

# AIRLINE ECONOMIC ANALYSIS

2018-2019 EDITION

TOM STALNAKER  
GRANT ALPORT  
ANDY BUCHANAN  
AARON TAYLOR



# CONTENTS

<b>EXECUTIVE SUMMARY</b>	<b>3</b>
<b>REPORT METHODOLOGY</b>	<b>6</b>
<b>REVENUE</b>	<b>8</b>
Revenue Versus Gross Domestic Product	9
Operating Revenue	9
Revenue Drivers	9
Profitable Pacific?	16
<b>COST</b>	<b>17</b>
Increase in Costs	18
Domestic Unit Cost Trend and Gap	18
Domestic Cost Performance	18
An Uncertain Future for Jet Fuel Prices	21
<b>PROFIT</b>	<b>22</b>
Hanging Onto Profitability Amid Declining Margins	23
<b>BUSINESS CYCLE REVIEW</b>	<b>25</b>
Aligning Capacity and Demand to Drive Margins	26
<b>WORLD CAPACITY TRENDS</b>	<b>28</b>
The Global View	29
<b>OPERATIONAL RESILIENCE</b>	<b>31</b>
Why Resiliency Matters	32
On-Time Performance	32
Is Regulation a Solution?	33
Improvements Underway	33
<b>APPENDIXES</b>	<b>37</b>
Revenue Appendix	38
Cost Appendix	47
Profit Appendix	52
Business Cycle Appendix	55
World Capacity Appendix	57



# EXECUTIVE SUMMARY



In 2018, airlines in the United States stretched their unbroken string of operating profits to eight years, but they're now facing tough choices as costs increase and margins narrow. While persistently strong demand for air travel is pushing many carriers to add capacity, the additional routes and service are making pricing more competitive and putting pressure on yields.

Airline operations also face mounting obstacles to sticking to their published schedules. For carriers, it's coming down to a battle of growing capacity and revenue versus maintaining operational resilience. With predictions of a global economic slowdown in 2019 and 2020, remaining profitable may become more of a test.

For the year ending in September 2018, the average carrier margin declined to 8.5 percent as higher operating costs began to offset rising revenue. That's down 2.1 percentage points from the previous 12 months, and it marks the third straight year that US airline margins have contracted.

Moving forward, profit growth may be constrained by political instability and government-required compensatory costs from delays and cancellations — particularly in Europe, where the EU 261 regulation penalizes carriers on behalf of passengers. Although not reflected in this analysis, the 35-day shutdown of the US government that began December 22 cut into airline revenue in 2018's fourth quarter; it will have an even bigger impact on first quarter 2019, when most of the stoppage took place.

The fallout from contentious Brexit negotiations over the United Kingdom's withdrawal from the European Union also is likely to affect the industry. Recently, uncertainty around Brexit has caused some airlines to issue guidance on lower revenue. In October, the International Air Transport Association also warned that Brexit "could potentially have considerable implications for all players in this important aviation market."

On the plus side, the industry is benefiting from a sizable drop in jet fuel prices from October to December. Although prices began to creep up in first quarter 2019, the US Energy Information Agency (EIA) forecasts average oil prices at a manageable \$60 a barrel, with jet fuel about \$2 a gallon through May. Prices could trend upward after that.

## BIG CHALLENGES AHEAD

The challenges facing airlines go beyond figuring out how to manage growth and stay profitable. Growth strategies need to prioritize operational

resiliency as well, especially as customers demand more service and reliability from airlines. Also, the impact of capacity growth on an already severely constrained infrastructure — both in the air with overworked air traffic controllers and on the ground with overly congested airports — must be addressed. In addition, the airline industry will likely contend with mounting pressure from governments and the public to reduce greenhouse gas emissions, even as available seat miles (ASMs) rise. Finally, as the longest rebound on record runs out of steam after 10 years, the industry faces the prospect of sluggish economic growth of less than two percent annually in North America and Europe as well as slower expansion globally.

Based on current trends and pressures, the operating margin for US airlines is expected to narrow to between five and six percent in 2019 — a margin that is less than 40 percent of the industry's peak of 15 percent in 2015. Ironically, this margin squeeze began during a period of falling oil prices: In January 2016, prices per barrel slid to around \$35 from a high of more than \$110 in 2014. Although prices quickly recovered to above \$50, they have not returned to the \$80-plus levels they had maintained between mid-2009 and October 2014.

Fuel makes up about a quarter of total operating costs for carriers and represents the industry's second-largest expense. Even so, the pattern makes it clear that many factors other than fuel — most notably labor, the No. 1 expense, and capacity — affect profitability as much or more than fuel over the medium to long term.

## THE IMPACT OF MORE CAPACITY

This year's Oliver Wyman Airline Economic Analysis (AEA) reinforces earlier findings that adding capacity at a pace faster than US economic growth has contributed to carriers' eroding margins over the past several years, a situation likely to continue until a balance between supply and demand is restored. In 2014, capacity began to expand faster than the US gross domestic product (GDP) — much faster, in fact. That year, GDP grew 2.5 percent versus capacity growth well above three percent. By 2015, capacity growth was peaking above four percent, while GDP was 2.9 percent. Industry margins also peaked that year at 15 percent, helped by oil prices that averaged around \$50 a barrel.



In 2016, GDP took a sudden slide to below two percent as the trade deficit ballooned and oil prices plunged. While airline capacity growth also began to slow, it failed to match the drop in GDP. That's when margins began to fall despite lower oil prices. The capacity numbers suggest that the industry has not always exercised the discipline it sometimes boasts of achieving and that it will experience shrinking margins until real capacity discipline returns.

One caveat: While margins have declined in recent years, they are still higher than they were from 2010 to 2013, when they were six percent or lower. The fact that margins were in the teens from 2015 to 2017, even though on the decline, reflects the impact of lower oil prices.

## EXPANDING TO THREE CATEGORIES

This year, for the first time, the Airline Economic Analysis is dividing US airlines into three categories instead of two — Network, Value, and Ultra Low-Cost — to create groupings that better represent common characteristics. The expansion in categories reflects changes in the industry, such as cost structures, reliance on ancillary revenue, and dependence on international revenue. That created the need to split the Value category, creating a third to

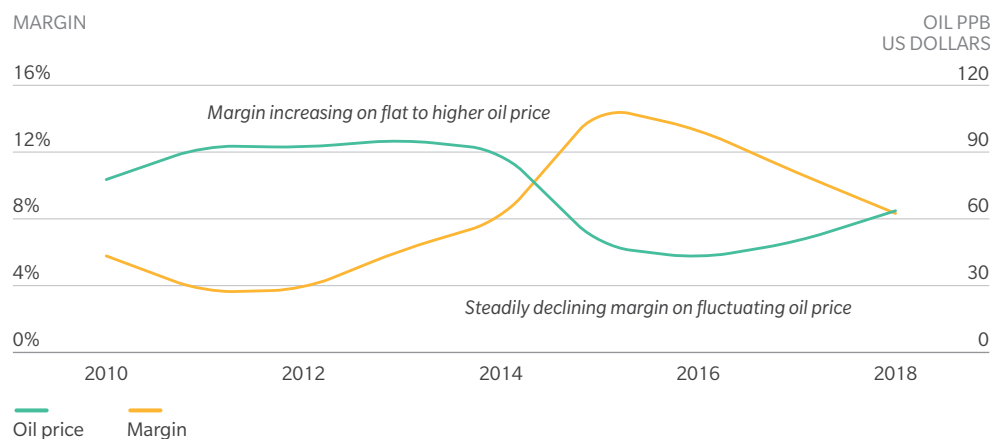
accommodate the emergence of the newer Ultra Low-Cost Carriers (ULCCs).

Of the three categories, Value airlines achieved the best operating margin in the third quarter 2018 — 11.9 percent. Network carriers realized a 7.5 percent margin, while the ULCC group's operating margin was 6.5 percent. During the third quarter, Network carriers increased capacity 3.8 percent, Value carrier capacity rose 5.1 percent, and ULCC capacity grew 16.2 percent.

Capacity growth for all three carrier groups has ensured steady revenue growth, particularly when it comes to international routes. AEA data show international revenue growth outpacing domestic. Revenue from domestic flights for all three categories grew over the 12-month period ending in September 2018.

There's no doubt that the rising demand for air travel is encouraging airlines to focus on the need for new capacity and the potential to expand revenue and market share — even if such moves mean sacrificing margins and reducing yield. While airlines remain profitable, the prospect of slowing GDP may force carriers to reassess capacity expansions, especially given rising pressures on operations from that rapid growth. Indeed, the industry's biggest risk over the next decade may be failing to strike the right balance between capacity and profitability at a time when managing operations grows increasingly difficult.

**EXHIBIT 1: US AIRLINE INDUSTRY MARGIN AND OIL PRICE PER BARREL, 2010 THROUGH Q2 2018**



Source: Form 41 and Energy Information Administration accessed at eia.gov

# REPORT METHODOLOGY

This year, for the first time, the AEA will divide the passenger airlines it tracks into three categories — Network, Value, and Ultra Low-Cost. Although for years we have used only two categories, Network and Value, structural changes in the industry in the United States have made that division less relevant and meaningful. The result of expanding to three categories means that the members of each grouping share more commonalities.

The categories reflect business model similarities, based on financial and operational characteristics. For example, all carriers in the Network group produce the highest unit revenue as well as have the highest cost structure, while Ultra Low-Cost Carriers (ULCC) have the lowest. Also, among the metrics used to determine categories are domestic revenue per available seat mile (RASM) and cost per available seat mile (CASM).

On an operational basis, the Network group now includes only those carriers with a large

international presence in all three major world regions — Atlantic, Latin, and Pacific.

## AIRLINES TRACKED

Below is a list of all the US passenger airlines in their respective categories for which data are tracked and analyzed by the report.

A substantial part of our financial analysis is based on US Department of Transportation Form 41 data. This data include transport-related revenue and expenses, mainly related to regional partners and codeshares.

To facilitate a fair comparison of airlines, we exclude transport-related categories from the Revenue and Cost sections of the report. However, recognizing that a substantial portion of Network carriers' business design is based on regional partner feeds and codeshare participation, the Profit section includes the Form 41 Transports category where that information is reported. Throughout the report, we refer to



### NETWORK CARRIERS

American  
Delta  
United



### VALUE CARRIERS

Alaska  
Hawaiian  
JetBlue  
Southwest



### ULTRA LOW-COST CARRIERS

Allegiant  
Frontier  
Spirit



the non-standard terms RASM<sub>xT</sub> and CASM<sub>xT</sub>. The “xT” portion of the terms indicates that we have eliminated transport-related revenue and expense.

We have also updated the format of our report. Our written analysis has been trimmed to focus on the most relevant and significant trends and charts. More detailed analyses for each section are now gathered in appendixes at the end of the report.

As it has in past years, the report combines historical data for merged airlines including

American/US Airways; Southwest/AirTran; Delta/Northwest; United/Continental; and Alaska/Virgin America. This report focuses almost exclusively on US carriers, based on the availability of reported regulatory data. However, in the World Capacity section, we provide an expanded review by geographic region.

Lastly, totals between charts and text throughout the report may vary slightly because of rounding used in the text.

**EXHIBIT 2: DOMESTIC RASM<sub>xT</sub> VERSUS CASM<sub>xT</sub> FOR THE 10 CARRIERS, Q3 2018**



Source: Planestats.com > Form 41 Financials > P 1.2 Income Statement



# REVENUE





## REVENUE VERSUS GDP

US airline revenue has recovered since 2016, following two years of flat to declining performance. Since the third quarter of 2016, airline revenue is up 14 percent. This revenue expansion has been driven by 10.1 percent growth at passenger carriers and 32.1 percent growth at cargo carriers.

Exhibit 3 depicts the relationship of US airline revenue to US GDP. Over the past 15 years, airline revenue growth has been significantly less stable than US GDP growth, but has still outperformed it most of the time since 2005.

## OPERATING REVENUE

The highest revenue growth was in the international segment, which outpaced domestic revenue growth across all three airline groups. International revenue growth was 42.7 percent for ULCCs, 11.4 percent for Network carriers, and 10.9 percent for the Value carrier group.

Domestic revenue increased for the three airline groups as well, growing 17.6 percent for ULCCs, 9.5 percent for Network airlines, and 5.8 percent for the Value group. It should be noted that the ULCCs are adding onto a significantly smaller base, particularly in the international market, which inflates their percentage growth.

Overall, Network carrier revenue grew 10.3 percent year-over-year. Revenue for the Value carriers rose 6.2 percent. Despite international revenue growth of 10.9 percent, international makes up just 9.2 percent of total revenue in the Value group. The international portion is up 0.4 percentage point year-over-year.

The ULCC group produced year-over-year revenue growth of 18.9 percent and now accounts for 4.1 percent of US airline revenue, despite producing 9.1 percent of available seat miles (ASMs) for the combined three groups.

International revenue growth outpaced domestic growth for all three carrier groups. For Network carriers, international revenue represents 41.6 percent of total revenue. It was up 0.4 percentage point for the 12 months ending September 2018 over the same 2017 period.

## REVENUE DRIVERS

For the 12 months ending in September 2018, capacity was the largest driver of Network carrier domestic revenue, producing 49.3 percent of total revenue growth, or \$1.4 billion in new revenue. Yield was the second-largest driver, accounting for 28.2 percent, or \$398 million.

Fees, which ended up as the third-largest driver, produced 19.3 percent of revenue growth, or \$273 million. However, that contribution was only because American Airlines adjusted the way it reports miscellaneous revenue.<sup>1</sup>

For Network carriers, a 0.7-cent yield increase provided \$510 million of growth in international operations during the year ending in September 2018, despite depressed Pacific results. Again, the reporting adjustment by American Airlines contributed to a \$321 million year-over-year increase in revenue.

For Value carriers' domestic revenue, a 4.9 percent increase in ASMs produced \$384 million in year-over-year revenue growth. A slight rise in yield, up 0.2 cent, provided an additional \$114 million in revenue. The increases were partially offset by a decrease in load factor, reducing revenue by \$61 million.

International capacity growth for Value carriers added \$50 million during the third quarter. Yield increased 0.4 cent, boosting revenue by \$27 million.

ULCC domestic revenue followed a similar pattern to both Network and Value carrier groups, with capacity growth producing more revenue gain than the other categories. ULCC domestic ASMs were up 14.8 percent (\$126 million). Growth in fees provided an additional \$73 million in revenue during the third quarter. Load factor and yield both spurred slight gains.

Price and volume drivers for ULCC international operations are more difficult to analyze because of the small sample size. ASMs grew 38.3 percent, or \$18 million, while load factor fell 2.2 points, or \$2 million. The expansion of Latin America and Caribbean service is driving ULCC international growth.

Exhibit 5 shows the split in capacity growth between domestic and international markets by carrier group. For all three carrier groups — Network, Value, and ULCC — domestic ASMs have increased at least 4.9 percent year-over-year. Domestic capacity outpaced GDP growth of 3.4 percent during the 12 months ending September 2018 for all three groups.

<sup>1</sup> During the third quarter 2018, American Airlines reclassified about \$321 million from Transports to Miscellaneous Revenue.

Unlike the Value and ULCC groups, Network international capacity growth was lower than for domestic growth.

Exhibit 6 looks at capacity growth by individual airline and shows the diverging strategies employed by each carrier. Within the Network carrier group, Delta and United are growing domestic capacity significantly more than US GDP growth, at seven-plus percent and 6.6 percent, respectively. By contrast, American has increased domestic capacity 2.8 percent and overall capacity 2.6 percent.

Among the Value carrier group, only Southwest grew domestic capacity at a rate comparable to GDP growth. It expanded by 3.8 percent. Other Value carriers, Hawaiian and JetBlue, increased domestic ASMs more than seven percent. Alaska increased domestic capacity 4.9 percent. Unlike the other Value carriers, Alaska decreased international capacity during the quarter.

Year-over-year, ULCCs as a group significantly boosted capacity. Both Frontier and Spirit increased international ASMs more than domestic ASMs, admittedly on a small base. Frontier expanded its international capacity by about 30 percent and domestic by about seven percent. Spirit, the most aggressive on capacity of all the carriers, increased its international capacity by more than 40 percent and domestic by more than 20 percent. Allegiant grew domestic and international by about 13 percent.

The impact of domestic capacity growth can be seen in relatively slow domestic yield growth. For the Value and ULCC carrier groups, domestic yield rose less than two percent, at 1.4 percent and 1.7 percent respectively.

International yield for the Network group increased at the greatest rate, up 5.4 percent, while the ULCC group logged the slowest growth rate in international capacity.

Performance since 2016 shows that Network carriers have increased and maintained yield, while Value carriers at least stopped the decline in their yields. The ULCC yields appear to have stabilized, following a decline.

Exhibit 9 shows Network carrier yield by region since 2009. System yield is now back to 2013 levels, driven by recovery in the domestic and Atlantic regions. Latin region yield still trails 2013, but it has shown recovery since second quarter 2016. While there are signs of recovery, the Pacific region remains the laggard, with third quarter 2018 yield falling 18.3 percent below third quarter 2013.

Unlike capacity and yield, load factors remain relatively flat. With the exception of the ULCC operations, load factors remain within one

percentage point of the previous year. (see Exhibit 10).

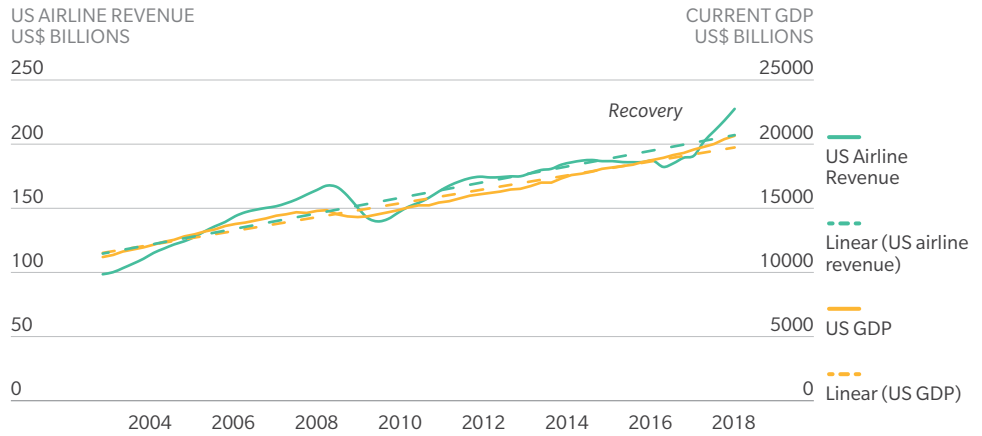
For example, Network domestic capacity grew 5.4 percent year-over-year, but Network domestic load factor increased just 0.3 point. Even the ULCC international capacity increase of 38.3 percent had just a negative 2.2 percentage-point impact on load factor. Put another way, passenger growth seems to be tracking in step with capacity additions.

Shifting to ancillary revenue performance, Exhibit 11 demonstrates the ULCC group's dependence upon fee-based revenue, with fees per segment passenger ranging from \$19.59 to \$48.01, or 25.4 percent to 42 percent of total passenger revenue. On average, the Value group passengers pay the least in ancillary fees. United reports the lowest ratio of fees to total passenger revenue, but maintains the highest ticketed revenue per segment, partially the result of having the longest average segment.

RASM growth by carrier group, shown in Exhibit 12, is split across carrier types. For Network carriers, RASM is trending toward the peak of 15.5, set in the second quarter 2014. Value carriers continue to experience flat RASM performance. Although the ULCC group's RASM performance is trending down, it shows signs of stabilizing between eight cents to nine cents.

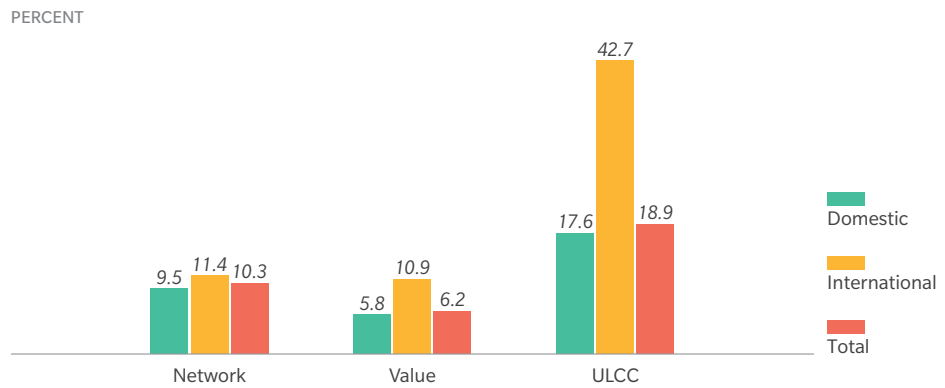
When looking at RASM performance by carrier group in Exhibit 13, the current RASM gap between Network and Value carriers of 1.2 cents is among the largest.

**EXHIBIT 3: US AIRLINE REVENUE AND GDP, Q1 2003 THROUGH Q3 2018**



Source: Planstats.com > Form 41 Financials > P 1.2 Income Statement

**EXHIBIT 4: US AIRLINE OPERATING REVENUE, Q3 2017 VERSUS Q3 2018**



Source: Mainline operations only; excludes transport-related revenue (regionals)

**EXHIBIT 5: PERCENT CHANGE IN CAPACITY (ASM), Q3 2017 VERSUS Q3 2018**

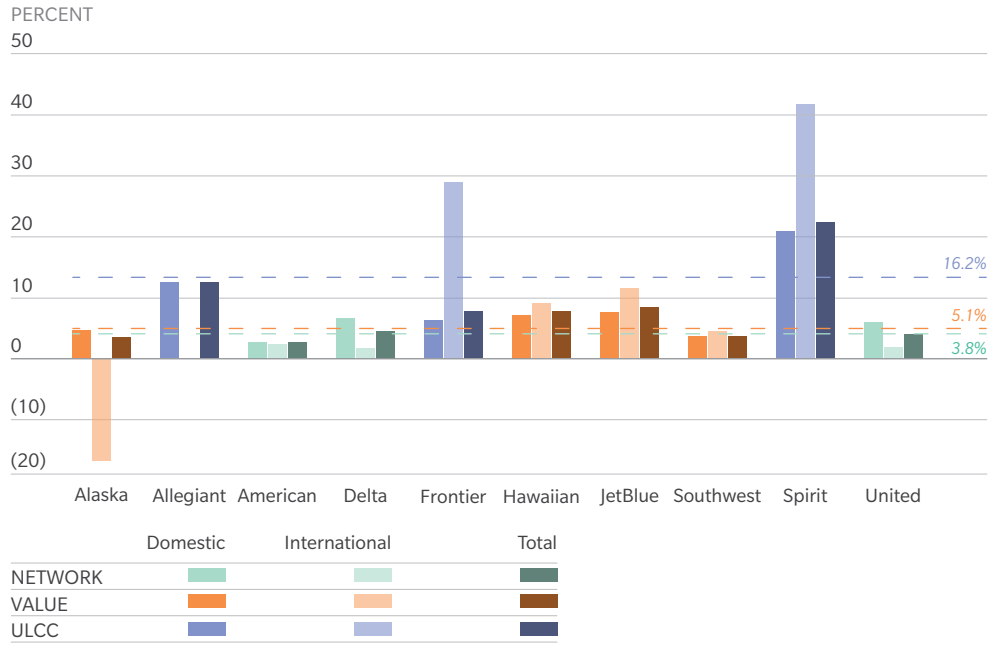
	DOMESTIC	INTERNATIONAL
NETWORK	5.3	2.0
VALUE	4.9	6.6
ULCC	14.8	38.3
<b>TOTAL</b>	<b>4.9</b>	<b>4.9</b>

Source: Planstats.com > Form 41 T2 Traffic

Note: Mainline operations only; excludes transport-related revenue (regionals)



**EXHIBIT 6: PERCENT CHANGE IN CAPACITY (ASM), Q3 2017 VERSUS Q3 2018**



**Source:** Planestats.com > Form 41 T2 Traffic  
**Note:** Mainline operations only; excludes transport-related revenue (regionals)

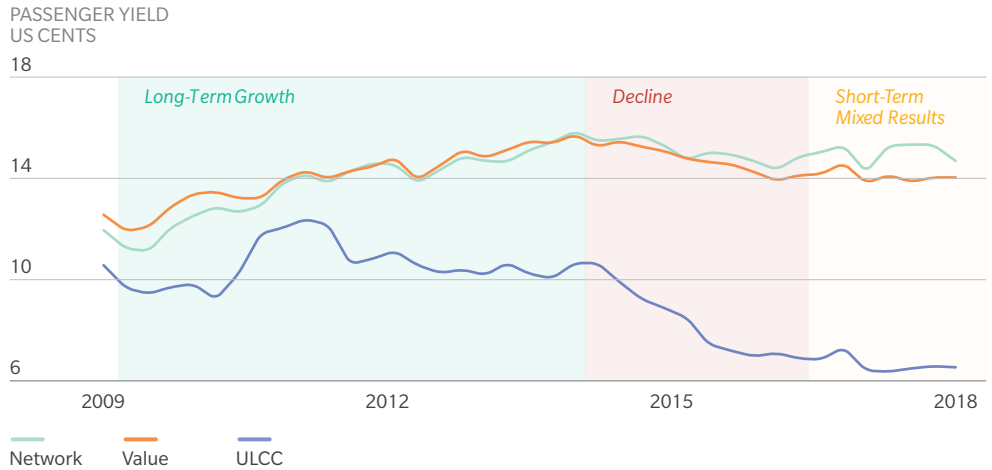
**EXHIBIT 7: CHANGE IN PASSENGER YIELD, Q3 2017 VERSUS Q3 2018**

	Q3 2017 US CENTS	Q3 2018 US CENTS	CHANGE PERCENT
NETWORK DOMESTIC	14.3	14.7	2.84
NETWORK INTERNATIONAL	13.1	13.8	5.42
VALUE DOMESTIC	13.9	14.0	1.40
VALUE INTERNATIONAL	13.0	13.4	3.35
ULCC DOMESTIC	6.4	6.5	1.69
ULCC INTERNATIONAL	5.8	5.9	1.03

**Source:** Planestats.com > Form 41 T2 Traffic  
**Note:** Mainline operations only; excludes transport-related revenue (regionals)

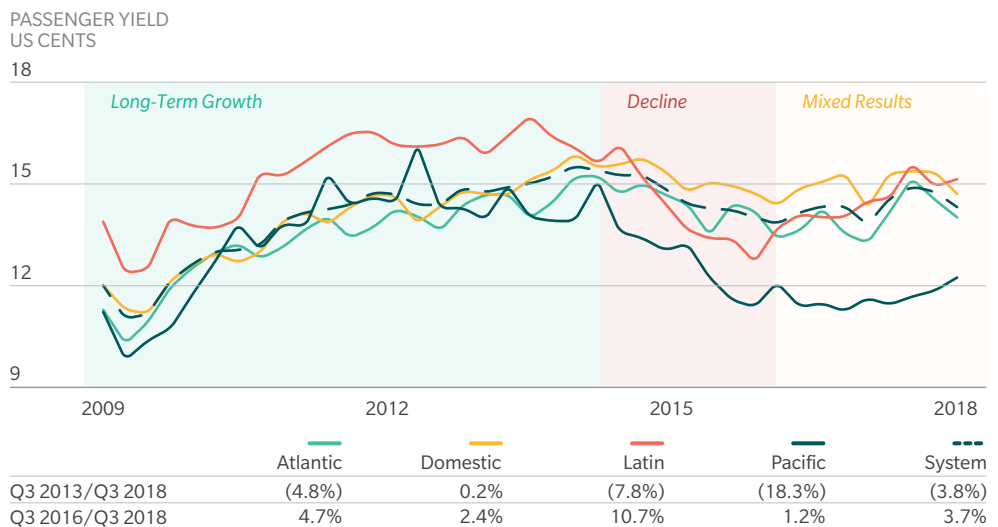


**EXHIBIT 8: LONG-TERM DOMESTIC PASSENGER YIELD TREND, Q1 2009 THROUGH Q3 2018**



**Source:** Planestats.com > Form 41 Financials > P1.2 Income Statement  
**Note:** Mainline operations only; excludes transport-related revenue (regionals)

**EXHIBIT 9: LONG-TERM NETWORK PASSENGER YIELD TREND BY REGION, Q1 2009 THROUGH Q3 2018**



**Source:** Planestats.com > Form 41 Financials > P1.2 Income Statement  
**Note:** Mainline operations only; excludes transport-related revenue (regionals)

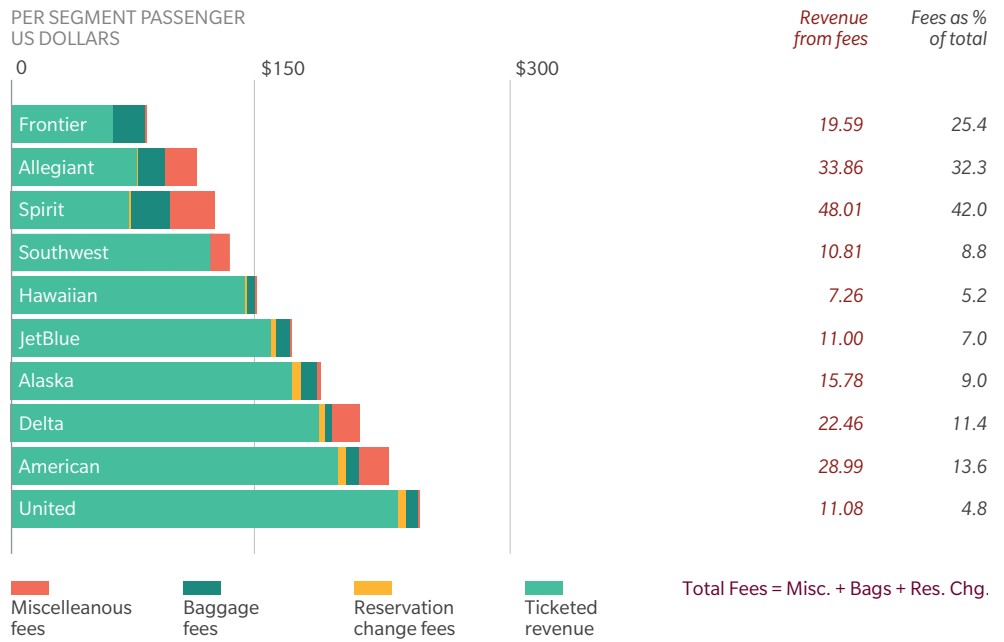
**EXHIBIT 10: PERCENT CHANGE IN LOAD FACTOR, Q3 2017 THROUGH Q3 2018**

	Q3 2017	Q3 2018	PTS CHANGE
NETWORK DOMESTIC	86.2	86.5	<b>0.30</b>
NETWORK INTERNATIONAL	84.1	84.5	<b>0.39</b>
VALUE DOMESTIC	85.3	84.7	<b>(0.63)</b>
VALUE INTERNATIONAL	84.4	84.7	<b>0.35</b>
ULCC DOMESTIC	84.8	86.5	<b>1.73</b>
ULCC INTERNATIONAL	86.2	84.0	<b>(2.22)</b>

**Source:** Planestats.com > Form 41 T2 Traffic  
**Note:** Mainline operations only; excludes transport-related revenue (regionals)



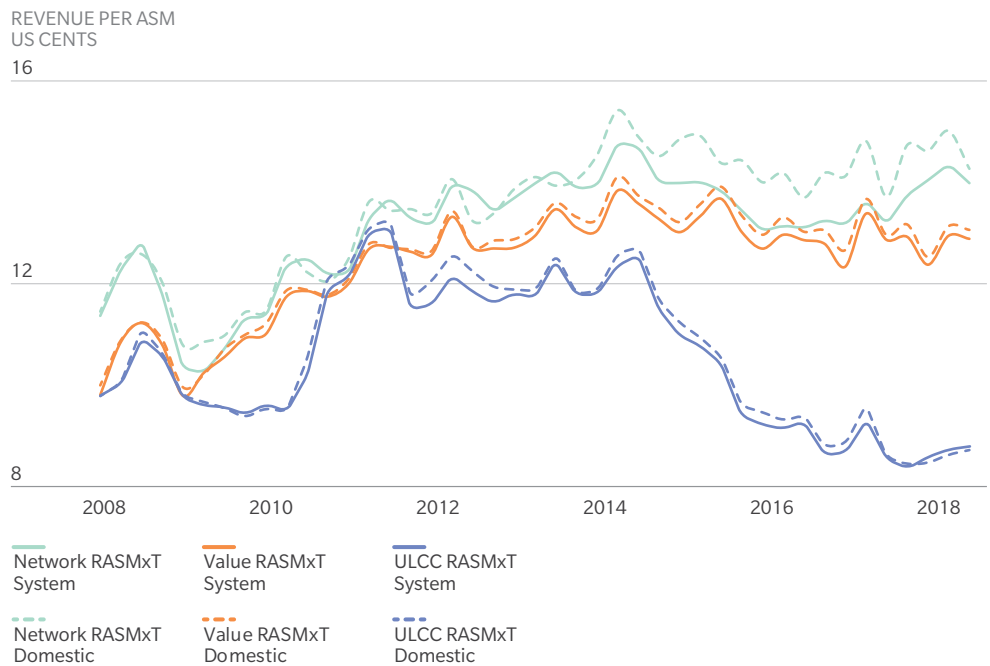
**EXHIBIT 11: THE IMPORTANCE OF SYSTEM SERVICE FEES VERSUS TICKETED REVENUE, Q3 2018**



Source: Planestats.com

Note: Adjustment made to Allegiant miscellaneous revenue, which is reported in Transports

**EXHIBIT 12: COMPARING THE DOMESTIC RASM OF NETWORK AND VALUE CARRIERS, Q3 2008 THROUGH Q3 2018**



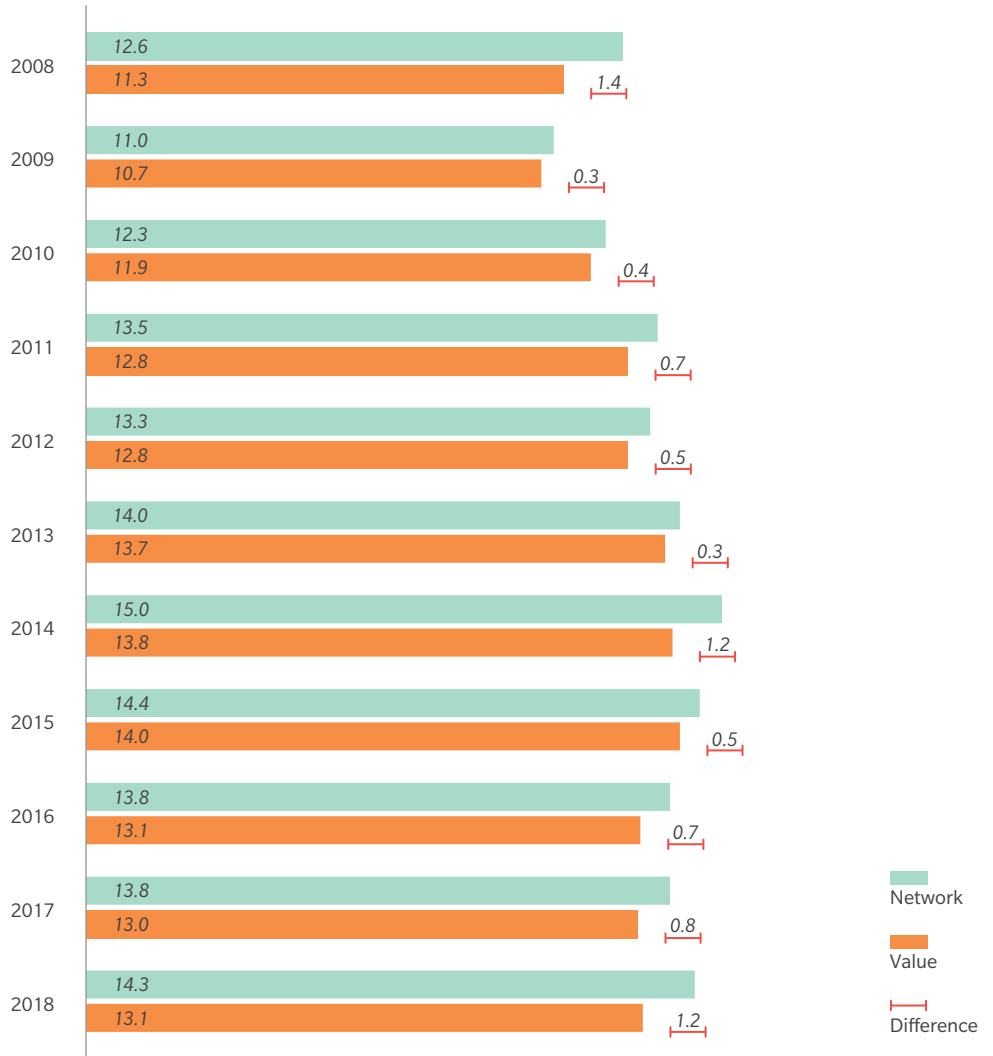
Source: Planestats.com

Note: Mainline operations only; excludes transport-related revenue (regionals)



EXHIBIT 13: COMPARING THE DOMESTIC RASM OF NETWORK AND VALUE CARRIERS, Q3 2008 THROUGH Q3 2018

REVENUE PER ASM  
US CENTS



Source: US DOT T100, PlaneStats.com

# PROFITABLE PACIFIC?

Since 2016, the Pacific operations of US-based international airlines have lost money, with an average operating margin of negative 1.2 percent. Over the same period, Atlantic operations produced an 11.7 percent operating margin, and Latin operations achieved a 7.8 percent margin. According to US Department of Transportation (DOT) data, Delta is the only US carrier to churn out consistent profit margins over the past 10 years in the Pacific.

The region's lack of profitability for US carriers can be attributed to several factors, including rapid capacity growth and the concomitant pressure on yield, increased competition, and rising carrier costs. Between 2014 and 2019, the number of seats between the US and the Pacific rose nearly 25 percent, with most of that growth coming from non-US carriers. Total passenger seats on US-China routes have more than doubled since 2014, accounting for a significant portion of the overall growth.

During the same period, Pacific market share for what are referred to as non-alliance airlines — almost all of which are non-US — increased 10 points, faster than their share growth in both the Atlantic and Latin regions. [Non-alliance carriers refer to airlines not affiliated with oneworld, Star Alliance, or SkyTeam.] The increased capacity and competition from non-US carriers, especially to China, has dampened passenger yield growth in the Pacific for US carriers.

On a stage-length adjusted basis, Pacific unit revenue was 0.6 cent lower than for the Atlantic region. Analysis of the two regions shows that a rapidly increasing stage length has affected

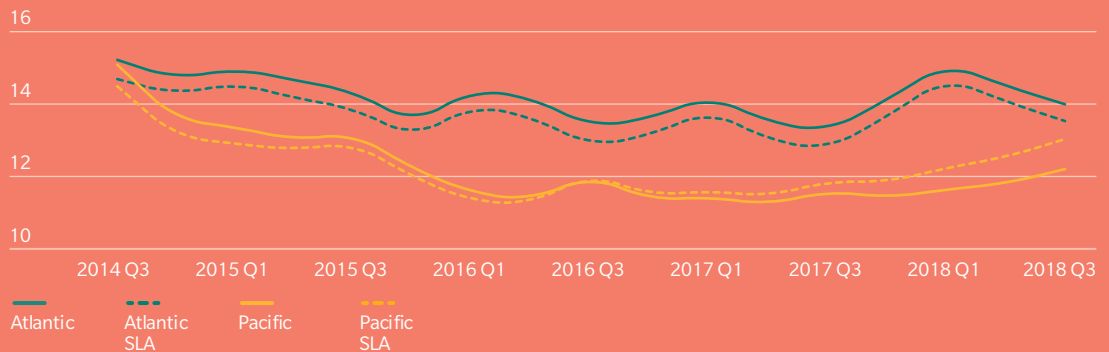
passenger yields in the Pacific as well. Since 2014, the average Pacific stage length has grown 24 percent, up more than 1,000 miles, largely because of new technology that enables aircraft to avoid congested traditional hubs, such as Tokyo's Narita International Airport.

During peak yields in 2014, adjusted and unadjusted yields were nearly equal between the Atlantic and the Pacific. But between 2016 and 2018, low unit passenger revenue hurt profitability in the Pacific. Over the period, unadjusted RASM in the Pacific was more than 1.6 cents lower than for the Atlantic, while unadjusted CASM for the two regions was essentially equal.

Finally, higher costs also reduced profitability in the Pacific. Labor made up nearly half of the increased expenses, on a stage-length adjusted basis, in the region. On average, labor costs are 13.1 percent higher in the Pacific than for Atlantic operations, according to the DOT. Fuel was also pricier in the Pacific, accounting for one-third of the cost increase over the Atlantic. Labor and fuel combined represented 80 percent of the increased cost and were higher for all carriers operating in both regions.

Reduced profitability in the Pacific region has harmed the overall operating profit for US-based international carriers. Fortunately, passenger yield for the region has begun to recover over the past several quarters as US carriers have adapted to rising competition. If the current yield trend continues, Pacific operations could finally provide greater margins for US carriers — maybe even this year.

## PASSENGER YIELD



Source: PlaneStats.com Mainline operations only. SLA = Stage-length Adjusted

# COST

**JET FUEL**  
**MAX. PRESSURE**  
**50 P.S.I.**  
**MAX. SUCTION**  
**11 P.S.I.**  
**0.8 BARS**



## INCREASE IN COSTS

Continuing the trend that began in 2017, US airlines' systemwide unit cost (excluding transport-related costs) increased seven percent year-over-year to 12.3 cents during the third quarter 2018. Network carriers, with a seven percent year-over-year rise to 13 cents, had the highest unit cost of the three groups. Value carriers saw their unit cost climb 7.6 percent to 11.6 cents. ULCCs rose 10.3 percent to 8.4 cents.

When looking only at domestic operations (shown in Exhibit A23 in the Cost Appendix), US airlines' unit cost moved up 7.1 percent, with all carrier groups seeing unit cost increases.

Higher fuel prices were the primary driver for the increase in unit costs. Network carriers' unit fuel cost jumped 30.5 percent, while Value carriers saw a 26 percent increase, and ULCC unit fuel cost soared 35.4 percent. As a result, fuel now represents 23.7 percent of operating costs for Network carriers, 25.2 percent for Value, and 31.3 percent for ULCC. Exhibit A26 in the Cost Appendix shows that the system average fuel price and fuel spot price have tracked closely since fourth quarter 2017, indicating no major hedging influence. Despite the higher prices, fuel costs trail labor, remaining the second-largest cost category for US airlines.

For the fourth straight year, labor represented the largest cost category for US airlines across all carrier groups. It accounted for 35.9 percent of Network carriers' systemwide unit cost, 36.1 percent for Value carriers, and 22.2 percent for the ULCC group. Network carrier unit labor crept up 0.9 percent year-over-year, third quarter. During the same period, Value and ULCC unit labor cost increased 3.5 percent and 15.4 percent, respectively.

Aircraft maintenance decreased 15 percent for Network carriers in the third quarter of 2018 compared to third quarter the year before. But Value carriers experienced an 8.6 percent increase in aircraft maintenance, while ULCCs remained flat. Although aircraft maintenance does affect quarterly profitability, it is difficult to analyze such short periods because heavy maintenance checks can cause swings in costs.

Aircraft ownership costs decreased for all three groups in the third quarter of 2018 versus Q3 2017, with Value carriers dropping the most at 6.8 percent. Network and ULCC slid 5.7 percent and five percent, respectively.

Other unit costs, including food, insurance, commissions, advertising, non-aircraft rentals, landing fees, and minor expenses, increased 11.8 percent for the Network carrier group and

1.5 percent for Value carriers. But for the ULCC group, these costs fell 4.1 percent.

## DOMESTIC UNIT COST TREND

Since 2008, the ULCC group has maintained relatively flat domestic unit costs, excluding fuel. The domestic unit costs decreased 5.8 percent since 2008, representing a compound annual growth rate (CAGR) of negative 0.6 percent. ULCCs are seeing a widening gap with Network and Value carriers, where unit costs have trended higher. Non-fuel unit costs at Network carriers are up 23 percent since 2008, representing a CAGR of 2.1 percent, while at Value airlines, non-fuel costs have climbed 23.2 percent, or a CAGR of 2.1 percent.

The domestic unit cost gap between Network and Value carriers is now two cents, compared with 1.7 cents in 2008. The gap between Value and ULCCs is 2.9 cents, compared with 0.9 cent in 2008, while the gap between Network and ULCCs has hit 4.9 cents, compared with 1.7 cents in 2008. This suggests that Value airlines are performing well against Network carriers, but less so against the ULCC group.

Unit fuel costs have tracked similarly across the carrier groups, with ULCCs achieving a slightly lower unit fuel cost since the beginning of 2015.

## DOMESTIC COST PERFORMANCE

On a stage-length adjusted basis, Spirit maintains its position as the lowest-cost producer in the US at 8.1 cents. Frontier and Allegiant, the other two members of the ULCC group, round out the lowest-cost producers in the US.

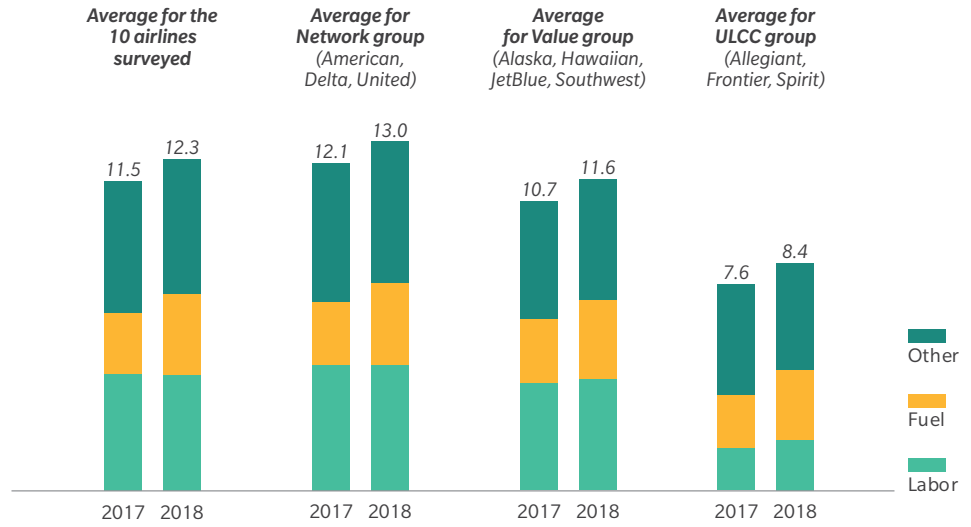
The Value carrier group falls between the ULCCs and the Network carriers. Hawaiian, at 10 cents, has the lowest domestic CASM of the Value carriers, followed closely by Southwest. JetBlue, at 12.7 cents, has the highest domestic CASM of the Value carriers. This still puts JetBlue's domestic unit cost below that for Delta.

Delta has the lowest domestic CASM of the Network carriers, at 13.4 cents. United has the highest CASM of US airlines, at 14.5 cents. The five percent gap between United and American has been increasing since 2017.



**EXHIBIT 14: SYSTEM CASM BY GROUP (EXCLUDING REGIONAL AFFILIATES), Q3 2017 VERSUS Q3 2018**

COST PER ASM  
US CENTS

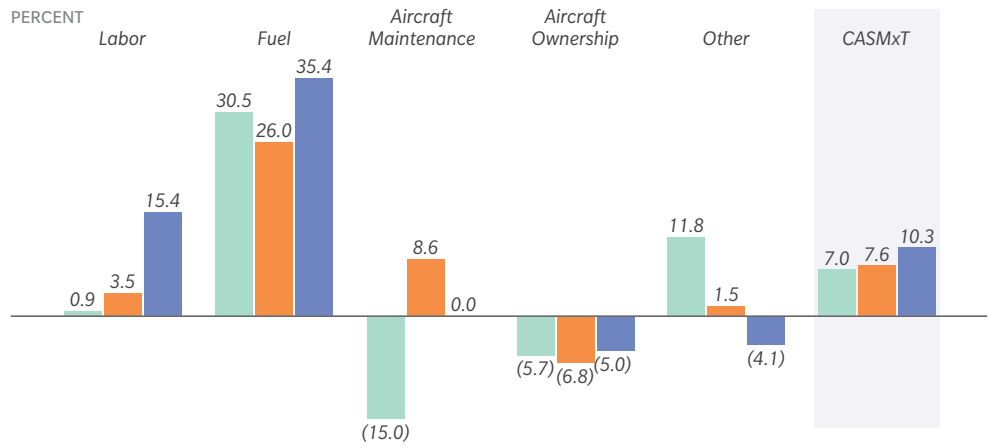


Source: Planestats.com

Note: Mainline operations only; excludes transport-related cost (regionals)

**EXHIBIT 15: CHANGE IN SYSTEM UNIT COSTS, Q3 2017 VERSUS Q3 2018**

PASSENGER YIELD  
US CENTS



PERCENT OF TOTAL COSTS

	Labor	Fuel	Aircraft Maintenance	Aircraft Ownership	Other
NETWORK	35.9	23.7	7.9	6.3	26.2
VALUE	36.1	25.2	9.9	5.9	23.0
ULCC	22.2	31.3	7.7	11.4	27.4

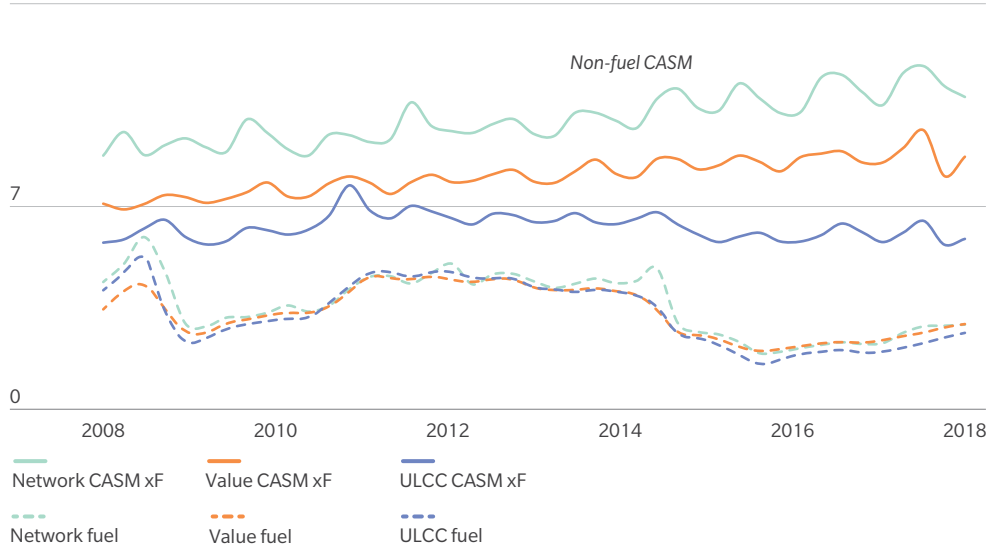
Source: Planestats.com

Note: Mainline operations only; excludes transport-related cost (regionals)



**EXHIBIT 16: GROWTH OF DOMESTIC CASM INCLUDING AND NOT INCLUDING FUEL, Q1 2008 THROUGH Q3 2018**

COST PER ASM  
US CENTS  
14

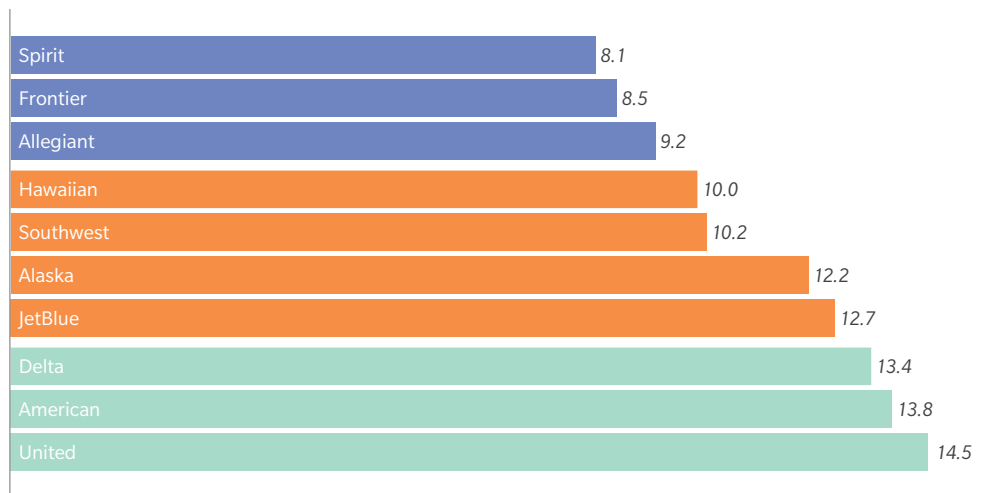


Source: Planestats.com

Note: Mainline operations only; excludes transport-related cost (regionals)

**EXHIBIT 17: DOMESTIC CASM DETAILS FOR INDIVIDUAL CARRIERS, Q3 2018**

STAGE-LENGTH ADJUSTED COST PER ASM  
US CENTS



Source: Planestats.com

Note: Mainline operations only. Excludes transport-related revenue and cost (regionals). Stage-length adjustment = CASM × (airline stage length / 1,000)<sup>0.5</sup>. Stage-length adjusting attempts to normalize airline unit costs based on the stage length flown.



# AN UNCERTAIN FUTURE FOR JET FUEL PRICES

After hitting a 10-year low at the beginning of 2016, jet fuel prices have since rebounded, boosting overall airline expenses. In third quarter 2018, fuel costs per ASM jumped 30 percent for the 10 US carriers included in the AEA study, versus fuel costs per ASM in Q3 2017. The sharp rise in fuel prices is the principal reason that overall costs shot up 8.9 percent. Breaking down the 8.9 percent rise, fuel accounted for 7.4 percent and non-fuel for the other 1.5 percent.

Based on recent trends, the average operating margin for the airline industry may fall to about five percent to six percent in 2019. That margin would be less than 40 percent of the industry's peak only four years before, in 2015.

According to the EIA, jet fuel prices hit \$2.31 per gallon in October 2018. That price was 123 percent above the spot-price low in January 2016. But oil markets were rattled by external factors such as Qatar's early December announcement that it would leave OPEC, an about-face on Iranian sanctions, an oversupply of oil, and forecasts for slower growth than anticipated in the world's biggest economies. By December 2018, the

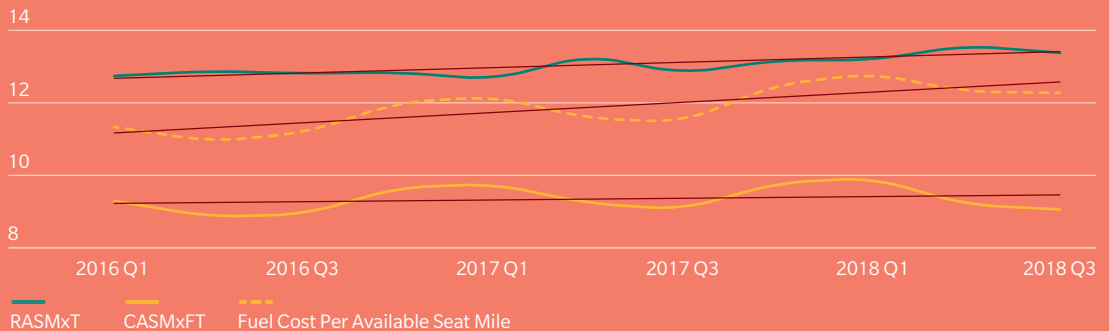
per-gallon price for jet fuel had fallen 19 percent to \$1.87.

While in 2019 prices for oil and jet fuel began creeping up again, EIA's Short-Term Energy Outlook expects them to flatten out at about \$2 per gallon through May 2019. After that, they could trend upward through the remainder of the year.

US airlines reported an average cost per gallon of \$2.21 during third quarter 2018. At that price, the system unit cost was three cents. Had the industry realized the \$1.91 a gallon forecast by the EIA, there would have been a 0.4 cent increase in profitability.

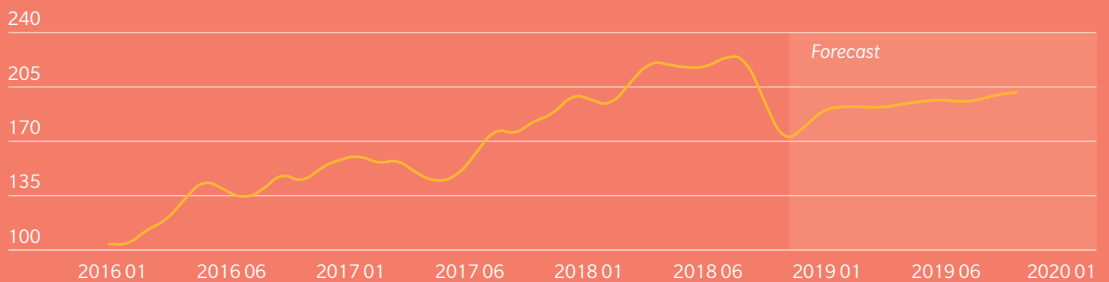
But there's generally a hazy outlook for jet fuel prices with demand for air travel rising at the same time the global economy may be slowing. Adding to the uncertainty are new environmental rules for cargo ships that compel them to use fuel with a lower sulfur content. This would put them in direct competition for the same low-sulfur distillates used by airlines and could push prices higher.

## UNIT REVENUE AND EXPENSE



Source: PlaneStats.com Mainline operations only

## FUEL COST PER GALLON (CENTS)



Source: US Energy Information Agency Short-Term Energy Outlook

# PROFIT



## HANGING ONTO PROFITABILITY AMID DECLINING MARGINS

In looking at profitability by the three carrier groups, ULCCs produced the highest operating margin from fourth quarter 2010 until fourth quarter 2015. Since the end of 2016, however, the group has the lowest operating margin of the three groups. The Value carriers have recently produced the highest operating margin, while the Network group continues to improve operating margins.

Network carrier operating profit was relatively flat, but the mix between domestic and international performance changed significantly from 2017 to 2018. Network carrier operating profit increased 0.6 percent to \$2.1 billion in third quarter 2018 over the third quarter 2017. Systemwide operating margin declined 0.8 percentage point to 7.5 percent. International profit soared 35.3 percent to \$1.4 billion, more than offsetting the 32.7 percent slide in domestic profit to \$719 million. As a result, the international margin rose to 11.9 percent, while domestic declined to 4.4 percent.

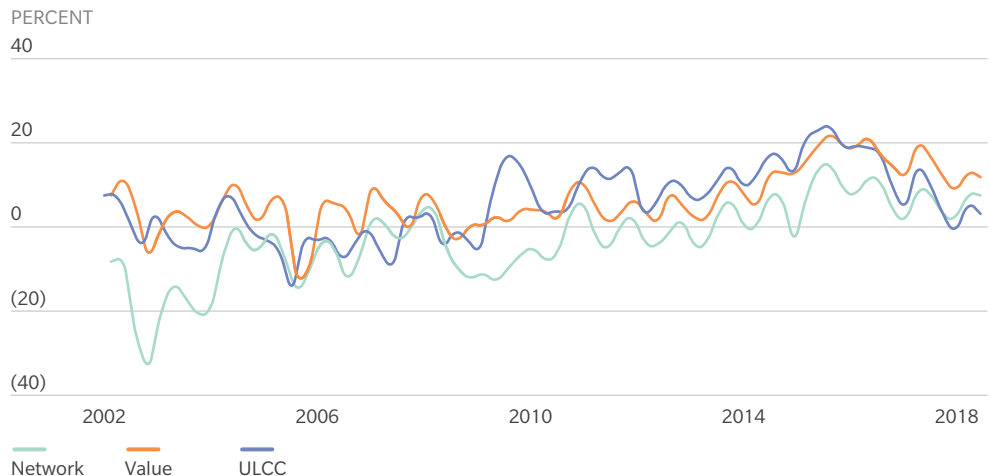
Value carriers achieved the highest operating margin of the three groups at 11.9 percent in

third quarter 2018, although that was down from 16.9 percent a year earlier. For Value carriers, domestic profit is the key source of system profit; even so, domestic profit tumbled 23.9 percent to \$1.1 billion. International profit declined 30.7 percent to \$133 million (see Exhibit 19). International flying produced the highest operating margin at 14.5 percent, compared with 11.7 percent for domestic flying.

ULCC operating profit plunged 43.4 percent from \$199 million to \$113 million, with a systemwide operating margin of 6.5 percent. Domestic flying makes up nearly all of ULCCs' operating profit. In the third quarter 2018, domestic flying produced \$106 million in profit, which was down 43 percent, while international flying produced just \$7 million, a decline of 48.6 percent.

Of the Network carriers, United has the highest exposure to the Pacific region at 33 percent of total international revenue. Delta has the highest exposure to the Atlantic region at 54 percent of total international revenue, and American has the highest exposure to the Latin America region at 44 percent of total international revenue.

EXHIBIT 18: SYSTEM LONG-TERM OPERATING MARGIN TREND, Q1 2001 THROUGH Q3 2018



Source: Planestats.com

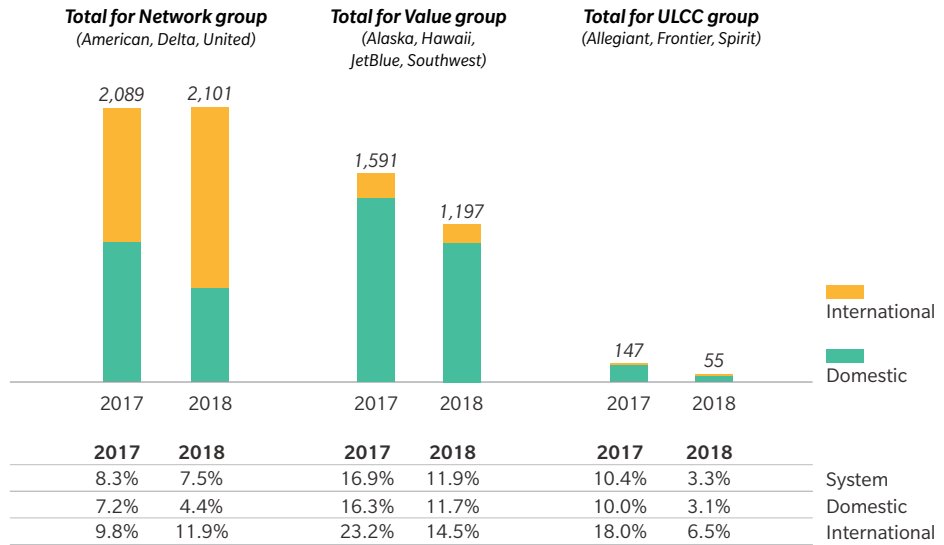
Note: Mainline operations only; excludes transport-related cost (regionals)





**EXHIBIT 19: OPERATING PROFIT AND OPERATING MARGINS, Q3 2017 VERSUS Q3 2018**

US\$ MILLIONS

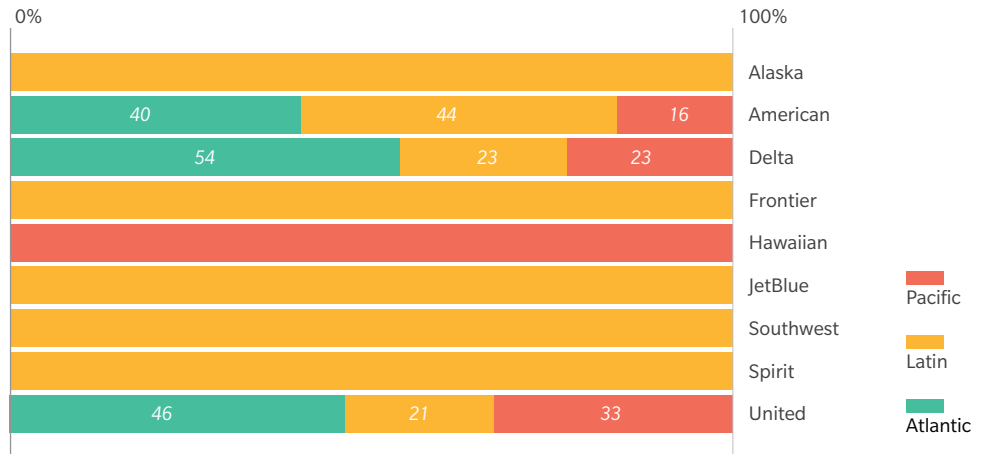


Source: Planestats.com

Note: Mainline operations only; excludes transport-related cost (regionals)

**EXHIBIT 20: INTERNATIONAL REVENUE EXPOSURE BY REGION, 12 MONTHS ENDING Q3 2018**

PERCENT OF INTERNATIONAL REVENUE



Source: Planestats.com

Note: Mainline operations only; excludes transport-related cost (regionals). Allegiant does not fly internationally.



# BUSINESS CYCLE REVIEW



## ALIGNING CAPACITY AND DEMAND TO DRIVE MARGINS

At a macro level, the US airline industry has produced profitable margins dating back to 2010. From 2010 to 2015, the U.S. airline industry produced growing margins, bottoming at four percent in 2011 and peaking at 15 percent in 2015. However, since peaking in 2015, the margin for the US airline industry has declined each year, most recently reaching eight percent for the first half of 2018.

During this period of margin contraction between 2015 and 2018, the price of oil, the industry's second-largest cost driver, dropped from the mid-\$90 per barrel range to below \$65 (and in most years was at or below \$50, as shown in Exhibit 22). Thus, the industry transitioned from a period of margin expansion on higher energy cost to margin erosion with lower energy cost.

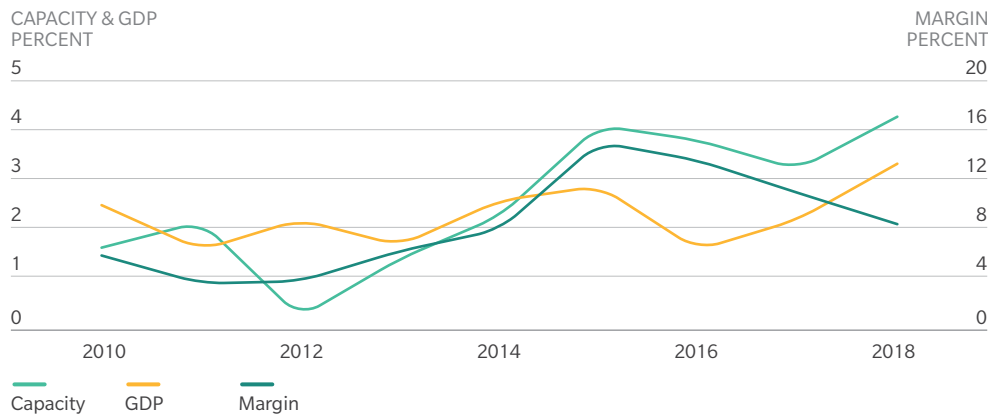
During the period of margin expansion, industry capacity growth generally remained at or below GDP growth. In 2015, as oil prices dropped, industry capacity began to grow faster than GDP. Subsequently, margin consistently declined as capacity growth continued to outpace GDP.

Prior to this period, the industry was producing its highest margins in decades, despite the industry operating in a macroeconomic environment that had previously contributed to losses (relatively high energy cost and lower/slowing GDP growth, as shown in Exhibit 22). Yet the industry transitioned from being unprofitable to producing its best returns in decades while continuing to operate in an environment characterized by higher cost and slower economic growth. This transition correlates to the period of industry consolidation.

As the industry moved through and emerged from the period of the most intense consolidation, capacity growth remained generally aligned with GDP growth and margins grew. As shown in Exhibit 23, though, the significant oil price drop in 2015 appears to have contributed to a period where the industry began growing capacity faster than GDP.

At the industry level, capacity growth aligned with GDP has allowed load factor to increase and average fares to stabilize and increase. With the recent uptick in capacity growth in excess of GDP growth, fares have fallen to maintain an average load factor of 84 percent.

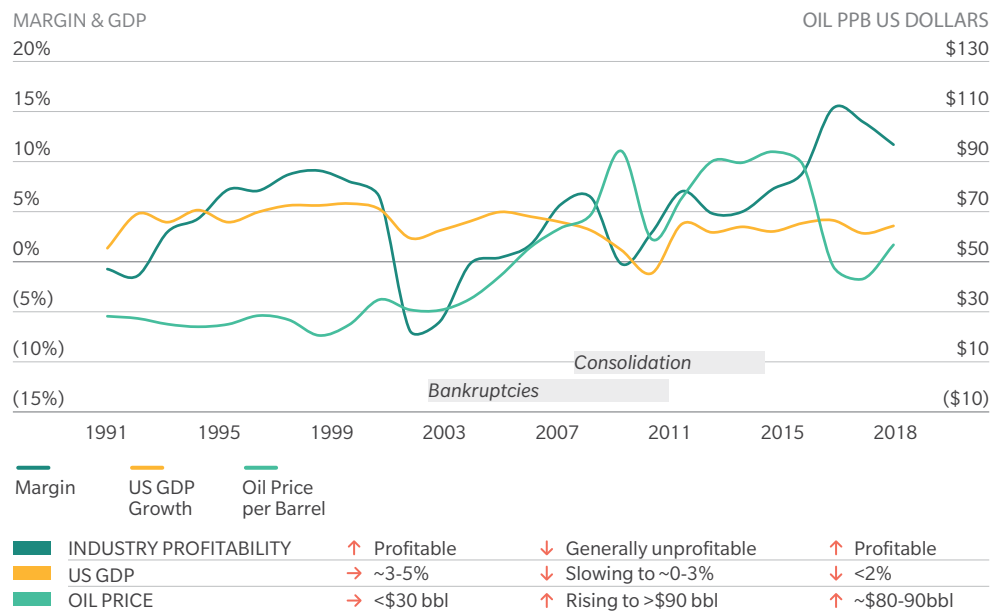
**EXHIBIT 21: US AIRLINE INDUSTRY MARGINS, GDP, AND AIRLINE CAPACITY, Q1 2010 THROUGH Q2 2018**



Source: Form 41 and Bureau of Economic Analysis accessed at bea.gov

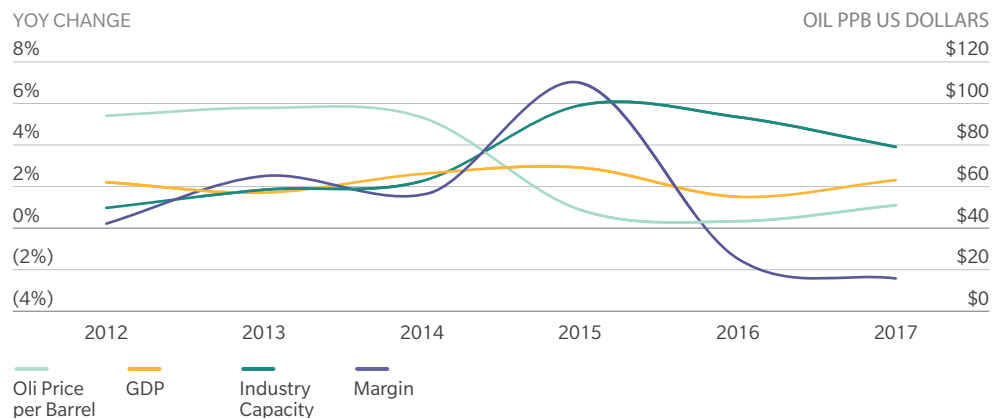


**EXHIBIT 22: US AIRLINE INDUSTRY MARGINS AND MACROECONOMIC INDICATORS, 1991 THROUGH 2017**



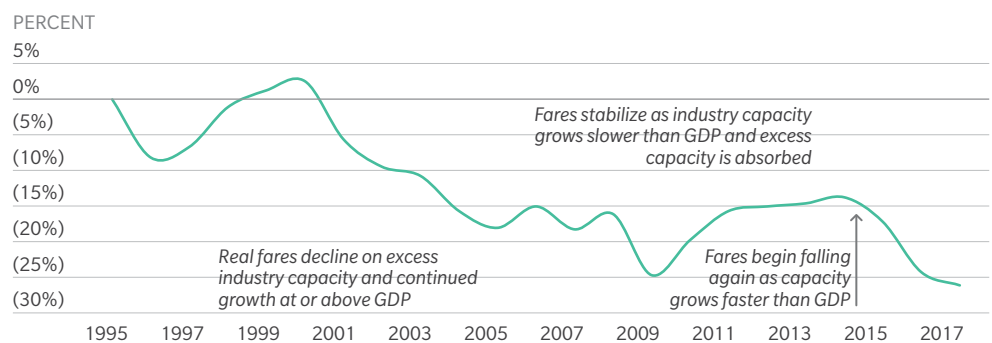
Source: US Department of Transportation, Bureau of Economic Analysis, and Energy Information Administration

**EXHIBIT 23: AIRLINE US MARGINS AND MACROECONOMIC INDICATORS, Q1 2012 THROUGH Q2 2018**



Source: US Department of Transportation, Bureau of Economic Analysis, and Energy Information Administration

**EXHIBIT 24: AVERAGE US DOMESTIC AIRFARE INDEXED IN 2017 US DOLLARS, 1995 THROUGH 2017**



Source: US Department of Transportation

# WORLD CAPACITY TRENDS



UP

CONTROL R

30



## THE GLOBAL VIEW

Capacity analysis can indicate the strength of the airlines within a region. However, healthy growth rates vary greatly by region, driven by differences in the maturity of the air travel market. The following section analyzes capacity growth across regions. Additional charts by region can be found in the World Capacity Appendix.

Worldwide, airlines added 4.3 percent more ASMs during the year ended November 2018 compared to the year ended November 2017. This growth was down from 7.3 percent between 2016 and 2017. In all regions except for Latin America, departures, seats, and ASMs all increased. In Latin America, departures declined two percent while both seats and ASMs increased.

Growth was more equally distributed than the previous year. Asia/Oceania was once again the fastest-growing region in the world, with ASMs increasing 5.5 percent over 2017. This was down from the 10 percent growth that the region achieved in 2017. The global share of Asia/Oceania ASMs increased to 34.9 percent, continuing to make it the world's largest aviation market.

North America, comprising 24 percent of global capacity, grew ASMs by 3.2 percent while departures grew by less than a percent.

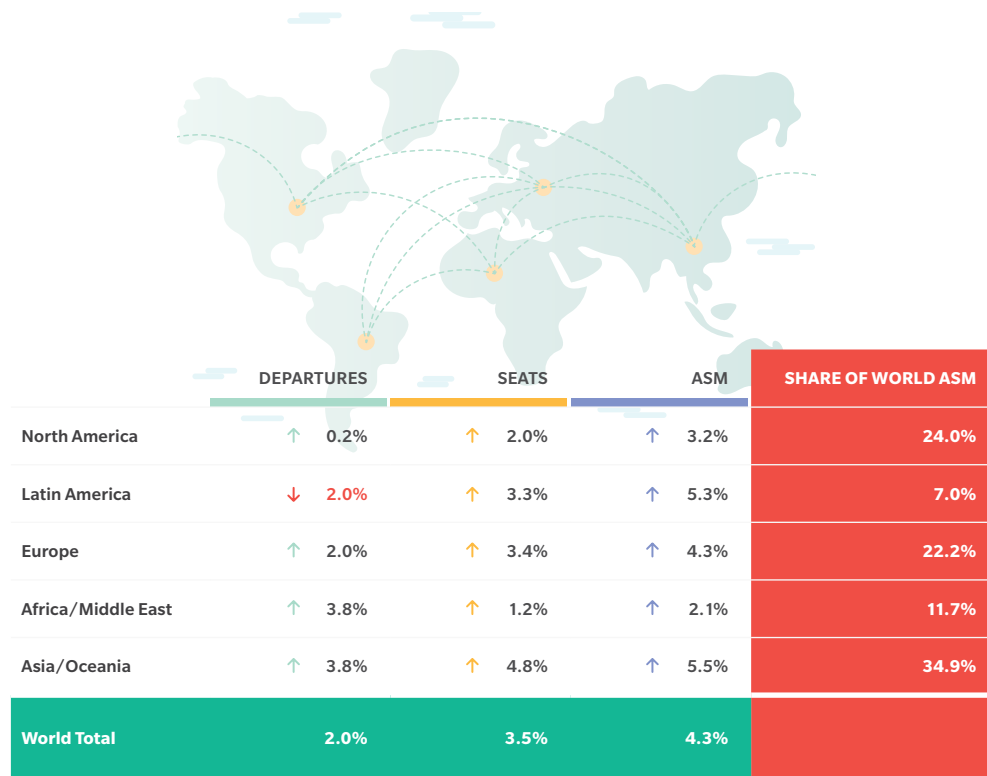
The world's third-largest market is Europe, representing 22.2 percent of total ASMs. Airlines added 4.3 percent ASMs to the European market during 2018. This was down from the 8.1 percent ASM growth in 2017.

Growth in the Africa/Middle East continued to decelerate. ASMs grew just 2.1 percent while departures increased 3.8 percent. The region now represents 11.7 percent of worldwide ASMs.

Latin America/Caribbean capacity increased 5.3 percent, surpassing the 5.1 percent growth in 2017. This ASM growth was driven by an increase in stage length (up 1.9 percent) as departures declined 2.0 percent. The region comprises just 7.0 percent of the global commercial aviation market.

Since 2009, Africa/Middle East has produced the highest capacity growth. The region's ASMs have grown 125 percent since 2009. However, as the chart shows, growth is slowing for the region. All other regions continue to produce capacity growth with Asia/Oceania closing the gap with Africa/Middle East. North America, arguably the most mature aviation market, has the lowest capacity growth since 2009 at 31 percent.

EXHIBIT 25: WORLD CAPACITY CHANGE, NOVEMBER 2017 VERSUS NOVEMBER 2018

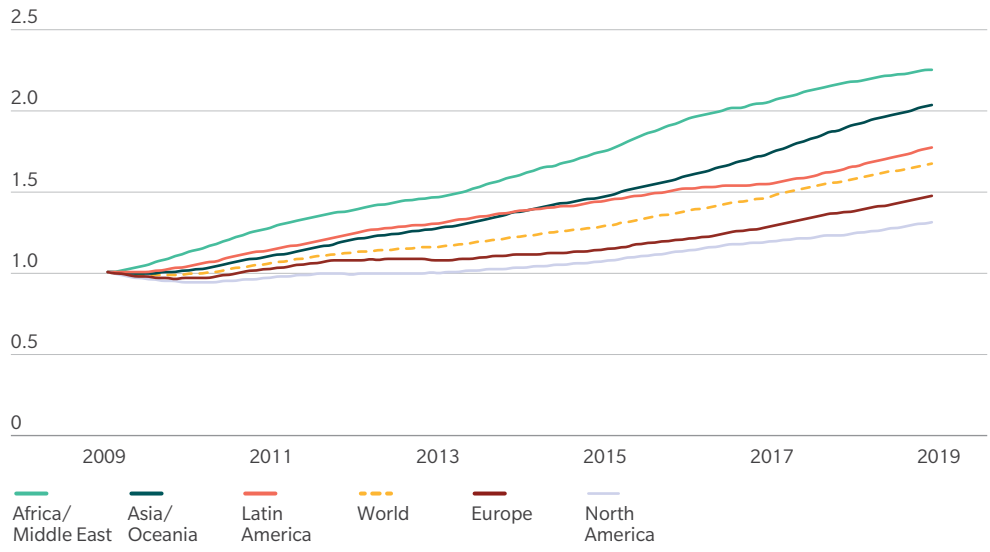


Source: Planestats.com



EXHIBIT 26: WORLD CAPACITY INDEX, 2009 THROUGH 2019

CAPACITY INDEX  
1.0 = JAN 2009



Source: Planestats.com



# OPERATIONAL RESILIENCE



## WHY RESILIENCY MATTERS

Boiled down to its essence, operational resilience is the ability of airlines to adhere to the schedules they publish, allowing for potential disruption and building in a cushion to recover when the unexpected happens. Without it, airlines would fail to meet customer expectations, put pressure on their employees, and ultimately suffer in the marketplace.

While it has always been a focus of carriers, resiliency today has become more challenging as airlines contend with increasingly congested skies and airports. In the US, according to the federal Department of Transportation, almost 36 percent of reported delays were solely from the volume of traffic; in Europe, the number exceeded 60 percent. Exhibit 27 shows the increase in the number of flights in Europe and the US since 2010.

The more capacity that airlines add, the more that bottlenecks in the system worsen and the more that airlines' operational resilience is tested, as shown by metrics that gauge on-time performance and completion factors. Much of the logjam stems from conditions beyond the control of the industry, despite its years of lobbying for change. The conditions include congestion affecting air traffic control and overburdened airport infrastructure, such as too few runways, taxiways, and gates, among other things.

Still, airlines can address operational resilience by taking a more integrated and technologically advanced approach to commercial and operational planning. Airlines are increasingly using sophisticated solutions involving machine learning and predictive analytics to increase outcome predictability and ultimately optimize decision-making.

Airlines can introduce more operational resilience into their schedules through a number of strategies, including increased block time, longer turn times, or a reduction in flying. But all of these also mean lower aircraft utilization and less revenue, potentially resulting in less competition and fewer options for customers. Airlines must constantly maintain a balance between commercial goals and reliable operations, but many are reluctant to fund operational performance by sacrificing potential financial returns. In addition, there is no guarantee that competitors will follow suit, which means a risk of losing share to rivals.

Of course, some of the problem could be alleviated in coming years if the global economies begin to slow, as anticipated, and capacity reductions are implemented. Although

there has been some industry effort to mirror economic activity, the expansion of airline capacity is still outpacing GDP growth, which means the congestion in the skies and at airports may linger even after growth slows.

## ON-TIME PERFORMANCE

Globally, airlines have racked up an uneven record when it comes to on-time performance (OTP). North America has posted mostly declines over the last four years, most recently dropping from 78.7 percent of flights on time in February 2018 to 74.5 percent in February 2019. Its best year was 2017, when OTP improved to 81.5 percent. On time is defined as departing or arriving within 15 minutes of the scheduled time.

In 2019, European on-time performance jumped from 73.9 percent in February 2018 to 78.4 percent in February 2019. This may reflect an increase in penalties related to attempts by the EU to reduce delays and cancellations.

The Asia Pacific region has shown steady improvement over the four years, with on-time performance increasing from 73 percent in February 2016 to 76.3 percent in February 2019. Of all the regions, Latin America has maintained the highest on-time performance record, with 80.1 percent of flights arriving on time in February 2019. However, that was down from 82.9 percent in February 2018.

To deal with the congestion and preserve operational resilience, airlines have begun to increase block times. This enables airlines to preserve on-time performance, but it comes at the cost of utilization and revenue generation. Taking the example of routes between New York's John F. Kennedy International Airport to Miami International Airport, an aircraft today faces a block time of three hours compared with two hours, 20 minutes in 1995. That's an increase of 29 percent, which limits the time an aircraft can be flown during a day and raises crew costs. In other words, lengthening block times requires airlines to have more aircraft and more employees to fly the routes on their schedules compared with decades earlier. It ultimately reduces utilization and revenue-generating time for the aircraft.

Increased block times are largely a result of increased capacity in the skies. Eurocontrol, the agency that manages the European air traffic control network, reported that the European network generated a total of 19.1 million minutes of en route delays, 105 percent higher than in 2017. In the US, the length of the average delay increased 20 seconds, or 2.7 percent, over 2017,

according to Federal Aviation Administration (FAA) data.

## IS REGULATION A SOLUTION?

In Europe and the US, regulation is increasingly seen as a tool to reduce delays by imposing penalties on airlines and compensating passengers. Flight Compensation Regulation 261/2004, or EU 261 as it is commonly called in Europe, was passed in 2004 and went into effect in 2005. This regulation establishes common rules on compensation and assistance to passengers when they are denied boarding or experience flight cancellations or long delays. EU 261 applies to flights departing from European Union airports, regardless of the carrier's origin, and flights arriving at EU airports when operated by European carriers. Compensation ranges from €250 to €600, depending on flight distances, for delays of over two hours, cancellations, or denied boarding.

In the US, the Department of Transportation passed a rule in 2015 that prohibits US airlines, with some exceptions, from allowing an aircraft to remain on the tarmac for more than three hours without deplaning passengers. There are also rights afforded to passengers when they are denied boarding. All US airlines restricted overbooking after 2017.

EU 261 claims are growing and becoming material costs for European carriers. While no comprehensive published data exist, European carriers — especially low-cost carriers — have noted the impact of regulation in recent years. In July 2018, Ryanair reported that EU 261 “right-to-care” costs jumped 40 percent in the first quarter. Similarly, Wizz Air announced that in first quarter 2018, its EU 261 costs rose 203 percent after an unprecedented number of disruptions led to a 426 percent increase in cancellations.

Interestingly, the US industry appears to be trying to avert punitive regulation by self-policing its on-time performance and putting more of a cushion into schedules and operating standards. For instance, block time on top US routes climbed 18 percent, while block time on EU routes has edged up only five percent since 2005, when EU 261 went into effect.

Trade association Airlines for America estimates that the average cost per block minute was \$68.40 during 2017—a figure that is

expected to rise for 2018 with the increase in fuel prices and other operating costs.

But this is a long-term trend. Here's a simple example: If the US industry operated 2018 schedules as published but used 2005 block time, the resulting crew cost reduction would be \$2.2 billion, or a savings of about 2.6 percent in total operating costs. In other words, increases in block time cost the industry about 2.6 percentage points of margin.<sup>1</sup>

## IMPROVEMENTS UNDERWAY

There are factors outside the airlines' control that can and do often hurt on-time performance globally. These include overburdened air traffic control and airport infrastructure, which are at the root of the disruptions.

Improvements to the air traffic control system in the US and around the world are being developed and implemented as soon as viable. These include hardware upgrades as well as procedural changes that can utilize the limited airspace more efficiently. While there remains debate on which entity will ultimately fund the improvements, there is little doubt the upgrades are required.

Airport infrastructure is another important constraint affecting on-time performance. Airline growth throughout the world has led to increasing airport infrastructure challenges and greater congestion. For 2019 to 2027, airport operators in Europe plan to spend 4.6 times the amount on infrastructure that they did between 2012 and 2018. In the US, plans call for spending only 1.6 times more on airport infrastructure over the same time frame.

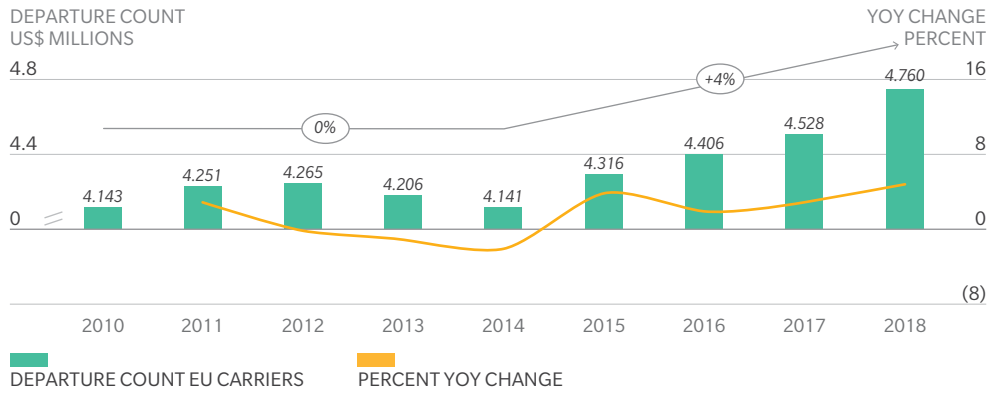
While infrastructure growth is beginning to catch up with demand, airlines still face a mounting challenge to maintain operational resilience given current and projected congestion levels. Better external conditions will certainly help, but at the end of the day the path to operational resilience will be found in strategies that optimize commercial and operational needs and not prioritize one over the other.

<sup>1</sup> Assumes that industry is defined as Alaska/Virgin America, Allegiant, American, Delta, Frontier, Hawaii, JetBlue, Southwest, United and Spirit. Uses regression-based block inflation applied to 2018 routes (regression measures block on a basket of common routes operated between 2005 and 2018 and adjusts the block based on stage length). Assumes YE Q2 2018 average crew cost per block hour. Assumes crew cost scales one-to-one with block changes.

**EXHIBIT 27: NUMBER OF FLIGHTS IN EUROPE AND THE UNITED STATES, 2010 THROUGH 2018**

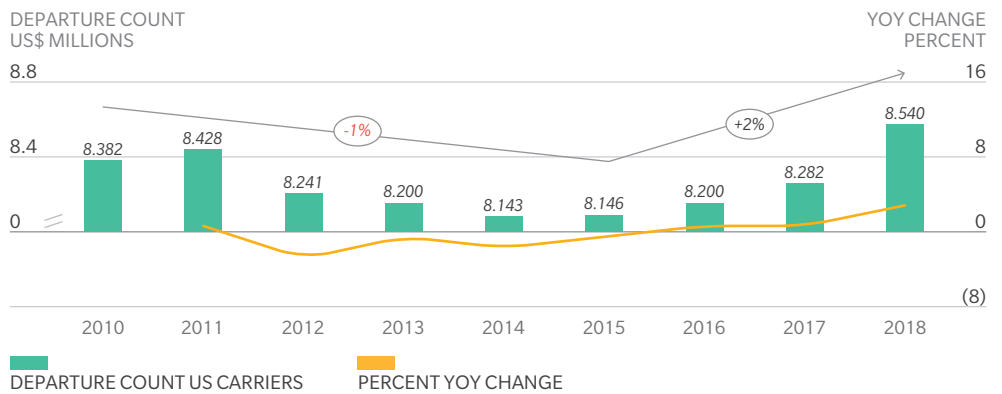
**EUROPE**

DEPARTURE COUNT  
US\$ MILLIONS



**US**

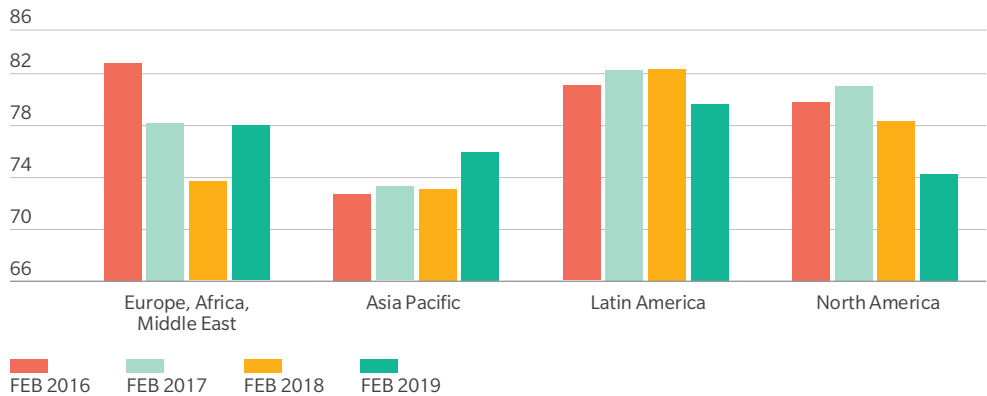
DEPARTURE COUNT  
US\$ MILLIONS



Source: Planestats.com

**EXHIBIT 28: AIRLINE INDUSTRY MAINTAINS UNEVEN GLOBAL ON-TIME PERFORMANCE RECORD**

PERCENT ON-TIME



Source: OAG FlightView and Oliver Wyman Analysis

Note: Percentage on-time is percentage of flights that depart or arrive within 15 minutes of the airline's schedule.



**EXHIBIT 29: EXAMPLES OF INCREASED BLOCK TIMES, 1995 VERSUS 2018**



Source: Planestats.com

**EXHIBIT 30: COMPARISON OF REGULATORY FRAMEWORKS**

	EU 261 <sup>5</sup>	US LEGISLATION
<b>APPLICATION</b>	Flights departing from EU airports Flights arriving at EU airports and are operated by EU carriers	US domestic flights operated by US airlines
<b>DELAYS</b>	Passengers are entitled to 3 types of benefits for delays, cancellations, and denied boarding <sup>4</sup> Compensation <sup>3</sup> : <ul style="list-style-type: none"> <li>• €250 for flights less than 1,500 km</li> <li>• €400 for flights more than 1,500 km – 3,000 km</li> <li>• €600 for flights more than 3,000 km</li> </ul>	Flights cannot remain on the tarmac for more than 3 hours without facing fines (\$27.5K per passenger) Food/water must be provided no later than 2 hours after a tarmac delay
<b>CANCELLATIONS<sup>1</sup></b>		No Federally Mandated Protection
<b>DENIED BOARDING<sup>2</sup></b>	Choice between rerouting, reimbursement, or rebooking: <ul style="list-style-type: none"> <li>• Reimbursement of your ticket (and a return flight to your departure airport if you have a connecting flight)</li> <li>• Rerouting to your final destination</li> <li>• Rerouting at a later date under comparable transportation conditions</li> </ul> Assistance: Compensation for refreshments, food, accommodation for overnight stay	If rescheduled to arrive: <ul style="list-style-type: none"> <li>• Within 1 hr of original arrival: no compensation</li> <li>• 1-2 hours of original arrival: 200% of one-way fare up to \$675</li> <li>• 2+ hours of original arrival: 400% of one-way fare up to \$1,350</li> </ul>
<b>DELAYED, LOST, OR DAMAGED LUGGAGE</b>	Up to €1,200 in liability	Up to \$3,500 in liability

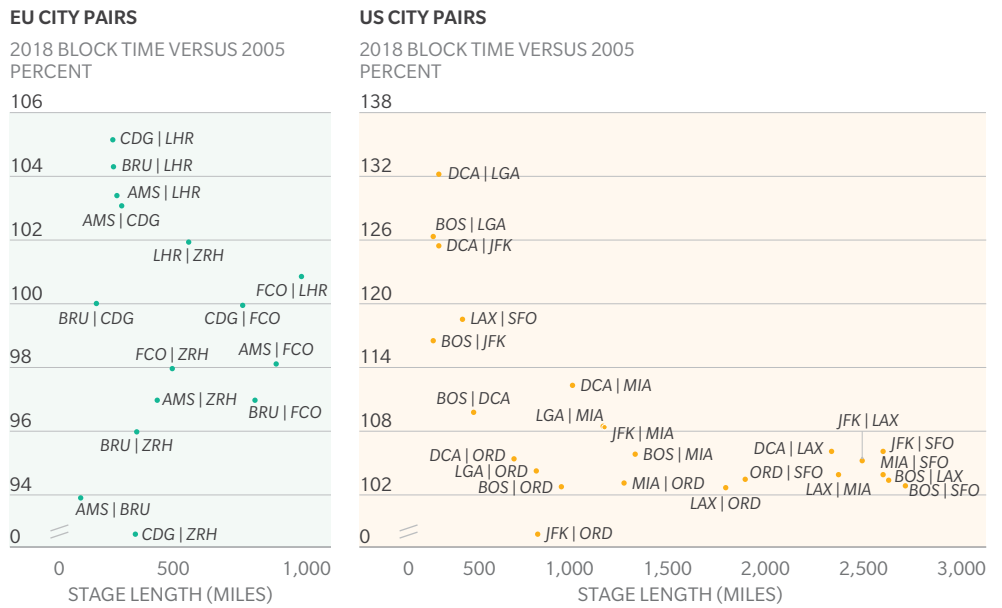
**Notes:**

1. Under EU 261, the airline is required to compensate you for a canceled flight if you were notified less than 14 days before your originally scheduled departure date. Additional restrictions apply if notified within 14 days and are able to be rescheduled.
2. Only applies to involuntary denied boarding situations
3. Compensation for delays can be reduced by 50 percent if a passenger arrives within 2-4 hours of the originally scheduled arrival.
4. Benefits do not apply if the airline can prove that extraordinary circumstances caused the cancellation or delay.
5. Statute of limitations depends on the country where the claim is processed and generally ranges from two to five years.

Source: Oliver Wyman Analysis



**EXHIBIT 31: PERCENT CHANGE IN BLOCK TIME ON REPRESENTATIVE LARGE EU AND US MARKETS**



Source: Planstats (OAG) for routes between representative large markets

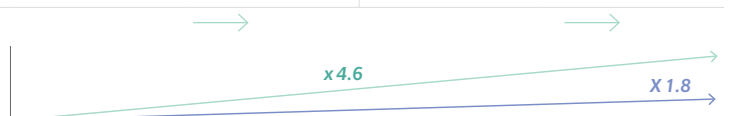
**EXHIBIT 32: US PASSENGER CARRIER DELAY COSTS**

CALENDAR YEAR 2017	DIRECT AIRCRAFT OPERATING PER BLOCK MINUTE	Δ vs. 2016
Crew – Pilots/Flight Attendants	\$22.67	6.7%
Fuel	\$21.27	15.3%
Maintenance	\$12.37	2.8%
Aircraft Ownership	\$9.40	1.3%
Other	\$2.77	(0.4%)
<b>TOTAL DIRECT OPERATING COSTS</b>	<b>\$68.48</b>	<b>7.4%</b>

Source: Airlines for America, <http://airlines.org/dataset/per-minute-cost-of-delays-to-u-s-airlines/>

**EXHIBIT 33: AIRPORT INFRASTRUCTURE INVESTMENT, IN US\$ MILLIONS, 2012 THROUGH 2018 VS. 2019 THROUGH 2027**

	EUROPE		USA	
	2012 – 2018	2019 - 2027	2012 – 2018	2019 - 2027
Airport Expansion	\$11,422	\$38,566	\$26,838	\$44,649
New Airport	\$427	\$20,421	\$30	\$265
Other	\$134		\$1,889	
<b>TOTAL</b>	<b>\$12,838</b>	<b>\$58,948</b>	<b>\$28,757</b>	<b>\$44,914</b>



Note: Reflects projects that have been completed, are under construction, or are committed.

Source: Business Monitor International

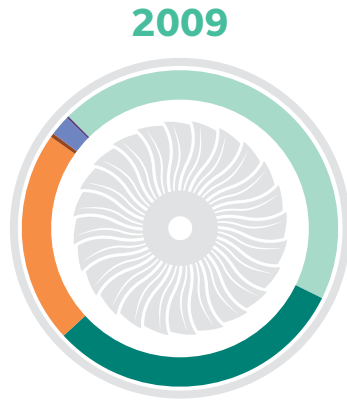
# APPENDIXES



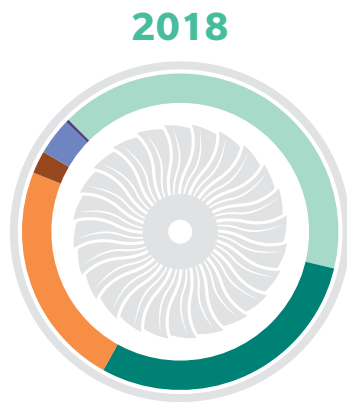
# REVENUE APPENDIX

**EXHIBIT A1: RELATIVE SIZE OF AIRLINE GROUPS**

SHARE OF OPERATING REVENUE



2009	
NETWORK DOMESTIC	44.7%
NETWORK INTERNATIONAL	30.8%
VALUE DOMESTIC	21.6%
VALUE INTERNATIONAL	0.4%
ULCC DOMESTIC	2.1%
ULCC INTERNATIONAL	0.2%



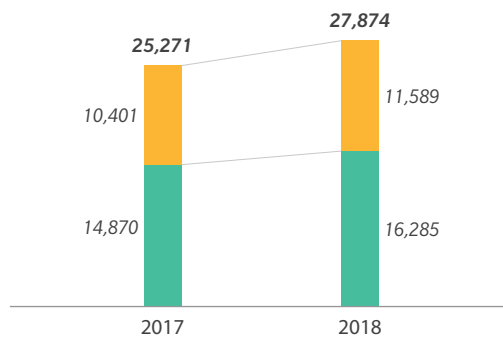
2018	
NETWORK DOMESTIC	41.2%
NETWORK INTERNATIONAL	29.3%
VALUE DOMESTIC	23.0%
VALUE INTERNATIONAL	2.3%
ULCC DOMESTIC	3.8%
ULCC INTERNATIONAL	0.3%

Source: PlaneStats.com

Note: Mainline operations only. Excludes transport-related revenue (regionals)

**EXHIBIT A2: NETWORK GROUP'S CHANGE IN OPERATING REVENUE, Q3 2017 VERSUS Q3 2018**

OPERATING REVENUE  
US\$ MILLIONS



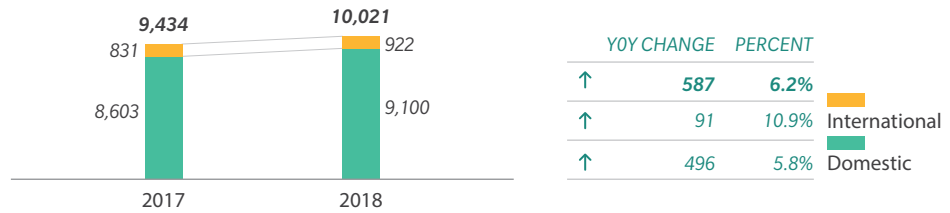
	YOY CHANGE	PERCENT	
↑	2,602	10.3%	International
↑	1,188	11.4%	Domestic
↑	1,415	9.5%	

Source: PlaneStats.com

Note: Mainline operations only. Excludes transport-related revenue (regionals)

**EXHIBIT A3: VALUE GROUP'S CHANGE IN OPERATING REVENUE, Q3 2017 VERSUS Q3 2018**

OPERATING REVENUE  
US\$ MILLIONS



Source: PlaneStats.com

Note: Mainline operations only. Excludes transport-related revenue (regionals)

**EXHIBIT A4: ULCC GROUP'S CHANGE IN OPERATING REVENUE, Q3 2017 VERSUS Q3 2018**

OPERATING REVENUE  
US\$ MILLIONS



Source: PlaneStats.com

Note: Mainline operations only. Excludes transport-related revenue (regionals)

**EXHIBIT A5: NETWORK CARRIER DOMESTIC REVENUE INCREASE – PRICE AND VOLUME DRIVERS, Q3 2017 VERSUS Q3 2018**

REVENUE DRIVERS			US\$ MILLIONS
Capacity	Impact Rank: #1	ASMs up 5.3%	698 ↑
Yield	Impact Rank: #2	Yield up 0.4 cent	398 ↑
Fees/Other	Impact Rank: #3	Baggage/reservation and cancel fees increase	273 ↑
Load factor	Impact Rank: #4	Percent of seats filled rises slightly	49 ↑
Cargo	Impact Rank: #5	Domestic cargo decreases slightly	3 ↓
<b>Revenue change Q3 2017/Q3 2018</b>			<b>1,415 ↑</b>

Source: PlaneStats.com, Oliver Wyman Analysis

**EXHIBIT A6: NETWORK CARRIER INTERNATIONAL REVENUE INCREASE – PRICE AND VOLUME DRIVERS, Q3 2017 VERSUS Q3 2018**

REVENUE DRIVERS			US\$ MILLIONS
Yield	Impact Rank: #1	Yield slightly up 0.7 cent	510 ↑
Fees/Other	Impact Rank: #2	Baggage/reservation and cancel fees increase	321 ↑
Capacity	Impact Rank: #3	ASMs up 2.0%	182 ↑
Cargo	Impact Rank: #4	International cargo increases 26.7%	131 ↑
Load factor	Impact Rank: #5	Percent of seats filled rises 0.4 point	43 ↑
<b>Revenue change Q3 2017/Q3 2018</b>			<b>1,188 ↑</b>

Source: PlaneStats.com, Oliver Wyman Analysis

**EXHIBIT A7: VALUE CARRIER DOMESTIC REVENUE INCREASE – PRICE AND VOLUME DRIVERS, Q3 2017 VERSUS Q3 2018**

REVENUE DRIVERS			US\$ MILLIONS
Capacity	Impact Rank: #1	ASMs up 4.9%	384 ↑
Yield	Impact Rank: #2	Yield up 0.2 cent	114 ↑
Load factor	Impact Rank: #3	Percent of seats filled down 0.6 point	61 ↓
Fees/Other	Impact Rank: #4	Baggage/reservation and cancel fees increase	51 ↑
Cargo	Impact Rank: #5	Domestic cargo up 9.8%	9 ↑
<b>Revenue change Q3 2017/Q3 2018</b>			<b>496 ↑</b>

Source: PlaneStats.com, Oliver Wyman Analysis

**EXHIBIT A8: VALUE CARRIER INTERNATIONAL REVENUE INCREASE – PRICE AND VOLUME DRIVERS, Q3 2017 VERSUS Q3 2018**

REVENUE DRIVERS			US\$ MILLIONS
Capacity	Impact Rank: #1	ASMs up 6.6%	50 ↑
Yield	Impact Rank: #2	Yield up 0.4 cent	27 ↑
Fees/Other	Impact Rank: #3	Baggage/reservation and cancel fees increase	8 ↑
Load factor	Impact Rank: #4	Load factor up 0.4 point	3 ↑
Cargo	Impact Rank: #5	Insignificant volume	2 ↑
<b>Revenue change Q3 2017/Q3 2018</b>			<b>91 ↑</b>

Source: PlaneStats.com, Oliver Wyman Analysis



**EXHIBIT A9: ULCC GROUP DOMESTIC REVENUE INCREASE – PRICE AND VOLUME DRIVERS, Q3 2017 VERSUS Q3 2018**

REVENUE DRIVERS			US\$ MILLIONS
Capacity	Impact Rank: #1	ASMs up 14.8%	126 ↑
Fees/Other	Impact Rank: #2	Baggage/reservation and cancel fees increase	73 ↑
Load factor	Impact Rank: #3	Percent of seats filled rises 1.7 points	20 ↑
Yield	Impact Rank: #4	Yield up 0.1 cent	17 ↑
Cargo	Impact Rank: #5	Insignificant volume	0
<b>Revenue change Q3 2017/Q3 2018</b>			<b>235 ↑</b>

Source: PlaneStats.com, Oliver Wyman Analysis

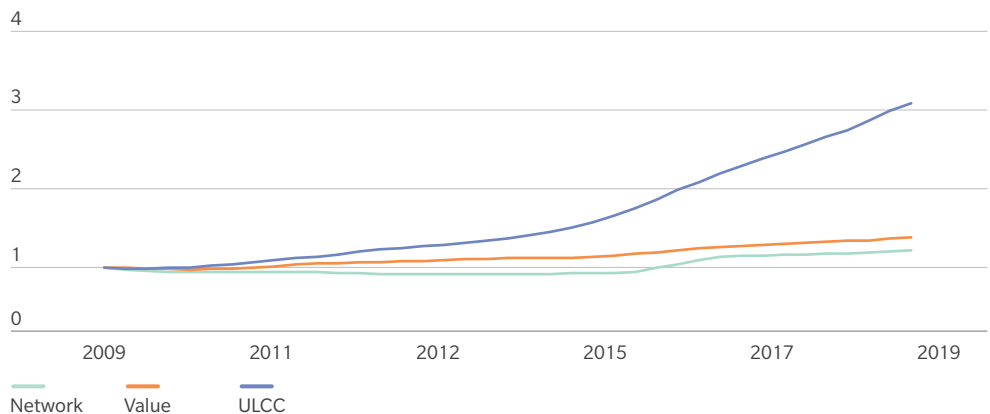
**EXHIBIT A10: ULCC GROUP INTERNATIONAL REVENUE INCREASE – PRICE AND VOLUME DRIVERS, Q3 2017 VERSUS Q3 2018**

REVENUE DRIVERS			US\$ MILLIONS
Capacity	Impact Rank: #1	ASMs up 38.3%	18 ↑
Fees/Other	Impact Rank: #2	Baggage/reservation and cancel fees increase	14 ↑
Load factor	Impact Rank: #3	Load factor down 2.2 points	2 ↓
Yield	Impact Rank: #4	Yield up slightly	1 ↑
Cargo	Impact Rank: #5	Insignificant volume	0
<b>Revenue change Q3 2017/Q3 2018</b>			<b>31 ↑</b>

Source: PlaneStats.com, Oliver Wyman Analysis

**EXHIBIT A11: LONG-TERM DOMESTIC CAPACITY INDEX, 2009 THROUGH 2018**

CAPACITY INDEX  
2009 = 1

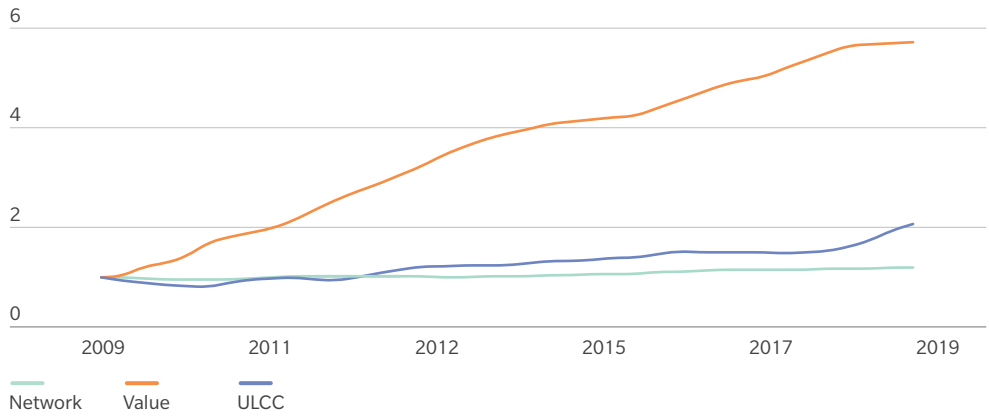


Source: PlaneStats.com > Form 41 T2 Traffic, Capacity = ASMs

Note: Mainline operations only.

**EXHIBIT A12: LONG-TERM INTERNATIONAL CAPACITY INDEX, 2009 THROUGH 2018**

CAPACITY INDEX  
2009 = 1

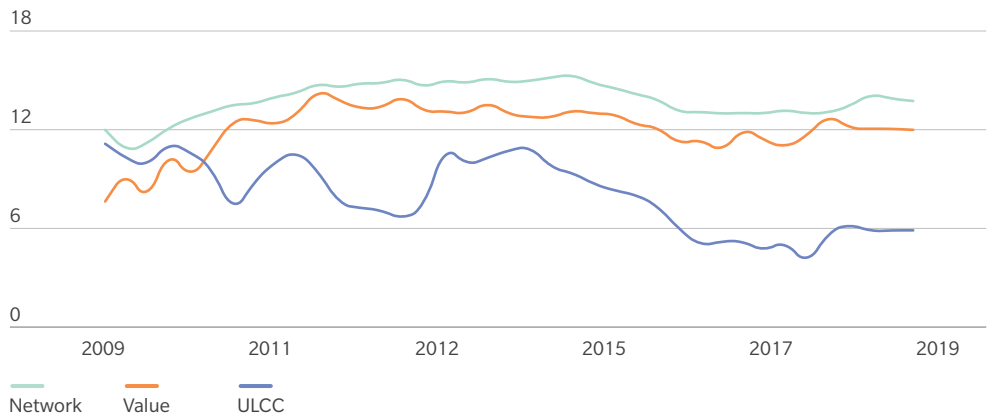


Source: PlaneStats.com > Form 41 T2 Traffic, Capacity = ASMs

Note: Mainline operations only.

**EXHIBIT A13: LONG-TERM INTERNATIONAL PASSENGER YIELD TREND, Q1 2009 THROUGH Q3 2018**

PASSENGER YIELD  
(CENTS)

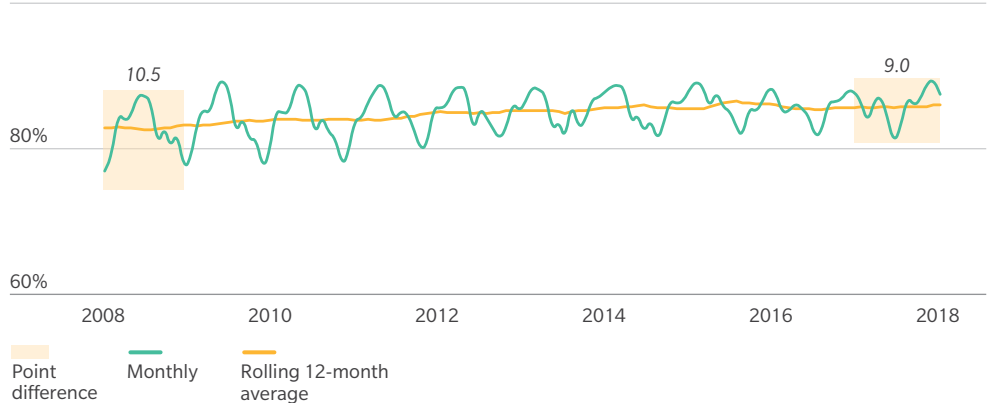


Source: Planestats.com > Form 41 Financials > P 1.2 Income Statement

Note: Mainline operations only.

**EXHIBIT A14: NETWORK CARRIER DOMESTIC LOAD FACTORS, JANUARY 2008–AUGUST 2018**

LOAD FACTOR  
100%

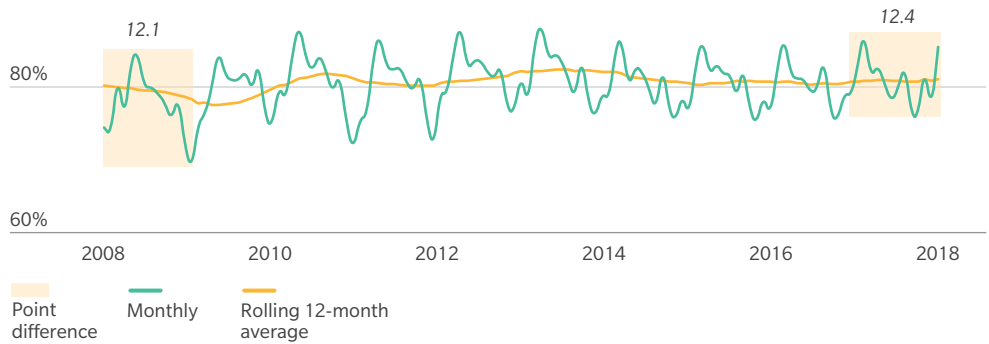


Source: US DOT T100, PlaneStats.com



**EXHIBIT A15: NETWORK CARRIER INTERNATIONAL LOAD FACTORS, JANUARY 2008 THROUGH MAY 2018**

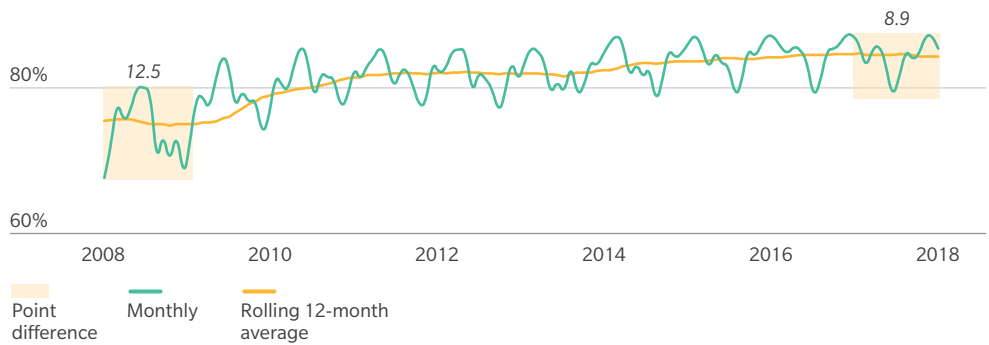
LOAD FACTOR  
100%



Source: US DOT T100, PlaneStats.com

**EXHIBIT A16: VALUE CARRIER DOMESTIC LOAD FACTORS, JANUARY 2008 THROUGH AUGUST 2018**

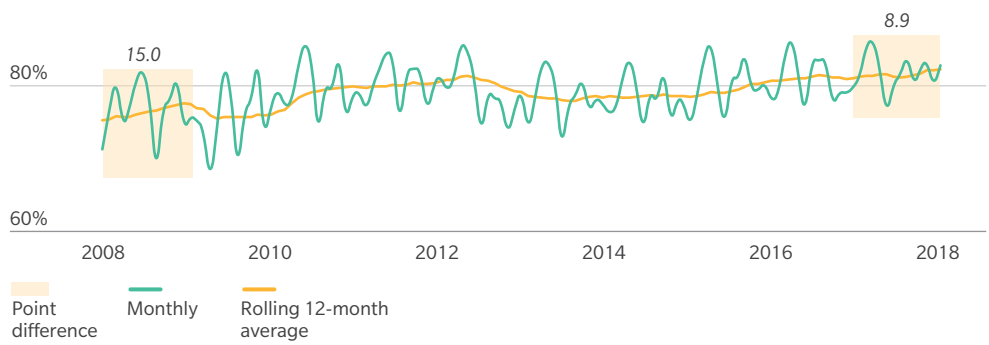
LOAD FACTOR  
100%



Source: US DOT T100, PlaneStats.com

**EXHIBIT A17: VALUE CARRIER INTERNATIONAL LOAD FACTORS, JANUARY 2008 THROUGH MAY 2018**

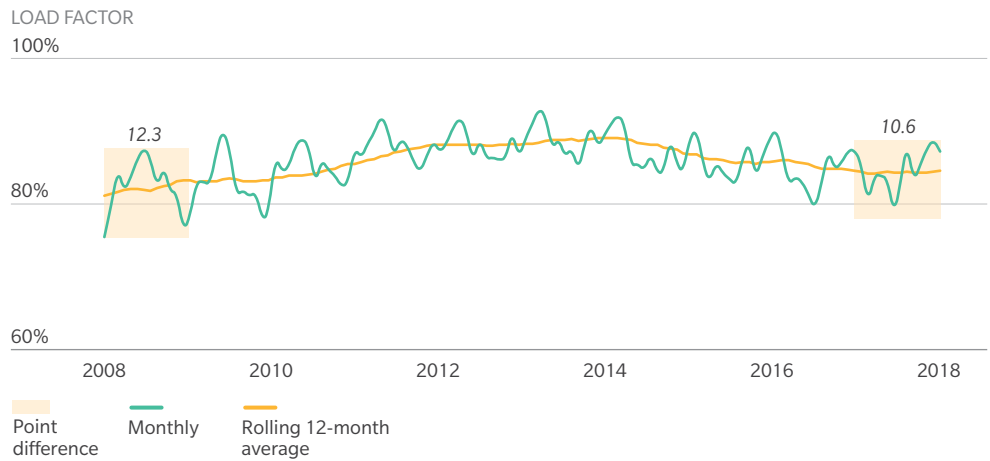
LOAD FACTOR  
100%



Source: US DOT T100, PlaneStats.com

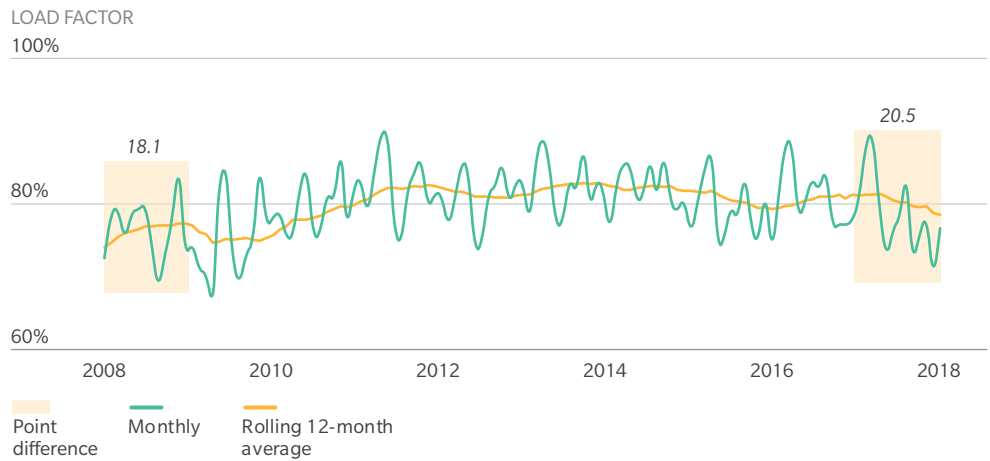


**EXHIBIT A18: ULCC GROUP'S DOMESTIC LOAD FACTORS, JANUARY 2008 THROUGH AUGUST 2018**



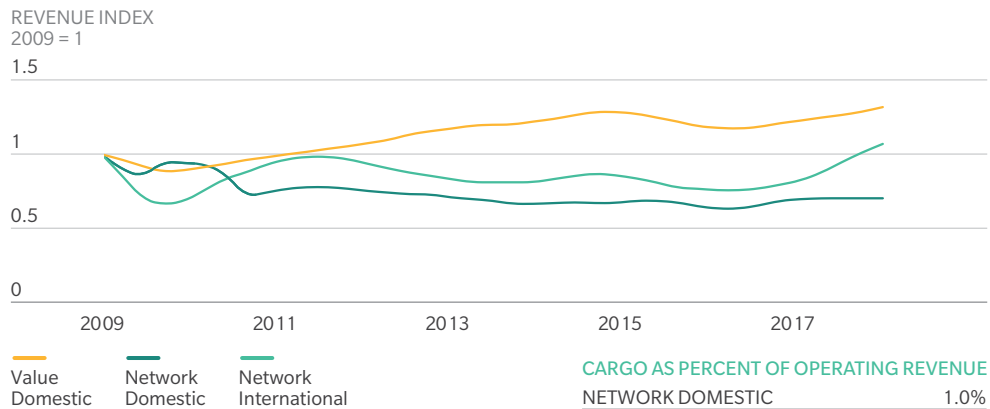
Source: US DOT T100, PlaneStats.com

**EXHIBIT A19: ULCC GROUP'S INTERNATIONAL LOAD FACTORS, JANUARY 2008 THROUGH MAY 2018**



Source: US DOT T100, PlaneStats.com

**EXHIBIT A20: LONG-TERM CARGO REVENUE INDEX, YE 2009 THROUGH 2018**



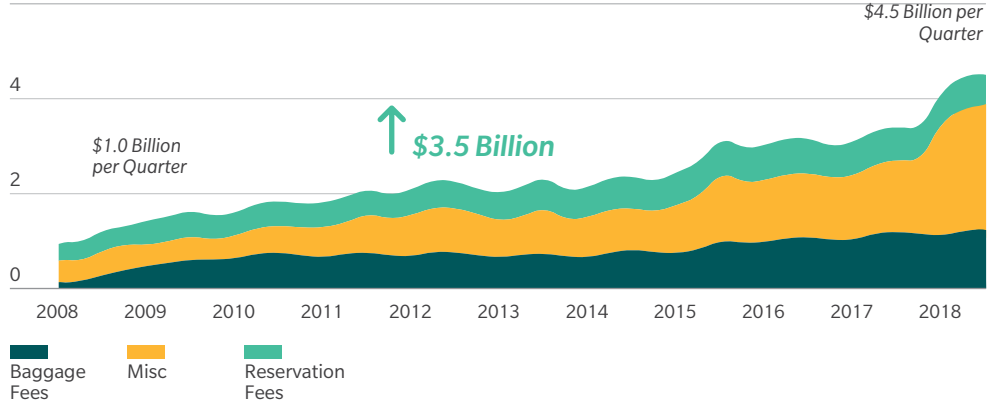
**CARGO AS PERCENT OF OPERATING REVENUE**

NETWORK DOMESTIC	1.0%
NETWORK INTERNATIONAL	5.9%
VALUE DOMESTIC	1.0%
VALUE INTERNATIONAL	1.1%

Source: US DOT T100, PlaneStats.com

**EXHIBIT A21: SYSTEM BAGGAGE, RESERVATION CHANGE AND MISCELLANEOUS FEES, Q1 2008 THROUGH Q3 2018**

SERVICE FEES  
US\$ BILLIONS

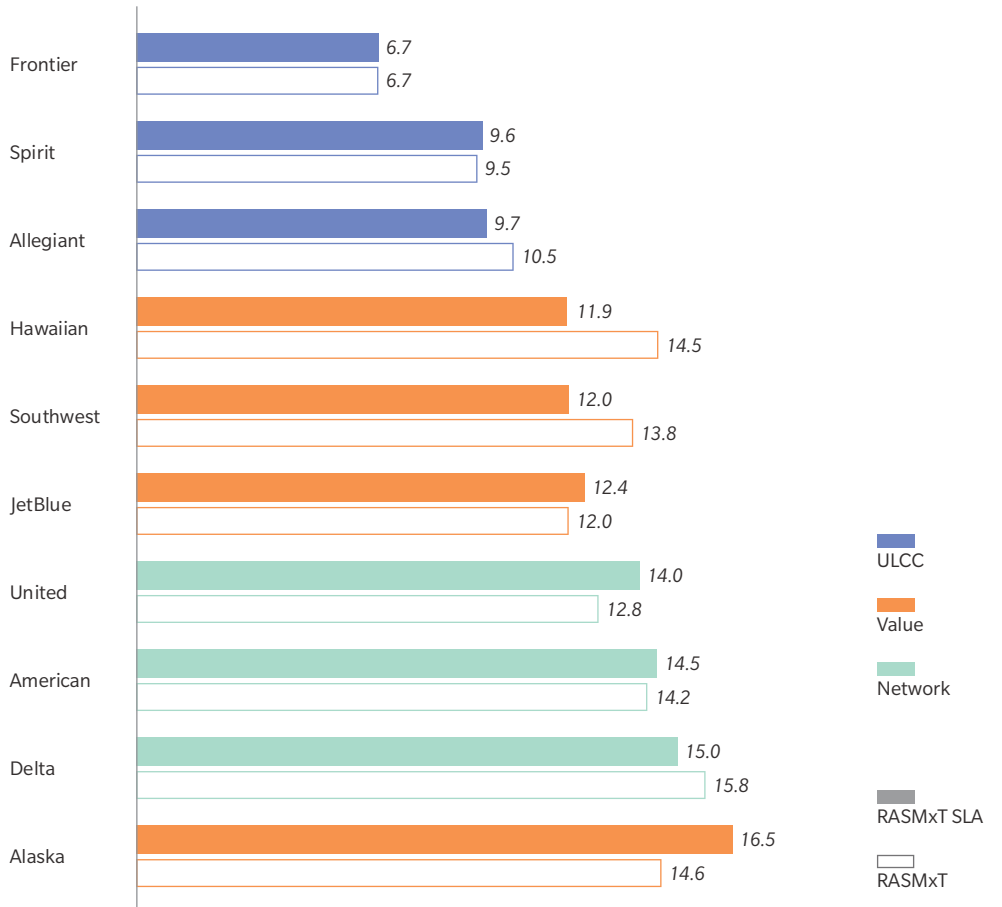


Source: PlaneStats.com > Form 41 Financials > P1.2 Income Statement for all carriers in study

Note: Adjustment made to Allegiant miscellaneous revenue, which is reported differently. Ancillary revenue as reported to DOT differs from ancillary revenue reported on SEC filings.

**EXHIBIT A22: DOMESTIC RASM BY AIRLINE, STAGE-LENGTH ADJUSTED TO 1,000 MILES, Q3 2018**

STAGE-LENGTH ADJUSTED DOMESTIC RASM  
US CENTS



Source: PlaneStats.com

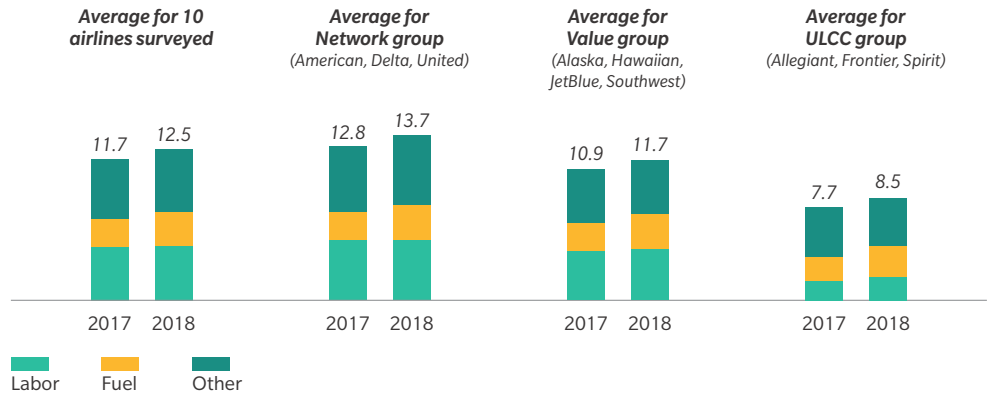
Note: Mainline operations only, Excludes transport-related revenue (regionals).

# COST APPENDIX



**EXHIBIT A23: DOMESTIC CASM BY GROUP (EXCLUDING REGIONAL AFFILIATES), Q3 2017 VERSUS Q3 2018**

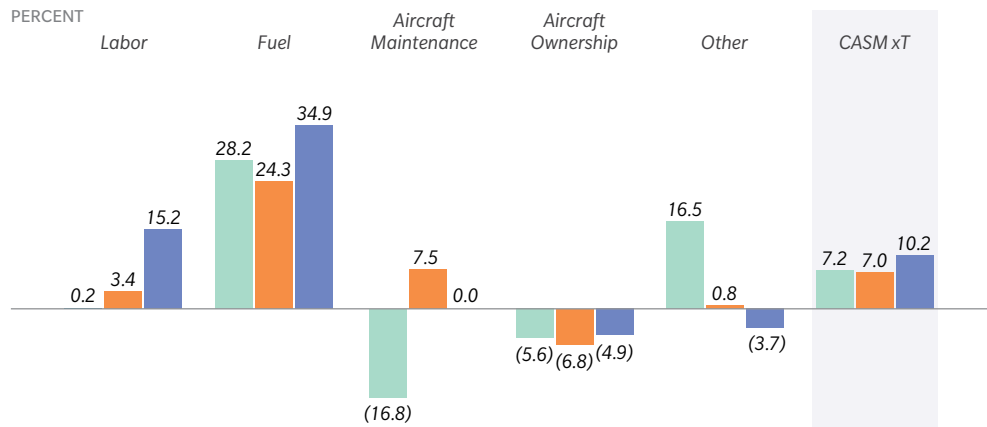
COST PER ASM  
CENTS



Source: PlaneStats.com

Note: Mainline operations only. Excludes transport-related revenue and cost (regionals).

**EXHIBIT A24: CHANGE IN DOMESTIC UNIT COSTS, Q3 2017 VERSUS Q3 2018**



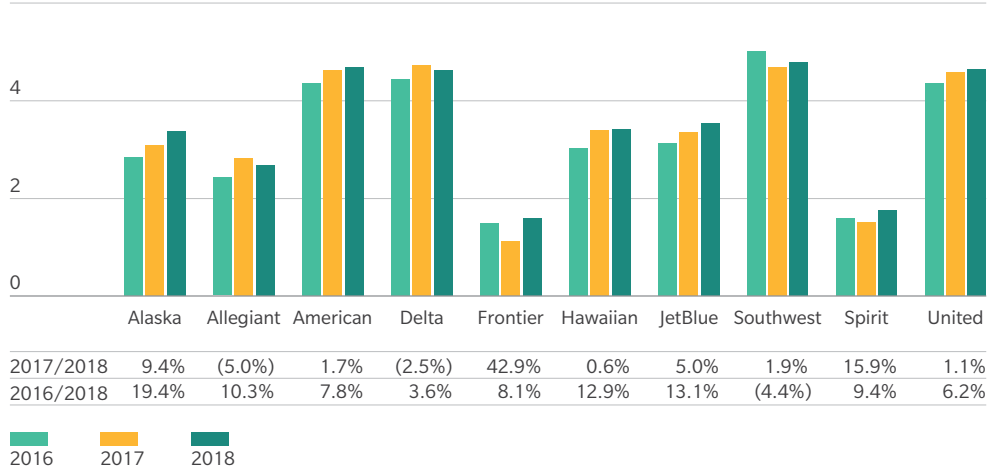
PERCENT OF TOTAL COSTS

	Labor	Fuel	Aircraft Maintenance	Aircraft Ownership	Other
NETWORK	36.8	21.2	8.0	6.2	27.8
VALUE	36.6	25.0	9.9	5.8	22.7
ULCC	22.3	30.9	7.8	11.4	27.6

Source: US DOT T100, PlaneStats.com

**EXHIBIT A25: US CARRIER SYSTEM LABOR UNIT COSTS, Q3 2016 VERSUS Q3 2017 VERSUS Q3 2018**

COST PER ASM  
US CENTS

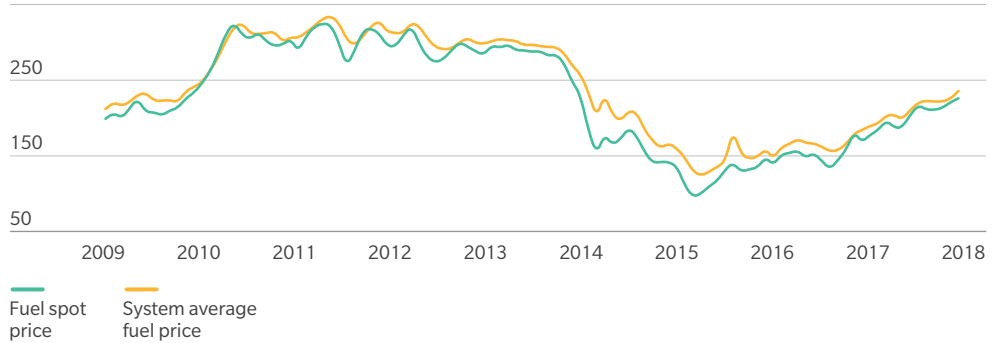


Source: PlaneStats.com

Note: Mainline operations only.

**EXHIBIT A26: SYSTEM AVERAGE FUEL PRICE (US CARRIERS) AND FUEL SPOT PRICE, DECEMBER 2009 THROUGH OCTOBER 2018**

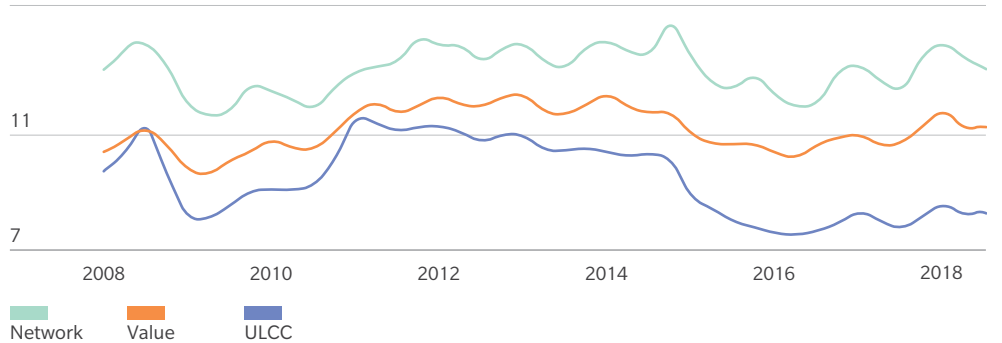
PER GALLON  
US CENTS



Source: Oliver Wyman research based on US Energy Information Administration data

**EXHIBIT A27: DOMESTIC CASM GAPS, Q1 2008–Q3 2018**

COST PER ASM (CENTS)

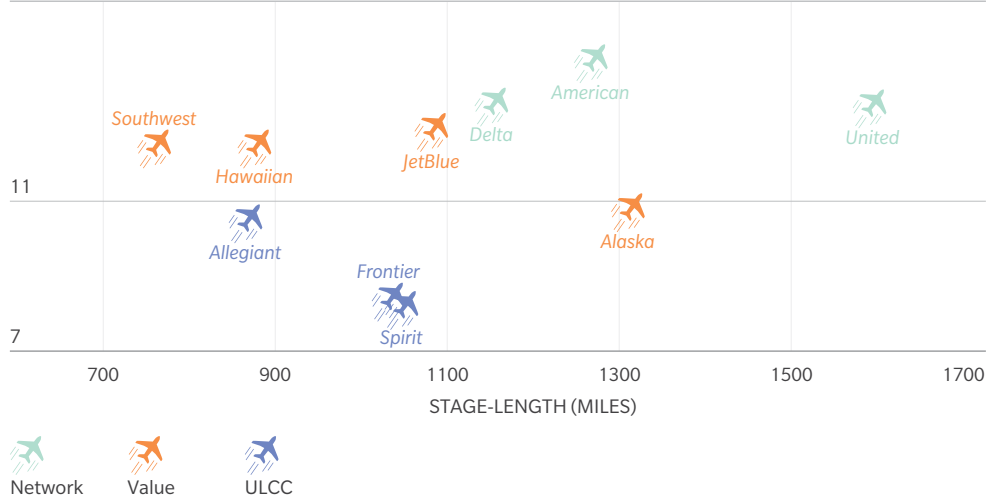


Source: PlaneStats.com

Note: Mainline operations only. Excludes transport-related cost (regionals).

**EXHIBIT A28: AVERAGE STAGE LENGTH VERSUS CASM, Q3 2018**

COST PER ASM  
US CENTS

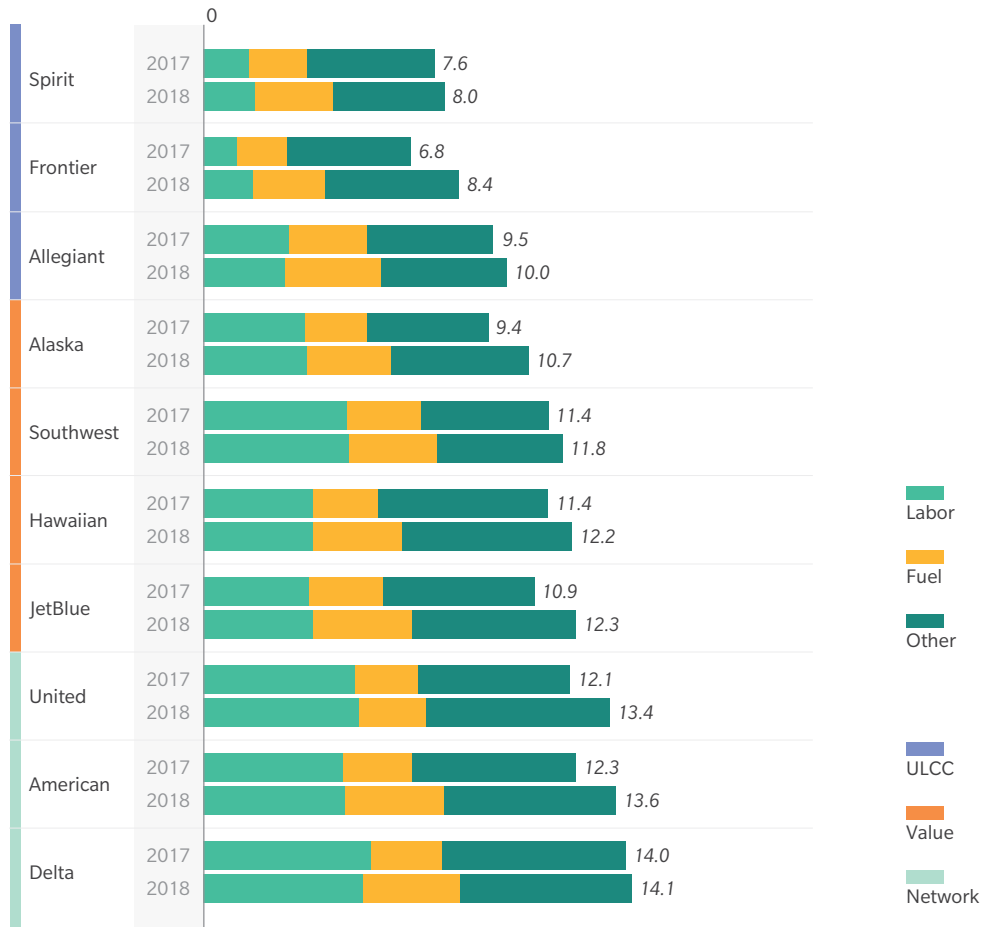


Source: PlaneStats.com

Note: Mainline operations only. Excludes transport-related cost (regionals).

**EXHIBIT A29: DOMESTIC CASM BREAKDOWN BY CARRIER, Q3 2017 VERSUS Q3 2018**

COST PER ASM  
US CENTS



Source: PlaneStats.com

Note: Mainline operations only. Excludes transport-related cost (regionals).

EXHIBIT A30: DOMESTIC CASM DETAILS BY CARRIER, Q3 2017 VERSUS Q3 2018

AIRLINE	YEAR	CASMxT	LABOR	FUEL	OTHER	CHANGE	%
Spirit	2017	7.6	1.5	1.9	4.2		
	2018	8.0	1.7	2.6	3.7	0.4	4.60
Frontier	2017	6.8	1.2	1.6	4.0		
	2018	8.4	1.7	2.4	4.4	1.6	23.75
Allegiant	2017	9.5	2.8	2.6	4.1		
	2018	10.0	2.7	3.2	4.1	0.5	5.05
Alaska	2017	9.4	3.4	2.0	4.0		
	2018	10.7	3.4	2.8	4.5	1.3	13.62
Southwest	2017	11.4	4.7	2.5	4.2		
	2018	11.8	4.8	2.9	4.1	0.4	3.60
Hawaiian	2017	11.4	3.6	2.2	5.6		
	2018	12.2	3.6	3.0	5.6	0.8	6.67
JetBlue	2017	10.9	3.5	2.4	5.0		
	2018	12.3	3.6	3.3	5.4	1.4	12.83
United	2017	12.1	5.0	2.1	5.0		
	2018	13.4	5.2	2.2	6.0	1.3	10.58
American	2017	12.3	4.6	2.3	5.3		
	2018	13.6	4.7	3.2	5.7	1.3	10.68
Delta	2018	14.0	5.5	2.4	6.1		
	2017	14.1	5.3	3.2	5.6	0.2	1.22

■ Network   
 ■ Value   
 ■ ULCC

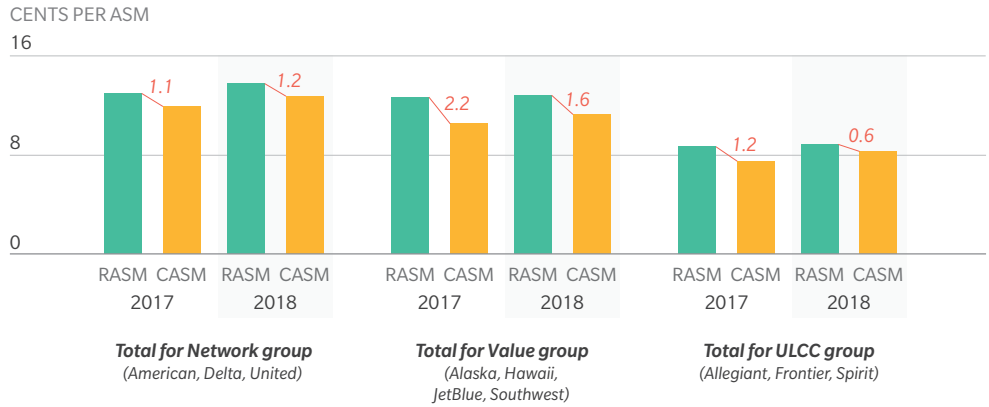
Source: PlaneStats.com

Note: Mainline operations only, excludes transport-related revenue and cost (regionals).



# PROFIT APPENDIX

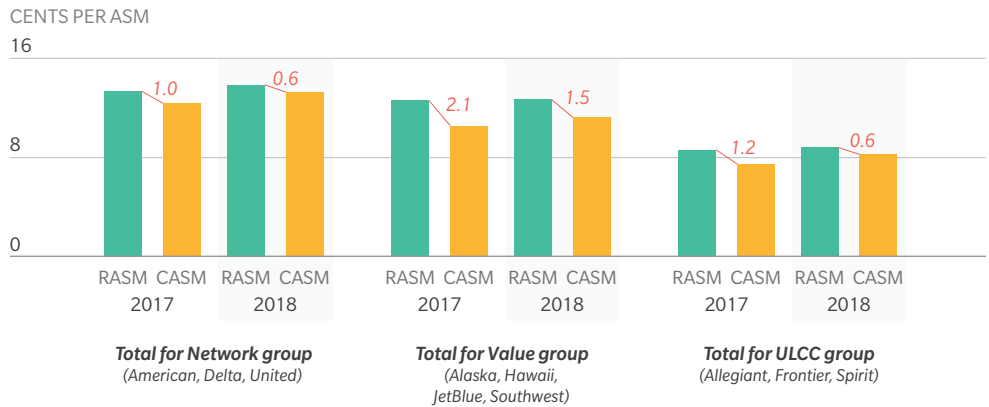
**EXHIBIT A31: COMPARISON OF SYSTEM RASM AND CASM, Q3 2017 VERSUS Q3 2018**



Source: PlaneStats.com

Note: Mainline operations only. Excludes transport-related cost (regionals).

**EXHIBIT A32: COMPARISON OF DOMESTIC RASM AND CASM, Q3 2017 VERSUS Q3 2018**



Source: PlaneStats.com

Note: Mainline operations only. Excludes transport-related cost (regionals).

**EXHIBIT A33: SYSTEM RASM VERSUS CASM BY CARRIER, Q3 2018**

	RASM (CENTS)	CASM (CENTS)	MARGIN (CENTS)	MARGIN %
Delta	14.8	12.6	2.1	14.5
Allegiant	12.1	10.0	2.1	17.6
Southwest	13.7	11.7	2.0	14.6
Hawaiian	13.4	11.7	1.7	12.9
Alaska	11.8	10.3	1.5	13.1
Spirit	9.5	8.0	1.5	15.9
American	14.3	13.6	0.7	5.0
JetBlue	12.5	12.1	0.4	3.1
United	13.0	12.7	0.3	2.3
Frontier	6.5	8.2	(1.7)	(26.5)

Network Value ULCC

Source: Planestats.com

Note: Mainline operations only. Excludes transport-related cost (regionals).

**EXHIBIT A34: CHANGE IN UNIT PROFIT, Q3 2017 VERSUS Q3 2018**

US CENTS

	2017	2018	CHANGE
Spirit	1.3	1.5	0.2
Delta	2.1	2.1	0.1
American	0.7	0.7	0.0
United	0.5	0.3	(0.2)
Southwest	2.2	2.0	(0.2)
Allegiant	2.8	2.1	(0.6)
Alaska	2.4	1.5	(0.9)
JetBlue	1.6	0.4	(1.2)
Hawaiian	3.1	1.7	(1.4)
Frontier	0.2	(1.7)	(1.9)

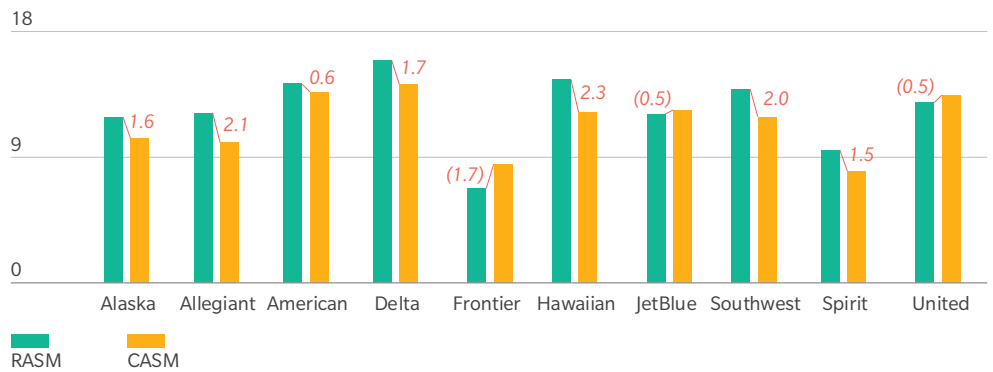
Network Value ULCC

Source: PlaneStats.com

Note: Mainline operations only. Excludes transport-related cost (regionals).

**EXHIBIT A35: DOMESTIC RASM VERSUS CASM BY CARRIER, Q3 2018**

US CENTS PER ASM

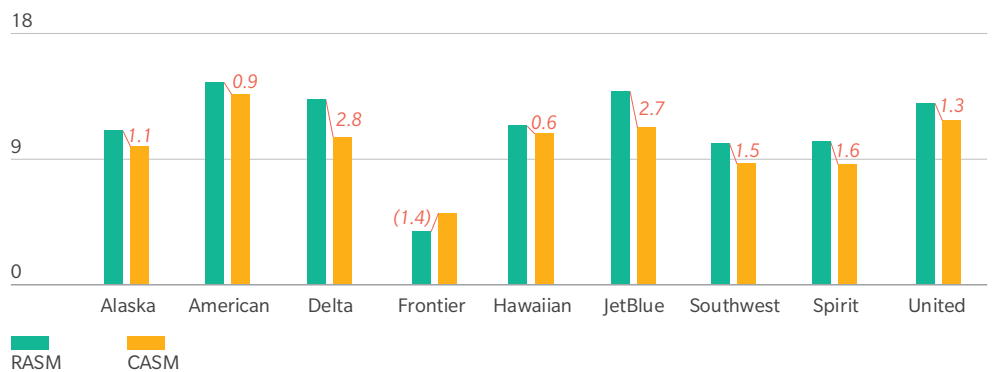


Source: PlaneStats.com

Note: Mainline operations only. Excludes transport-related cost (regionals).

**EXHIBIT A36: INTERNATIONAL RASM VERSUS CASM BY CARRIER, Q3 2018**

US CENTS PER ASM



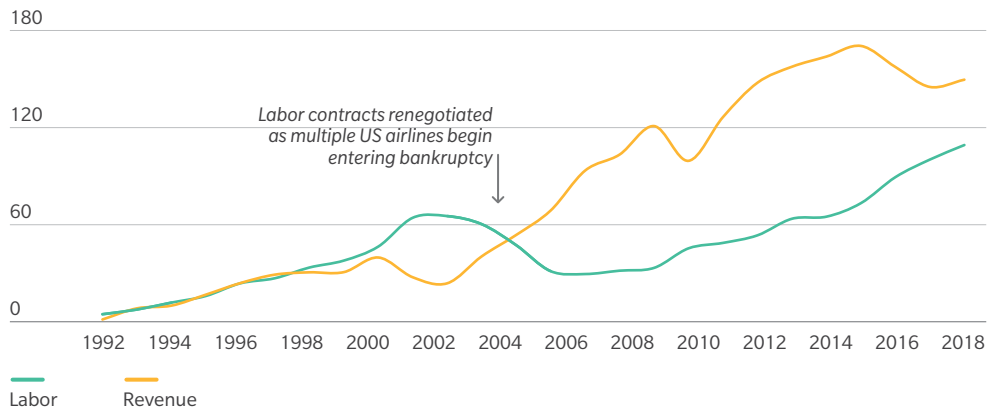
Source: PlaneStats.com

Note: Mainline operations only. Excludes transport-related cost (regionals).



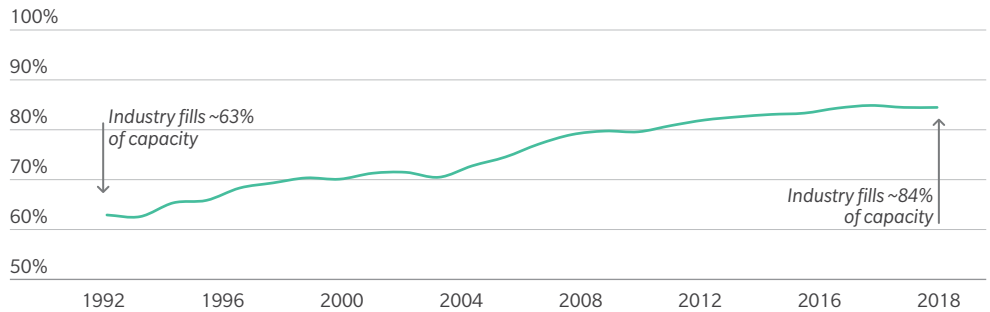
# BUSINESS CYCLE APPENDIX

**EXHIBIT A37: LABOR COST AND REVENUE PER ASM, INDEXED TO 1991**



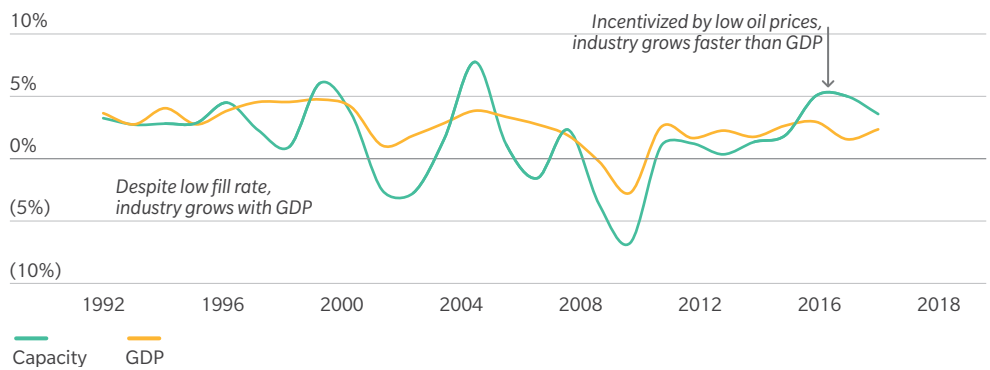
Source: US Department of Transportation for American, Continental, Delta, Northwest, United, US Airways

**EXHIBIT A38: US AIRLINE DOMESTIC INDUSTRY LOAD FACTOR, 1992 THROUGH 2018**



Source: US Department of Transportation

**EXHIBIT A39: US AIRLINE DOMESTIC INDUSTRY CAPACITY VERSUS US GDP GROWTH, 1992 THROUGH 2017**



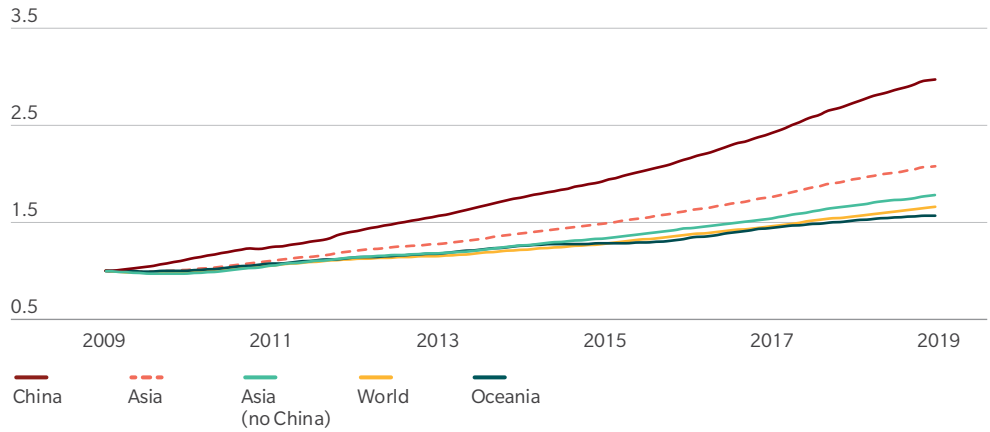
Source: US Department of Transportation and Bureau of Economic Analysis



# WORLD CAPACITY APPENDIX

**EXHIBIT A40: ASIA/OCEANIA CAPACITY INDEX**

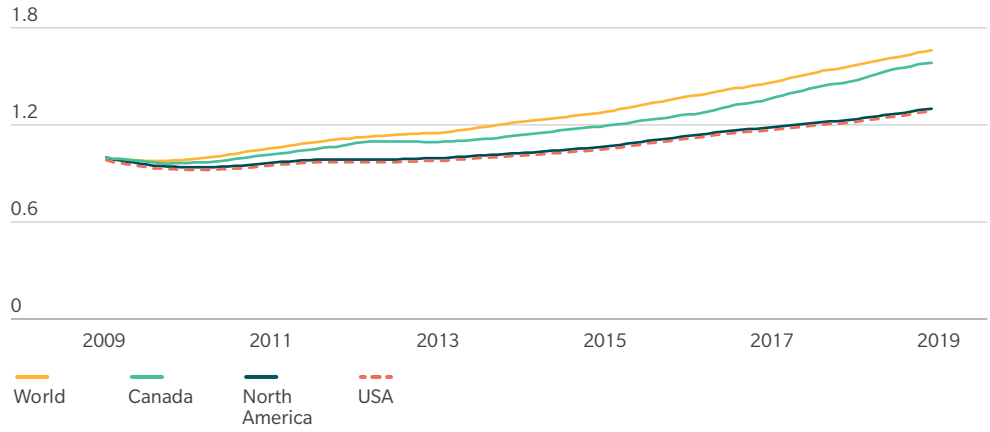
CAPACITY INDEX  
1.0 = JAN 2009



Source: PlaneStats.com

**EXHIBIT A41: NORTH AMERICA CAPACITY INDEX**

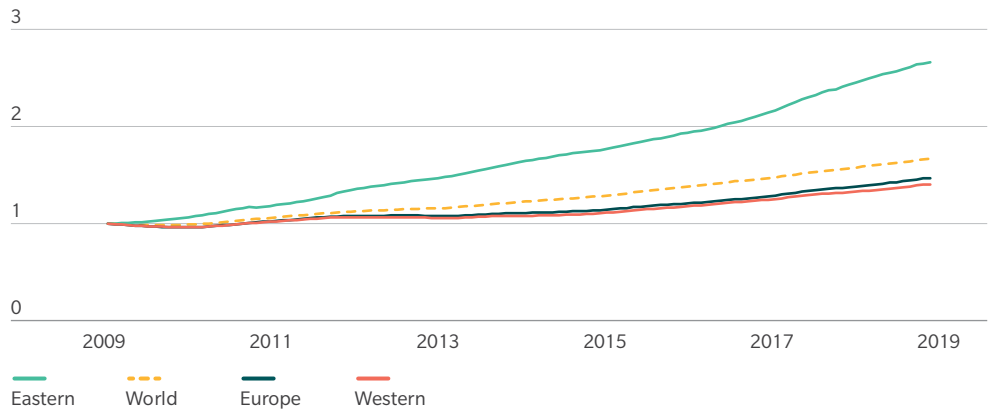
CAPACITY INDEX  
1.0 = JAN 2009



Source: PlaneStats.com

**EXHIBIT A42: EUROPE CAPACITY INDEX**

CAPACITY INDEX  
1.0 = JAN 2009

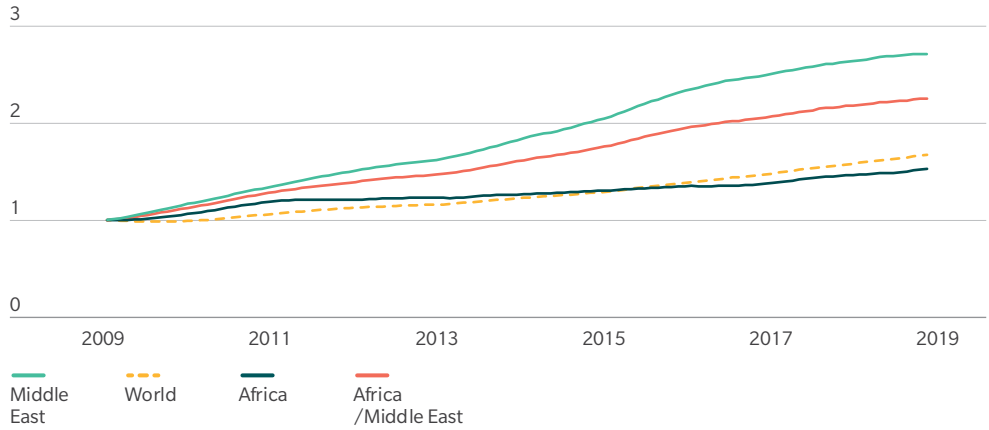


Source: PlaneStats.com



EXHIBIT A43: AFRICA/MIDDLE EAST CAPACITY INDEX

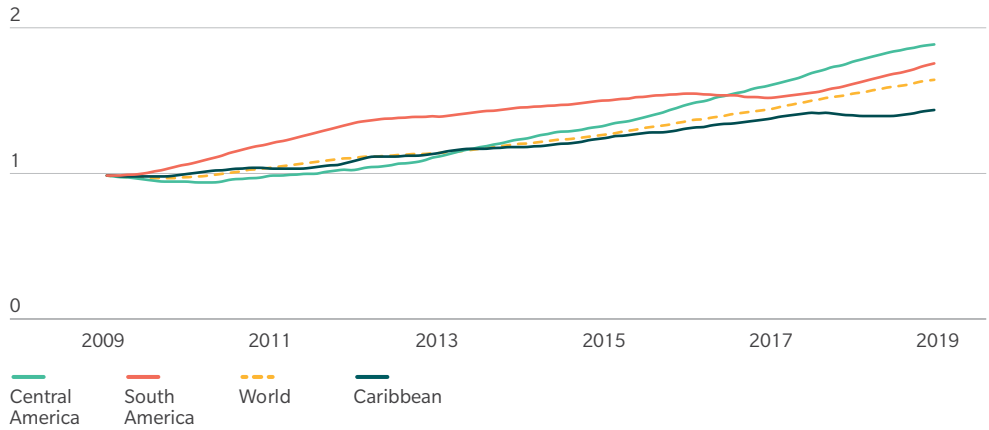
CAPACITY INDEX  
1.0 = JAN 2009



Source: PlaneStats.com

EXHIBIT A44: LATIN AMERICA/CARIBBEAN CAPACITY INDEX

CAPACITY INDEX  
1.0 = JAN 2009



Source: PlaneStats.com



## RECENT PUBLICATIONS FROM OLIVER WYMAN

For these publications and other inquiries, please visit [www.oliverwyman.com](http://www.oliverwyman.com).



### MOBILITY 2040: THE QUEST FOR SMART MOBILITY

Oliver Wyman surveyed 7,500 people worldwide to uncover how interested travelers are in smart mobility offerings, how these services might impact their travel choices, and who they trust to develop smart mobility options.



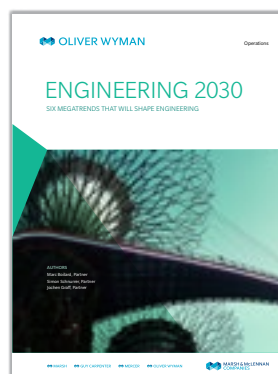
### GLOBAL FLEET & MRO MARKET FORECAST COMMENTARY 2019-2029

Our 10-year outlook of the commercial airline transport fleet and the associated maintenance, repair, and overhaul (MRO) market.



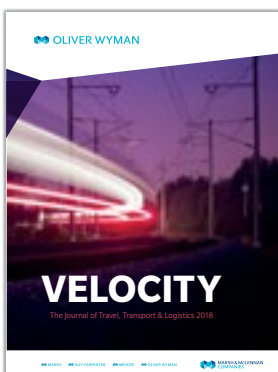
### MRO SURVEY 2018

Insights from our latest survey of executives in the maintenance, repair, and overhaul (MRO) industry.



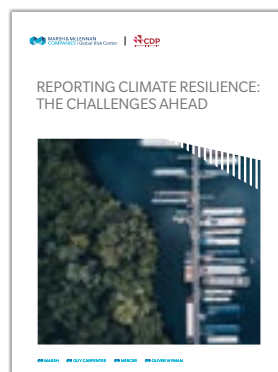
### ENGINEERING 2030

This report looks at six megatrends that will shape engineering.



### VELOCITY: THE JOURNAL OF TRAVEL, TRANSPORT & LOGISTICS 2018

Annual journal for the travel, transport, and logistics industries.



### REPORTING CLIMATE RESILIENCE: THE CHALLENGES AHEAD

Developed by MMC Global Risk Center and CDP, the report aims to help organizations disclose information on climate-related risks and opportunities in a consistent, comparable, and reliable way.



### NOW ARRIVING

Oliver Wyman's [PlaneStats.com](http://PlaneStats.com) publishes an in-depth data chart each day. Subscribe to daily email delivery at [www.planestats.com/arrival\\_subscribe](http://www.planestats.com/arrival_subscribe).



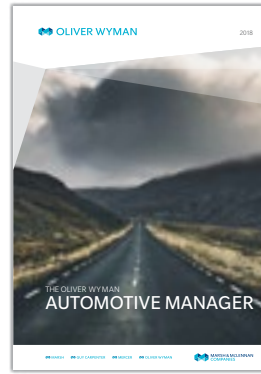
### FORBES CONTRIBUTORSHIP

Oliver Wyman's transportation team regularly explores transformative ideas and technologies across travel and transport for [Forbes.com](http://Forbes.com).



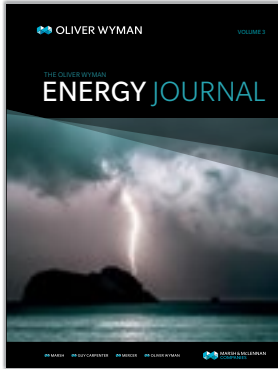
### PERSPECTIVES ON MANUFACTURING IN USTRIES

A collection of viewpoints on industrial companies' challenges and trends, as well as their opportunities and potential courses of action.



### AUTOMOTIVE MANAGER 2018

Perspectives on the latest trends and issues in the automotive industry.



### ENERGY JOURNAL VOL. 3

Oliver Wyman's latest thinking from across our global energy practice on the current and emerging opportunities and risks facing the industry.



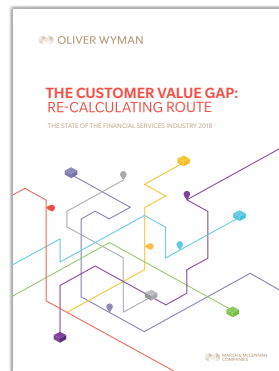
### RISK JOURNAL VOL. 7

A collection of perspectives on the complex risks that are determining many companies' futures..



### RETAIL & CONSUMER JOURNAL VOL. 6

Our latest perspectives on the retail and consumer goods industry.



### STATE OF THE FINANCIAL SERVICES INDUSTRY 2018

Traditional financial firms will need to accelerate customer value creation or risk conceding an increasing share of customer attention and wallet to other firms, primarily to "big tech."



### WORKFORCE FOR THE FUTURE

Oliver Wyman and Mercer join forces to help organizations prepare their workforces for the digital era.



### RETAIL'S REVOLUTION

We interviewed thousands of consumers and 50+ retail industry executives to make sense of the unprecedented change being experienced and present six new business models that will help organizations navigate the future.



## About Oliver Wyman

Oliver Wyman is a global leader in management consulting. With offices in 60 cities across 29 countries, Oliver Wyman combines deep industry knowledge with specialized expertise in strategy, operations, risk management, and organization transformation. The firm has more than 5,000 professionals around the world who work with clients to optimize their business, improve their operations and risk profile, and accelerate their organizational performance to seize the most attractive opportunities. Oliver Wyman is a wholly owned subsidiary of Marsh & McLennan Companies [NYSE: MMC]. For more information, visit [www.oliverwyman.com](http://www.oliverwyman.com). Follow Oliver Wyman on Twitter @ OliverWyman.

Our aviation, aerospace, and defense experts advise global, regional, and cargo carriers; aerospace and defense OEMs and suppliers; airports; MROs; and other service providers in the transport and travel sector to grow shareholder and stakeholder value, optimize operations, and maximize commercial and organizational effectiveness.

The team's capabilities also include: CAVOK, technical consulting on safety and compliance, maintenance programs, and certification; PlaneStats.com analytical data tools; and strategies and modeling for market share, network, and fleet planning analyses via our Network Simulation Center.

This deep industry expertise and our specialized capabilities make us a leader in serving the needs of the sector.

For more information on this report, please contact:

ROGER LEHMAN  
Transportation Practice Leader  
[roger.lehman@oliverwyman.com](mailto:roger.lehman@oliverwyman.com)

TOM STALNAKER  
Aviation Sector Leader & Study Author  
[tom.stalnakar@oliverwyman.com](mailto:tom.stalnakar@oliverwyman.com)

Copyright © 2019 Oliver Wyman

All rights reserved. This report may not be reproduced or redistributed, in whole or in part, without the written permission of Oliver Wyman and Oliver Wyman accepts no liability whatsoever for the actions of third parties in this respect.

The information and opinions in this report were prepared by Oliver Wyman. This report is not investment advice and should not be relied on for such advice or as a substitute for consultation with professional accountants, tax, legal or financial advisors. Oliver Wyman has made every effort to use reliable, up-to-date and comprehensive information and analysis, but all information is provided without warranty of any kind, express or implied. Oliver Wyman disclaims any responsibility to update the information or conclusions in this report. Oliver Wyman accepts no liability for any loss arising from any action taken or refrained from as a result of information contained in this report or any reports or sources of information referred to herein, or for any consequential, special or similar damages even if advised of the possibility of such damages. The report is not an offer to buy or sell securities or a solicitation of an offer to buy or sell securities. This report may not be sold without the written consent of Oliver Wyman.