haul service to Skyteam hubs
    b. DTW – More domestic frequencies and limited international capacity
    c. MSP - Shrinking hub with selected long-haul international service

3. **General downsizing**

   a. MEM - Downsized hub with increased regional carrier presence

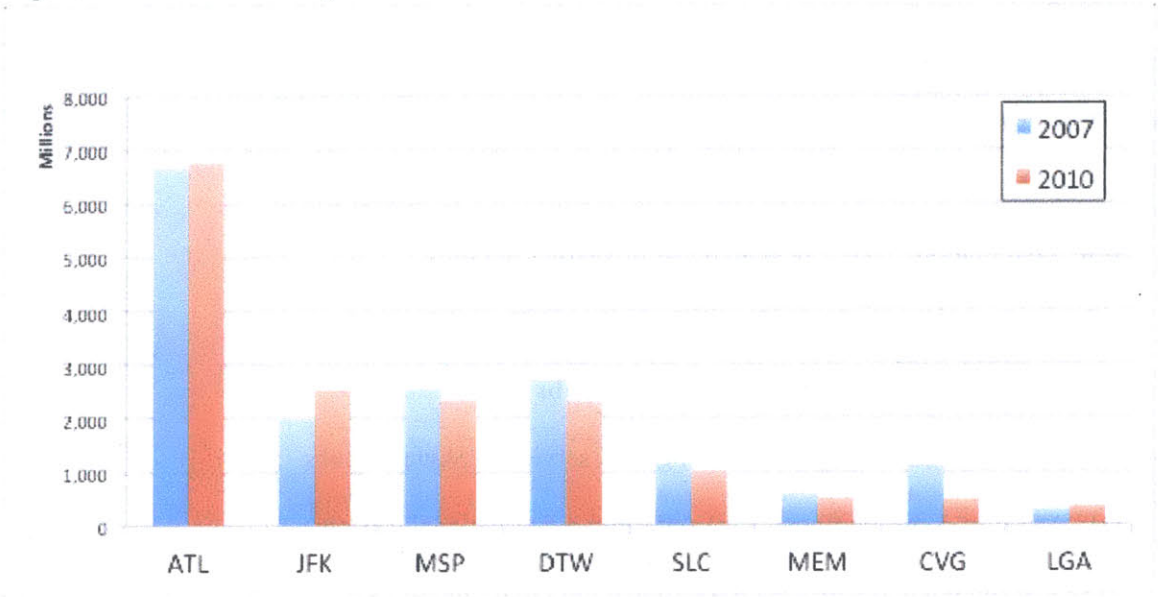
   b. CVG - Rapid hub downsizing across the board

The initial analysis will take place on an aggregate level to sum up changes in capacity, flights, destinations and operating carriers at these hubs. These insights will serve to highlight the principal changes in Delta-Northwest's combined network before moving on to an individual analysis of the hubs. The primary objective at the individual hub level will be to identify certain geographic and operational patterns that better illustrate increases or decreases of capacity at a hub.

3.1.1 Aggregate analysis of capacity, flights, destinations and operating carriers by hub

When looking at the 8 airports side by side, there appears to be a clear tendency towards shifting network capacity, strengthening some hubs and reducing the size of others. Figure 3-2 shows that ATL has become even more important as central hub in the network as total capacity has increased, including to the other hubs. JFK/LGA represent the strongest local hub market with an emphasis on long- and short-haul services respectively. These 3 hubs were the only ones to see overall capacity increases during this time period.

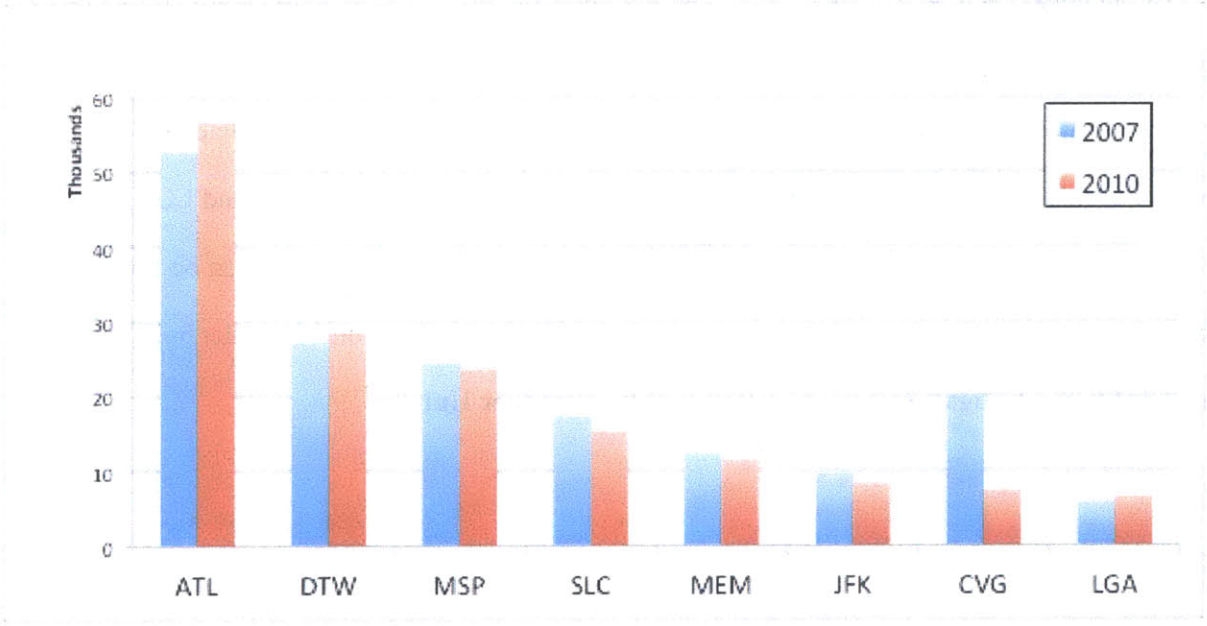
Figure 3-2: Total ASMs by Hub



Capacity at SLC, DTW and MSP has decreased, but they retain international long-haul connections to partner hubs along with a sizable domestic feeder network. At these airports, a significant proportion of domestic capacity has been shifted to the regional partners, which in turn contributed to smaller average aircraft sizes. CVG and MEM have very limited hub function after sweeping cuts in capacity, frequency and markets served.

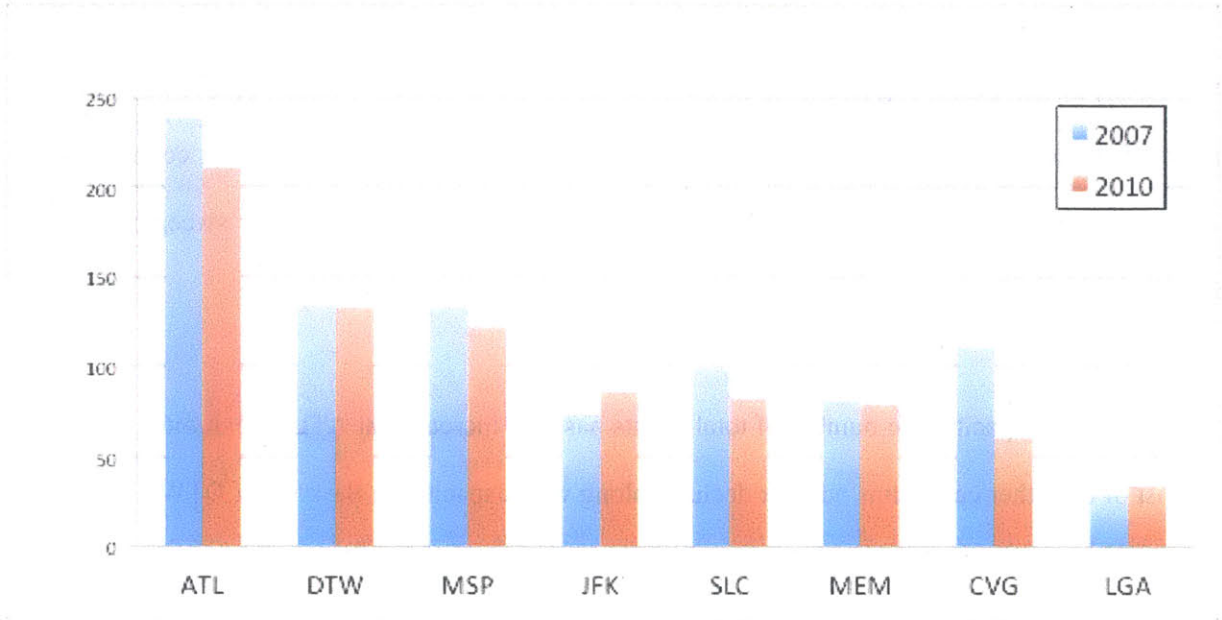
Along with capacity, the number of total flights has also increased at ATL as exhibited in Figure 3-3. In most of the other cases, this number declined along with capacity. In the case of DTW and JFK, a reverse trend points towards decreasing (DTW) and increasing aircraft sizes (JFK) respectively.

Figure 3-3: Total Flights by Hub



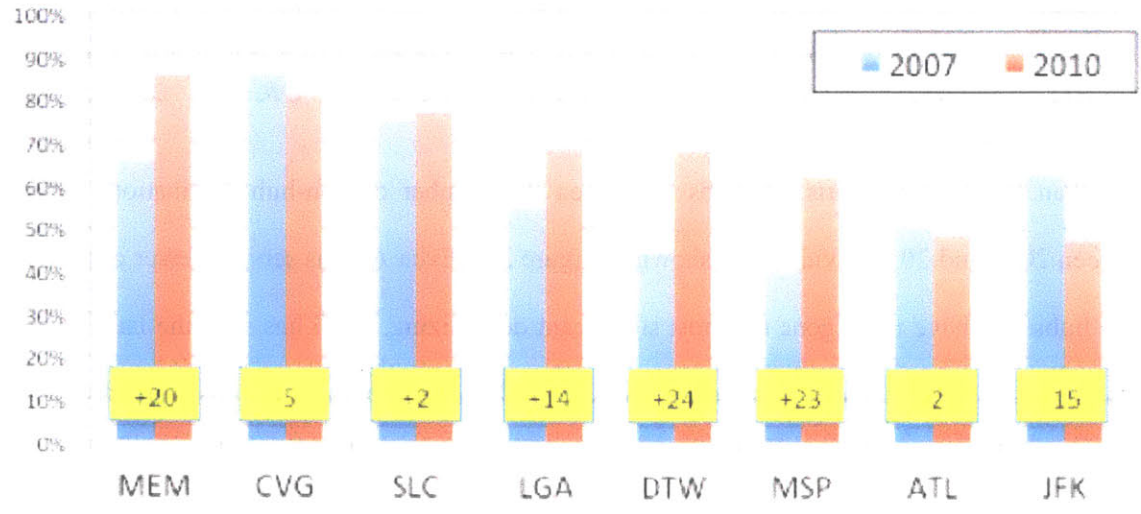
Other than the NYC airports, all hubs have seen the number of non-hub destinations served decrease between 2007 and 2010. Evidence is shown in Figure 3-4. Even ATL is serving fewer cities than before. Of the hubs that have undergone the most significant downsizing, CVG has seen the largest drop in destinations served with a reduction of almost 50%. At the other hubs, this number has either remained constant or decreased by a smaller proportion.

Figure 3-4: Number of non-hub Destinations by Hub



In summary, ATL is offering more flights and more capacity to fewer destinations while most of the other hubs (except in New York) have seen capacity, frequencies and destinations reduced. This points towards increased centralization and a shift of connecting capacity to ATL, in line with the basic rationale of economies of scale and exploiting revenue as well as cost synergies. JFK and LGA represent special cases because of their strong local market. Further evidence of centralization can be found in the increasing role of regional partners compared to mainline operations at most of the smaller hubs.

Figure 3-5: Share of Flights operated by Regional Partners per Hub



The comparison of how many flights were operated by mainline vs. regional partner carriers in Fig. 3-5 shows strong relative gains by the regional carriers at most of the downsized hubs. MSP, DTW and MEM have all seen the share of regional partner flights go up by at least 20 percentage points, SLC by 2. Despite the overall capacity increase at LGA, regional carriers have also become more important at this airport with an increase of 14 percentage points.

JFK has recorded the strongest decrease in the share of regional partners (-15 percentage points). ATL's share has remained relatively constant while CVG has also seen this share shrink (-5 percentage points), due mainly to the previously large presence of regional carriers, which subsequently had to bear a substantial amount of the capacity cuts.

To sum up, it is clear that Delta Airlines has combined its existing hubs with the Northwest Airlines hubs as part of their merger and moved capacity between them. ATL, JFK and LGA have grown during this process with different regional priorities while all other hubs have experienced cuts in capacity, frequencies and destinations. The airline has also moved a significant proportion of its flights to its regional partners with more favorable cost structures. This trend can be observed at virtually all of the downsized hubs and, to a certain extent, at ATL and LGA. In order to evaluate the role of the downsized hubs in particular, we have to look at the changes at the individual airport level and account for any regional variations.

3.1.2A: ATL – Primary hub in the combined network

The merger has strengthened ATL's position as primary hub in Delta's domestic and international network. Both the increasing number of flights as well the overall capacity growth (ASMs) in Table 3-1 attest to this fact.

Table 3-1: Change in Number of Flights and total ASMs at ATL

ATL	#Flights			ASMs (000s)		
	2007	2010	Change	2007	2010	Change
Domestic	47,607	51,835	+9%	3,949,319	3,960,481	+0%
International	5,102	4,880	-4%	2,699,690	2,815,810	+4%
TOTAL	52,709	56,715	+8%	6,649,009	6,776,291	+2%

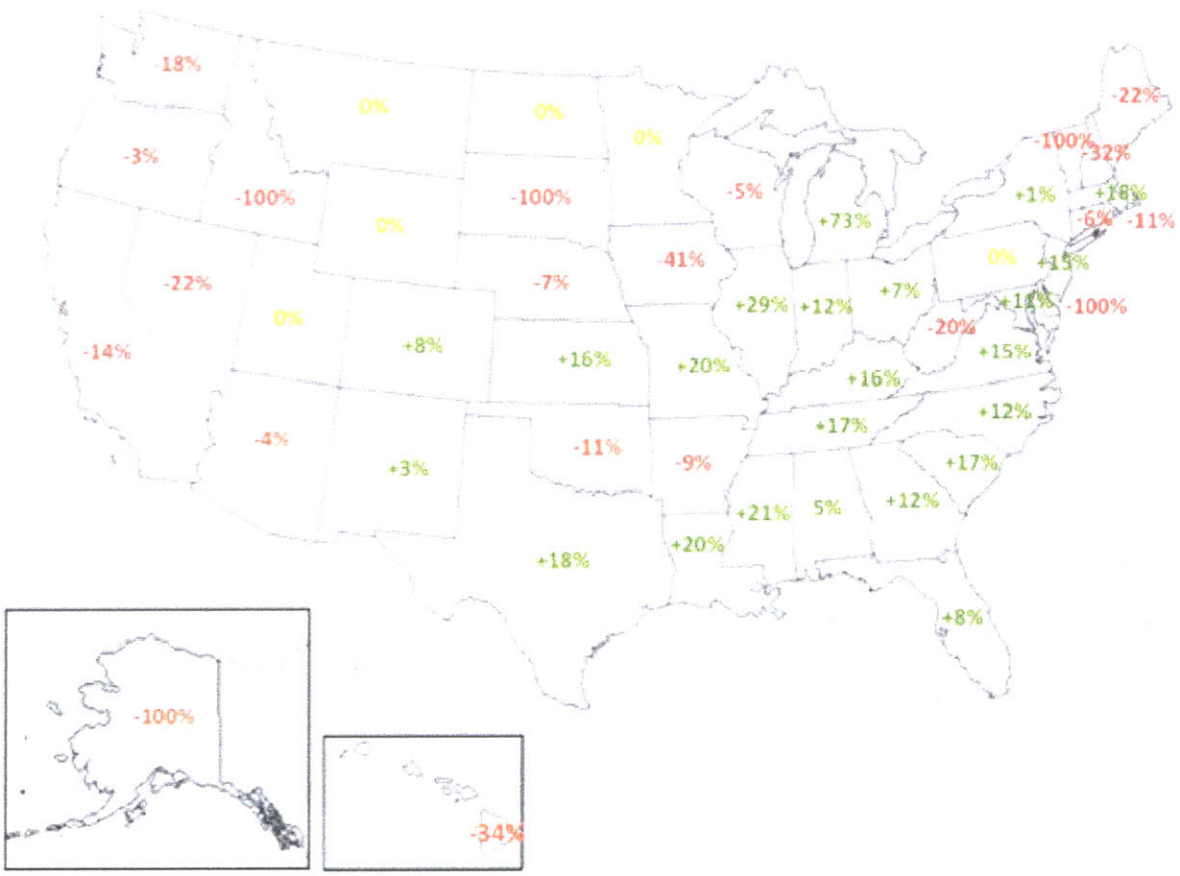
Capacity from ATL has increased across the board, both to domestic as well as international destinations. In international markets, the decreasing number of frequencies means that seat capacity per aircraft increased over the same time period. This is shown in Table 3-2

Table 3-2: Change in Number of Seats and avg. Seats per Aircraft at ATL

ATL	#Seats (000s)			Avg. Seats per Aircraft		
	2007	2010	Change	2007	2010	Change
Domestic	5,187	5,554	+7%	109	107	-2%
Intl.	854	847	-1%	167	173	+4%
TOTAL	6,041	6,401	+6%	115	113	-2%

Along with the increasing average aircraft size on an international level, aircraft capacity slightly decreased domestically. Considering the substantial increase in domestic frequencies coupled with a modest rise in ASMs, average stage lengths on domestic routes must have decreased. The visualization of domestic capacity changes between 2007 and 2010 in Figure 3-6 confirms this assessment.

Figure 3-6: Change in ATL hub capacity between May 2007 and 2010



There have been significant capacity increases from ATL to markets in the Midwest, South and Southeast. At the same time, there were reductions in the longer haul routes to the West Coast, Alaska and Hawaii. The realignment has also manifested itself in the relationship to the other hubs. ATL now offers more capacity to each of them, thus providing further evidence of hub consolidation, where connecting options have shifted to the primary hub. As capacity has declined at the other hubs, their local markets in particular have to rely more heavily on ATL to provide connecting options, particularly to international destinations. Table 3-3 shows these changes.

Table 3-3: ATL intra-hub capacity

Hub	2007 ASMs per month	2010 ASMs per month	Change
SLC	148,596,924	150,060,393	+1%
LGA	111,440,079	129,196,492	+16%
MSP	78,740,460	97,520,934	+24%
DTW	55,825,902	63,425,538	+14%
JFK	38,897,560	50,123,520	+29%
MEM	22,339,948	23,173,600	+4%
CVG	19,834,275	22,541,882	+14%

As far as international routes are concerned, the increased aircraft size is also accompanied by increasing stage lengths. The strongest capacity growth took place in the long distance markets to Asia, Africa and the Middle East while capacity to Europe saw significant cuts. Figure 3-7 shows the exact distribution.

Figure 3-7: Change in ATL hub capacity between May 2007 and 2010

When looking at the European destinations in detail in Table 3-4, capacity to France and the Netherlands has actually increased. From a strategic point of view, Delta appears to rely more on its

Skyteam partner AF-KLM to distribute its European traffic beyond these hubs. In addition, most of Delta's other hubs have retained at least some connections to these European hubs. Since the Skyteam network in Europe is so dense, Delta can take advantage of the alliance and focus on serving other long-haul destinations from ATL.

Table 3-4: Change in ATL Capacity to Destinations in Europe (in m ASMs)

Germany	Russia	Italy	UK	Denmark	France	Netherlands	Greece
-101	-68	-62	-56	-18	+7	+10	+19

Table 3-5 shows ASM hub capacity by operating carrier. At the top, the grey shaded lines show the change in aggregate capacity operated by Delta-Northwest mainline as well as its regional partners. More detailed information about which carriers specifically grew or declined is provided in the lines below. Mainline Delta has increased its overall capacity while regional partners have decreased despite a growing share of total flights at ATL. This corresponds to larger share of international long-haul flights for the mainline and the shifts towards shorter-haul domestic flights regional partners.

Table 3-5: ATL Hub Capacity by Operating Carrier

ATL	ASMs (000s)		
	2007	2010	Change
DL/NW mainline	**5,901,416**	**5,988,836**	**+1%**
Regional partners	**747,593**	**696,347**	**-7%**
ExpressJet	572,272	491,103	-81,168
Pinnacle	0	103,011	+103,011
Shuttle America	42,948	35,620	-7,327
Comair	21,159	24,370	+3,211
Mesaba	0	21,281	+21,281
Compass	0	20,962	+20,962
SkyWest	75,948	0	-75,948
Freedom Airlines	35,267	0	-35,267

To sum up, ATL has become a stronger central hub with a slight geographic reorientation. Capacity has increased substantially including to the other hubs. The map shows substantial growth in the Eastern United States and most of the international long-haul markets. It is clear that Delta continues to

build up its largest hub in order to maximize available connecting. The airport serves as primary gateway to the South and Southeast as well as virtually all international long-haul markets outside of Europe and the Skyteam hubs. Through this continued growth, Delta improves its ability to create the economies of scale described in part 1.

3.1.2B: JFK – International gateway geared towards larger aircraft

Along with Atlanta, JFK has benefited the most from Delta's hub realignment during the merger. There has been substantial capacity growth in both domestic and international markets. Table 3-6 shows these changes. Domestic frequencies, however, have been cut substantially, which points towards larger aircraft sizes and possibly longer stage lengths. The number of non-hub markets served increased from 73 to 86.

Table 3-6: Change in Number of Flights and total ASMs at JFK

JFK	#Flights			ASMs (000s)		
	2007	2010	Change	2007	2010	Change
Domestic	7,640	6,035	-21%	719,449	830,731	+15%
International	2,014	2,360	+17%	1,252,380	1,710,122	+37%
TOTAL	9,654	8,395	-13%	1,971,829	2,540,854	+29%

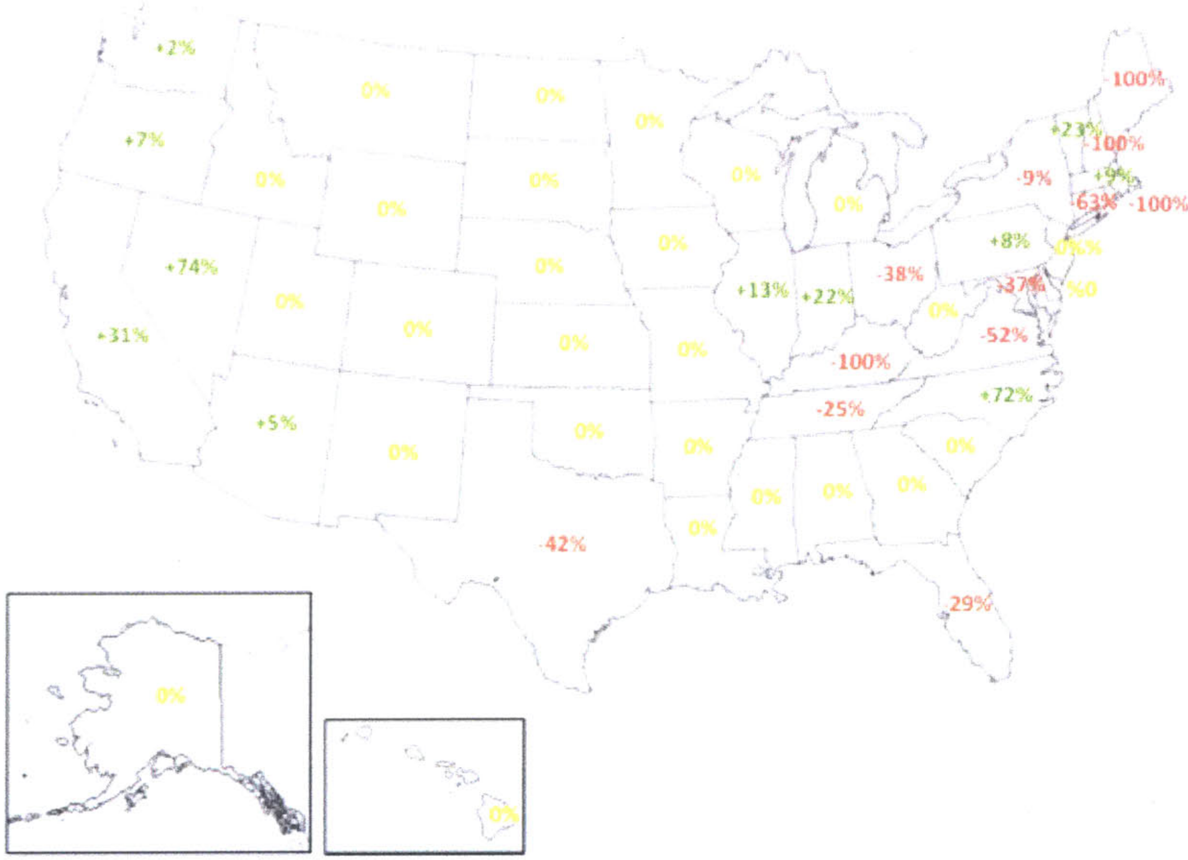
Table 3-7 shows how average aircraft capacity has grown on domestic as well as international routes. This corresponds with capacity growth that is largely focused on long-haul markets and allows Delta to move more passengers at this highly congested airport.

Table 3-7: Change in Number of Seats and avg. Seats per Aircraft at JFK

JFK	#Seats (000s)			Avg. Seats per Aircraft		
	2007	2010	Change	2007	2010	Change
Domestic	618	597	-3%	81	99	+22%
International	339	448	+32%	168	190	+13%
TOTAL	958	1,045	+9%	99	125	+26%

Figure 3-8 shows the domestic market, where Delta has substantially grown its capacity from JFK to the West Coast while keeping most of its short-haul capacity relatively constant.

Figure 3-8: Change in JFK Hub Capacity between May 2007 and 2010



Intra-hub capacity, as exhibited in Table 3-8, has been further concentrated on the 3 largest routes, with direct service now added to Memphis. With this service, JFK offers connections to all of the hubs in other parts of the country, which emphasizes the airport's bigger role as international hub in the network.

Table 3-8: JFK intra-hub capacity

Hub	2007 ASMs per month	2010 ASMs per month	Change
SLC	66,981,564	84,413,160	+26%
ATL	38,897,560	50,123,520	+20%
MSP	25,264,128	26,291,100	+4%
DTW	13,906,400	12,451,080	-10%
CVG	10,937,730	9,107,118	-17%
MEM	0	4,542,388	NEW

Delta has strengthened JFK as an international gateway to virtually all parts of the world. Much like ATL, the airport has seen significant capacity growth to Africa and the Middle East along with additional growth to Asia, South America and the Caribbean. This is shown in Figure 3-9. It appears that JFK has also taken over most of the European capacity shed by ATL. Given the geographic proximity, Delta has made a logical move to minimize circuity on these routes and bundle traffic at point where transatlantic and other international traffic can be bundled easily. For large parts of the United States, JFK represents a convenient transfer point for these routes. Conversely, JFK represents an important gateway to North America for passengers coming from Europe. Delta also offers direct service to additional Skyteam hubs in Europe such as Rome, Prague and Moscow, thereby increasing the number of available beyond connections particularly in Eastern and Southern Europe. In this context, the geographic positioning can be compared to United's hub in EWR.

Figure 3-9: Change in JFK hub capacity between May 2007 and 2010

The distribution of capacity by operating carrier in Table 3-9 aligns with the overall picture as Delta's share has increased substantially while the total capacity provided by regional partners has shrunk. The mainline carrier operates international services and larger aircraft.

Table 3-9: JFK Hub Capacity by Operating Carrier

JFK	ASMs (000s)		
	2007	2010	Change
DL/NW mainline	**1,862,894**	**2,422,638**	**+30%**
Regional partners	**108,935**	**94,556**	**-13%**
Comair	58,864	76,650	+17,787
Chautauqua	9,163	8,324	-839
Pinnacle	0	4,449	+4,750
Mesaba	0	4,158	+4,158
Compass	0	684	+684
Shuttle America	24,156	0	-24,156
Freedom Airlines	16,752	0	-16,752

JFK clearly has become Delta's international gateway on the East Coast. Strong capacity growth by the mainline, increased aircraft sizes and the increasing share of international flights all contribute to this assessment. Furthermore, the airline has underlined its long-term plans for the airport with a $1.2 billion investment in expanding capacity on the ground. (Gannon) In early 2013, the airline announced an additional $175 million investment to increase gate capacity. (Atlanta Business Chronicle)

The strategic orientation of JFK makes sense as it takes advantage of the geographic location while providing access to the New York City local market. With this international gateway, Delta has entered into direct competition with United-Continental (EWR) and American (JFK) over this lucrative market and offers multiple connecting options on both ends to its Skyteam partners. Judging by the recent capital investments, it is clear that the airline intends to become the dominant player.

3.1.2C: LGA – Access point to New York City for domestic markets

New York-LaGuardia does not represent a classical hub within the Delta-Northwest network. Even in 2010, the airport recorded only 279 daily connecting passengers compared to, for instance, 2,028

at CVG. Since New York City has such a strong local market, the observed buildup in capacity at LGA should be interpreted as an effort increase Delta's share in this important market. Offering connections is not the primary objective of the airline, especially considering the strict capacity constraints at the airport. Along with the strengthening of long-haul domestic routes from JFK, Delta has bolstered domestic capacity out of LGA. One of the major steps in this process was the 2011 swap of slot pairs with US Airways, which lead to a net increase of 116 slot pairs for Delta at LGA. (Credeur)Table 3-10 shows that the airline added almost 800 monthly frequencies between 2007 and 2010 and thereby increased capacity by almost 25%.

Table 3-10: Change in Number of Flights and total ASMs at LGA

LGA	#Flights			ASMs (000s)		
	2007	2010	Change	2007	2010	Change
Domestic	5,699	6,492	+14%	282,948	360,491	+27%
International	112	107	-4%	15,018	8,016	-47%
TOTAL	5,811	6,599	+14%	297,966	368,508	+24%

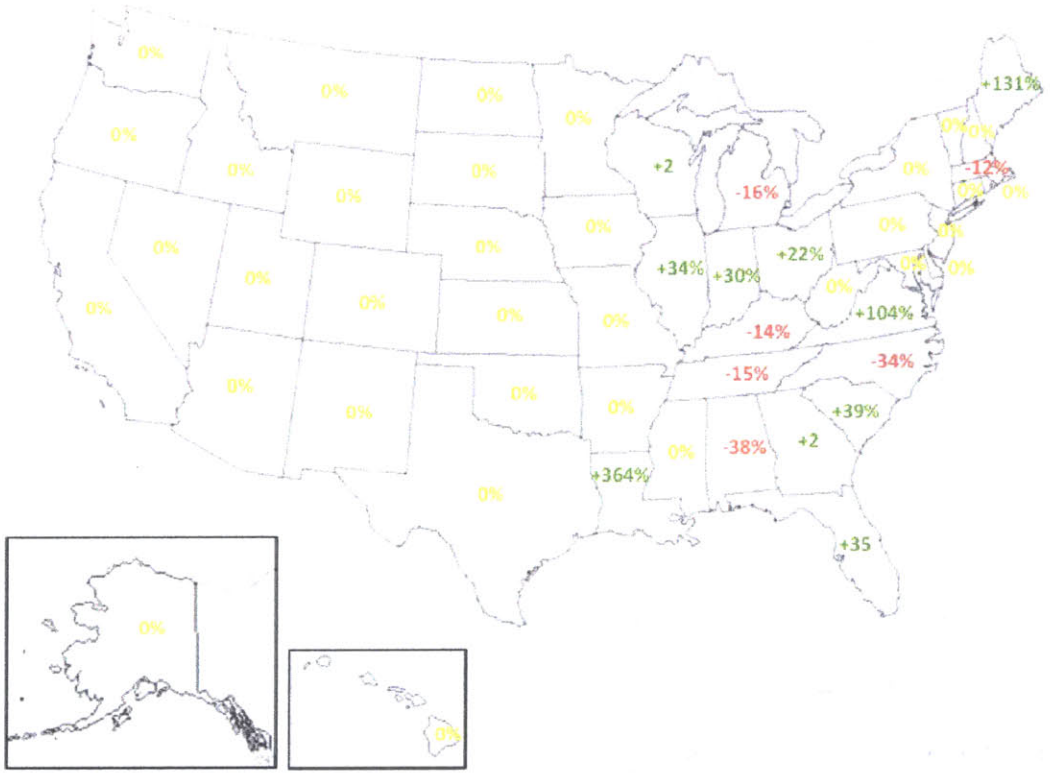
The average number of seats, as shown in Table 3-11, decreased as narrow bodies appear to have been replaced with more regional jets. International flying at LGA is limited to short-haul only and therefore primarily concerns Canada, which explains an even stronger reduction in aircraft capacity in these markets.

Table 3-11: Change in Number of Seats and avg. Seats per Aircraft at LGA

LGA	#Seats (000s)			Avg. Seats per Aircraft		
	2007	2010	Change	2007	2010	Change
Domestic	521	558	+7%	91	86	-5%
Intl.	16	9	-44%	146	81	-45%
TOTAL	538	566	+5%	93	86	-8%

The map of capacity changes in Figure 3-10 clearly shows a focus on growth in markets east of the Mississippi with virtually no domestic capacity cuts. So it appears that while strengthening New York as a whole, Delta aimed to operate longer stage length domestic and international flights from JFK while shorter haul markets grew out of LGA.

Figure 3-10: Change in LGA hub capacity between May 2007 and 2010



Intra-hub capacity in Table 3-12 shows significant growth to ATL, but cuts to all other hubs. Given the overall capacity increases, this points towards a shift towards more direct domestic services that used to be routed via the other hubs. In fact, the number of direct non-hub markets has increased from 29 to 34. Furthermore, it provides additional evidence for the consolidation of hub activity at ATL.

Table 3-12: LGA intra-hub capacity

Hub	2007 ASMs per month	2010 ASMs per month	Change
ATL	111,400,079	129,196,492	+16%
MSP	66,663,120	55,337,040	-17%
DTW	41,124,084	38,208,264	-7%
MEM	21,848,544	21,157,110	-3%
CVG	22,797,450	13,910,715	-39%

The emphasis on growing short-haul routes with smaller aircraft is further illustrated in Table 3-13 by the fact that the regional partners account for over half of the overall capacity growth at LGA between 2007 and 2010.

Table 3-13: LGA Hub Capacity by Operating Carrier

LGA	ASMs (000s)		
	2007	2010	Change
DL/NW mainline	**189,729**	**216,415**	**+14%**
Regional partners	**108,237**	**152,095**	**+41%**
Comair	66,334	56,562	-9,772
Shuttle America	30,160	46,946	+16,786
Pinnacle	7,719	24,729	+17,010
Mesaba	0	12,491	+12,491
Chautauqua	938	8,324	+10,429
Northwest	3,559	0	-3,559
ExpressJet	3,085	0	-3,085

Overall, the picture at LGA is very similar compared to JFK with capacity growth based on a strong local market. Domestic capacity and frequencies to the Eastern half of the United States have increased while aircraft sizes have decreased slightly and regional partners make up a higher share of total capacity. LaGuardia's increased importance in Delta's network is also reflected by a substantial infrastructure investment. Similar to JFK, the airline is investing $160 million in renovating the facilities at LGA to handle increasing traffic and improve the customer experience. (Delta Airlines)

3.1.3A: SLC – Reduced domestic hub with long-haul service to Skyteam hubs

Beyond Atlanta and the New York City airports, the other hubs in the Delta-Northwest network now play a smaller role than before the merger. Table 3-14 shows that Salt Lake City is one of the airports that have seen cuts in domestic capacity and frequencies. On the international level, ASMs nearly doubled but the number of flights decreased by over 50% due to a focus on partner hubs, which will be analyzed in more detail later in this section.

Table 3-14: Change in Number of Flights and total ASMs at SLC

SLC	#Flights			ASMs (000s)		
	2007	2010	Change	2007	2010	Change
Domestic	16,436	14,978	-9%	1,086,355	891,445	-18%
International	804	378	-53%	71,525	133,245	+86%
TOTAL	17,240	15,356	-11%	1,157,880	1,024,691	-12%

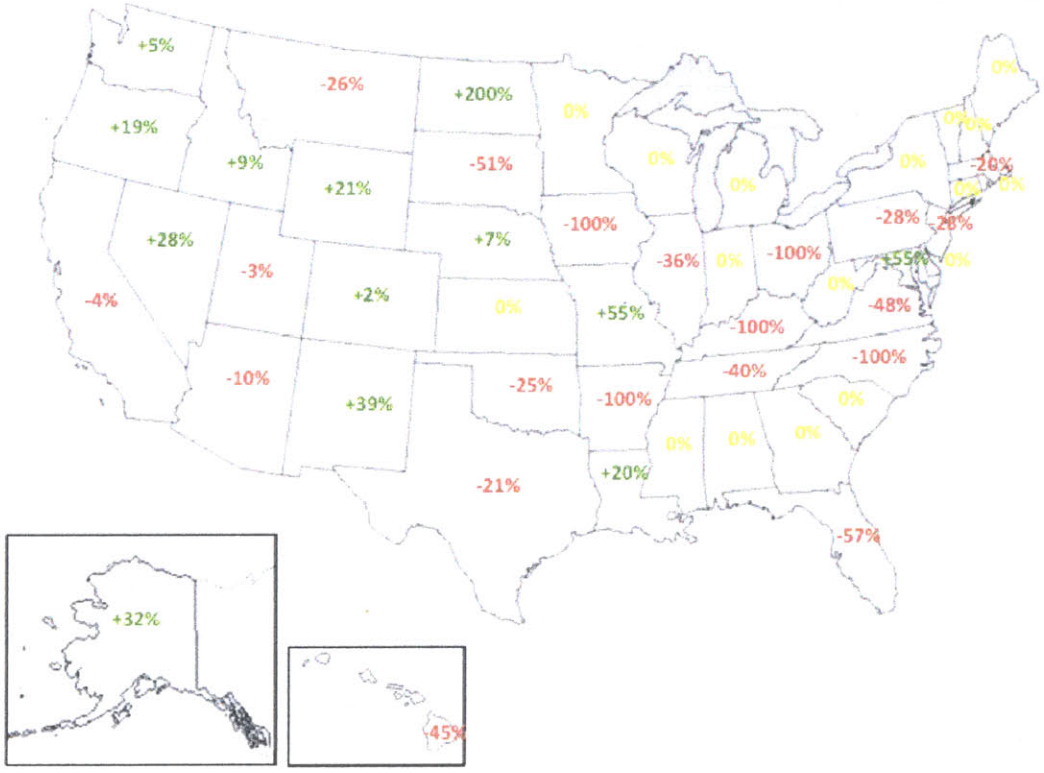
Along with the number of flights, total seat capacity was also reduced across domestic and international destinations. Average domestic aircraft size has stayed virtually constant at a level that reflects a significant proportion of regional aircraft. This is shown in Table 3-15. Due to a shift towards limited long-haul services, this metric has increased on the international level.

Table 3-15: Change in Number of Seats and avg. Seats per Aircraft at SLC

SLC	#Seats (000s)			Avg. Seats per Aircraft		
	2007	2010	Change	2007	2010	Change
Domestic	1,295	1,189	-8%	79	79	0%
Intl.	63	45	-29%	78	118	+51%
TOTAL	1,358	1,234	-9%	79	80	+1%

Figure 3-11 shows no clear regional pattern in the capacity changes from SLC, other than that most of the reductions have taken place in the most populous states (CA, TX, FL, IL, OH, NY, VA, NC). Some states have also seen capacity increases, mainly in the Northwest and on other short-haul routes from SLC.

Figure 3-11: Change in SLC hub capacity between May 2007 and 2010



Capacity grew to most of the hubs in Delta's network as demonstrated in Table 3-16. Given the overall capacity cuts from the airport, it is evident that the airport is losing importance as a hub and that previous non-stop services are being re-routed via other hubs. The total number of non-stop markets served has also declined from 99 to 82.

Table 3-16: SLC intra-hub capacity

Hub	2007 ASMs per month	2010 ASMs per month	Change
ATL	148,596,924	150,060,393	+1%
JFK	66,981,564	84,413,160	+26%
DTW	12,233,060	55,143,554	+351%
MSP	45,546,360	48,323,142	+6%
CVG	70,396,050	36,319,600	-48%

Along with the overall cuts, Table 3-17 shows a shift of domestic capacity from mainline Delta to its regional partners. This aligns with the growth of some of the short-haul markets from SLC.

Table 3-17: SLC Hub Capacity by Operating Carrier

SLC	ASMs (000s)		
	2007	2010	Change
DL/NW mainline	**782,954**	**633,555**	**-19%**
Regional partners	**374,926**	**391,136**	**+4%**
SkyWest	356,759	360,743	+3,984
Mesaba	0	30,393	+30,393
ExpressJet	18,167	0	-18,167

As far as international service is concerned, the strong growth in capacity and average aircraft sizes is due to the new routes introduced to the partner hub at CDG and Northwest's Japan hub at NRT. These require larger aircraft, thus accounting for the increase in average aircraft capacity on the international level. Other international service to Mexico and Canada has been reduced. Overall, the importance of SLC as a hub in Delta's network has decreased during the merger. The airport ranked among the smaller hubs even before the merger and provides a focal point for Delta's operations West of the Mississippi. As capacity was shifted to short-haul markets operated by regional carriers, this strategic role has been reinforced. Replacing existing international flights with services to partner hubs put SLC in

the position of reliever for the main international gateways in order to offer easier connections to the Western United States. Its unique geographic position allows SLC to maintain a viable hub with attractive connecting options despite of the capacity cuts that have already been undertaken. Whether Delta will continue the downsizing of SLC and instead increase service to the region from its other hubs remains to be seen.

3.1.3B: DTW – More domestic frequencies with limited international capacity

The DTW hub has seen capacity cuts across the board, both in domestic as well as international markets. As a former Northwest hub, this adjustment is tied to the shift of capacity to ATL, the primary hub in the combined network. This is most obvious in the international markets, where the airport lost all of its long-haul flights to Europe and Asia and instead grew capacity to Central America and the Caribbean. On the domestic front, minor capacity cuts have been accompanied by an increase in frequencies, as shown in Table 3-18.

Table 3-18: Change in Number of Flights and total ASMs at DTW

DTW	#Flights			ASMs (000s)		
	2007	2010	Change	2007	2010	Change
Domestic	24,933	26,521	+6%	1,475,301	1,453,730	-1%
International	2,153	2,009	-7%	1,245,691	879,485	-29%
TOTAL	27,086	28,530	+5%	2,720,992	2,333,215	-14%

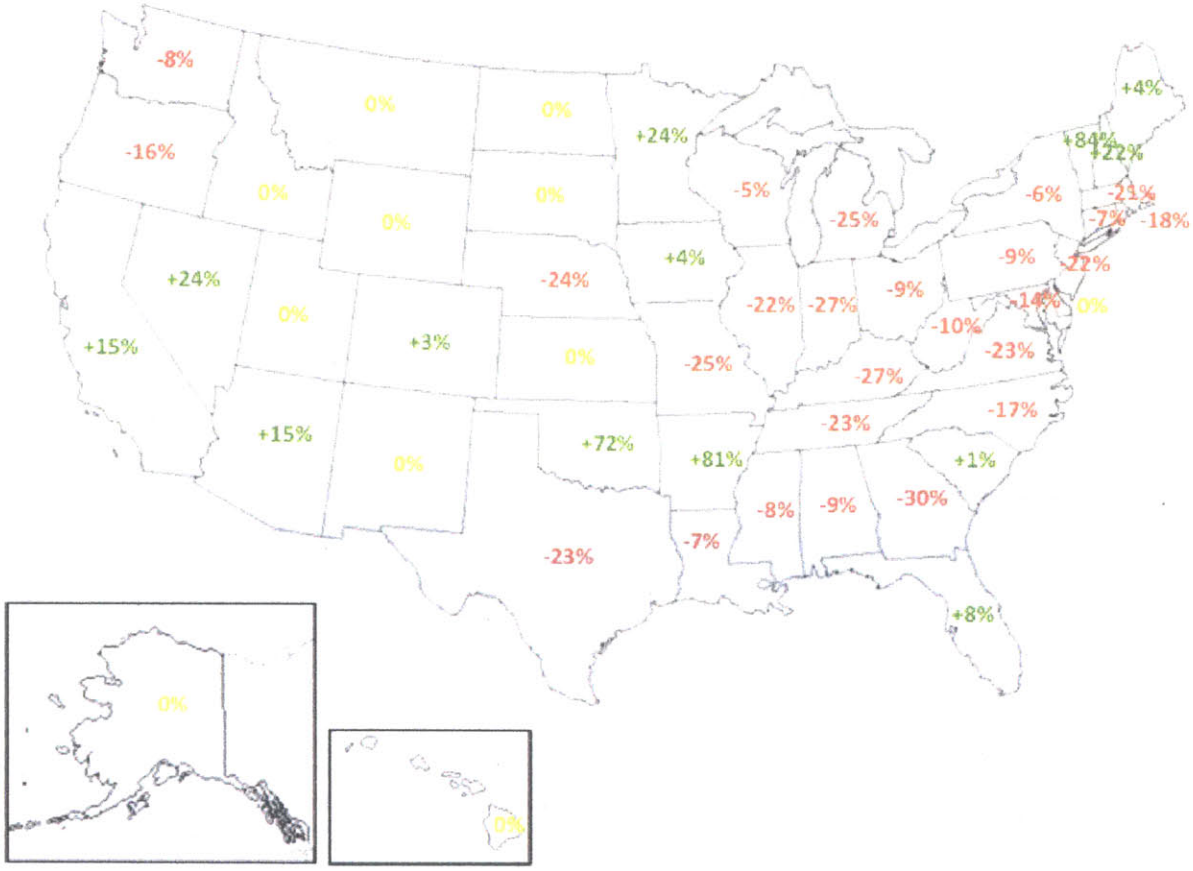
Table 3-19 shows how average aircraft capacity has decreased for both domestic and international flights. This is due to the reduced international long-haul markets and a shift towards regional carriers to operate domestic routes.

Table 3-19: Change in Number of Seats and avg. Seats per Aircraft at DTW

DTW	#Seats (000s)			Avg. Seats per Aircraft		
	2007	2010	Change	2007	2010	Change
Domestic	2,333	2,107	-10%	94	79	-16%
Intl.	336	253	-25%	156	126	-19%
TOTAL	2,669	2,360	-12%	99	83	-16%

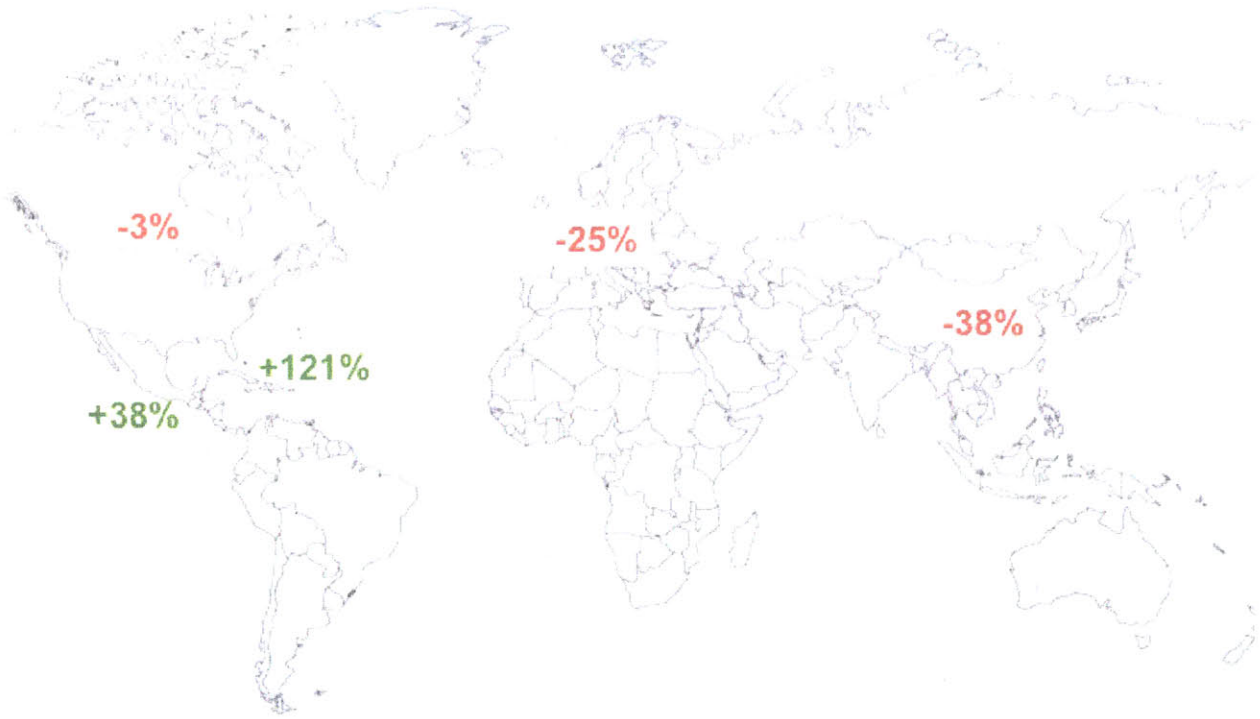
Most of the domestic capacity cuts took place in markets east of the Mississippi with some growth in the Southwest, the Plains and Florida. Figure 3-13 shows the map of domestic capacity changes. The number of non-hub markets served has remained relatively stable (133 vs. 134) over the same time frame.

Figure 3-12: Change in DTW hub capacity between May 2007 and 2010



The international map in figure 3-13 shows substantial cuts in long haul services to Europe and Asia. Nonetheless, Delta maintains direct service to major hubs like AMS, CDG, FRA and NRT along with a new route to China (PVG). In addition, capacity grew slightly to the Caribbean and Central America. All in all, the downsizing of DTW's hub functions is apparent but the airport retained its status as an international gateway, particularly with service to partner hubs.

Figure 3-13: Change in DTW hub capacity between May 2007 and 2010



Capacity to the other hubs, seen in table 3-20, has also decreased substantially in most cases. ATL was strengthened as primary gateway. Additionally, there was a substantial increase in capacity to SLC, which offers connections to the West Coast and beyond.

Table 3-20: DTW intra-hub capacity

Hub	2007 ASMs per month	2010 ASMs per month	Change
ATL	55,825,902	63,425,538	+14%
SLC	12,233,060	55,143,554	+351%
MSP	80,743,872	45,752,256	-43%
LGA	41,124,084	38,208,264	-7%
MEM	35,455,030	19,723,740	-44%
JFK	13,906,500	12,451,080	-10%
CVG	7,511,200	4,697,935	-37%

Not all of the previous NW mainline capacity was shifted to the combined Delta. A large portion of this came from the dropped long-haul services. Table 3-21 shows this clearly. Regional carriers have become significantly more important at DTW. This corresponds to the reduction in average aircraft sizes.

Table 3-21: DTW Hub Capacity by Operating Carrier

DTW	ASMs (000s)		
	2007	2010	Change
DL/NW mainline	**2,515,931**	**1,921,513**	**-24%**
Regional partners	**205,062**	**411,702**	**+101%**
Comair	0	59,115	+59,115
Shuttle America	0	640	+640
Pinnacle	176,773	174,987	+1,786
Mesaba	28,289	84,931	+56,642
Chautauqua	0	21,803	+21,803
Compass	0	43,526	+43,526
Freedom Airlines	0	26,700	+26,700

Similar to what happened in SLC, DTW has seen its capacity as a hub decline over the course of the merger integration process. Again, the shift did not equal a complete downsizing but a strategic re-alignment of the airport in terms of operations and geographic focus. Domestic capacity only saw marginal reductions, but the share of regional carriers at the airport doubled. In this context, average aircraft size decreased as narrow bodies were replaced with smaller regional jets. In turn, the number of frequencies actually increased. As far as geography is concerned, capacity cuts have primarily affected the East while there has been growth to many Western states. So growth took place in markets that saw capacity decline from ATL and LGA, which indicates a focus on cross-country connections at the airport. DTW also had its international capacity shrink, but the airport maintains direct service to major Skyteam hubs.

So while DTW experienced some downsizing, it remains a key hub for Delta based on its geographical position for cross-country connections and a local market that will remain important as long as Detroit represents the heart of the US car industry. The airport therefore has inherent strengths that should position it well for future rounds of capacity cuts within the network.

3.1.3C: MSP – Shrinking hub with long-haul service to Skyteam hubs

The situation at MSP is comparable to DTW in that it used to be a major hub for Northwest and thus experienced domestic cuts in capacity as well as frequency. Table 3-22 shows this. International flying, on the other hand, has increased. The total number of non-hub markets served, however, has also decreased from 133 to 122. Overall, the cuts in domestic markets were limited, but affected virtually all parts of the network.

Table 3-22: Change in Number of Flights and total ASMs at MSP

MSP	#Flights			ASMs (000s)		
	2007	2010	Change	2007	2010	Change
Domestic	22,824	21,685	-5%	1,979,745	1,747,720	-12%
International	1,651	2,060	+25%	567,291	602,951	+6%
TOTAL	24,475	23,745	-3%	2,547,036	2,350,670	-8%

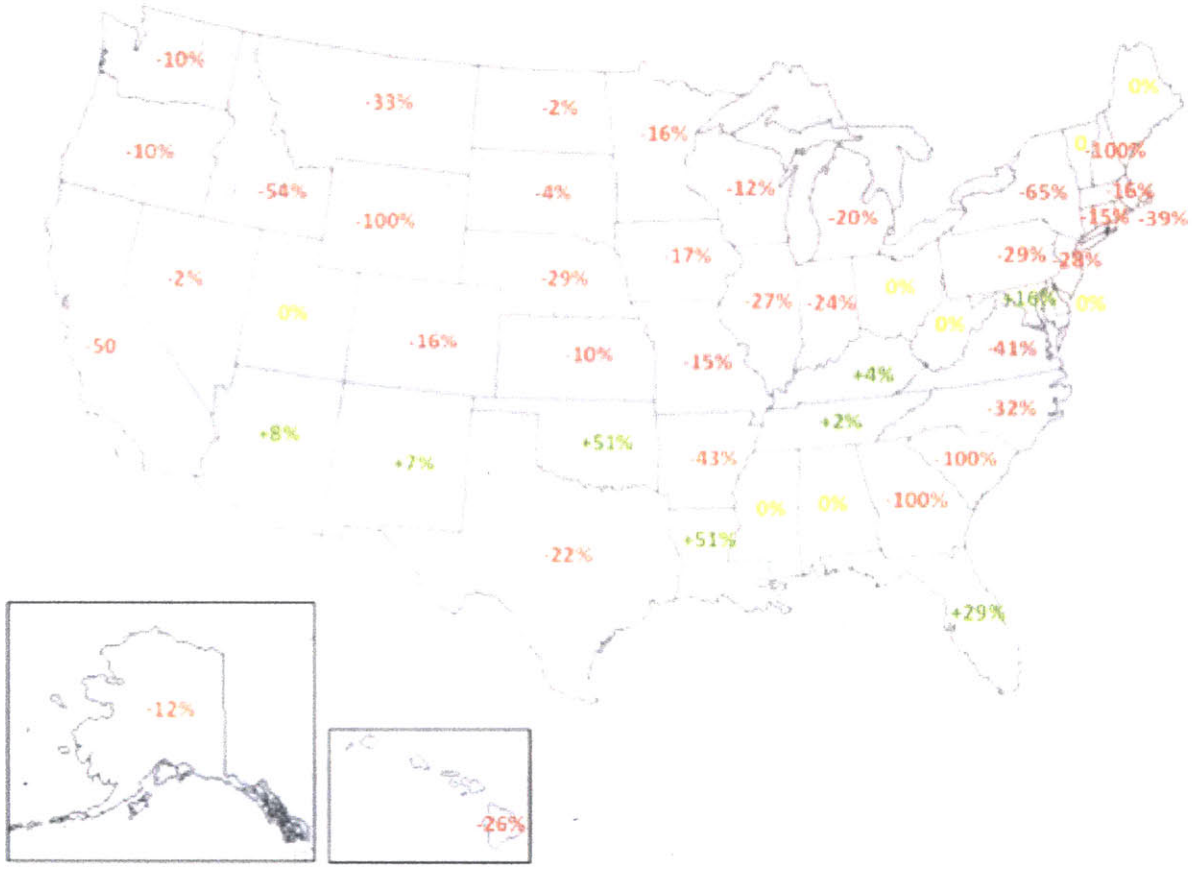
As Table 3-23 shows, Delta now operates smaller aircraft on average, which is in part due to the higher proportion of capacity operated by the regional partners.

Table 3-23: Change in Number of Seats and avg. Seats per Aircraft at MSP

MSP	#Seats (000s)			Avg. Seats per Aircraft		
	2007	2010	Change	2007	2010	Change
Domestic	2,332	2,008	-14%	102	93	-9%
International	216	233	+8%	131	113	-14%
TOTAL	2,548	2,240	-12%	104	94	-10%

Domestic capacity cuts have taken place to nearly all states except for small pockets in the South and Southwest. Figure 3-14 also reflects the growing connecting options in the aftermath of the merger, particularly via ATL.

Figure 3-14: Change in MSP hub capacity between May 2007 and 2010



As in the other cases of shrinking hubs, Table 3-24 shows intra-hub capacity between MSP and ATL increasing substantially while it was reduced to almost all other hubs.

Table 3-24: MSP intra-hub capacity

Hub	2007 ASMs per month	2010 ASMs per month	Change
ATL	78,740,460	97,520,934	+24%
LGA	66,663,120	55,337,040	-17%
SLC	45,546,360	48,323,142	+6%
DTW	80,743,872	45,752,256	-43%
JFK	24,264,128	26,291,100	+4%
MEM	45,629,500	25,433,100	-44%
CVG	15,378,720	11,944,776	-22%

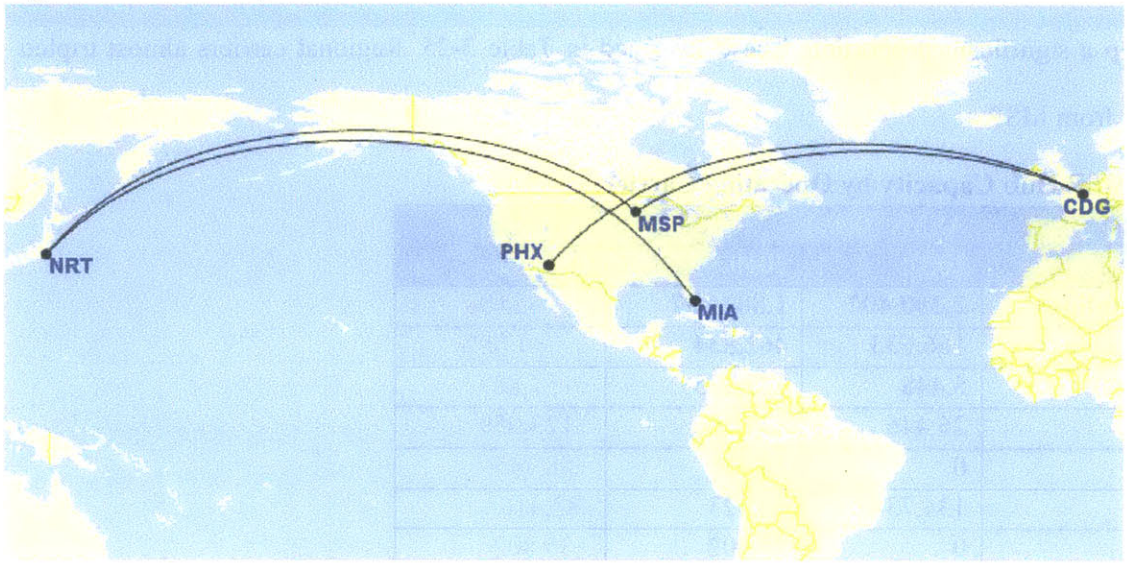
Mainline Delta took over the majority of the previous Northwest capacity, but regional partners also picked up a significant proportion. These are listed in Table 3-25. Regional carriers almost tripled their capacity from MSP.

Table 3-25: MSP Hub Capacity by Operating Carrier

MSP	ASMs (000s)		
	2007	2010	Change
DL/NW mainline	**2,380,402**	**1,887,837**	**-21%**
Regional partners	**166,633**	**462,834**	**+178%**
Compass	5,448	163,335	+157,887
Mesaba	26,446	149,506	+123,059
SkyWest	0	58,745	+58,745
Pinnacle	134,738	52,323	-82,416
Comair	0	35,402	+35,402
Freedom Airlines	0	2,439	+2,439
ExpressJet	0	1,084	+1,084

Concerning long-haul international service, MSP has seen a development similar to SLC with a focus on the major Skyteam hubs in Europe and Asia. Delta has also replaced Northwest's LGW service with a direct flight to LHR. This underlines the strategy to use the smaller hubs as reliever for ATL to service traffic that does not necessarily need to flow through the primary hub. The Skyteam hubs offer enough beyond connections to make a direct long-haul service viable combined with local feeders at MSP. And geographically, MSP is well positioned to bundle traffic from the Eastern United States to Asia or from the Western states to Europe. For example, domestic capacity has increased the most to markets in the Southwest and Florida. A look at the great circle distances in figure 3-15 reveals that MSP represents a convenient connecting point for both regions towards the East and West respectively.

Figure 3-15: Nonstop and Hub Routes



(Source: Great Circle Mapper, www.gcmap.com)

Overall, MSP shows similar trends as SLC and DTW. Domestic service was reduced, but the cuts do not threaten the basic hub function. Regional carriers have become a lot more important and subsequently contributed to reduced average aircraft sizes. The airport still offers direct long-haul services to major partner hubs and the total number of destinations has decreased by only about 10%. Considering its geographic advantages, MSP is in a good position to remain part of the future Delta network to relieve ATL and offer convenient connections to a select group of markets. The only certainty pertains to the relatively similar profile of DTW and MSP, but for now both appear viable side-by-side.

3.1.4A: MEM – Downsized hub with increased regional carrier presence

The Memphis hub used to be the smallest Northwest hub prior to the merger. During the initial network reorganization, MEM has seen cuts across the board in terms of frequencies, overall capacity and aircraft sizes as exhibited in Table 3-26. Since it started from a very low base, the cuts further undermine its status as a hub. Proportionally, the international markets were reduced to a very small presence in MEM. The number overall number of non-hub markets served stayed relatively constant at 79 compared to the previous 81.

Table 3-26: Change in Number of Flights and total ASMs at MEM

MEM	#Flights			ASMs (000s)		
	2007	2010	Change	2007	2010	Change
Domestic	12,060	11,375	-6%	478,331	440,211	-8%
International	344	216	-37%	112,282	73,670	-34%
TOTAL	12,404	11,591	-7%	590,613	513,981	-13%

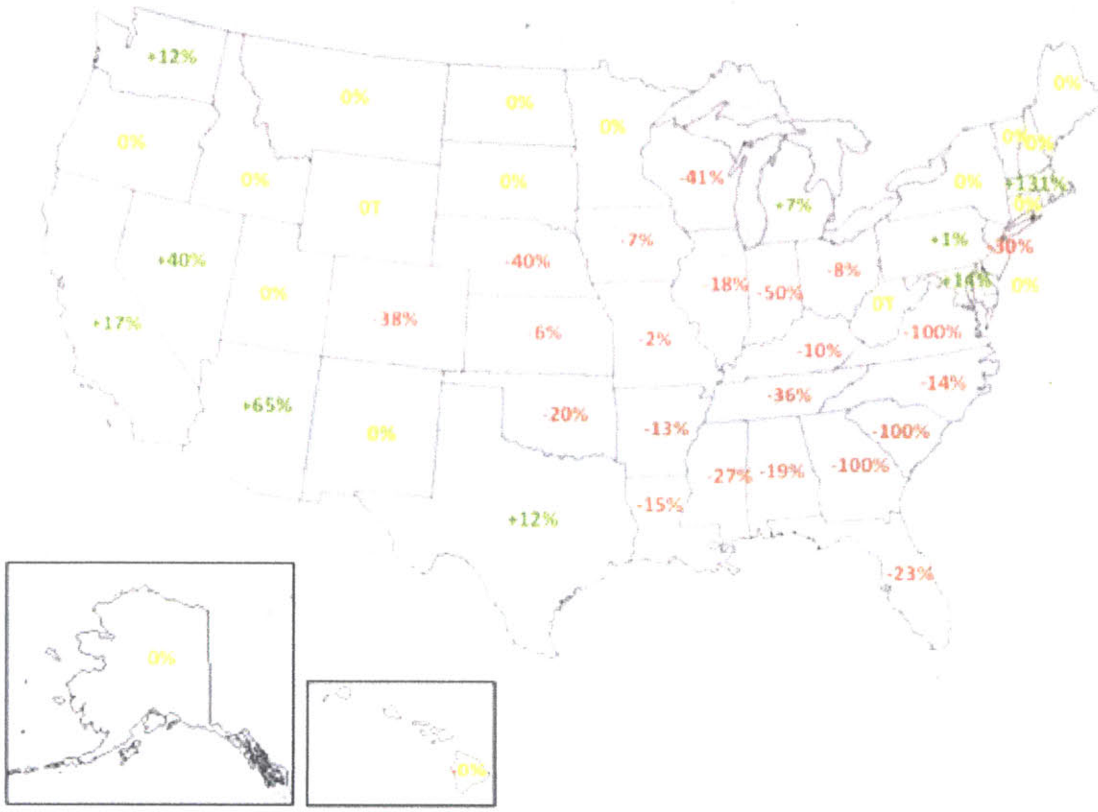
Substantial changes occurred with regards to the average aircraft size, which was reduced further from an already small base. This is shown in Table 3-27.

Table 3-27: Change in Number of Seats and avg. Seats per Aircraft at MEM

MEM	#Seats (000s)			Avg. Seats per Aircraft		
	2007	2010	Change	2007	2010	Change
Domestic	865	727	-16%	72	64	-11%
International	48	27	-44%	139	113	-19%
TOTAL	913	754	-17%	74	65	-12%

Capacity was cut primarily along the East Coast with moderate increases in the West and Texas. The proximity to ATL is a problem for MEM and the reductions in the East coincide with ATL's gains in the same geographic area. Figure 3-15 demonstrates these changes.

Figure 3-15: Change in MEM hub capacity between May 2007 and 2010



Intra-hub capacity, shown in Table 3-28, has also been cut to 4 of the other hubs, with only ATL, JFK and SLC seeing growth. As in other cases, connecting options were moved to the primary hubs. Given Memphis' location, it is natural for connections via SLC to increase as it offers less circuitous connections to the West than ATL. MSP remained the most important intra-hub route for MEM, but capacity was cut significantly compared to Northwest's old network.

Table 3-28: MEM intra-hub capacity

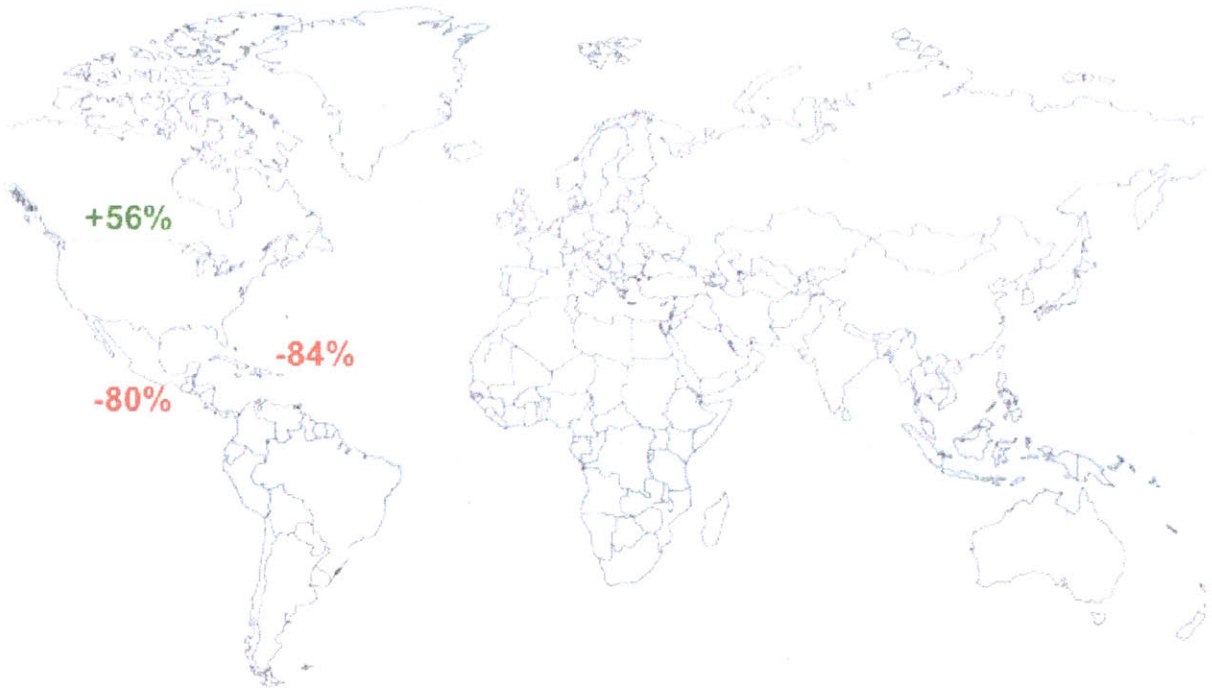
Hub	2007 ASMs per month	2010 ASMs per month	Change
MSP	45,629,500	25,433,100	-44%
ATL	22,339,948	23,173,600	+4%
LGA	21,848,544	21,157,110	-3%
DTW	35,455,030	19,723,740	-44%
SLC	4,791,800	16,771,300	+250%
JFK	0	4,542,368	NEW
CVG	5,227,716	3,812,380	-27%

Similar to DTW and MSP, Northwest's capacity at MEM has only partially been compensated by mainline Delta. There has been significant growth of capacity among the regional partners, which now account for almost half of the total capacity marketed by Delta. Table 3-29 lists the carriers.

Table 3-29: MEM Hub Capacity by Operating Carrier

MEM	ASMs (000s)		
	2007	2010	Change
DL/NW mainline	**429,687**	**272,499**	**-37%**
Regional partners	**160,926**	**241,482**	**+50%**
Pinnacle	146,064	129,595	-16,469
Mesaba	14,862	53,718	+38,856
ExpressJet	0	32,008	+32,008
Compass	0	13,375	+13,375
Chautauqua	0	10,079	+10,079
Comair	0	2,587	+2,587
Freedom Airlines	0	120	+120

Figure 3-16: Change in MEM hub capacity between May 2007 and 2010



International routes, shown in Figure 3-16, were cut significantly with long-haul service only available to KLM's hub at ATL, but with less capacity than before the merger. The only other remaining international routes are to leisure markets in Mexico and the Caribbean. This shows that out of all the

previous Northwest hubs, MEM is the most likely to be phased out in the future due to its location and relatively small size. Especially the proximity to ATL at around 300 miles makes it very unlikely that the combined airline will sustain the hub in the long run.

3.1.4B: CVG – Rapid hub downsizing across the board

Of all the hubs, CVG has recorded the largest relative drop in capacity and frequencies. These affected all regions, domestic as well as international. The number of non-hub markets served has dropped from 111 to 61. Given the geographic proximity to DTW, this can be interpreted as clear evidence of consolidation to eliminate what essentially represents a duplicated structure. Internationally, the only exception in terms of capacity was CDG, which as a key partner hub has actually seen increased service from CVG. Table 3-30 shows this.

Table 3-30: Change in Number of Flights and total ASMs at CVG

CVG	#Flights			ASMs (000s)		
	2007	2010	Change	2007	2010	Change
Domestic	19,335	7,153	-63%	893,096	390,024	-56%
Intl.	724	307	-58%	218,033	106,754	-51%
TOTAL	20,059	7,460	-63%	1,111,128	496,778	-55%

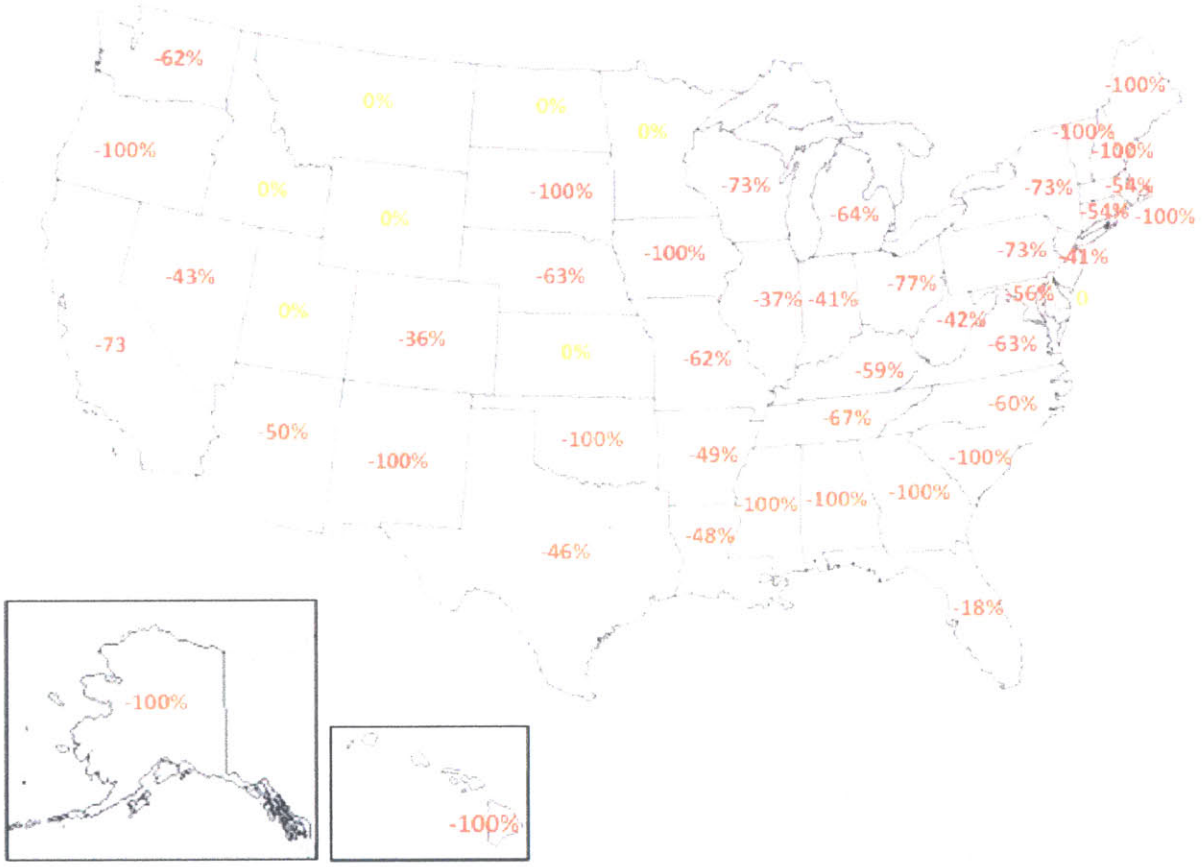
Average seats per aircraft, listed in Table 3-31, increased on the domestic level, but they remained at a very low level due to the heavy use of regional jets by Delta's partners.

Table 3-31: Change in Number of Seats and avg. Seats per Aircraft at CVG

CVG	#Seats (000s)			Avg. Seats per Aircraft		
	2007	2010	Change	2007	2010	Change
Domestic	1,257	506	-60%	65	71	+9%
Intl.	74	27	-64%	102	89	-13%
TOTAL	1,331	533	-60%	66	71	+8%

The map in Figure 3-17 shows little differences with regards to how the cuts have affected different regions with cuts across the entire United States.

Figure 3-17:Change in CVG hub capacity between May 2007 and 2010



Intra-hub capacity has been cut to all hubs except ATL. CVG's relevance as a hub and O-D market is declining rapidly and ATL as primary hub offers the largest number of connecting options. Table 3-32 highlights that SLC remains on top of this category, but has also seen intra-hub capacity shrink by almost 50%.

Table 3-32: CVG intra-hub capacity

Hub	2007 ASMs per month	2010 ASMs per month	Change
SLC	70,396,050	36,319,600	-48%
ATL	19,834,275	22,541,882	+14%
LGA	22,797,450	13,910,715	-39%
MSP	15,378,720	11,944,776	-22%
JFK	10,937,730	9,107,118	-17%
DTW	7,511,200	4,697,935	-37%
MEM	5,227,716	3,812,380	-27%

While some of the regional partners have grown at CVG, the sweeping capacity cuts have affected both mainline and regional carriers. With almost 50% of capacity, regional carriers have a very strong presence at the airport compared to most other hubs in Delta's network. These numbers, presented in Table 3-33, provide further illustration for the downsizing of the hub. Given the sweeping cuts in virtually all markets served from CVG, it seems like just a matter of time until the hub is completely phased out. Similar to MEM, the proximity to another hub (DTW, 220 miles) makes CVG more or less redundant as a hub and the network changes seen between 2007 and 2010 confirm this. Considering the weak growth in the surrounding area in recent years, CVG's local market does not appear to warrant a large offering of nonstop service either. The growth of intra-hub capacity to ATL shows that Delta intends to route much of this traffic through its primary hubs in the future.

3.1.5 Significant capacity cuts and hub consolidation at Delta-Northwest

Analyzing each hub on its own revealed a number of trends that go beyond the aggregate analysis of winners and losers in the network. ATL, JFK and LGA have all grown, but in very different ways. ATL has clearly strengthened its position as primary hub, particularly through its strong growth at the international level and to the hubs with reduced service. JFK has seen a shift towards larger aircraft and longer stage-lengths, on both international and domestic routes. Combined with LGA, which grew in short-haul markets, the airport represents a hub as well as an access point to the New York City market.

SLC, DTW and MSP all experienced capacity cuts, but remain viable hubs within the network. MEM and CVG, on the other hand, only played a very minor role in 2010 and will likely lose their hub functions. Delta appears to have re-positioned the smaller hubs with a focus on geographic location and connections to its international partners in order to relieve ATL and the international gateway at JFK. At all of these hubs, regional carriers have increased their share of capacity and certain geographic patterns were identified that highlight the positioning of these airports. CVG and MEM, on the other hand, provide

good examples of the virtual elimination hubs that have lost their strategic purpose in a larger network due to their geographic proximity to much larger hubs.

Delta's strategic re-positioning during the merger confirms many of the elements laid out in part 1 with regards to revenue synergies. In a combined network, the airline moved services to the hubs that could serve them best. By moving most of its long-haul international operations to ATL and JFK, the airline has created strong international gateways that can bundle passenger flows at geographically convenient locations. This puts Delta in a position to attract more international passengers to these hubs and subsequently operate larger aircraft at lower unit costs.

On a smaller scale, the remaining hubs serve a similar purpose for international connections. Long-haul services to Skyteam hubs from these airports make it possible to offer attractive connections for passengers originating in parts of the country where a routing via ATL would be too circuitous. By taking advantage of the partners' beyond connections, Delta will likely create enough demand for these long-haul flights. Domestically, there has been a similar trend to focus capacity to certain regions where access is most convenient. ATL serves as primary access point to the South and Southeast, DTW and MSP offer cross-country connections while SLC represents the gateway to the Western United States. Redundant hubs, like MEM and CVG, will continue to be phased out.

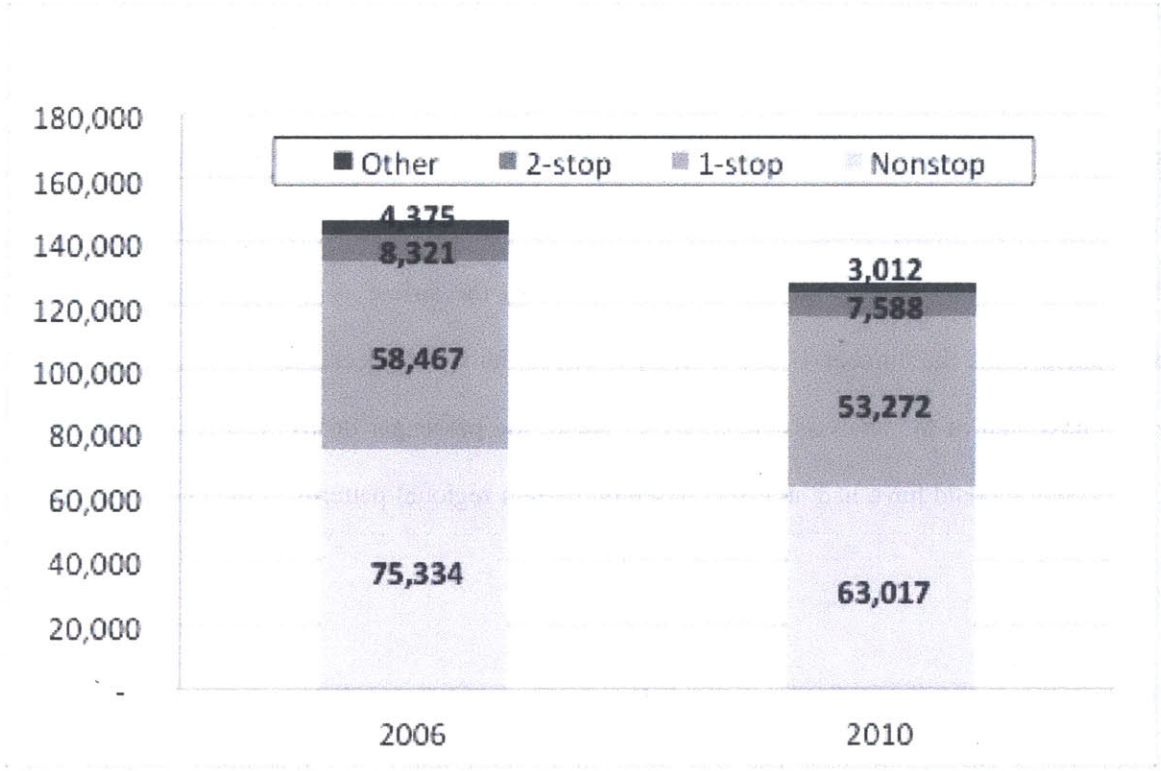
So with a slight overall reduction in network capacity, Delta appears to have created a more efficient network that can offer passengers access to a large number of possible destinations. The airline has reduced overlap without damaging its competitive position in these markets. It remains to be seen whether passengers will accept additional connecting points via ATL or other hubs in the system. But considering current industry-wide consolidation, the number of nonstop services from non-hub destinations will likely decrease at many non-hub cities.

While analysis does not focus on cost synergies, it is reasonable to assume that a more efficient network will also reduce costs for Delta. In addition to potentially larger aircraft to be operated on long-haul routes or to and from the major hubs, the increased reliance on regional carriers should also lead to lower costs across the board. In summary, the Delta-Northwest merger demonstrated many of the effects on hubs and network design that should be expected as part of a consolidation. It remains to be seen whether all of the medium hubs will be able to retain their current capacity and service levels in the coming years.

3.2 The Demand Side – Change in DL-NW domestic passenger flows in the wake of the merger

In order to test the underlying assumption that network consolidation can be achieved without a substantial negative impact on traffic, the next step of the analysis will be to track how passenger flows have changed. Similar to the supply-side view, the approach will involve a snapshot of traffic on all flights marketed by Delta and Northwest before and after the merger based on the 10% sample of domestic tickets.[2] Since this information is only available for domestic markets and comparable is not available on an international level, this section will be restricted to domestic passengers. One issue arises from the timing of the merger. Northwest ticket sample data for the second quarter 2007 is incomplete so the analysis uses May 2006 as reference point before the merger.

Figure 3-18: DL-NW Daily Domestic Passengers



[2] The data analyzed in this section is sourced from the US DOT 10% Ticket Sample Database that was accessed through the Diio Mi Market Intelligence portal.

Between May 2006 and May 2010, Delta-Northwest recorded a substantial decrease in domestic passengers carried from about 146,500 to 127,000 daily as exhibited in figure 3-18. This represents a drop of 13%. Naturally, any analysis of this time period needs to account for the impacts of the recession on air travel. A look at the same months reveals that total US domestic passenger numbers have decreased by roughly 6%. For the full years 2006 and 2010, the decline amounts to only 4%. (Bureau of Transportation Statistics) So Delta-Northwest has lost passengers at a higher rate than the domestic average, which could indicate possible effects of the merger and the subsequent network consolidation process as well as a shift towards serving more international markets. Other passengers in this case refer to passengers that did not connect at one of the hubs identified in Section 3.1.

Overall, the combined airline has reduced the number of domestic ASMs by 10% over the same time period, from 19.3m in May 2006 to 17.4m in May 2010. Domestic capacity reductions in the whole system totaled 8%, from 99.8m to 91.4m. (BTS) So Delta-Northwest cut capacity by more than the market as a whole during the recession. But as has been shown in the analysis of the airline's network consolidation, significant capacity was also shifted in between the hubs. One indicator can be found in the change of different itinerary types. Figure 3-18 also shows that the airline as carried about 16% fewer nonstop passengers while the number 1- and 2-stop passengers have only decreased by 9% respectively. Therefore, the next step of the analysis will focus on where the passenger drops occurred and whether network consolidation could have had an effect based on certain regional patterns in the changing traffic flows.

3.2.1 Correlation between schedule changes and aggregate shifts in passengers

To determine where Delta-Northwest has lost most of its passengers and potentially identify any connection to post-merger network consolidation, it helps to aggregate O-D markets based on which groups they fall into.

Table 3-33: Change in Daily Passengers by Market Type

Nonstop Markets	Daily Pax Up	Daily Pax Down	Daily Pax TOTAL
Dropped	51	(8,400)	(8,349)
No Change	16,956	(29,982)	(13,026)
Added	1,809	(42)	1,767
TOTAL	18,816	(38,424)	(19,608)

As should be expected, the markets where nonstop services were discontinued have experienced a significant reduction in passengers. This is shown in table 3-33. What is more surprising is that the largest reduction took place in markets where the type of service did not change, i.e. where nonstop service was maintained or where it never existed in the first place. Delta-Northwest lost almost 30,000 daily passengers in O-D markets like this, but, on the other hand, also added 17,000 passengers in the same category. So there has been a shift and that can be interpreted as a result of capacity adjustments between the hubs and which allowed the airline to recapture passengers.

These shifts can be illustrated by looking at how 1-stop connections changed at the different hubs in the system. The three hubs that grew during the hub consolidation process (ATL, JFK and LGA) all saw an increase in domestic connecting passengers between 2006 and 2010. Table 3-34 shows that ATL has clearly strengthened its position as core hub, which now accounts for almost half of all domestic connections. On the other hand, all of the downsized hubs saw their number of connecting passengers decline. In case of the moderately downsized hubs, this amounted to a reduction of up to 10%. CVG suffered the most by losing over 2/3 of its connections.

Table 3-34: Change in daily 1-stop connections by connecting hub

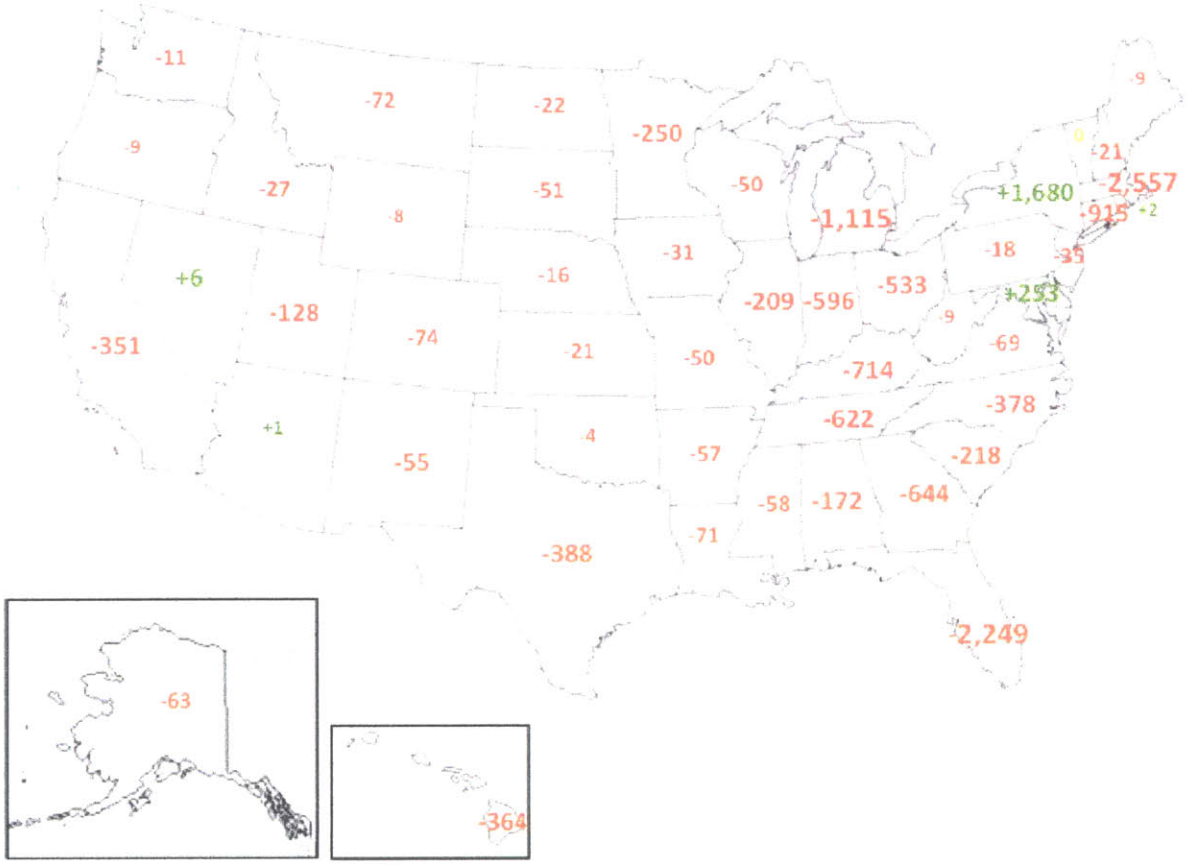
	ATL	JFK	LGA	MEM	DTW	SLC	MSP	CVG	TOTAL
2006	22,544	194	193	4,351	9,222	5,645	9,599	6,719	**58,467**
2010	24,918	536	279	3,928	8,735	5,069	7,778	2,028	**53,272**
Change	2,374	341	86	(423)	(486)	(577)	(1,821)	(4,691)	**(5,195)**

To sum up, the largest drop in domestic passengers did not come from eliminated nonstop services but took place in markets that either kept their nonstop service or that already had to rely on connections in 2006. The large fluctuations in this group are partially due to shifts between the hubs, but could also include potential shifts in capacity between nonstop markets. While this analysis has not touched upon capacity changes in these markets directly, it has become clear that hub re-alignment accounts for at least a portion of the changes in domestic passenger flows. In order to obtain a more detailed picture, the next step will be to analyze the change in Delta-Northwest's passenger flows on a geographic level to identify potential patterns.

3.2.2 Geographic shifts in domestic Delta-Northwest passenger flows

A look at a geographic distribution of the changes in daily domestic nonstop passenger flows between 2006 and 2010 in figure 3-19 shows the impact of downsizing many of the existing hubs. Michigan (-1,115), Tennessee (-622), Ohio (-533), Minnesota (-250) and Utah (-128) all suffered, at least partially, from reduced nonstop service to the hubs located there. New York, on the other hand, recorded the strongest growth with 1,680 additional daily passengers. Again, this reflects the strengthening of service to JFK and LGA respectively.

Figure 3-19: Change in Daily Nonstop Passengers by Destination (from all domestic origins)

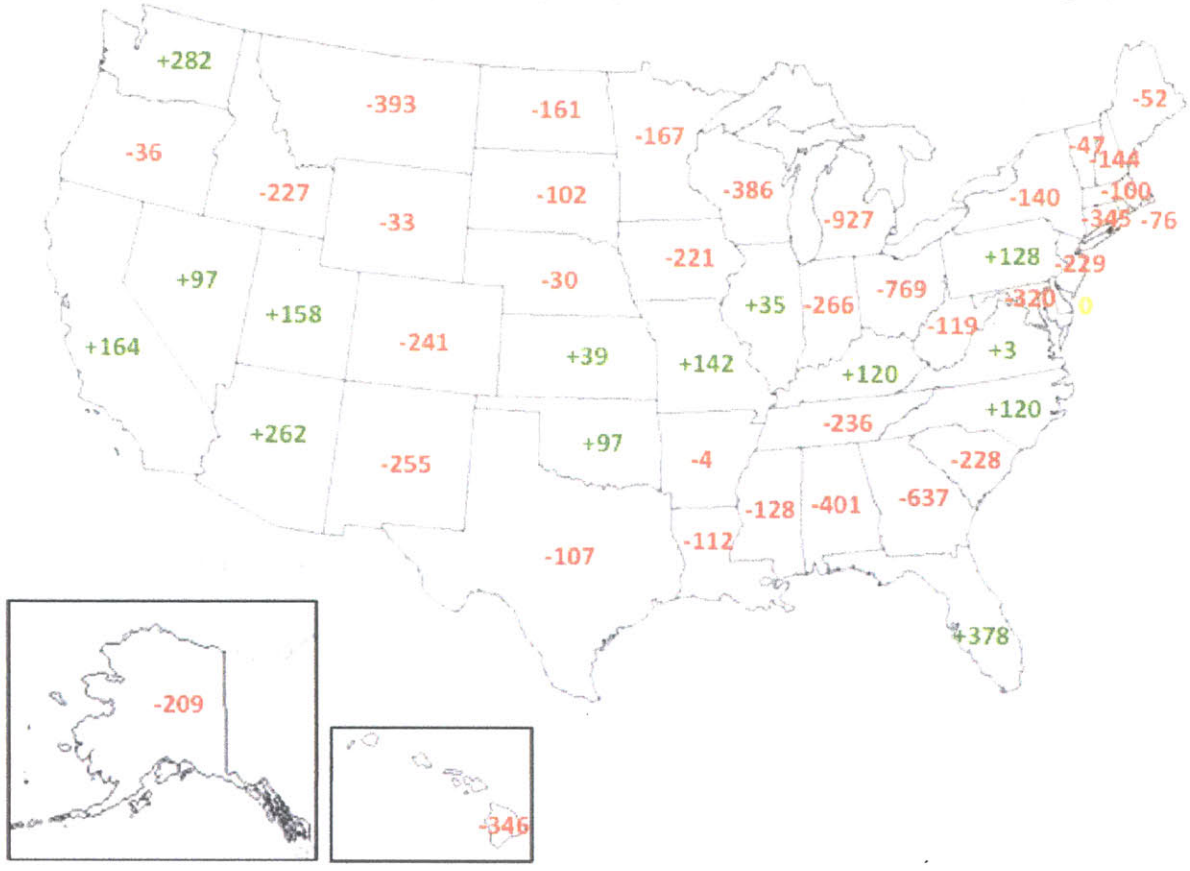


The non-hub states with even bigger losses were Massachusetts (-2,557) and Florida (-2,249). Massachusetts represents an interesting case, because Delta used to operate a substantial number of point-to-point routes to BOS that bypassed its hubs. Examples include MCO (20,000 seats per month) FLL (12,000), PBI (12,000) and LAX (8,000) along with numerous routes operated by the regional partner Comair. In 2010, these routes were either abandoned (FLL, LAX) or capacity was cut substantially (MCO, PBI). Non-hub routes at BOS only accounted for 22% of capacity after the merger compared to 41% in 2006.

Similarly, Delta and Northwest together offered roughly 385,000 seats per month in 2006 out of Florida on point-to-point routes compared to only 102,000 in 2010. The number of point-to-point routes to Florida also dropped from 120 to just 13 in 2010. Both cases therefore serve as evidence for a

substantially consolidated network in which point-to-point service was replaced by connecting services through the hubs. A good illustration of this shift can be found when mapping the change in 1-stop connecting passengers by destination state, as seen in figure 3-20. For instance, Florida has experienced a net increase in this category (+378). This is much smaller than the loss of nonstop passengers, but still substantial considering the intermittent recession and the fact that Florida's gains are the largest countrywide in this category.

Figure 3-20: Change in Daily 1-stop Passengers by Destination (from all domestic origins)

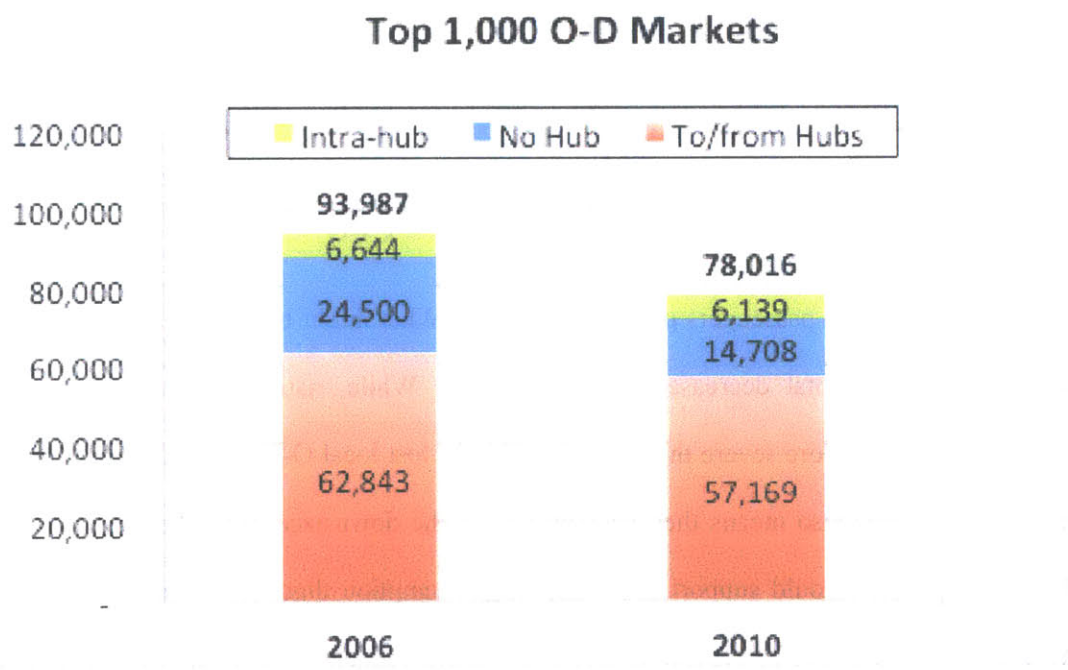


The number of 1-stop connecting passengers, as shown in figure 3-20, has clearly increased in certain parts of the country, primarily on the West Coast, in several of the plain states and select states along the East Coast. In other states (Utah, Kansas, Missouri and Washington), the number of additional 1-stop passengers exceeded the drop in nonstop passengers and thus amounted to a net increase in passengers to these states.

Another way to look at the geographical distribution is to compare them with economic growth rates during this period of crisis. While there is no clear correlation in all cases, some of the states with the most substantial decrease in passenger flows also recorded the weakest average annual GDP growth rates during this time period: Michigan (0%), Florida (0%), Connecticut (0%) and Ohio (1%). On the other side of the coin, the states with net gains in passengers generally show slightly higher average growth rates: Utah (4%), Washington (3%), Pennsylvania (3%), Oklahoma (3%), New York (2%) and Missouri (2%). (Bureau of Economic Analysis) So despite a number of outliers in both directions, there appears to be at least some correlation between passenger flows and economic growth over the observed time frame at the state level.

3.2.3 Analysis of Change in Top O-D Markets

Figure 3-21: DL-NW Top 1,000 O-D Markets (prior to merger)



Another way to analyze the change in passenger flows between 2006 and 2010 is to focus on the top O-D city pairs only. In the combined Delta-Northwest network, the top 1,000 city pairs in 2006 saw their daily passenger numbers decrease from roughly 94,000 to 78,000 over the time period analyzed in

this study as seen in figure 3-21. It is noteworthy that city pairs involving the eight hubs (incl. intra hub traffic) accounted for a majority of these passengers with a share of over 80% in 2010. The number of passengers in hubs markets also declined at a much slower rate than those in nonstop markets.

Figure 3-22: Change of Daily O-D Passengers to/from Hubs

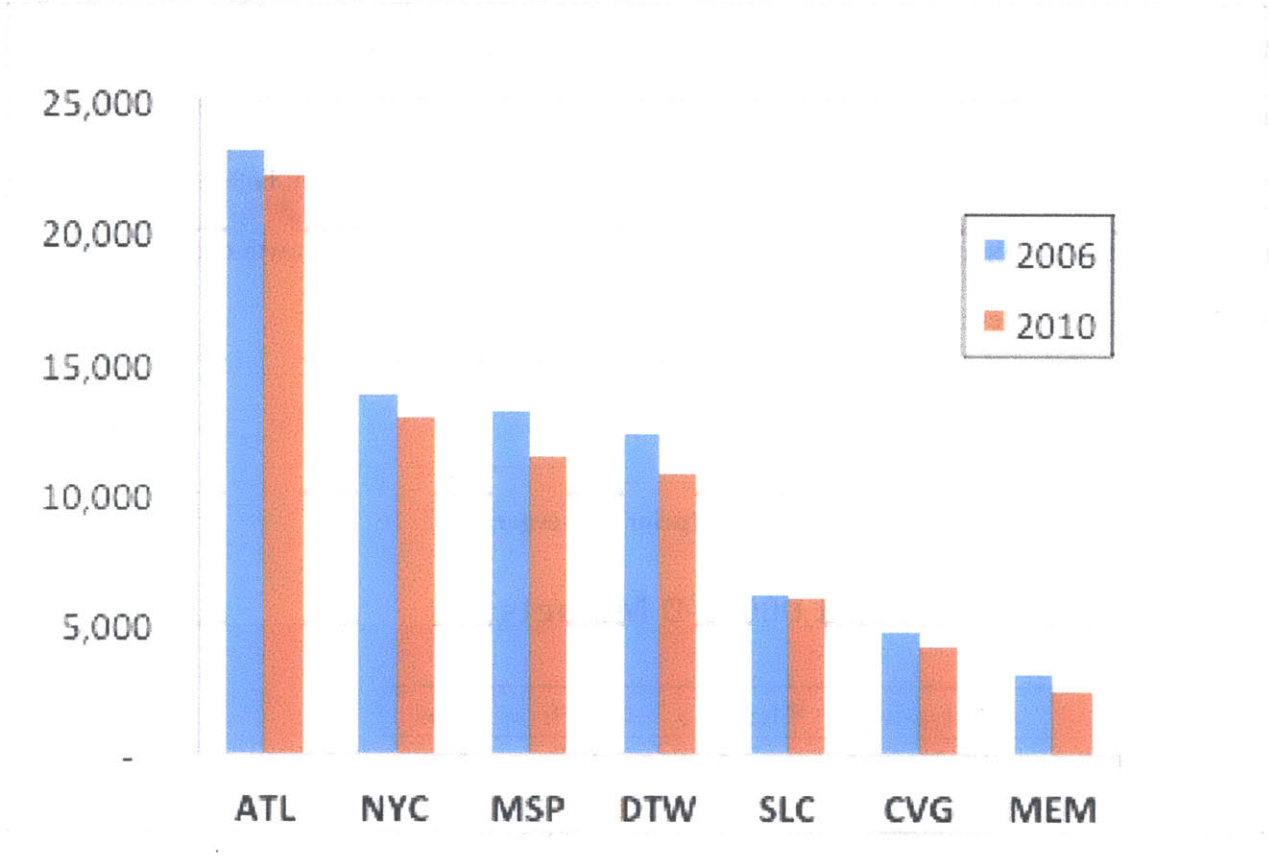


Figure 3-22 shows daily O-D passengers per individual hub. What might be surprising is that all eight hubs saw relatively similar total decreases in this category. While, naturally, the decline in percentage points at MEM is much more severe than at ATL, all hubs lost local O-D passengers between 2006 and 2010. By extension, this also means that capacity cuts at the downsized hubs did not lead to drastic losses in local traffic. This would support the underlying assumption that the service quality at these hubs was more or less maintained by replacing previous nonstop capacity with additional services via the other hubs.

The reductions at the top non-hub airports were more substantial. In figure 3-23, we can see that BOS and the Florida airports MCO, FLL and TPA lost substantial portions of their local O-D passengers to the top markets in Delta's network. DCA saw a significant drop as well. As discussed previously, cuts in point-to-point capacity at these focus cities play an important role here.

Figure 3-23: Change of Daily O-D Passengers to/from top 15 non-hub airports

Non-hub markets, as demonstrated in Fig 3-21 lost nearly 10,000 passengers or 40% of their 2006 levels. Table 3-35 shows the change in passengers in non-hub markets (i.e. BOS-MCO, etc.) that connect via one of the hubs. We can see that 1-stop connections in this group only declined by 1,363 with ATL and the New York City airports making up for some of the losses at the downsized hubs. In total, Delta lost over 6,000 passengers in non-hub markets where nonstop service was discontinued, but Table 3-35 shows that only 447 are now being connected via one of the hubs.

Table 3-35: Change in connecting passengers in non-hub markets (from top 1,000 O-D markets)

Markets	ATL	LGA	JFK	SLC	DTW	MSP	MEM	CVG	TOTAL
Nonstop dropped	552	3	11	16	(34)	(37)	(30)	(34)	447
Never Nonstop	(300)	14	96	(195)	(300)	(107)	(21)	(943)	(1,757)
Still nonstop	22	1	3	(10)	(39)	(13)	5	(22)	(53)
TOTAL	275	18	109	(189)	(373)	(156)	(47)	(999)	(1,363)

This highlights that one of the most substantial changes in Delta's network between 2006 and 2010 was cutting point-to-point services bypassing the hubs since the airline has been unable to recapture most of these passengers on its connecting services.

3.2.4 Traffic decline exceeded capacity cuts

Hub consolidation had a substantial effect on Delta-Northwest's performance in terms of carried passengers in the domestic market. There are clear shifts between the hubs in favor of ATL, JFK and LGA and away from the downsized hubs as far as connecting traffic is concerned. However, the evidence is not completely clear on whether or not the network re-alignment has harmed the airline's passenger performance. As the integration period coincided with the recession, the first observation is that passenger numbers have declined substantially across the board. Delta-Northwest has seen a larger decrease than the country average, but has also cut system capacity more aggressively. Significant geographical differences in the change of passenger numbers points towards local economic conditions in the different states as at least one reason behind the passenger reductions in Delta's network.

While the evidence is not entirely conclusive, it is clear that connecting markets have suffered far less than non-stop markets. The analysis of Delta's top 1,000 markets has shown the substantial passenger reduction due to discontinued point-to-point services from non-hub cities. Furthermore, local passengers to and from the hubs, include those that were downsized, decreased by a much smaller amount than in non-hub markets. Overall, this aligns with the concept of network consolidation, where markets can be served via alternative hubs to increase efficiency. Since this analysis did not include information on the profitability of these services, the exact motivation behind cutting the point-to-point flights might have also been based on other factors. It remains to be seen whether Delta can recapture these passengers on its connecting services over time.

3.3 Summary - Network consolidation accompanied by a significant drop in domestic traffic during the recession

The underlying premise of this study was that airline mergers allow airlines to consolidate their networks to exploit operational synergies while retaining their existing customers. In the case of Delta and Northwest, it has been shown that the combined carrier has strengthened its core hub ATL along with the New York City airports at the expense of the other hubs in the system. The other hubs have experienced varying degrees of capacity cuts along with strategic shifts concerning geographical coverage and an increase presence of regional partners to take over mainline capacity. Over the same time period, the airline also cut numerous point-to-point services bypassing the hubs, contributing to a double-digit cut in overall capacity.

The effects on passenger traffic are heavily diluted by the recession, which occurred at the same time as the merger. Total traffic flows have decreased significantly. Nonetheless, it is clear that connecting traffic has suffered much less than non-stop services as connections shifted towards ATL and, to a lesser degree, JFK and LGA. By reducing capacity at focus cities, Delta lost passengers but achieved a higher concentration in its network. An examination of traffic by geographic region shows that some states have seen nonstop passengers at least partially replaced by connecting passengers.

Overall, it appears that Delta-Northwest's network integration had already made significant progress by 2010, which is likely to continue. There is evidence that the airline has managed to maintain service quality in a lot of its markets despite shifting capacity, but an ultimate verdict on the resulting traffic performance requires a larger time frame to account for any effects related to the recession.

4. THE UNITED-CONTINENTAL MERGER

4.1 The Supply Side - Consolidation and re-alignment of UA-CO hubs during the merger

A few months after Delta and Northwest concluded their merger, United and Continental followed suit on 2 May 2010 and announced their $3 billion merger to create the world's biggest airline at the time. (NYT DealBook) The integration was concluded in December 2011, when the FAA granted a single operating certificate to the combined carrier. (Pasztor) As in the previous case study, these dates will frame the analysis of United-Continental's capacity changes. The comparison will be based on snapshots from May 2010 and May 2012 and consider all flights marketed by either of the two carriers including regional carriers.

Total network capacity, as shown in figure 4-1, did not change to a significant degree in the case of United-Continental. Domestic and international capacities also represent roughly the same proportions in 2010 and 2012. This marks a difference from Delta-Northwest and their reduction of domestic capacity. The analysis will therefore look at whether this is due to geographic shifts or the fact that the worst recession effects were over by the time United and Continental merged so that cuts did not have to be as steep as in the previous case.

Figure 4-1: Total Network ASMs in May (marketed by UA & CO)

Similar to the Delta-Northwest case, the United-Continental merger combined two legacy carriers operating hub-and-spoke networks with multiple hubs. There are a total of 8 domestic hubs in the merged network that will be analyzed: New York-Newark (EWR), Houston-Intercontinental (IAH), Chicago-O'Hare (ORD), San Francisco (SFO), Washington-Dulles (IAD), Denver (DEN), Los Angeles (LAX) and Cleveland (CLE). United-Continental also operates two hubs outside the continental United States in Guam (GUM) and Tokyo-Narita (NRT). These hubs will appear in the aggregate network analysis but will not be analyzed in detail, as their strategic role is so different from the hubs located in the 50 states. The approach to analyzing the United-Continental merger will be identical to the Delta-Northwest case and focus on hub operations to quantify how capacity has shifted between the hubs and identify patterns that can lead to conclusions about the carrier's strategy. First, an aggregate analysis will highlight the relative size of each hub with regards to capacity, flights, destinations and the role of regional carriers. Then an analysis of each hub by itself will examine any changes in greater detail.

As opposed to Delta-Northwest, the hubs in the combined United-Continental network can be best grouped by their size after the merger. There are some variations in terms of capacity and frequency changes, but the importance for the system can be best captured by these categories:

Primary hubs

- EWR – Gateway to New York City and the world
- IAH – Selective growth during the merger, but facing Southwest
- ORD – Slightly smaller, but still a major hub for the combined carrier
- SFO – Growing West Coast gateway
- IAD – Secondary East Coast gateway with regional carrier growth

Medium-sized hubs

- LAX – Access to strong local market and smaller international gateway

- DEN – Downsizing in both domestic and international markets

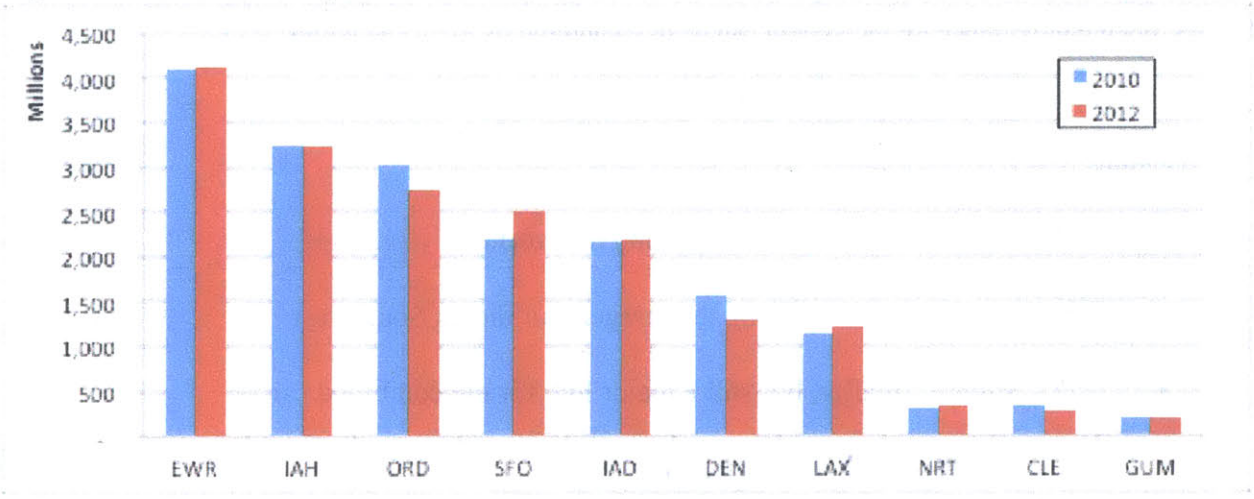
Small hubs with limited relevance for the network

- CLE – Minor regional hub with large regional carrier presence

4.1.1 Aggregate analysis of capacity, flights, destinations and operating carriers by hub

The aggregate overview in Figure 4-2 reveals a key difference between the networks of Delta-Northwest and United-Continental. While Delta operates a centralized hub in ATL that accounts for roughly 50% of total hub capacity, United-Continental distributes this role between a number of hubs in different parts of the country. Based on capacity, EWR, IAH, ORD, SFO and IAD represent the primary hubs in the network, but DEN and LAX also offer more than 1b ASMs. Only CLE is significantly smaller and comparable to Delta's hub in MEM in terms of available capacity. Figure 4-2 also shows that most of the hubs maintained their available capacity or even increased it between 2010 and 2012. The only hubs to see reductions in this category were ORD, DEN and CLE. SFO saw the largest increase with over 300m ASMs added (+15%).

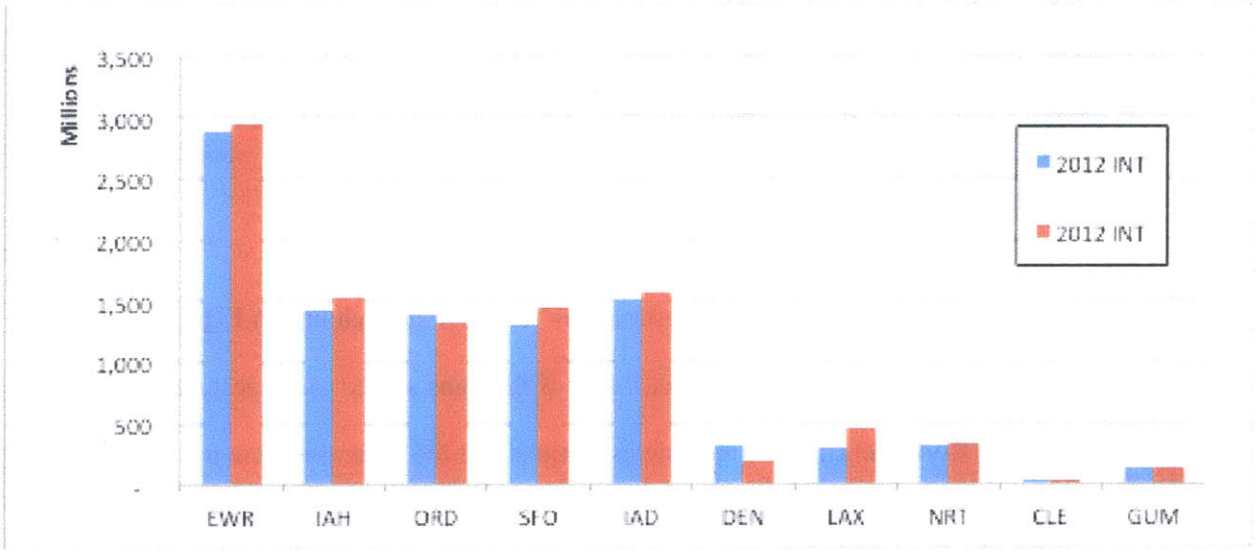
Figure 4-2: Total ASMs by Hub



Another key difference to Delta's network can also be found in the distribution of international capacity between United-Continental's hubs. Figure 4-3 shows that EWR is the clear leader in this category, but IAD, IAH, SFO and ORD all represent strong international gateways as well. In addition,

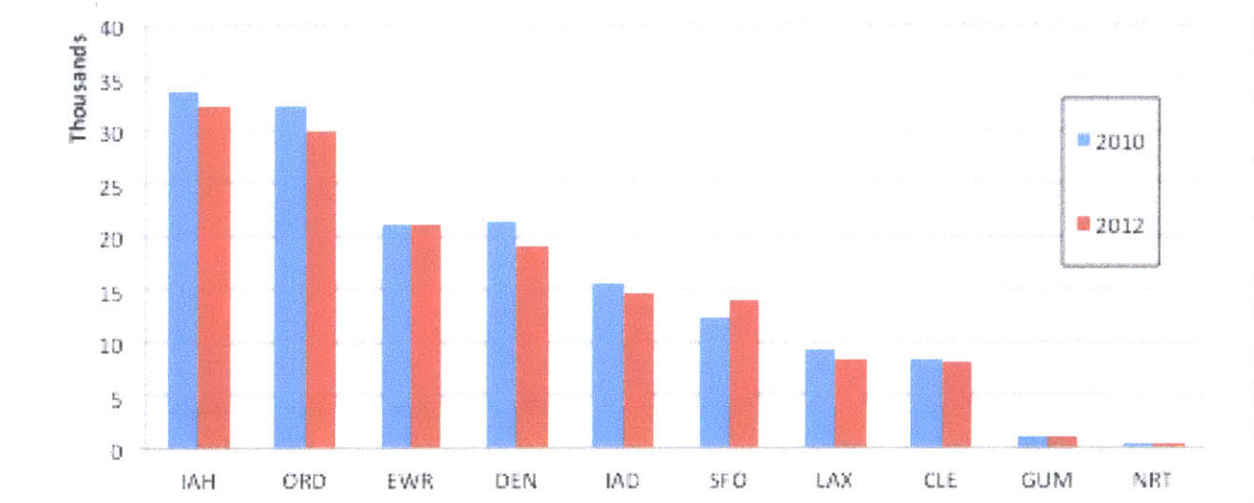
only ORD and DEN have seen their international capacity decline during the merger while the others have grown in this category. So it becomes clear that as opposed to Delta, United-Continental's strategy shows less emphasis on centralization. The detailed analysis later in this section will examine the geographic orientation of these hubs to identify any shifts during this period.

Figure 4-3: International ASMs by Hub



Comparing the hubs based on the number of flights, as demonstrated in figure 4-4, reveals that the biggest hubs by ASM capacity do not have the largest number of flights. EWR, for instance, only ranks third in this category behind IAH and ORD. This points towards different emphases in terms of aircraft size similar to what has been observed at Delta. It is also noteworthy that all hubs offered fewer flights in 2012 than they did in 2010 with the exception of SFO. Considering the increases in capacity, it is likely that flights to destinations served by both carriers have been consolidated to achieve cost synergies. A closer look at aircraft sizes will be conducted later in this section to confirm this.

Figure 4-4: Total Flights by Hub



An overview of the number of non-hub destinations served from each hub in Figure 4-5 offers a very different picture from what happened at Delta. Most of the hubs served more destinations in 2012 than they in 2010. ORD, EWR and CLE are the only exceptions, but the decreases were not substantial in any case.

Figure 4-5: Number of non-hub Destinations by Hub

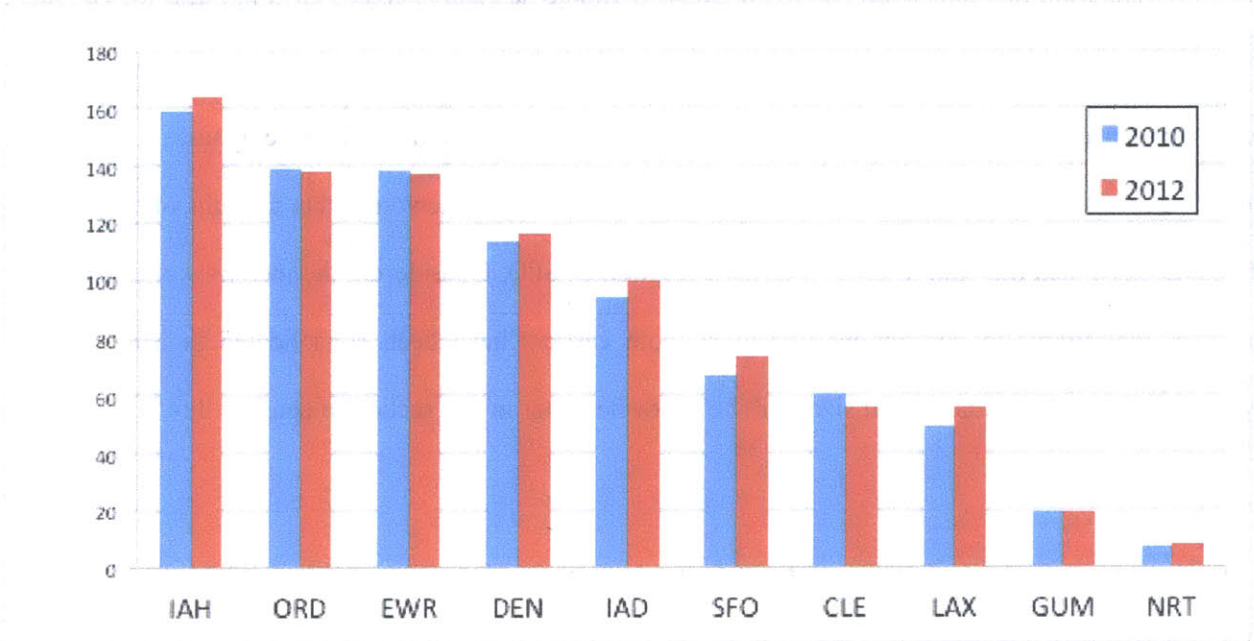


Figure 4-6 shows how the share of regional carriers operating on behalf of United-Continental has changed. Compared to Delta-Northwest, regional carriers already accounted for 60% or more of flights at all of United-Continental's domestic hubs before the merger. The overall trend is very similar to what happened at Delta, as almost all airports had a higher proportion of flights operated by regional partners in 2012 compared to 2010. The only exception is LAX. The fact that CLE, the smallest domestic hub by capacity, is served almost exclusively by regional partners shows that the airport only plays a very minor role as a hub.

As has been mentioned in part 3, the increased reliance on regional partners is largely due to their generally more favorable cost structure. It is evident that United-Continental also aimed to reduce operating costs by shifting capacity to its partners.

Figure 4-6: Share of Flights operated by Regional Partners

Overall, United-Continental has pursued a somewhat different strategy compared to Delta-Northwest. In its multi-hub network, a significant proportion of hubs did not experience any downsizing but rather grew in some categories. These include EWR, IAH, SFO, IAD and LAX. ORD experienced

some reductions in capacity, destinations and flights, but nonetheless remains one of the airline's primary hubs. The only airports to see more significant downsizing were DEN and CLE to a degree where the hub function has come into questions. CLE already started from a very low base and thus plays a very minor role. The fate of DEN remains to be seen, but the airport shares many characteristics with Delta's SLC hub, which is also losing significance. The following pages contain a more detailed analysis of each hub in order to identify any strategic shifts that go beyond aggregate capacity or flights.

4.1.2A: EWR – Gateway to New York City and the world

EWR has not experienced substantial changes over the course of the merger. Table 4-1 shows that international capacity increased slightly accompanied by a minor decline in domestic capacity. But these changes are negligible relative to the overall capacity available at EWR.

Table 4-1: Change in Number of Flights and total ASMs at EWR

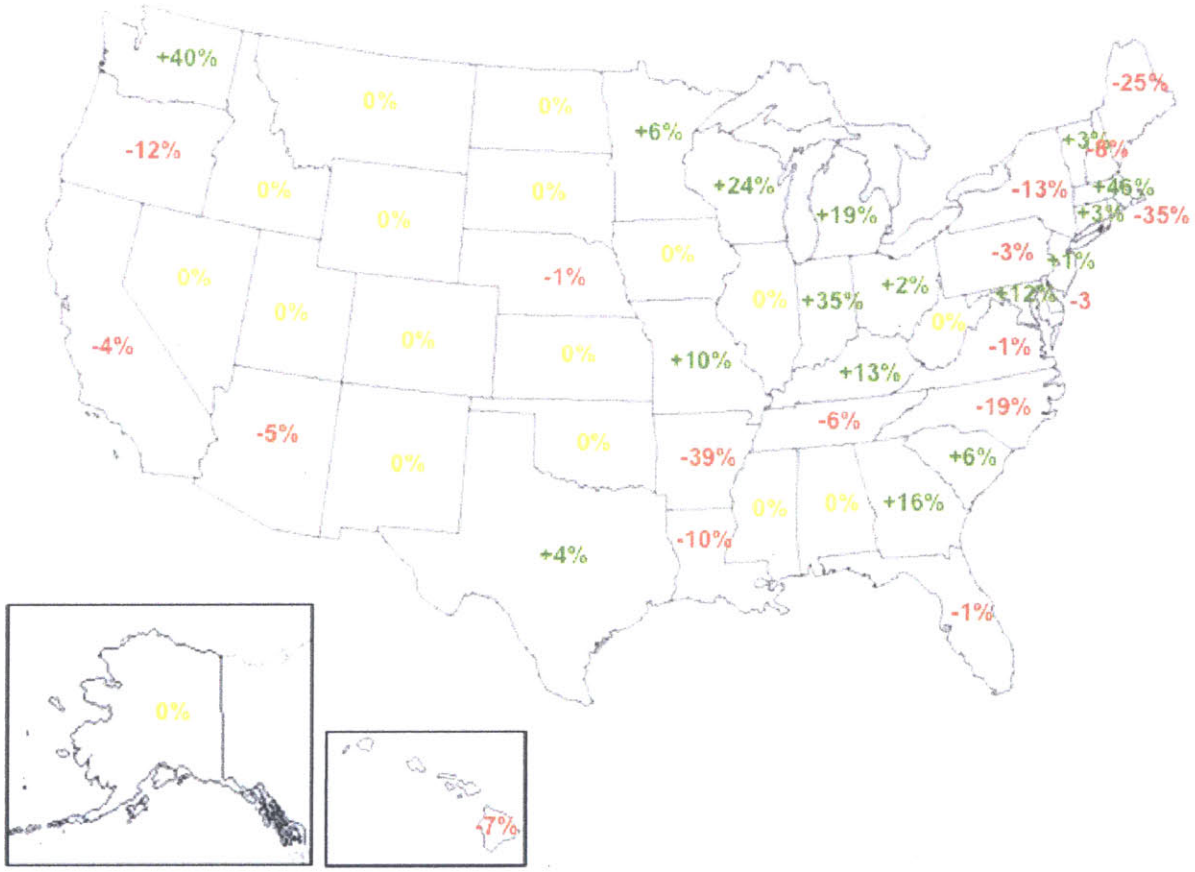
EWR	#Flights			ASMs (000s)		
	2010	2012	Change	2010	2012	Change
Domestic	18,279	18,399	+1%	1,207,105	1,190,965	-1%
International	2,736	2,713	-1%	2,886,648	2,939,955	+2%
TOTAL	21,015	21,112	0%	4,093,753	4,130,919	+1%

Along the same lines, aircraft sizes remained fairly constant as well. International capacity growth, seen in table 4-2, came from a slight increase in aircraft sizes on these routes. International markets account for roughly 20% of seats at EWR.

Table 4-2: Change in Number of Seats and avg. Seats per Aircraft at EWR

EWR	#Seats (000s)			Avg. Seats per Aircraft		
	2010	2012	Change	2010	2012	Change
Domestic	1,740	1,740	0%	95	95	0%
Intl.	412	415	+1%	150	153	+2%
TOTAL	2,152	2,155	0%	123	124	+1%

Figure 4-7: Change in EWR hub capacity between May 2010 and 2012



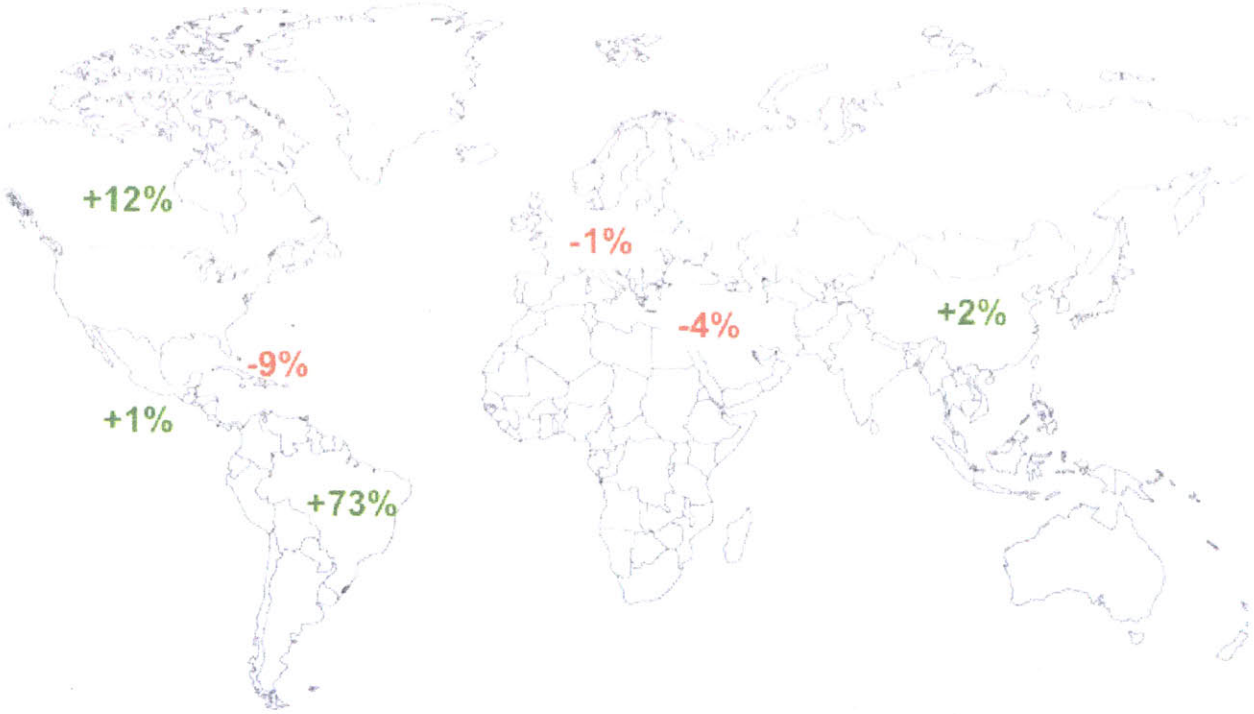
Domestic capacity changes, as demonstrated in figure 4-7, were minor in virtually all parts of the country. Washington saw a significant increase in this category. Intra-hub markets from EWR, however, experienced growth to all but two of the other hubs. Table 4-3 shows double-digit growth to the West Coast hubs and ORD. Only IAH and IAD had less capacity in 2012 than before the merger.

Table 4-3: EWR intra-hub capacity

Hub	2010 ASMs per month	2012 ASMs per month	Change
SFO	199,723,725	237,003,435	+18.67%
LAX	166,211,874	199,647,624	+20.12%
IAH	172,099,200	155,796,200	-9.47%
DEN	81,891,915	88,605,630	+8.20%
ORD	66,559,987	76,485,782	+14.91%
CLE	19,208,584	19,854,580	+3.36%
IAD	5,592,102	4,512,192	-19.31%

The strong local market certainly plays a role here. Growing intra-hub capacity also shows that EWR has strengthened its position as a primary international gateway for the combined carrier. Figure 4-8 shows growing capacity to Asia and especially Latin America. There were minor cuts to Europe, the Middle East and the Caribbean.

Figure 4-8: Change in EWR hub capacity between May 2010 and 2012



In terms of the carriers operating this capacity, mainline United now offers more capacity from EWR than Continental did in 2010. This can be seen in table 4-4. The regional partners have also increased their capacity, but their total share has decreased slightly.

Table 4-4: EWR Hub capacity by Operating Carrier

EWR	ASMs (000s)		
	2010	2012	Change
UA/CO mainline	**3,782,508**	**3,808,480**	**+1%**
Regional partners	**311,245**	**322,437**	**+4%**
United	-	3,808,480	+3,808,480
Shuttle America	-	43,856	+43,856
Expressjet	248,450	226,308	+226,308
Colgan Air	57,547	37,992	-19,555
CommutAir	5,248	14,281	+9,034
Continental	3,782,508	-	-3,782,508

It seems clear that EWR continues to play an important role in the strategy of the combined carrier. Given its geographic location, the airport has a similar gateway function as JFK for Delta. Added capacity from the other hubs shows that within the combined network, United aims to strengthen this position. The buildup of JFK and LGA mentioned in part 3 also makes EWR even more important for United in order to protect its access to the attractive New York City local market.

4.1.2B: IAH – Selective growth during the merger, but facing Southwest

Similar to EWR, IAH represented one of the cornerstones of Continental's network prior to the merger in addition to the airline's headquarters. Table 4-5 shows, however, that capacity has been reduced more at IAH. Nonetheless, the cuts do not amount to a strategic re-alignment of the hub, which serves as a key distributor for domestic traffic as well as international gateway with a focus on Central America.

Table 4-5: Change in Number of Flights and total ASMs at IAH

IAH	#Flights			ASMs (000s)		
	2010	2012	Change	2010	2012	Change
Domestic	30,727	29,033	-6%	2,614,029	2,551,674	-2%
International	3,026	3,283	+8%	700,859	687,348	-2%
TOTAL	33,753	32,316	-4%	3,314,888	3,239,022	-2%

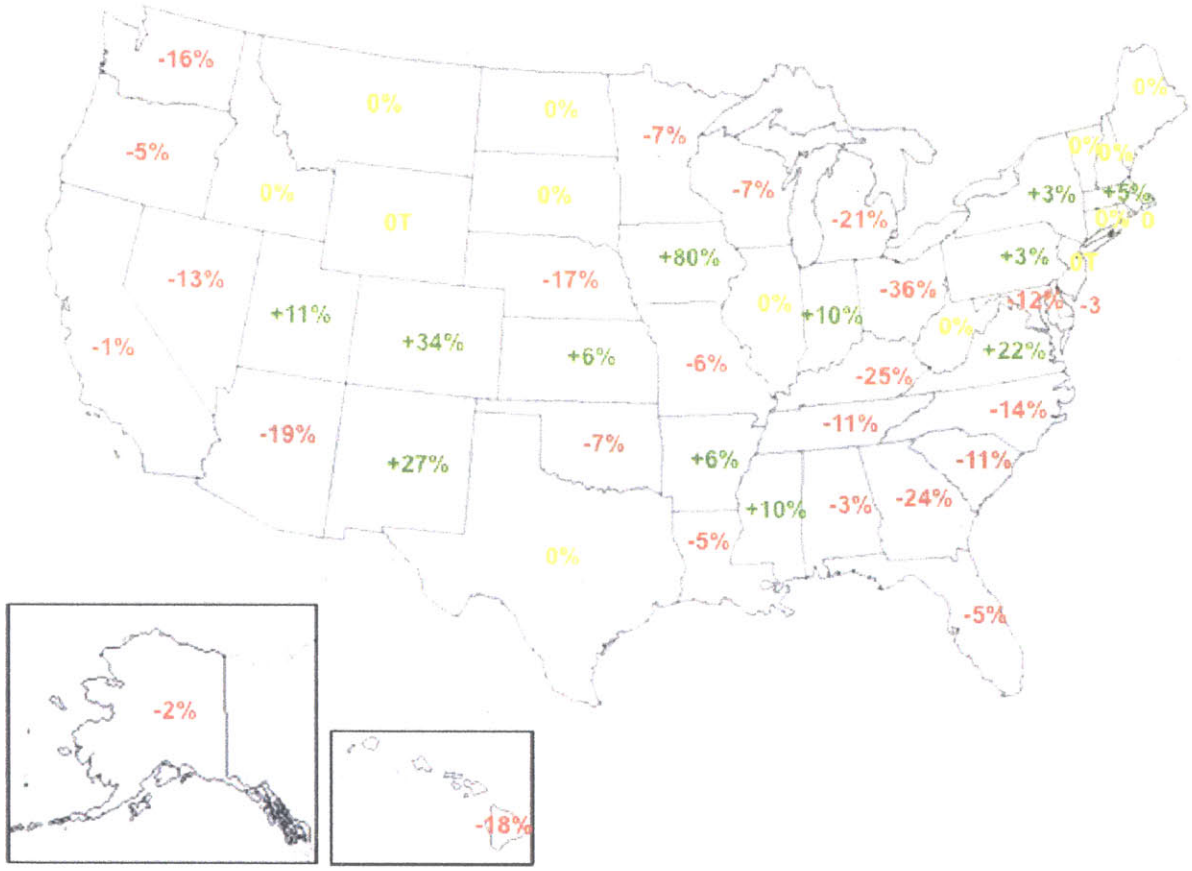
Table 4-6 shows a decrease of overall seat capacity driven by domestic markets. Average aircraft sizes have remained relatively low on both the international and domestic level. The focus on shorter haul international markets like Mexico explains the average seating capacity of only 112 on international flights.

Table 4-6: Change in Number of Seats and avg. Seats per Aircraft at IAH

IAH	#Seats (000s)			Avg. Seats per Aircraft		
	2010	2012	Change	2010	2012	Change
Domestic	2,627	2,506	-5%	86	86	0%
Intl.	340	367	+8%	112	112	0%
TOTAL	2,968	2,873	-3%	99	99	0%

Domestic capacity changes, as exhibited in figure 4-9, show that the capacity cuts were distributed fairly evenly across the United States. There is some consistency in cutting capacity to all West Coast states and the Southeast, but no states has experienced cuts by an amount that would undermine IAH's role as a primary hub in United's network.

Figure 4-9:Change in IAH hub capacity between May 2010 and 2012



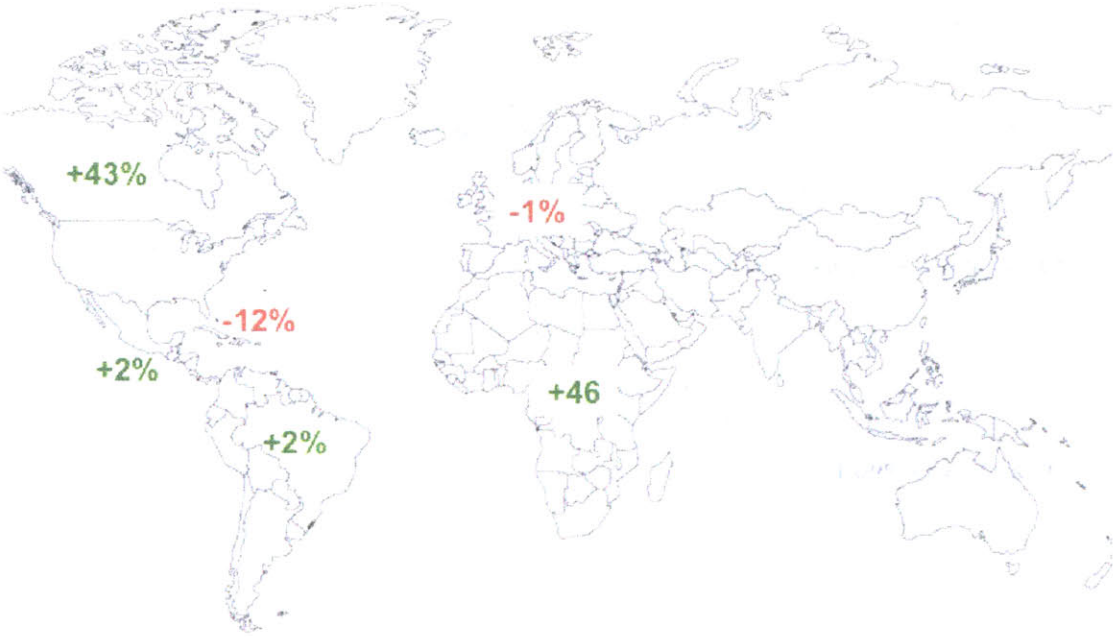
Similar to EWR, Table 4-7 shows double-digit growth from most of the other hubs. IAH also represents an attractive local market, but the airport also serves as international gateway to a number of global regions.

Table 4-7: IAH intra-hub capacity

Hub	2010 ASMs per month	2012 ASMs per month	Change
EWR	172,099,200	155,796,200	-9.47%
LAX	146,394,640	153,475,805	+4.84%
SFO	114,446,730	148,364,805	+29.64%
ORD	84,434,925	101,086,775	+19.72%
DEN	73,880,688	92,791,692	+25.60%
CLE	62,176,090	50,952,973	-18.05%
IAD	27,510,420	47,398,890	+72.29%

Figure 4-10 shows that international capacity grew to Latin America, Canada and Africa. Given its geographic location, IAH represents an ideal gateway to Latin America for most parts of the United States.

Figure 4-10: Change in IAH hub capacity between May 2010 and 2012



As exhibited in table 4-8, the decrease in domestic capacity has been accompanied by a slight shift towards more regional partner activity. They have increased their overall share of capacity and additional carriers have started operating from IAH.

Table 4-8: Hub capacity by operating carrier

IAH	ASMs (000s)		
	2010	2012	Change
UA/CO mainline	**2,648,261**	**2,614,925**	**-1%**
Regional partners	**586,049**	**624,098**	**+6%**
United	-	2,614,925	+2,614,925
Expressjet	550,349	404,486	-145,863
SkyWest	-	158,418	+158,418
Colgan Air	13,884	39,716	+25,832
CommutAir	-	11,535	+11,535
Shuttle America	-	9,943	+9,943
Chautauqua	21,816	-	-21,816
Continental	2,648,261	-	-2,648,261

The position of IAH within the combined airline's network remained strong during the merger. Despite the loss of Continental's headquarters, the airports maintained its importance for domestic connections and as an international gateway. Nevertheless, the airport has experienced some domestic capacity cuts that could be attributed to the elimination of duplications in the combined network. In 2012, United announced a 10% capacity cut at IAH in response to the city's decision to let Southwest operate international flights from Houston Hobby. (Koenig & Freed) Whether this will undermine IAH's hub function in the long run and where this capacity will be moved remains to be seen.

4.1.2C: ORD – Slightly smaller, but still a major hub for the combined carrier

After the merger, Chicago has become the headquarters of the combined airline and the hub at ORD has remained one of the largest in United's network. As opposed to EWR and IAH, however, the airport experienced noteworthy capacity cuts between 2010 and 2012. Table 4-9 shows a cut of roughly 10% in domestic ASMs and flights.

Table 4-9: Change in Number of Flights and total ASMs at ORD

ORD	#Flights			ASMs (000s)		
	2010	2012	Change	2010	2012	Change
Domestic	30,826	28,327	-8%	2,388,121	2,148,903	-10%
International	1,561	1,586	+2%	624,776	607,886	-3%
TOTAL	32,387	29,913	-8%	3,012,897	2,756,789	-9%

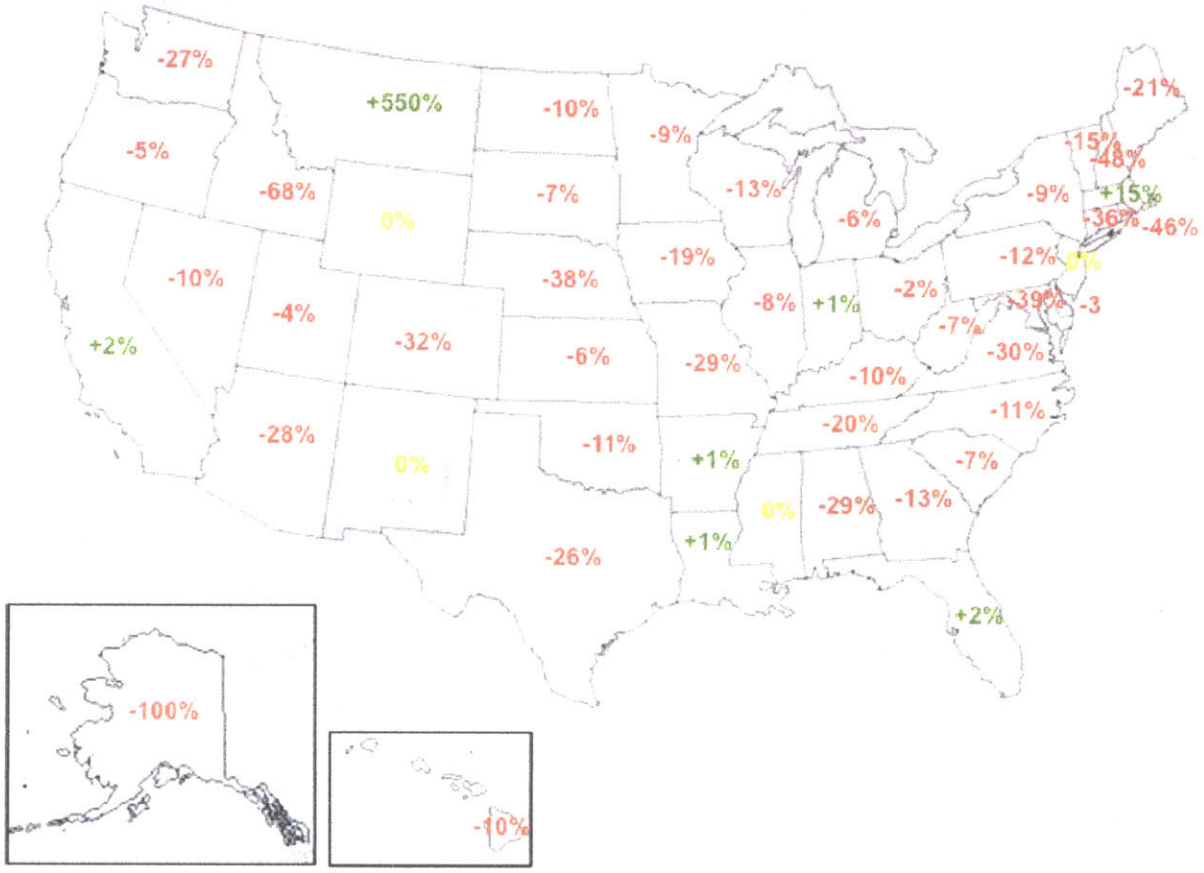
Average aircraft capacity, as seen in table 4-10, also decreased over the same time period in both international and domestic markets. As a result, the total number of seats available in these markets declined as well.

Table 4-10: Change in Number of Seats and avg. Seats per Aircraft at ORD

ORD	#Seats (000s)			Avg. Seats per Aircraft		
	2010	2012	Change	2010	2012	Change
Domestic	2,593	2,290	-12%	84	81	-4%
Intl.	194	190	-2%	124	120	-3%
TOTAL	2,787	2,480	-11%	104	100	-4%

The geographic distribution of capacity changes in figure 4-11 shows a fairly even distribution of capacity cuts across the United States. It should be noted that some of the coastal states (California, Florida and Massachusetts) saw slight capacity increases that highlight ORD's importance to connect cross-country traffic.

Figure 4-11:Change in ORD hub capacity between May 2010 and 2012



As opposed to EWR and IAH, intra-hub capacity from ORD also declined in some cases. Through the integration process, IAH has recovered the capacity lost by DEN while EWR has gained as well. But overall, ORD maintains strong links with the other hubs in United's network.

Table 4-11: ORD intra-hub capacity

Hub	2010 ASMs per month	2012 ASMs per month	Change
SFO	234,822,276	252,519,878	+7.54%
LAX	190,416,145	183,327,955	-3.72%
IAH	84,434,925	101,086,775	+19.72%
DEN	105,424,248	83,567,016	-20.73%
EWR	66,559,987	76,485,782	+14.91%
IAD	42,089,940	37,661,838	-10.52%
CLE	14,956,912	13,912,848	-6.98%

In addition to benefitting from the attractive Chicago local market, ORD remains an international gateway with increased capacity to the Americas and Asia. But figure 4-12 also shows capacity reductions to Europe that were more significant than those observed at EWR and IAH. These took place on flights to Italy (-27m ASMs) and the Netherlands (-12m ASMs). But at the same time, United has further increased its capacity to Germany to 125m ASMs, which points towards an increased reliance on its Star Alliance partner Lufthansa to distribute its European traffic.

Fig. 4-12: Change in ORD hub capacity between May 2010 and 2012

Table 4-12 demonstrates that the capacity cuts affected both the mainline carrier and its regional partners. But the proportion of capacity offered has shifted slightly towards regional partners who experienced smaller cuts.

Table 4-12: ORD Hub Capacity by Operating Carrier

ORD	ASMs (000s)		
	2010	2012	Change
UA/CO mainline	**2,344,930**	**2,139,782**	**-9%**
Regional partners	**667,968**	**617,008**	**-8%**
United	2,344,930	2,139,782	-205,148
Expressjet	112,869	225,572	+112,703
SkyWest	207,861	123,700	-84,161
Shuttle America	139,041	99,974	-39,067
GoJet	100,774	82,415	-18,359
Mesa	62,778	67,575	+4,797
Trans States	44,645	17,772	-26,873

To sum up, ORD was the first of the United hubs analyzed where domestic capacity was cut to a degree that is noteworthy. The hub still offers more flights and destinations than most other hubs in the network, but aircraft sizes have declined and regional carriers operate a slightly larger share of total capacity after the merger. Given the importance of Chicago as the company's headquarters and international growth to a number of regions, the cuts can be interpreted as fine-tuning of existing capacity that was not directly affected by the merger.

4.1.2D: SFO – Growing West Coast Gateway

As pointed out in the aggregate analysis of United's network, SFO recorded the largest capacity of all of the hubs. Table 4-13 shows that these increases took place in both domestic and international markets. Due to its geographic position, SFO's international capacity generally represents a higher share of the total than at other hubs. But domestic capacity actually increased substantially more over the course of the merger.

Table 4-13: Change in Number of Flights and total ASMs at SFO

SFO	#Flights			ASMs (000s)		
	2010	2012	Change	2010	2012	Change
Domestic	11,522	13,029	+13%	1,546,722	1,790,592	+16%
International	746	889	+19%	628,581	701,886	+12%
TOTAL	12,268	13,918	+13%	2,175,303	2,756,789	+27%

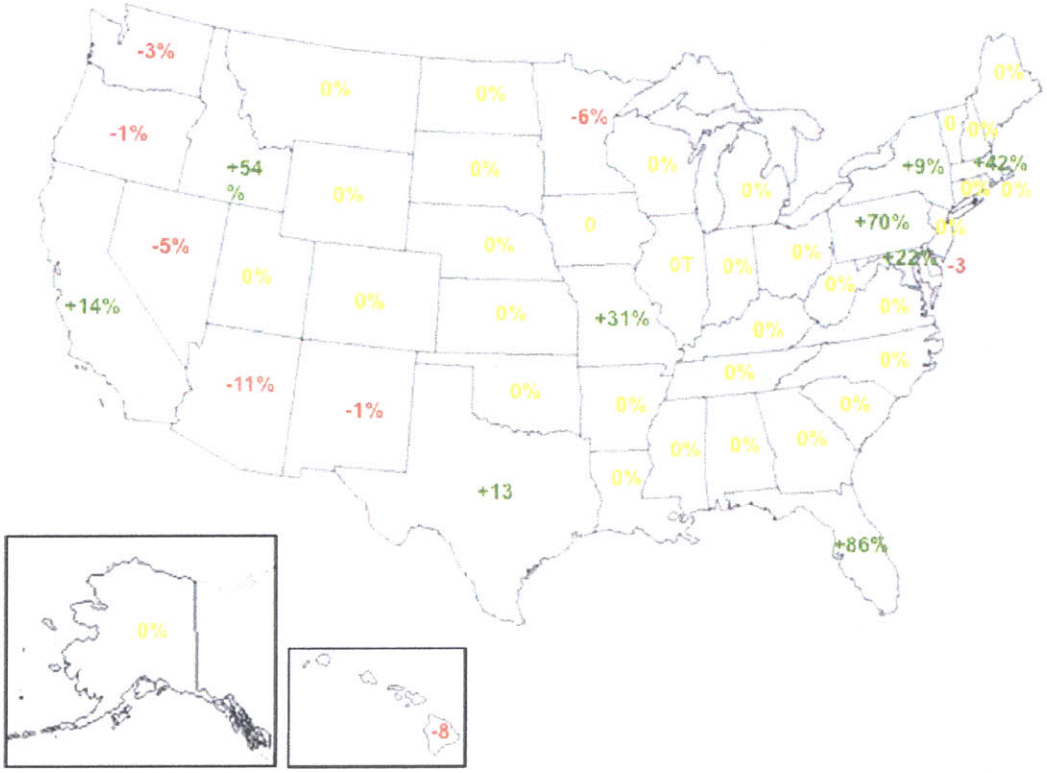
In Table 4-14, we can see that average aircraft sizes actually decreased slightly across the board and that capacity growth therefore came from the increased frequencies. Despite of this, SFO still shows larger average aircraft sizes than most of the other hubs, especially in international markets due to the large number of long-haul services.

Table 4-14: Change in Number of Seats and avg. Seats per Aircraft at SFO

SFO	#Seats (000s)			Avg. Seats per Aircraft		
	2010	2012	Change	2010	2012	Change
Domestic	1,000	1,106	+11%	87	85	-2%
Intl.	138	163	+18%	185	183	-1%
TOTAL	1,138	1,269	+12%	136	134	-1%

Domestic capacity growth, as shown in figure 4-13, was particularly strong to the Northeast, Florida and Texas. This demonstrates the importance of nonstop operations from the large populations centers to SFO and further on to Asia without the need to connect at one of the other hubs in the middle of the country. Capacity cuts only occurred in a small number of states and were minor.

Figure 4-13: Change in SFO hub capacity between May 2010 and 2012



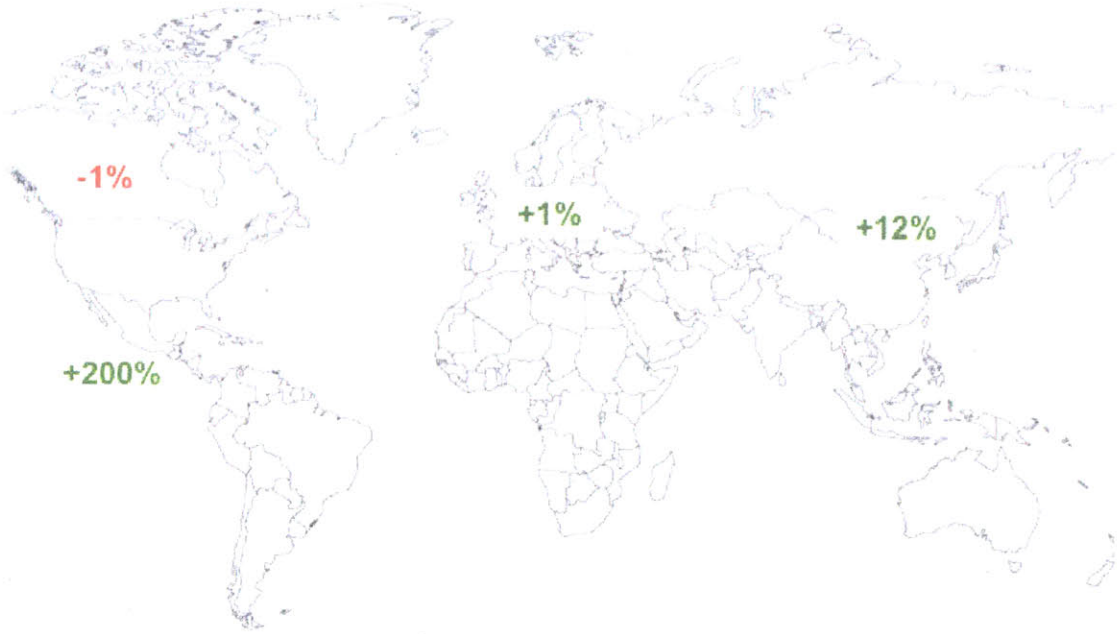
Similar to EWR and IAH, table 4-15 shows that intra-hub capacity increased across the board. Only capacity to DEN is lower than before the merger. In most of the cases, there was double-digit growth to SFO, which underlines the importance of this hub in the combined United-Continental network.

Table 4-15: SFO intra-hub capacity

Hub	2010 ASMs per month	2012 ASMs per month	Change
ORD	234,822,276	252,519,878	+7.54%
IAD	198,246,726	246,191,306	+25.18%
EWR	199,723,725	237,003,435	+18.67%
IAH	114,446,730	148,364,805	+29.64%
DEN	94,792,109	78,632,572	-17.05%
LAX	44,245,404	45,374,691	+2.55%
CLE	28,125,415	42,923,943	+52.62%

As indicated before, SFO represents an important international gateway due to its geographic position and its local market. Figure 4-14 confirms that capacity increased to almost all of the regions served from SFO. Given the short distance, the increase of ASMS to Central America is particularly substantial but Asia also represents an important market for SFO.

Figure 4-14: Change in SFO hub capacity between May 2010 and 2012



The international gateway and focus on larger population centers also translates into a smaller role for regional partners. SkyWest is the only carrier operating on behalf of United other than the mainline at this hub and while its capacity increased, mainline increased its share even more.

Table 4-15: SFO Hub Capacity by Operating Carrier

SFO	ASMs (000s)		
	2010	2012	Change
UA/CO mainline	**2,017,412**	**2,279,426**	**+13%**
Regional partners	**157,891**	**212,479**	**+35%**
United	2,017,412	2,279,426	+262,014
SkyWest	157,891	212,470	+54,588

SFO has clearly become a more important hub in the combined network after the merger. Capacity and frequency increases across the board for both domestic and international markets confirm this. Growing capacity to population centers in the East and South also shows that United is emphasizing nonstop service to accommodate strong local demand and connections to international markets beyond SFO.

4.1.2E: IAD – Secondary East Coast Gateway regional carrier growth

Prior to the merger, IAD served as United's primary international gateway on the East Coast. Considering that the combined carrier now also has the EWR hub in its network, it is somewhat surprising to see overall capacity stay virtually constant at IAD. International capacity, as shown in table 4-16, even increased slightly along with international frequencies. In turn, domestic frequencies saw some minor cuts.

Table 4-16: Change in Number of Flights and total ASMs at IAD

IAD	#Flights			ASMs (000s)		
	2010	2012	Change	2010	2012	Change
Domestic	14,519	13,414	-8%	1,451,721	1,441,717	-1%
International	1,036	1,110	+7%	700,859	734,304	+5%
TOTAL	15,555	14,524	-7%	2,152,579	2,176,021	+1%

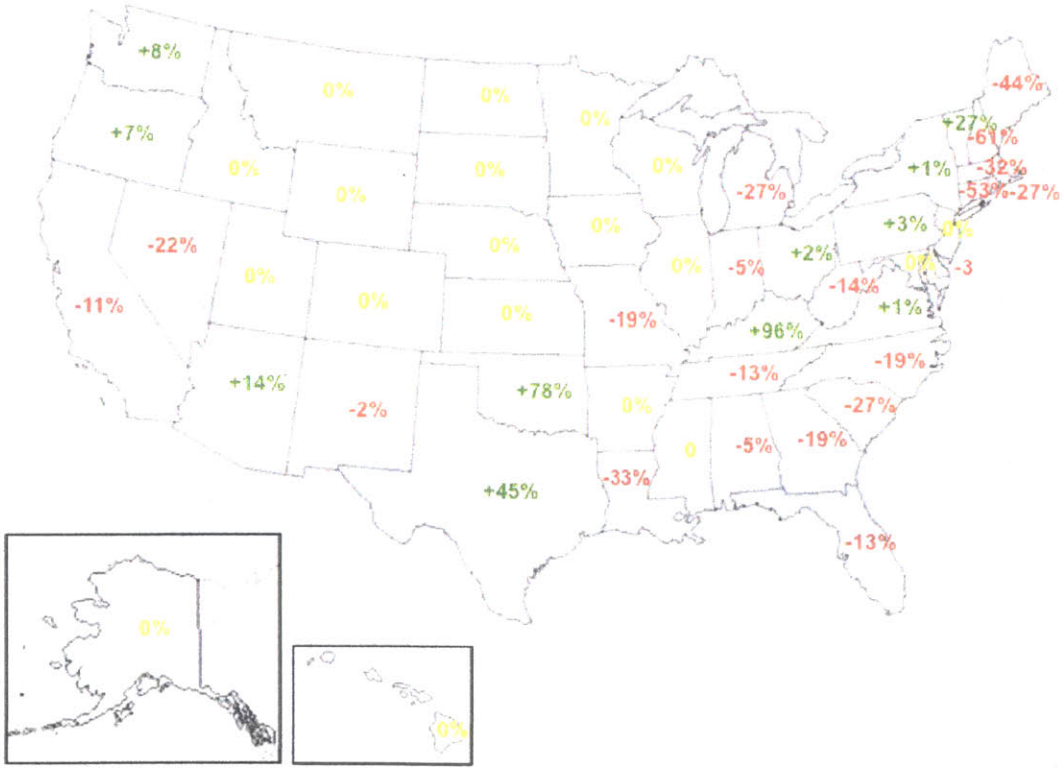
Table 4-17 shows that only minor adjustments were made to the average aircraft size. Similar to SFO, relatively large aircraft are used on international flights as most of them represent long-haul services.

Table 4-17: Change in Number of Seats and avg. Seats per Aircraft at IAD

IAD	#Seats (000s)			Avg. Seats per Aircraft		
	2010	2012	Change	2010	2012	Change
Domestic	1,134	1,058	-7%	78	79	+1%
Intl.	177	186	+5%	171	168	-2%
TOTAL	1,311	1,244	-5%	125	123	-2%

In Figure 4-15, we can see that domestic capacity was primarily cut in shorter haul markets on the East Coast in favor of longer haul markets in the West and Southwest. This aligns with the observations from SFO that United is promoting longer haul nonstop services to the hubs that offer better connections to the international gateways at the coast. In addition, IAD also serves an attractive local market where United will likely aim to preserve its market share.

Figure 4-15: Change in IAD hub capacity between May 2010 and 2012



Except for SFO and IAH, intra-hub capacity from IAD also decreased to all other hubs. The airport also does not have direct service to the LAX hub. Table 4-19 also shows that capacity between IAH and IAD has increased significantly over the course of the merger, which points towards increasing connections offered from IAD via IAH and vice versa.

Table 4-19: IAD intra-hub capacity

Hub	2010 ASMs per month	2012 ASMs per month	Change
SFO	198,246,726	246,191,306	+24.18%
DEN	119,262,924	106,103,448	-11.03%
IAH	27,510,420	47,398,890	+72.29%
ORD	42,089,940	37,661,838	-10.52%
EWR	5,592,102	4,512,192	-19.31%
CLE	4,939,776	3,999,744	-19.03%

International capacity changes, as exhibited in figure 4-20, show a mixed picture for IAD. There have been substantial increases to Europe and Africa, which make sense given the geographic location where IAD can funnel traffic from the United States towards these regions. This also shows that IAD has in fact been strengthened as a European gateway where EWR lost some capacity. So United appears to follow a slightly different strategy from Delta and not emphasize its New York City hub as exclusive East Coast gateway. International capacity to other regions, particularly Latin America, was reduced. With the background of network integration, this seems intuitive as these markets can be served via some of the other hubs. The substantial growth in capacity to IAH can also be interpreted in this context as it offers United a way to combine some of its southbound international traffic at IAH.

Figure 4-20: Change in IAD hub capacity between May 2010 and 2012

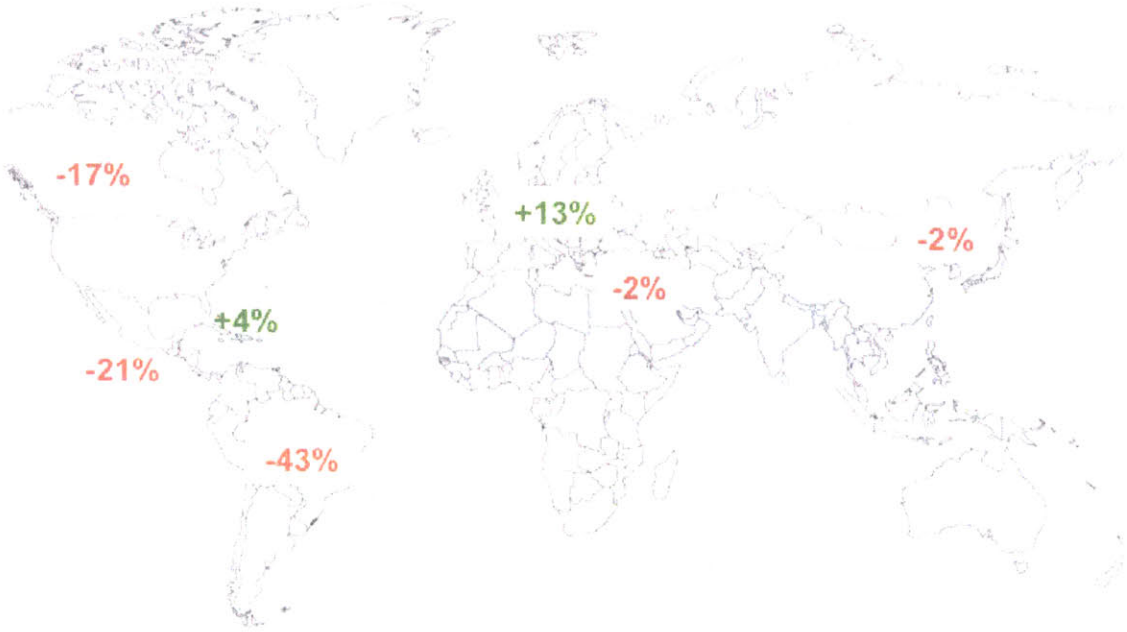


Table 4-15 shows a small increase of regional carrier capacity relative to the mainline at IAD. What is more noteworthy at IAD is the increase of frequencies offered by regional partners, which went up from about 9,500 to 10,900 and therefore accounted for 75% of IAD frequencies in 2012. As figure 4-6 showed, this was the largest increase of all hubs and now makes IAD the hub with the second largest ratio of frequencies operated by regional partners.

Table 4-20: IAD Hub Capacity by Operating Carrier

IAD	ASMs (000s)		
	2010	2012	Change
UA/CO mainline	**1,927,268**	**1,885,944**	**-2%**
Regional partners	**225,311**	**274,632**	**+22%**
United	1,927,268	1,885,944	-41,324
Expressjet	16,690	83,690	+67,000
Mesa	44,440	48,191	+3,751
Colgan Air	10,140	32,685	+22,545
GoJet	49,149	18,963	-30,186
Shuttle America	49,822	15,964	-33,858
Trans States	34,687	15,739	-18,948
Other	20,383	59,400	+39,017

Overall, it appears that United has strengthened the IAD hub as a transatlantic gateway despite the relative proximity to EWR. Domestically, growth in cross-country markets can be interpreted as an effort to facilitate these international connections. The substantial increase in frequencies operated by regional partners appears to contradict the notion of a strengthened hub to some degree. In the case of the Delta-Northwest merger, these shifts generally coincided with the downsizing of hubs in order to take advantage of the partners' more favorable cost structure. So far, this does not seem to be the case at IAD and United has in general been more inclined to use regional carriers than Delta.

4.1.3A: LAX – Access to strong local market and smaller international gateway

LAX plays an interesting role in United's network as it represents the second major gateway on the West Coast in addition to SFO. United is therefore the only large US carrier operating two hubs on the West Coast. As shown in the aggregate section of this report, LAX is much smaller than SFO in terms of capacity, flights and destinations. Table 4-25 and 4-26 show that domestic flying has decreased both in terms of capacity and available frequency. At the same time, however, international capacity has grown by over 50% and the number of international frequencies has increased by about 44%.

Table 4-25: Change in Number of Flights and total ASMs at LAX

LAX	#Flights			ASMs (000s)		
	2010	2012	Change	2010	2012	Change
Domestic	9,006	8,044	-11%	1,002,915	988,658	-1%
International	200	288	+44%	141,703	222,572	+57%
TOTAL	9,206	8,322	-10%	1,144,618	1,211,230	+6%

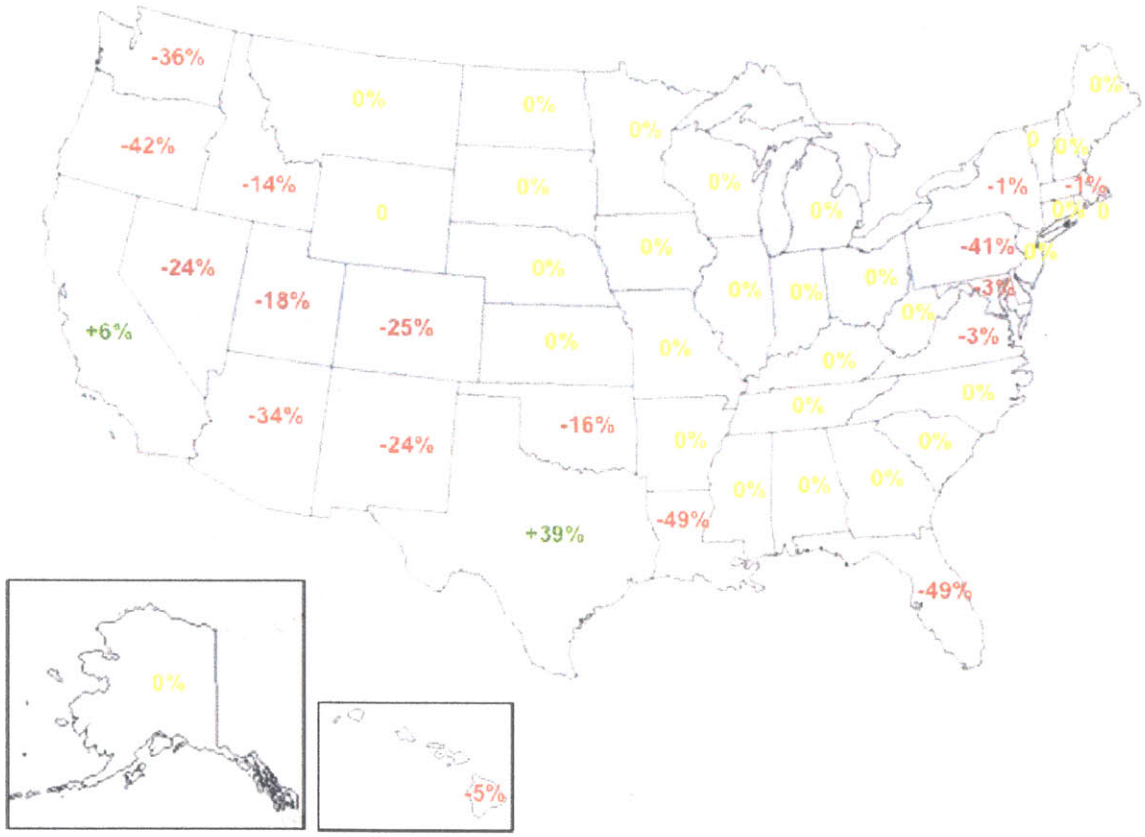
Table 4-26 also shows a substantial increase in aircraft capacity in international markets, which point towards an increased use of large wide bodies serving long haul routes. On the other hand, domestic aircraft sizes further decreased to the relatively low level of 72 seats on average.

Table 4-26: Change in Number of Seats and avg. Seats per Aircraft at LAX

LAX	#Seats (000s)			Avg. Seats per Aircraft		
	2010	2012	Change	2010	2012	Change
Domestic	668	583	-13%	74	72	-3%
Intl.	31	53	+71%	157	185	+18%
TOTAL	699	636	-9%	116	129	+11%

In figure 4-23, we can see that capacity reductions primarily affected short-haul flights to LAX, Hawaii and cross-country services from the Northeast and Florida. United did not have service from this hub to most other parts in the country before the merger so its domestic function primarily focuses on serving the states in its immediate vicinity and large population centers on the East Coast. In this sense, the underlying domestic strategy is similar to that of SFO, but focused on a much smaller set of destination states.

Figure 4-23: Change in LAX hub capacity between May 2010 and 2012



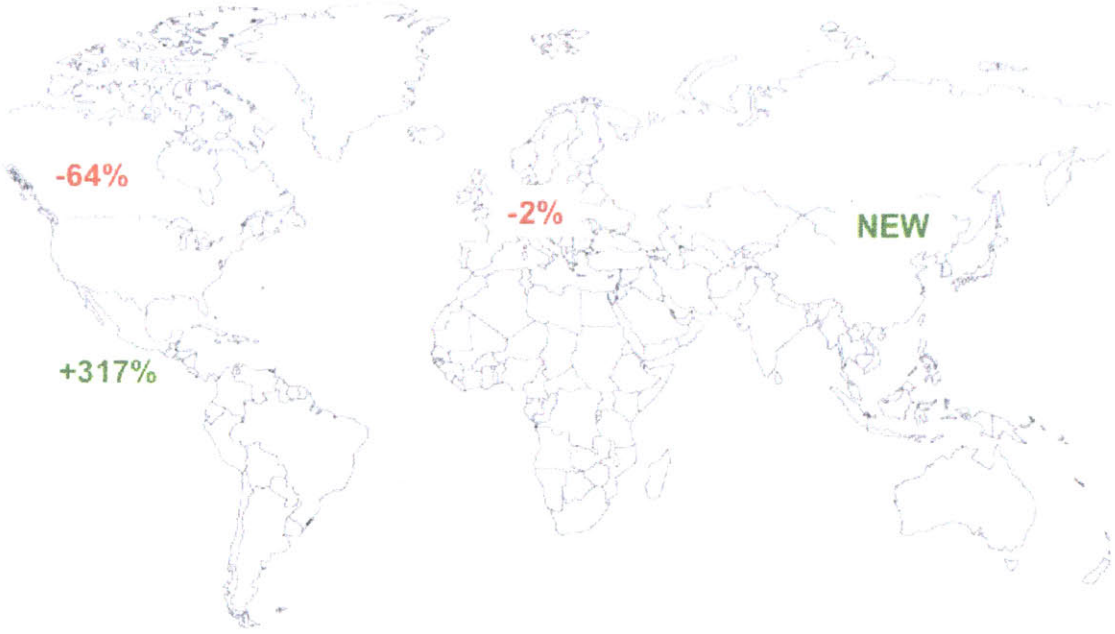
Intra-hub traffic has increased to all hubs with the exception of ORD and DEN. This is shown in table 4-27. In combination with the capacity cuts in figure 4-23, this points towards a decrease in cross-country traffic as ORD and DEN would naturally serve as connecting points for these markets.

Table 4-27: LAX intra-hub capacity

Hub	2010 ASMs per month	2012 ASMs per month	Change
EWR	166,211,874	199,647,624	+20.12%
ORD	190,416,145	183,327,955	-3.72%
IAH	146,394,640	153,475,805	+4.84%
DEN	75,875,826	63,981,088	-15.68%
CLE	49,602,533	52,815,478	+6.48%
SFO	44,245,404	45,374,691	+2.55%

Figure 4-24 maps the changes in international capacity where growth has taken place to Central America and Asia. As stated earlier, the geographic position makes LAX a suitable gateway for these markets. It should be noted that SFO increased capacity to both of these regions as well so the dual hub strategy on the West Coast continued throughout the merger. In addition, both LAX and SFO are important local markets for these destinations with a particular emphasis on ethic traffic.

Figure 4-24: Change in LAX hub capacity between May 2010 and 2012



Considering the shift towards more international capacity, it is not surprising that the mainline has increased its capacity share at LAX. This is shown in table 4-28. Continental shows up as a hub carrier in this point because of the direct services it used to operate to several destinations in Hawaii.

Table 4-28: LAX Hub Capacity by Operating Carrier

LAX	ASMs (000s)		
	2010	2012	Change
UA/CO mainline	**995,715**	**1,086,676**	**+9%**
Regional partners	**148,903**	**124,554**	**-16%**
United	928,588	1,086,676	+158,088
ExpressJet	-	431	+431
SkyWest	148,903	124,123	-24,780
Continental	67,127	-	-67,127

The analysis has shown that the role of LAX in United's network is fairly similar to that of the larger SFO hub. Its local market and geographic position provide a foundation for a viable international gateway and increasing capacity through additional frequencies and larger aircraft on international routes show that United aims to bolster this position. The relative geographic proximity to SFO does not undermine LAX and the airport will likely remain an important component alongside United's primary international gateways.

4.1.3B: DEN – Downsizing in both domestic and international markets

DEN represents a smaller hub within the combined network of United compared to the larger international gateways discussed up to this point. Table 4-21 also shows a much smaller share of international capacity and flights than at the other airports. Considering the airport's position in the center of the United States and the smaller local market, it makes sense that it does not function as a major international gateway. Over the course of the merger, DEN has also experienced significant capacity cuts in both domestic and international markets. Domestic flights and capacity were cut by more than 10% and international capacity reduced by more than half.

Table 4-21: Change in Number of Flights and total ASMs at DEN

DEN	#Flights			ASMs (000s)		
	2010	2012	Change	2010	2012	Change
Domestic	20,629	18,372	-11%	1,468,732	1,240,579	-16%
International	785	651	-17%	97,603	49,848	-49%
TOTAL	21,414	19,023	-11%	1,566,335	1,290,427	-18%

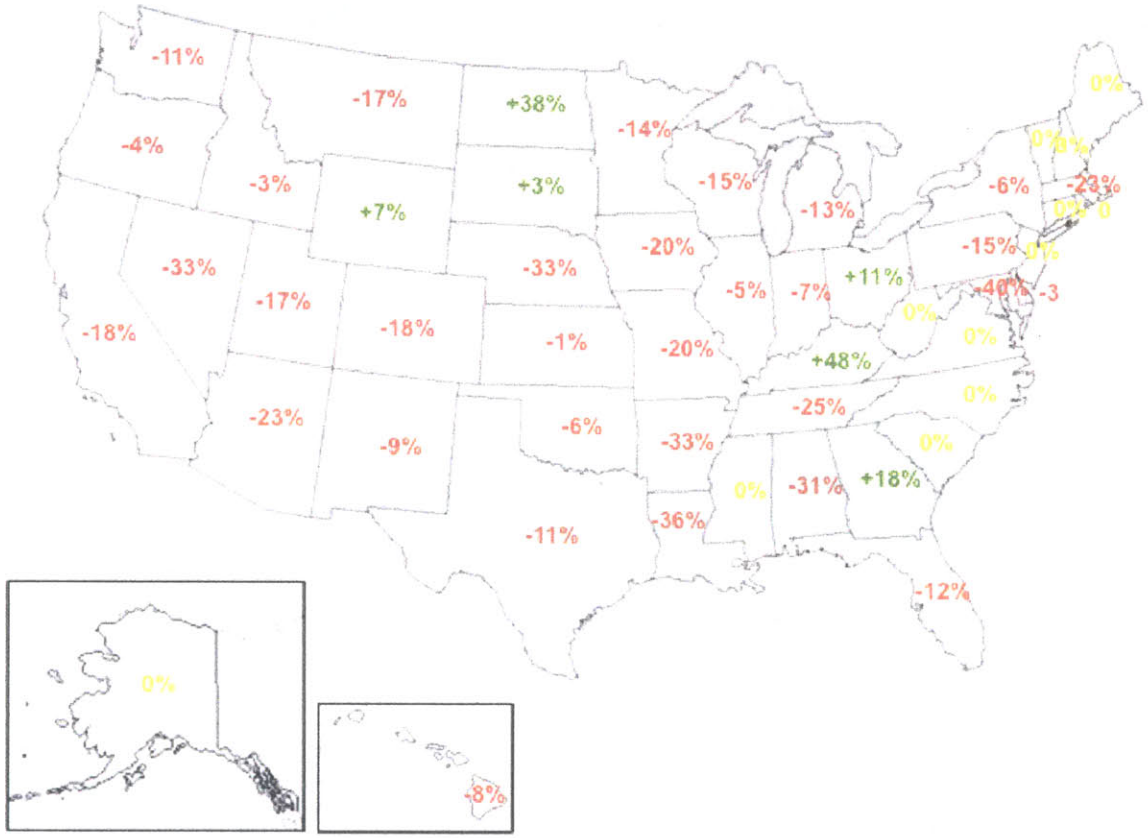
Cuts were also made to total available seats and average aircraft capacity, as shown in table 4-22. Compared to the other hubs, United on average operates very small at DEN with a capacity of only 77 seats.

Table 4-22: Change in Number of Seats and avg. Seats per Aircraft at DEN

DEN	#Seats (000s)			Avg. Seats per Aircraft		
	2010	2012	Change	2010	2012	Change
Domestic	1,743	1,488	-15%	84	81	-4%
Intl.	62	47	-24%	80	73	-9%
TOTAL	1,805	1,535	-15%	82	77	-6%

Figure 4-21 shows capacity cuts to virtually all parts of the country except for a few states. Capacity has been cut particularly to the West Coast states, which indicates that DEN's importance to connect cross-country traffic is decreasing. Considering the increases in cross-country capacity at the coastal airports mentioned above, it appears that United has been replacing connections with new nonstop services in these markets. DEN appears to be a victim of this strategy.

Figure 4-21:Change in DEN hub capacity between May 2010 and 2012



Intra-hub capacity, as shown in table 4-23, has also been cut to all of the old United hubs. Capacity was increased to EWR, IAH and CLE, which can be linked to the integration of networks and the growing reliance of DEN to connect to the international gateways to make up for lost international capacity.

Table 4-23: DEN intra-hub capacity

Hub	2010 ASMs per month	2012 ASMs per month	Change
IAD	119,262,924	106,103,448	-11.03%
IAH	73,880,688	92,791,692	+25.60%
EWR	81,891,915	88,605,630	+8.20%
ORD	105,424,248	83,567,016	-20.73%
SFO	94,792,109	78,632,572	-17.05%
LAX	75,875,826	63,981,088	-15.68%
CLE	19,124,724	24,028,407	+25.64%

Figure 4-22 shows that DEN has lost all of its nonstop services to Europe. EWR, along with IAD and ORD, represent natural choices to recapture this traffic on their connecting services.

Figure 4-22: Change in DEN hub capacity between May 2010 and 2012

Capacity cuts have affected both mainline and regional carriers, but regional carriers have increased their capacity share to now make up more than half of the available capacity at DEN. This further supports the interpretation that DEN is being downsized and losing importance as a hub in United's network.

Table 4-24: Hub capacity by operating carrier

DEN	ASMs (000s)		
	2010	2012	Change
UA/CO mainline	**1,027,875**	**834,209**	**-19%**
Regional partners	**538,461**	**456,217**	**-15%**
United	1,027,875	834,209	-193,666
SkyWest	420,807	240,787	-180,020
ExpressJet	-	96,105	+96,105
Shuttle America	83,774	64,489	-19,285
GoJet	23,842	54,836	+30,994
Trans States	10,038	-	-10,038

So all signs point towards a reduction of hub activity at DEN. Capacity cuts, smaller aircraft sizes and a bigger role for regional partners align with many of the changes observed at the hubs downsized during the Delta-Northwest merger. Considering DEN's geographic position, cross-country traffic can also be routed via ORD and IAH or nonstop, as the changes at some of the other hubs have shown. The airport remains a viable hub, but especially the cuts in international capacity indicate a much smaller role for DEN in the future.

4.1.4A: CLE – Minor regional hub with large regional carrier presence

The former Continental hub at CLE is the smallest hub in the combined carrier's network by capacity and number of frequencies. Table 4-29 shows a further decrease in both of these categories. Despite a small increase in international capacity, international service at CLE remains negligible and does not include any long-haul routes.

Table 4:29: Change in Number of Flights and total ASMs at CLE

CLE	#Flights			ASMs (000s)		
	2010	2012	Change	2010	2012	Change
Domestic	8,211	7,956	-3%	310,863	278,670	-10%
International	197	195	-1%	5,335	6,908	+29%
TOTAL	8,408	8,151	-3%	316,198	285,578	-10%

In table 4-30, we can see that United operates extremely small aircraft at CLE, which is due to the very large share of regional partners operating there. The level slightly above 50 seats indicates that virtually no narrow bodies are used.

Table 4:30: Change in Number of Seats and avg. Seats per Aircraft at CLE

CLE	#Seats (000s)			Avg. Seats per Aircraft		
	2010	2012	Change	2010	2012	Change
Domestic	478	444	-7%	58	56	-3%
Intl.	10	11	+10%	53	56	+6%
TOTAL	488	455	-7%	55	56	+2%

Capacity cuts have taken place primarily along the East Coast as shown in figure 4-25. Given the limited overall capacity, CLE only had significant service to a relatively small number of states. The most significant states by number of flights are New York, Pennsylvania, Indiana, Michigan and Wisconsin so the airport primarily serves destinations in its immediate vicinity and small capacity growth has predominantly affected short haul services as well.

Figure 4-25: Change in CLE hub capacity between May 2010 and 2012

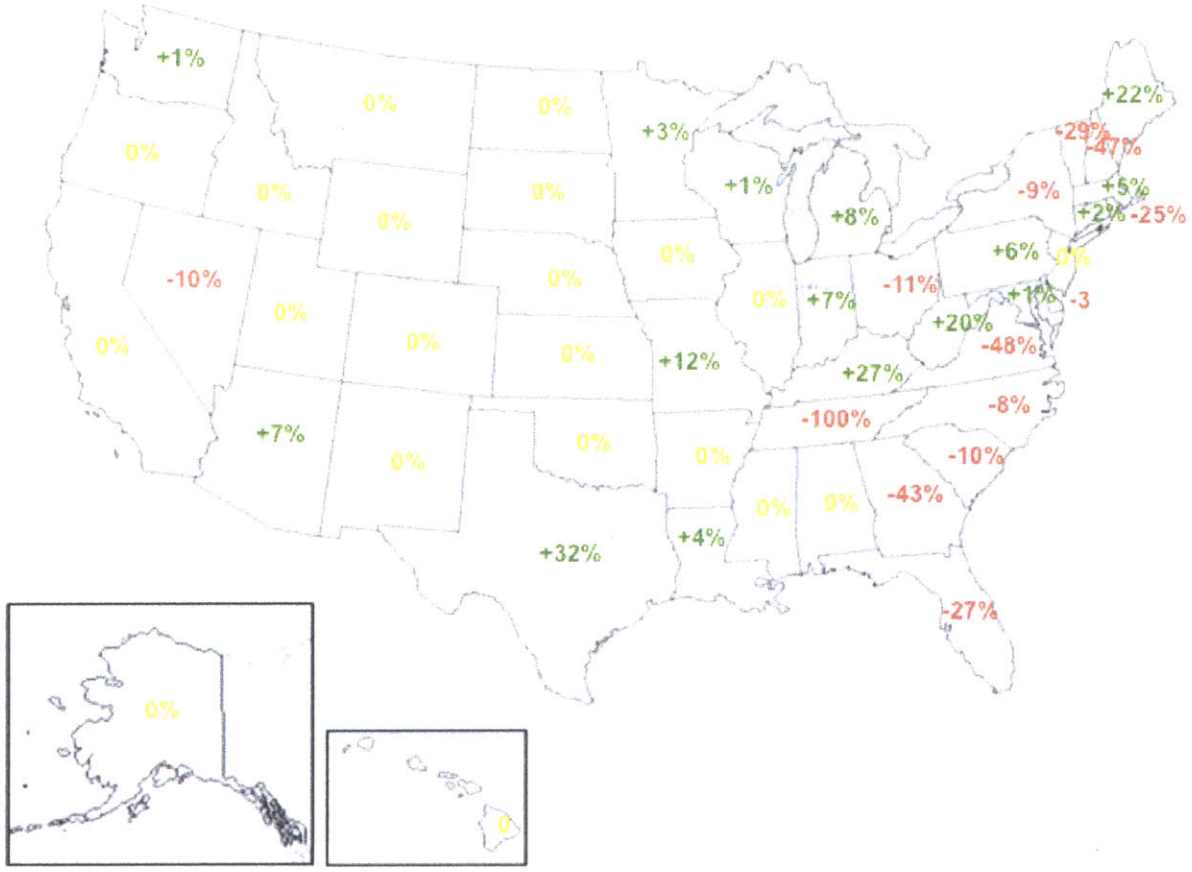


Table 4-31 shows that intra-hub capacity has increased overall and, most significantly to the West Coast hubs, DEN and EWR. With the background of network integration, it makes sense to reduce capacity to IAH and instead distribute it to some of the former United hubs that can offer similar connections.

4-31: CLE intra-hub capacity

Hub	2010 ASMs per month	2012 ASMs per month	Change
LAX	49,602,533	52,815,478	+6.48%
IAH	62,176,090	50,952,973	-18.05%
SFO	28,125,415	42,923,943	+52.62%
DEN	19,124,724	24,028,407	+25.64%
EWR	19,208,584	19,854,580	+3.36%
ORD	14,956,912	13,912,848	-6.98%
IAD	4,939,776	3,999,744	-19.03%

International capacity, as stated before, is a very small component at CLE. Figure 4-26 displays that there has been a minor increase to Central America but the airport only offers limited service to leisure destinations. Capacity to the Caribbean was eliminated entirely.

Figure 4-26: Change in CLE hub capacity between May 2010 and 2012

We have seen that regional carriers account for the vast majority of flight operations at CLE. But, as Table 4-32 shows, the mainline still accounts for the majority of capacity offered. Regional offer the short-haul regional services that play the biggest role at CLE while mainline United serves some of the longer haul markets to international destinations and the other hubs.

Table 4-32: CLE Hub Capacity by Operating Carrier

CLE	ASMs (000s)		
	2010	2012	Change
UA/CO mainline	**186,078**	**162,284**	**-13%**
Regional partners	**130,121**	**120,226**	**-8%**
United	-	162,284	+162,284
Expressjet	82,965	75,940	-7,025
Chautauqua	34,534	21,730	-12,804
CommutAir	11,106	15,549	+4,443
Trans States	-	5,363	+5,363
Silver Airways	1,516	1,644	+128
Continental	186,078	-	-186,078

The low starting point before the merger and the continued capacity cuts indicate that CLE does not play a significant role in combined United-Continental network. Since the distance to ORD is very low with only 315m, CLE is in an equally difficult position as MEM and CVG in the Delta-Northwest network. With a 90% share of flights for regional carriers, the hub in its current form only appears viable by taking advantage of their cost structures. As network integration proceeds, the CLE hub would become even more vulnerable.

4.1.5 Capacity shifts with stable network capacity overall

The analysis of the network and hubs operated by the combined United-Continental has revealed a very different evolution from that of Delta-Northwest in the previous section. Most notably, the network does not have one centralized hub that accounts for a disproportionally large share of capacity like Delta does in ATL. Instead, there are five primary hubs that differ slightly with regards to their geographic orientation but all account for a significant share of overall network capacity: EWR, IAH, ORD, SFO and IAD.

Though EWR stands out in terms of international capacity, all five of these hubs represent large international gateways serving a number of different global regions. Given their geographic positioning,

their international services generally focus on the regions most accessible to them. EWR, IAD and ORD represent the primary gateways to Europe while IAH and SFO provide access to Latin America and Asia respectively. Nonetheless, the hubs are not exclusively focused on serving these international markets and generally offer service to other global regions as well. These are frequently directed at linking with the Star Alliance partners, for instance in the case of SFO's service to Germany or ORD's service to Brazil. United also benefits from the fact that these cities also have significant local markets that support international service more than, for example, MSP, DTW or even ATL in the case of Delta.

It appears that the merger has not affected the position of these five hubs as international gateways and primary hubs in the network. However, most of them have experienced small cuts in domestic capacity between 2010 and 2012. But at the same time, there have been capacity increases to certain parts of the country that indicate in which direction United might be moving in terms of strategy. The coastal hubs have generally increased capacity to the opposite coast and intra-hub capacity has also grown in most cases. One interpretation of these shifts concerning network integration could be that United is strengthening its coastal hubs by offering more nonstop capacity in longer haul markets and that traffic in shorter haul markets is being routed via hubs like IAH or ORD. It should be noted that the respective changes in capacity are relatively small and that these changes need to be observed over a longer time frame to reach a more robust conclusion. But growing intra-hub capacity in particular provides an indicator of advancing network integration and, ultimately, consolidation.

Beyond the five major hubs, the combined carrier operates three smaller hubs in the United States that play a somewhat different role in the network. LAX appears to offer international access to a strong local market and some reliever functions for SFO. DEN has experienced the most significant capacity cuts among the airports analyzed in this section. International capacity in particular has been reduced to a point where the airport should be characterized as a domestic hub with only minor international service. But domestic capacity has been cut as well and, given growing nonstop services from coast to coast,

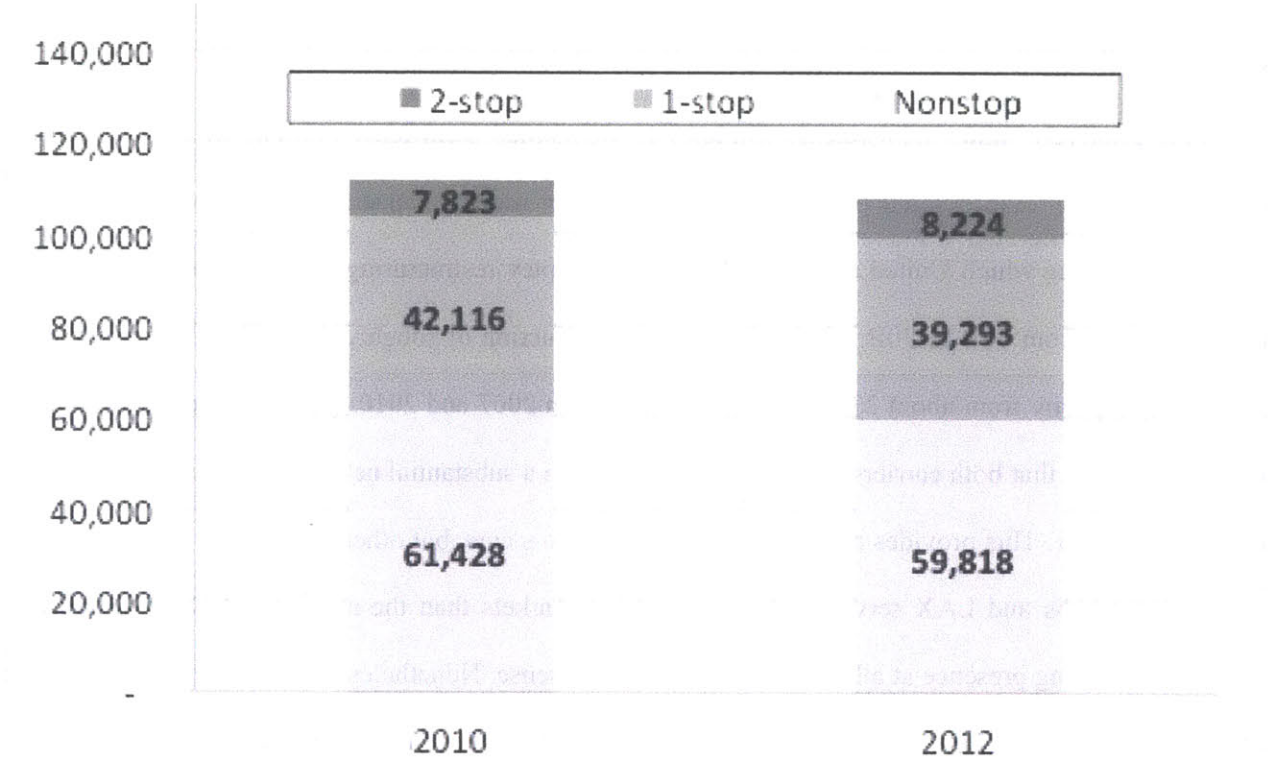
could see further reductions in the future. Lastly, CLE has always been a small hub and plays a very minor role in the system with a large presence of regional partners. While LAX seems to have a lasting place in United's strategy, DEN and CLE look like the first victims of the merger. Similar to the Delta case, CLE faces the issue of geographic proximity to another hub. This is not an issue for DEN, but as opposed to Delta, United operates two hubs on the West Coast that could make a Rocky Mountain hub redundant.

Comparing the United-Continental merger with Delta-Northwest has revealed a number of interesting differences in terms of network structure and adjustments during the integration process. Other than some relatively minor adjustments, United has maintained significant portions of its pre-merger network. History provides some perspective on these rather modest capacity cuts. Between 2001 and 2010, a time during which United also went through bankruptcy restructuring, the airline decreased total system capacity from 53B to 30B ASMs. This equals a reduction of roughly 44%. Continental reduced total system capacity from about 23B to 10 B ASMs between 2007 and 2010. (MIT Airline Data Project) So it is safe to say that both carriers had already gone through a substantial network consolidation process prior to the merger. This provides a new perspective on Delta's cuts, but other factors play a role as well. Its five major hubs and LAX serve much stronger local markets than the majority of Delta's hubs so maintaining a strong presence at all of them makes intuitive sense. Nonetheless, operating at least 6 major US hubs in the long run also appears to contradict the principles of economies of scale outlined in part 1 of this analysis. The recent events in Houston and United's decision to cut capacity by 10% indicate the possibility of a possibly downsizing the IAH hub in the face of competitive pressures and viable alternatives at the other hubs. Whether this will take place or whether capacity cuts will ultimately take place at one or more of the other hubs remains to be seen in the years to come as industry consolidation continues.

4.2 The Demand Side – Change in UA-CO domestic passenger flows in the wake of the merger

The approach to analyzing the demand side effects of the United-Continental merger will be identical to that used for Delta-Northwest. For this purpose, all passengers traveling on flights marketed by United or Continental were considered. Traffic data represents snapshots from May 2010 and May 2012 to represent the situation before and after the merger based on the same time frame as the supply side analysis in section 4.1.[3]

Figure 4-27: UA-CO Daily Domestic Passengers



Compared to the substantial traffic reduction Delta experienced during its merger, United only saw a minor decline. Figure 4-27 shows that total traffic decreased by about 4% from 111,000 per day to about 107,000. This is small compared to Delta's 13% decline and at least partially reflects the better economic conditions during the integration period. Nonetheless, it is clear that United also did not maintain its traffic levels over the course of the merger and thereby appears to contradict the underlying

[3] The data analyzed in this section is sourced from the US DOT 10% Ticket Sample Database that was accessed through the Diio Mi Market Intelligence portal.

premise of this analysis that economies of scale will allow the merging carriers to at least maintain their pre-merger levels. The objective of this section will be to identify the reasons and to reach a conclusion about whether this decrease could also represent the result of strategic decision similar to Delta's move to reduce non-hub point-to-point services.

A closer look at passenger types shows an equal total decline of nonstop and 1-stop passengers between 2010 and 2012. It should be noted that nonstop passengers represent a higher share of United's passengers both 2010 and 2012 (about 55%) than they did for Delta (about 50%). As stated in section 4.1, United's hub structure is characterized by strong local markets that would explain this higher ratio. Another difference from the Delta-Northwest case is that 2-stop connections increased at United from 2010 to 2012 by about 5%. The hub structure can also serve as an explanation here considering the absence of a strong centralized hub that would ultimately facilitate 1-stop connections.

Figure 4-1 in the previous section has already shown that overall system capacity remained virtually constant. So there is a similarity to the Delta-Northwest case in that traffic decreased more than the aggregate change in capacity would indicate. For this reason, the approach to analyzing where these passenger drops occurred will be identical to section 3.2 and focus on identifying patterns that could point towards effects related to network integration.

4.2.1 Correlation between schedule changes and aggregate shifts in passengers

The first step will again be to show the change in passenger flows in markets that offered nonstop service either before or after the merger. Table 4-33 shows that only a very small number of passengers were lost in markets where nonstop service was dropped. Instead, the most substantial fluctuations occurred in markets where no change took place, i.e. where no nonstop service was added or removed. This corresponds to the observations in the Delta-Northwest case with the difference that Delta's decreases due to dropped nonstop service were much more severe. Again, these numbers can be

interpreted as a result of shifting capacities between hubs. The fact that the numbers are much smaller than in Delta's case aligns with the generally less significant adjustments made by United during the merger.

Table 4-33: Change in Daily Passengers by Market Type

Nonstop Markets	Daily Pax Up	Daily Pax Down	Daily Pax TOTAL
Dropped	12	(313)	(301)
No Change	12,202	(16,524)	(4,322)
Added	605	(15)	590
TOTAL	12,819	(16,852)	(4,033)

Table 4-34 shows the shift in 1-stop domestic connections between the hubs. While even the largest United hubs by connecting passenger volume are much smaller than ATL, connections are distributed fairly evenly within two groups. The key players in this segment are ORD, IAH and DEN with around 8,000 passenger connections per day, but all have seen the number of domestic connecting passengers decrease between 2010 and 2012. This is not surprising considering the capacity cuts affecting these airports that are outlined in section 4.1. The second group has about 2,000 daily connecting passengers per hub and includes the coastal hubs as well as CLE. EWR and SFO were the only hubs to increase the number of 1-stop connecting passengers over the observed period of time.

Table 4-34: Change in daily 1-stop connections by connecting hub

	CLE	DEN	EWR	IAD	IAH	LAX	ORD	SFO	TOTAL
2010	1,771	8,364	2,045	3,250	9,270	1,839	9,708	2,233	38,479
2012	1,670	7,321	2,264	3,073	8,384	1,687	8,469	2,656	35,523
Change	(101)	(1,043)	219	(178)	(886)	(152)	(1,239)	423	(2,956)

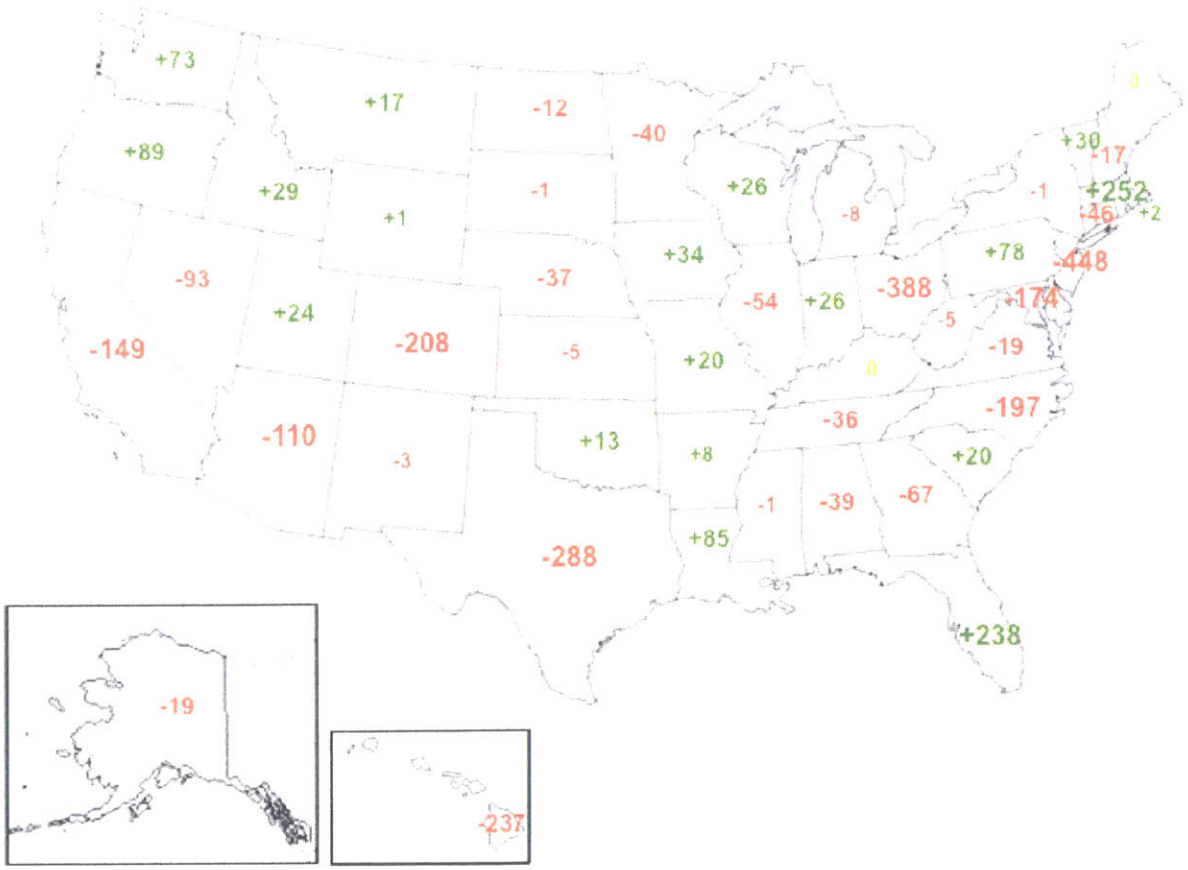
When comparing these hubs, it seems clear that the airports where domestic capacity was cut the most (DEN, ORD and IAH) continue to function as primary connecting points for domestic traffic. This leads to a different interpretation of capacity cuts compared to the Delta-Northwest case. Whereas Delta downsized several hubs significantly, it appears that United cut some, potentially excess, capacity without

reducing the status of its domestic hubs. In order to obtain a clearer picture about these changes, the next step will be to track the geographic shifts of passenger flows.

4.2.2 Geographic shifts in domestic United-Continental passenger flows

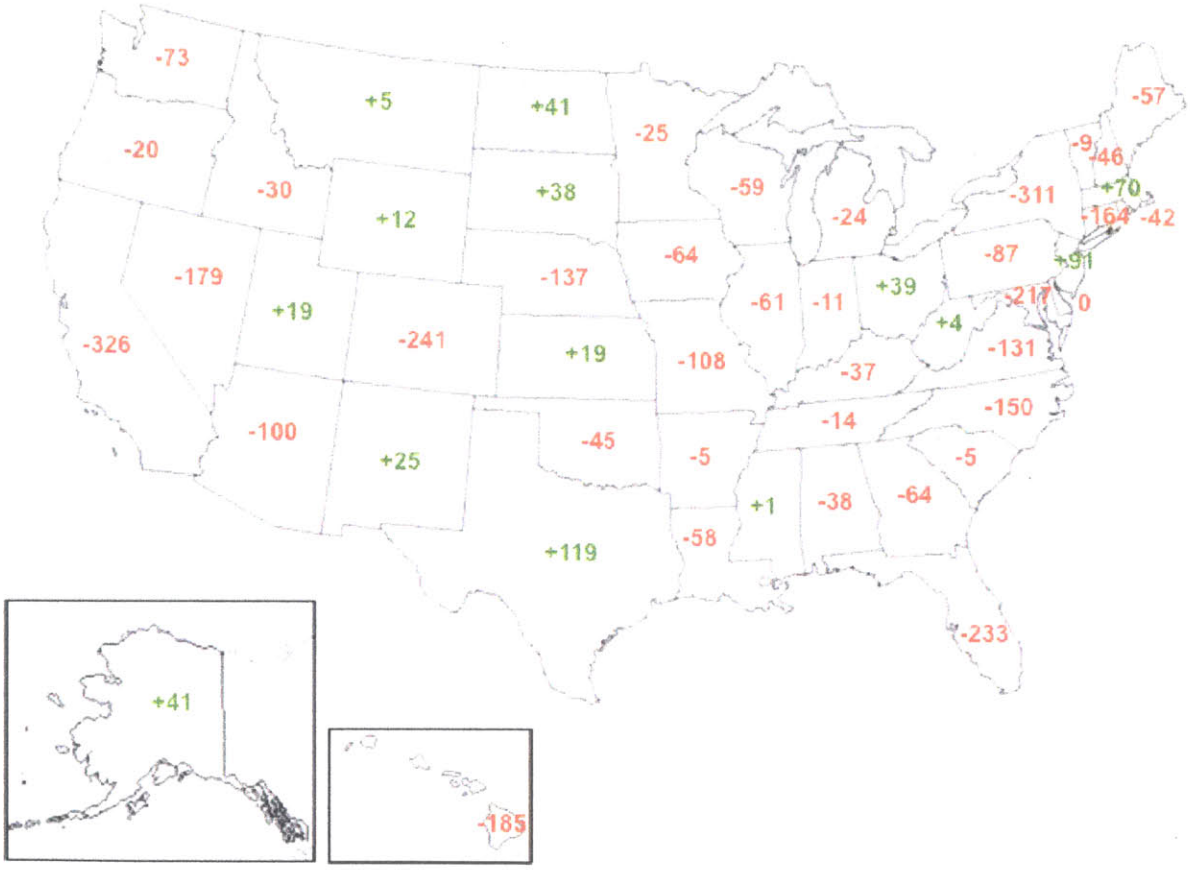
Figure 4-28 shows the change in daily nonstop passengers by destination state. The strongest growth took place in markets to Massachusetts, Florida and the Pacific Northwest. Overall, there is no clear geographic distribution of nonstop traffic growth that would highlight the network changes that took place. Conversely, the largest total decline occurred in the hub states New Jersey, Texas, Colorado, Ohio and California along with North Carolina. It should be noted that due to their large overall traffic volume, the relative decline in the hub states other than Ohio only averaged about 2-4%. Nonetheless, the decline is striking since not all of the hubs experienced domestic capacity cuts during this time period.

Figure 4-28: Change in Daily Nonstop Passengers by Destination (from all domestic origins)



The changes in daily domestic 1-stop passengers exhibited in Figure 4-29 show a different geographic pattern from the nonstop passengers. Reductions took place along both coasts and across most of the South. At a high level, this confirms the previous observation that connections to the coasts, particularly for cross-country services, have been cut during the integration process. But, as figure 4-28 shows, not all coastal states have seen a simultaneous increase of nonstop passengers. Connecting passenger growth, on the other hand, has primarily affected sparsely populated states with the exception of Massachusetts, Ohio and Texas.

Figure 4-29: Change in Daily 1-stop Passengers by Destination (from all domestic origins)



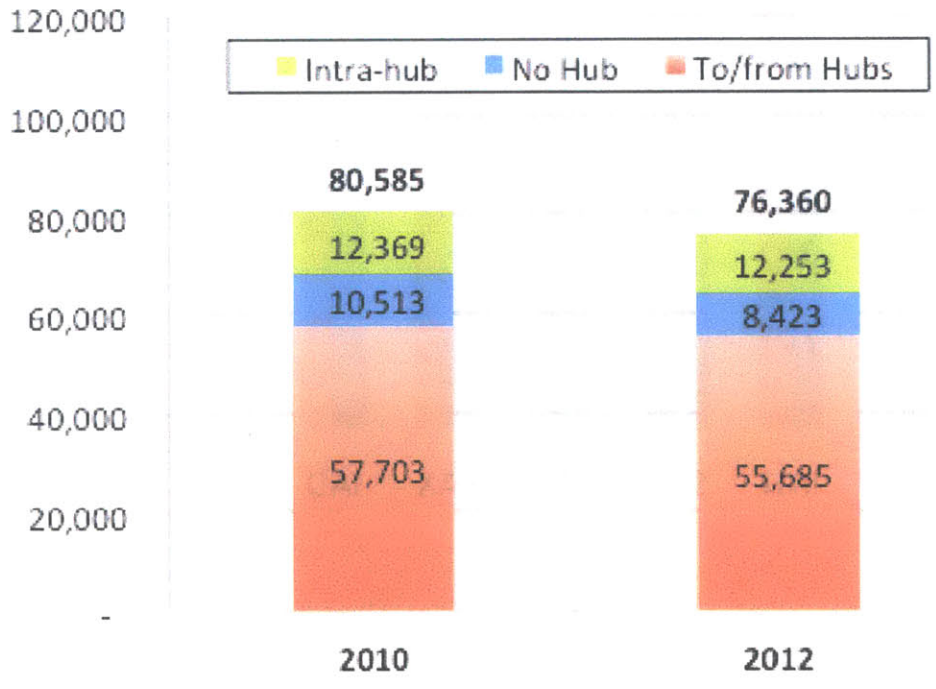
So comparing the two types of traffic, it seems that nonstop domestic traffic has become more important compared to 1-stop connections in a number of states. Since no reliable data is available on international traffic, its role in the overall performance is speculative. But considering that most of the

major gateways increased international capacity, it is possible that passengers connecting to the international services have partially displaced nonstop local traffic. When all types of passengers are considered, United's net traffic decreased or remained constant to most states. The most notable exception is Massachusetts with 322 additional daily passengers in 2012. In order to identify other potential drivers behind the passenger reduction at United, the next part of the analysis will examine the top 1,000 O-D markets in more detail.

4.2.3 Analysis of Change in Top O-D Markets

Traffic in the top 1,000 O-D markets has also decreased as figure 4-30 shows. The relative change is similar to that of the network as a whole at about 5% compared to the 2006 levels. So even in its most important domestic markets, the combined airline has lost passengers over the course of the merger. Since the United hubs represent strong local markets, markets involving hubs accounted for over 85% of this traffic in both 2010 and 2012. The reductions are evenly distributed between markets to/from hubs and non-hub markets while intra-hub markets remained virtually unchanged.

Figure 4-30: UA-CO Top 1,000 O-D Markets (prior to merger)

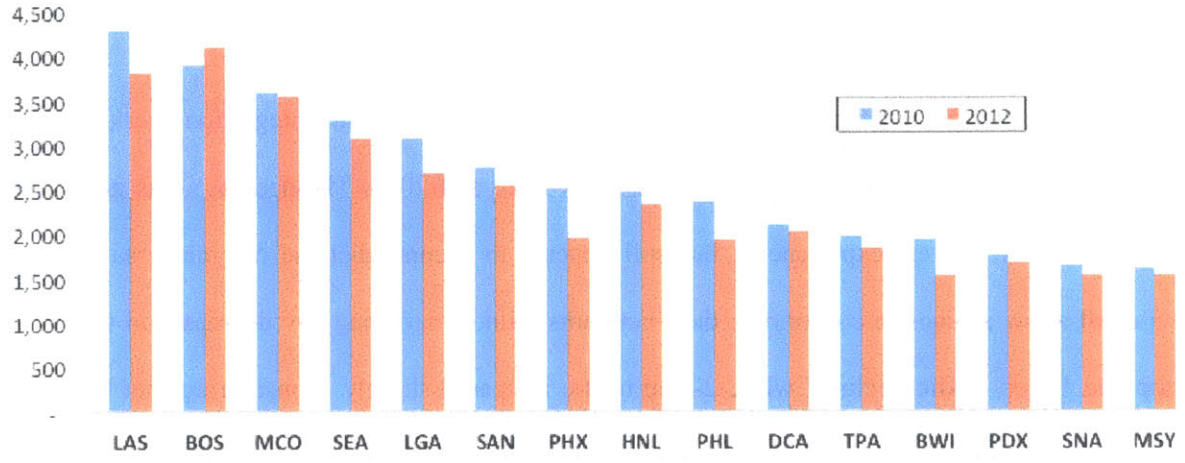


How important the local hub markets are can be seen in figures 4-31 and 4-32. The eight domestic hubs also represent the largest O-D destinations among the top 1,000 markets. Even CLE still has more passengers than LAS as the biggest non-hub destination. Fig. 4-31 also shows that traffic decreased slightly at all hubs except SFO. These changes align with the shifts in available seats outlined in section 4.1, but recall that the situation was similar at Delta despite a much more substantial hub downsizing. This is surprising considering the effects of the recession on Delta's traffic that did not influence performance during the United-Continental merger. So while it seems that the airline has consolidated capacity in response to the merger, it has not been successful in retaining the passengers. One possible explanation could be the aforementioned increase in international capacity and the potential displacement by international connecting passengers.

Figure 4-31: Change of Daily O-D Passengers to/from Hubs

Figure 4-32 shows that traffic at the top 15 non-hub cities has also declined with the exception of BOS. However, none of them experienced a reduction similar to the cities in the Delta network that lost point-to-point services during the merger.

Figure 4-32: Change of Daily O-D Passengers to/from top 15 non-hub airports



Further evidence is provided in table 4-35, which shows the change in connecting passengers in non-hub markets. The majority of the roughly 2,000 passengers that were lost in non-hub markets, as exhibited in Figure 4-30, used to connect via one of the hubs. This shows that cutting point-to-point service away from the hubs was a much smaller component in United-Continental's network integration than at Delta-Northwest, where passenger reductions in this segment were much more substantial. United's largest non-hub markets were and still are primarily served via its hubs. EWR and SFO grew in this segment, but not by enough to make up for the losses accumulated by the remaining six hubs. The decreases, in general, align with the capacity cuts outlined in section 4.1 where EWR remained virtually constant and SFO was the only one to see domestic capacity increase.

Table 4-35: Change in connecting passengers in non-hub markets (from top 1,000 O-D markets)

Markets	CLE	DEN	EWR	IAD	IAH	LAX	ORD	SFO	TOTAL
Nonstop dropped	-	0	-	-	-	1	-	8	8
Never Nonstop	(51)	(468)	40	(33)	(344)	(167)	(396)	121	(1,297)
Still nonstop	-	-	-	-	-	0	-	0	0
TOTAL	(51)	(468)	40	(33)	(344)	(167)	(396)	129	(1,288)

So the analysis of United-Continental's top 1,000 O-D markets has revealed that even these important markets that predominantly include traffic to/from hubs have experienced similar reductions in traffic as the rest of the network.

4.2.4 Traffic decline exceeded capacity cuts

Despite a more favorable economic environment during the integration period, United-Continental has also lost domestic passengers between 2010 and 2012. The decrease was more modest than what Delta-Northwest experienced, but still appears to contradict the original assumption that mergers will allow airlines to consolidate their networks without suffering any decreases in traffic. Both nonstop and 1-stop traffic declined while 2-stop traffic increased slightly. Considering that United does not focus its network on one large centralized hub, the increase of 2-stop passengers results from the slightly different focus geographic focus of its hubs.

Traffic decreases generally align with the capacity cuts described in the previous section. The traffic analysis also shows that the hubs affected by the strongest domestic capacity cuts remain the dominant connection points for domestic traffic. So the cuts can be interpreted as fine-tuning the domestic network structure in the face of the merger rather than a substantial downsizing like at Delta. The analysis has also revealed that dropped nonstop services also accounted for only a very minor reduction in traffic. Since the decreases in traffic have also affected the top O-D markets in United's network, the airline has clearly failed to integrate without negative effects on its market share.

4.3 Summary – Reduction in traffic despite constant system capacity hints at exogenous or other network effects

United-Continental's merger has been very different compared to the Delta-Northwest case in terms of capacity changes. Total system ASMs have remained virtually constant between 2010 and 2012. However, there has been a shift from domestic to international capacity at a number of hubs. This also highlights another key difference with the Delta-Northwest merger. Whereas the combined Delta downsized a number of its hubs to the point of disbanding them all together, United does not appear to abandon any of its hubs. Almost all of them saw capacity increase or remain at a high level. DEN lost substantial international capacity but remains one of the primary domestic connecting points and CLE already played a very minor role before the merger. Similar to Delta-Northwest, the share of regional partners in terms of frequencies and capacity also increased in United's network during the merger. Prior to the merger, however, United already relied on these carriers to a much greater extent than Delta so this shift represents a continuation of this policy.

As Section 4.2 has shown, United was unable to increase or even maintain its traffic over the course of the merger. The fact that the traffic decline has affected all hubs as well as the top O-D markets in the network indicates that underlying causes have influenced the network as a whole. Though reductions generally align with capacity decreases, it is clear that the airline has failed to capitalize on the merger synergies at least over the time frame used for this analysis. Considering that the recession had ended by the time the merger was announced, exogenous economic effects cannot be used to explain this shortfall in the way they did for Delta. As stated above, a possible explanation could be derived from the shift towards international capacity and the facilitated connections via the new hubs. International traffic was not part of this analysis, but it would have displaced some of United's domestic traffic since domestic capacity has decreased slightly at the same time. Another possible reason could also be the airline's poor operational performance during the integration period that might have turned passengers away. A series of computer glitches and generally poor on-time performance during this time caused inconveniences for

customers and were well publicized to a point where United's image could have suffered. (Mouawad 2012)

While network consolidation in the case of United-Continental was not as extensive and clear-cut as with Delta and Northwest, the network changes exhibit some of the characteristics to exploit economies of scale outlined at the beginning of this analysis. Downsizing international capacity at DEN and growing it at the coastal hubs in particular represents such a measure along with growing intra-hub capacity. Compared to the changes at Delta, however, the adjustments at United were minor. For the moment, the integration represents a combination of the two networks with marginal adjustments. The recent cuts at IAH show that more substantial shifts could still occur in the future so the network integration was not complete as of May 2012. Time will also show whether the reductions in domestic traffic were only temporary and due to the issues during the integration process.

5. CONCLUSIONS

The premise of this analysis has been to test the assumption that airlines can exploit economies of scale and scope after a merger by consolidating their networks while maintaining or increasing their traffic levels. For this purpose, the two most recently concluded mergers of major American carriers, United-Continental and Delta-Northwest, were analyzed from a supply and demand perspective. The analysis has revealed a number of substantial differences between the two cases that show how airline mergers can take very different shapes with regards to network structure depending on the complementarity of the individual networks. Yet there are also similarities that can help to answer more general questions about airline mergers.

When contrasting the results of Sections 3.1 and 4.1, we can see the different paths that Delta-Northwest and United-Continental have taken on the supply side to integrate their respective networks. On an aggregate level, the most notable difference is that Delta-Northwest cut total system capacity as measured in ASMs while this metric has remained virtually constant at United-Continental. A closer look at how capacity changes have affected the respective airlines' hubs shows an even more drastic difference. In the case of Delta-Northwest, we have seen clear capacity consolidation at the major hubs with ATL now accounting for over 40% of total system capacity. At the same time, Delta has downsized a number of hubs, primarily CVG and MEM, and cut point-to-point services bypassing the hubs. So overall, there is clear evidence that the combined airline is pursuing a consolidation strategy to reduce or eliminate redundant hubs and strengthen its primary hubs to exploit the economies of scale and scope outlined in Section 1.

United-Continental, on the other hand, has pursued a different strategy. While some capacity shifts have taken place, the role of its domestic hubs within the network remained relatively unchanged. Other than a reduction of international capacity at DEN, no downsizing has taken place at any of the hubs while the majority of hubs has seen a shift to more international capacity. A closer look at the original

networks of the two carriers involved in each merger provides a possible explanation for these different approaches. Delta already operated a large centralized hub at ATL whereas United and Continental merged two networks with several hubs of roughly equal size.

Furthermore, the geographical distribution of the United-Continental hubs is very different from that operated by Delta-Northwest. The hubs that saw the most substantial downsizing, MEM and CVG, are located within a few hundred miles of much larger hubs and therefore became more or less redundant as the hub density increased in a combined network. United-Continental, on the other hand, operates hubs with a much larger geographic spread and therefore, experienced less overlap once the networks were integrated. Even the hubs that are relatively close to each other, such as EWR-IAD and SFO-LAX, were in a better position to survive since they serve large local markets as well, which can not be said for MEM, CVG or SLC. Instead, Delta has also focused capacity at major local markets by building up substantial capacity at both JFK and LGA.

These results show that network integration of major legacy carriers operating multiple hubs can take a variety of shapes depending on several factors like:

1. The original size of the hubs
2. The geographic location of the hubs with respect to each other
3. Whether the hub is also serving a major local market

Differences concerning these three points provide part of the explanation why both carriers have chosen different paths to pursue the network revenue effects outlined in Part 1 of this analysis. The other factor distinguishing the two cases is timing. As stated in Section 3-1, Delta and Northwest completed their integration during the recession and capacity was cut across the industry over the same period of time. So the combination of its initial network characteristics and the exogenous economic effects provide a reason for why Delta-Northwest cut total system capacity while United-Continental maintained their previous levels after significant capacity reductions during the years leading up to the merger.

Nonetheless, the two mergers display a number of similarities that are aimed to realize cost and revenue effects described in the introduction. Both Delta-Northwest and United-Continental have increased the share of domestic flights operated by regional partners. The share of these partners at the respective hubs also aligns with the relative importance of the hub in the network. Downsized or minor hubs like MEM and CLE show a much higher share of regional carrier flights than international gateways like EWR or ATL. In both cases, it is clear that the airlines sought to benefit from the better cost structures offered by regional partners and reduce capacity by utilizing their smaller aircraft.

Another similarity can be found in the growing intra-hub traffic in both networks. This trend clearly shows the effort to maximize the number of available O-D markets served and the number of available frequencies offered by the combined carriers. As stated at the beginning of this thesis, these metrics provide good indicators for the quality of service in a market and should help the airline to increase its market share.

While it has been shown that the strategies used in both mergers were designed to take advantage of cost and revenue economies of scale, the analysis has also revealed that neither of the airlines has succeeded in growing or maintaining its traffic over the same period of time. Both airlines saw their total traffic decrease over the periods analyzed: Delta-Northwest by 13% and United-Continental by 4%. Recall that United-Continental did not reduce its capacity while Delta's total system capacity shrank by only 10%. Although this appears to contradict the underlying assumption of this analysis, a number of external factors need to be considered when evaluating these changes. Delta and Northwest merged during a prolonged recession that had negative effects on airline traffic worldwide. United-Continental, on the other hand, experienced several operational problems including computer system failures and poor on-time performance that turned away customers. From the data used in this analysis, we cannot determine the magnitude of these effects on reducing traffic. But some negative consequences are likely, particularly in the case of Delta-Northwest and the recession where traffic decline was strongest in the geographic areas with the lowest average rates of economic growth.

The more detailed analysis of traffic patterns in Sections 3.2 and 4.2 has also revealed trends that ultimately align with the theories of network consolidation as well as economies of scale and scope. Delta lost a significant number of passengers in markets where point-to-point services were abandoned or reduced. Strategically, removing these services and routing them via the major hubs would provide precisely the scale and scope advantages that we have identified as the objective of network integration. Within the time frame of the analysis, Delta has not been able to recover these passengers on its connecting services but further study of the traffic patterns from 2010 onwards is needed to determine whether such a shift simply requires a longer time frame. The relatively small decline in connecting markets compared to nonstop already points to similar effects reflecting the increased reliance on Delta's major hubs.

Section 4.2 showed that United-Continental recorded decreasing domestic traffic across the board including in its largest O-D markets. Due to the absence of reliable data on international passengers, it is not possible to determine with certainty whether more lucrative international passengers have also replaced domestic passengers. But the clear tendency in the network with international capacity growth from virtually all of the hubs provides a good indicator that international traffic will likely be increasing as well. Considering the simultaneous decline in domestic capacity, the logical conclusion would be that the relative share of international traffic in United-Continental's network is increasing. Further study based on proprietary airline data would be needed in this area to confirm this theory.

To sum up, the analysis of the two most recently concluded major airline mergers in the United States has confirmed the theoretical framework with regards to the supply side while the demand effects remain inconclusive. In both cases, network integration has increased size and scope of operations at the major hubs within the constraints set by the original independent networks. So it is safe to speak of consolidated networks where strengths have been amplified and redundancies have, at least to some degree, been reduced. Within the time frame covered by the analysis, both of the new combined carriers have been unable to return to their pre-merger traffic levels. The analysis did not consider the general

effects of increased capacity discipline on the US airline industry or the development of average fares during this process. Additional research is needed to determine whether the decrease in traffic primarily represented low-fare passengers that did not have a major impact on the airlines' bottom line.

In addition to the influence of exogenous factors on traffic described in previous sections, another possible explanation could lie in the time frame of the analysis. Two years after the conclusion of its merger, Delta Airlines reported a $1.6 billion profit for 2012 and expects "solid improvement" for 2013 and the merger is widely considered to be a great success story. (Reuters) So an expanded time frame beyond the technical completion of a merger could lead to very different results with regards to post-merger traffic. Considering a longer time frame would not only limit the effects of singular exogenous factors on the results but also account for a possible delay in the passenger response to the "new" airline.

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