

# 2009-2013

## Transportation Outlook Series:

*Aircraft Equipment Finance Market*





The Foundation is the only research organization dedicated solely to the equipment finance industry.

The Foundation accomplishes its mission through development of future-focused studies and reports identifying critical issues that could impact the industry.

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**2009-2013**  
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## Preface

### **Purpose of This Study**

The Equipment Leasing & Finance Foundation commissioned a series of reports on the equipment finance outlook within the transportation segment. Global Insight was selected to conduct the research. This, the third of those reports, provides an outlook on aircraft supply and demand, offers a review of the current situation and an analysis of future trends, and provides insight into those aspects of the leasing and financing industry affecting and affected by this market.

In preparing this report Global Insight utilized its pre-existing expertise in analyzing and forecasting sales of aircraft. In addition, broad knowledge of the macroeconomic environment and of the various markets crucial to the aircraft industry provided a foundation for the report.

### **Primary and Secondary Information Sources**

Information used in this outlook comes from several sources:

- United States Census Bureau
- United States Energy Information Administration
- United States Federal Reserve Board
- United States Department of Transportation Publications
- Information provided by the International Air Transport Association
- Various industry publications including *Aircraft Value News* and *Aviation International News*
- Reports and analysis from media sources
- Earnings call records and SEC filings
- Congressional testimony records
- Interviews with ELFA members
- Airlines suffered a double-whammy in 2008. Fuel costs rose to unprecedented heights during the early half of the year, and a credit crisis struck just as prices retreated, severely limiting financing options.

## Executive Summary

- Under tightening credit conditions, financiers find themselves in a position to dictate stricter terms while lessors must contend with a growing supply of available aircraft in the secondary market.
- Aircraft equipment leases have been trending away from long-term capital leases, traditionally favored by U.S. markets, and into shorter-term operating leases. Lessors and financiers are more hesitant to enter into long-term deals given the uncertainty that has been present in the airline industry ever since September 11th.
- Older, less fuel-efficient planes were the first ones parked when high fuel costs and waning demand strained budgets and forced airlines to cut capacity.
- Values for older narrowbodied aircraft are crumbling as airlines remove them from service in favor of their newer generation counterparts. Widebodied aircraft values have held up better in comparison to narrowbodies, but their values are under increasing downward pressure in the weakened global economy.
- Production delays at major manufacturers and the machinists' strike at Boeing have been a godsend. The deferred introduction of new aircraft models into the present well-supplied market has been beneficial to the values of newer narrowbodied and widebodied aircraft.
- International demand for air travel has boomed over recent years, and a prodigious number of airlines have sprung up, particularly in the Middle East and Asia. Aircraft demand abroad will remain robust, albeit at a slightly lower level than before the U.S. credit freeze.
- The latest oil shock prompted aircraft and aircraft parts manufacturers to renew focus on fuel efficiency. The transition toward more environmentally-friendly and fuel-efficient aircraft has begun, as plane manufacturers dabble with alternative fuels and engine-makers work on lowering engine noise and fuel consumption.
- Corporate aircraft sales are generally less dependent on financing than their commercial counterparts, and finance terms in the past have favored the borrower. Nevertheless, under more restrictive credit conditions, finance terms have become less borrower-friendly than they have been in recent years.
- Real GDP in the U.S. is projected to decline for four consecutive quarters beginning in the third quarter of 2008. Exports are expected to decline throughout 2009 as the slowdown becomes a worldwide phenomenon.
- Governments and central banks are working together to unfreeze lending markets, but credit conditions will ease only slowly.
- The U.S. dollar gained strength against most currencies, except the Japanese yen and the Chinese renminbi, as the European economy weakens amid the financial turmoil.
- Announced production increases at major manufacturers may be deferred as new orders dwindle in the current economic environment. Large backlogs buffer aircraft manufacturers somewhat from decelerating orders.
- Demand for aircraft will come primarily from emerging markets in Asia and the Middle East. A host of new airlines, including low-cost carriers, have come about to serve the increasing population of flyers.
- Narrowbodied and widebodied aircraft will maintain holds on their respective markets. The future introduction of the Boeing 787 and the Airbus A350 opens the door for long-haul flights between smaller markets.

- The focus of international aviation expansion has been on developing longer point-to-point routes directly connecting smaller markets, such as Chicago to Prague or Portland to Tokyo.
- Air cargo demand has been trended down in 2008. High fuel costs hurt the competitiveness of shipping via air, and with most Western nations headed into recessions, export-intensive markets will suffer slow-downs as well.
- Global demand for corporate aircraft is expected to remain strong despite the economic downturn. The corporate market sees tremendous potential for growth in the international market, particularly in the Middle East, Russia, and Asia.
- Annual deliveries of corporate jets are expected to reach 1,200 in 2008 and 2,000 by 2016.





## Aircraft Leasing and Financing Trends

With more than 5,000 aircraft leased worldwide, roughly one-third of the global freight and passenger fleet is under lease. This is up from 25% in 2001, and analysts predict that the proportion under lease will reach 50% by 2010.<sup>1</sup> The aircraft leasing industry usually runs counter-cyclical, because airlines seek more financing during downturns.

During September 2008, the U.S. financial crisis took a dramatic turn for the worse, with credit markets freezing up, once again, and investment banks disappearing. Governments and central banks are trying to unfreeze lending markets as the U.S. crisis spreads overseas. Credit conditions will ease only slowly, and the impact of any economic stimulus will only be felt with a lag. The current economic situation is a double-whammy for airlines and leasing companies. After enduring revenue losses as a result of high oil prices for most of 2008, airlines will require financing to pay for new aircraft, but tight credit conditions may prevent their doing so.

### Commercial Aviation

#### Current Conditions

Global oil prices soared to unprecedented heights during the latter half of 2007 and through 2008, forcing a large number of airline bankruptcies. Fuel costs for the airline industry jumped 48% during the first half of 2008 compared to the same period in 2007<sup>2</sup>. As a result, airlines cut capacity and parked less fuel-efficient planes. Many airlines, including United, Southwest, Alaska Air, and Delta, also negotiated fuel contracts in fear that oil prices would stay high or rise even more.

Unfortunately for the airlines, crude oil prices did not remain high. In the final quarter of 2008, the price of West Texas crude was reduced by half, from \$124 per barrel in the second quarter to \$61 per barrel in the fourth. Airlines, already locked into the higher prices, found themselves incurring greater fuel costs than they would have in the spot market. During the third quarter of 2008, hedging against oil prices led to quarterly

net mark-to-market losses of more than \$500 million for United Airlines and nearly \$250 million for Southwest Airlines.<sup>3</sup>

Despite landing on the wrong side of their fuel hedges, airlines found themselves in better than expected financial positions entering the final quarters of 2008. However, just as crude oil prices retreated from their July peaks, a crippling credit crunch froze liquidity and severely restricted any access to financial capital. The recession that had been forestalled—owing in part to fiscal stimulus package earlier in the year—finally hit in September 2008 with the collapse of financial giants Lehman Brothers and American International Group (AIG).

#### Credit Crisis

The broad reach of the ongoing subprime mortgage crisis became apparent with the collapse of major financial institutions, such as AIG, Goldman Sachs, and Lehman Brothers, in fall 2008. Credit conditions, which had already melted considerably from late 2007 through 2008, evaporated almost completely thereafter. Generally, leasing and financing companies carry on during downtimes as more consumers and businesses are in need of loans or leases. However, the credit crunch dramatically reduced lending. Many lenders and lessors—already suffering massive capital losses as a result of bad debt stemming from the bursting of the housing bubble and the subsequent rise in credit defaults and delinquencies—have much less available capital to dole out among the growing pool of applicants. Where they can be found, finance deals are very lender-friendly and contain more restrictive terms than those to which the borrower has been accustomed.

Banks and other companies that provide financing for aircraft are in such a position. There is still robust demand from airlines, but lending volume has faded considerably in light of the current credit market. Lenders, no longer trusting the financial situations or creditworthiness of their borrowers, are unwilling to part with whatever capital they had in hand, if there

<sup>1</sup>"Big birds soar into a trillion-dollar market", *The Australian*, August 8, 2008

<sup>2</sup>Bureau of Transportation Statistics, Air Carrier Financial Reports (Form 41)

<sup>3</sup>Hannon, Dave. "Hedging Programs Cost Airlines Big in the Third Quarter". *Purchasing*, Oct 21, 2008

was any at all. Financiers are also reluctant to enter into long-term agreements in the uncertain market, thus lease terms have naturally shortened. By industry reports, there are only 19 banks left in the commercial aviation finance business<sup>4</sup>.

Aircraft lessors, on the other hand, must now contend with a greater supply of available aircraft in the secondary market in addition to their competitors. Lease terms have been hit as a result of oversupply in the market. The capacity cuts announced by the airlines during the summer are likely to remain as the economic downturn keeps downward pressure on passenger demand for air travel; planes that had been taken out of service when fuel prices were still at record highs are likely to remain parked. Lease rates are generally weaker, but those for newer generation planes are holding up better than those for classic models.

Lack of available financing also impacts the manufacturing side. Production orders tend to be placed at the height of an airline's business cycle and deliveries made towards the bottom. At the trough of the current business cycle, airlines—still reeling from high fuel costs during the summer of 2008—lack cash to pay and are hard-pressed to find financing for their new planes. Major manufacturers, Boeing and Airbus, not wanting to hold a growing number of unsold aircraft, are also stepping up efforts to provide financing for their customers.

### **Shift to Operating Leases**

The decision of owning versus leasing an aircraft—which is also applicable to other equipment types—is primarily driven by tax benefits. In the domestic U.S. market, airlines have traditionally preferred long-term leverage leasing because they can stretch out the financing of high-valued assets, such as aircraft, and take advantage of the depreciation. After the attacks of September 11, 2001, the stability of commercial airlines was severely tested, and for lessors and financiers, the appeal of shorter-term operating leases, which have been the preferred method of finance in the international market, grew. Operating leases offer more

protection for the lessor. Lease terms are typically stricter and may include cancellation clauses.

When oil prices began to rise in 2007, the stability of the airline industry was again called into question. Uncertainty in the commercial aviation market helped operating leases gain further traction in aircraft leasing. As the U.S. economic outlook and credit conditions deteriorated and delinquency risks increased, lessors were reluctant to lock into long-term leverage leases. The consequence was a natural shift into short-term operating leases, which provide the lenders with a greater level of security.

Leverage leasing may further fade as more banks begin operating under the Basel II Accord initially released in 2004. Under the international convention, financial institutions can choose between three methods of assessing capital risk. The new calculation of credit risk includes a measurement of operational risk, which includes estimates of a potential borrower's probability of default and the lender's potential loss given default. Institutions opting for more sophisticated methods of calculating risk are rewarding with lower capital requirements relative to their capital base. Approximately 20 of the most internationally-active U.S. banks and independent leasing companies are expected to comply with the most advanced risk assessment approach. Airlines requesting financing will find that their financial statements will be scrutinized more closely as bank-owned and independent leasing companies focus more on default risk and loss given default.

Some airlines may choose to take advantage of off-balance sheet financing options, such as operating leases, to improve the look of their financial situation and thus their risk assessment.<sup>5</sup> From the lender's perspective, leverage leasing will become less attractive given such factors as uncertainty in the commercial aviation market. The unguaranteed residual value of the aircraft under a leveraged lease also carries higher risk under the new calculation method. In the event of a default, the lender can only seize the aircraft, and depending on the market, the value of the aircraft may not be enough to recoup the debt.

<sup>4</sup>ELFA member interview

<sup>5</sup>"The Impact of the New Basel II Capital Accord on Your Next Credit Application", Fortis

## Residual Values

Aircraft residual values very much depend on the age and type of the planes. Narrowbodied planes are the workhorses of commercial aviation industry. They comprise a majority of the commercial fleet and represent the most liquid market for investors. Widebodied aircraft service a smaller portion of the market; they are typically reserved for long-haul flights. Narrowbodies are a commoditized market; the products are homogeneous with some models only having one or two engine manufacturers. Generally, liquidity in the narrowbodied aircraft commodity market means that there is greater demand for planes coming off lease. In the present environment, widebodied aircraft residual values have held better than those of some narrowbodies, but even they are beginning to show signs of weakness.

### Previous Generation Narrowbodied aircraft

Earlier generation aircraft tend to be owned out right and have lower capital costs since they are not attached to any mortgage or lease payments; however, high fuel costs have negated this advantage. Older aircraft were the first to be taken out of service when oil prices skyrocketed. As airlines park older generation narrowbodies, such as the Boeing 737 classics or older generation Airbus A320s, in favor of their newer counterparts, residual values of the older models have been crumbling. For instance, values of B737-300s have fallen 20% since the start of 2008 and will continue to fall going into 2009<sup>6</sup>. Demand for elderly aircraft with yesterday's engine technology, aerodynamics, and avionics is vanishing. Placing the aircraft is increasingly difficult as parked supply is multiplying. Operators are opting for newer aircraft, even with the higher price tag. As creditors pull financing from struggling airlines given the current credit crisis, the market becomes flooded with even more elderly aircraft. Given the oversupply, many of the parked planes will live out their lives in the boneyards.

### Modern Narrowbodied aircraft

The economic downturn has mainly impacted the values of the older generation aircraft. However, with many aircraft operators under pressure, the weakness

in the economy has seeped into the modern narrowbodied aircraft market. Availability of newer aircraft models, such as the Airbus A320-200, Boeing 737-700 and 737-800, has not been a major detriment to values, and demand still remains strong for these more fuel-efficient models. Values for the aforementioned models have fallen a modest 3-5 percent since the beginning of 2008<sup>7</sup>, but the problems present in the overall market are intensifying given the latest upheaval in the financial sector. Although fuel prices have fallen drastically as economic conditions worsened, continued depressed demand for air travel offers no incentive for airlines to reverse capacity cuts, as airlines are close to right-sizing their fleets. One unlikely bright spot for modern narrowbody values radiates from production delays at the major manufacturers, Airbus and Boeing. Rates of production at their respective plants will likely remain as they were rather than be ramped up as it was announced in early 2008. As a result, the introduction of the newest generation of aircraft will be pushed back, which will help residual values of the current generation of modern aircraft.

### Widebodied aircraft

Widebodied aircraft are generally reserved for long-haul, international flights and serve a smaller market than do narrowbodied aircraft. For most of 2008, long-haul flights generated consistent profits for airlines while short- and medium-haul flights were not as reliable. However, the near cessation of credit in the U.S. caused by the latest and most severe blow to the financial market near the end of 2008 has sailed overseas, and the U.S. recession threatens to evolve into a global one. Widebody values, which were sustained despite increased fuel prices, are beginning to succumb to the worldwide credit crunch. While the Airbus A330-200 and the Boeing 777-300ER are more suitable investments over the medium term, the A380-800 has actually seen a slight increase in value and is one of the few stars of the widebody market. Orders for the A330-200 and the B777-300ER continue to be strong, but weakness in the overall market is undermining their values.<sup>8</sup> In a situation similar to modern narrowbodies, the much postponed introduction of the Boeing 787 to the

<sup>6</sup>Mortishead, Carl. "Aircraft leasing dives as mergers hit values of older planes". *The Times*, Sept 19, 2008

<sup>7</sup>"Values of Newer Aircraft Start to Falter." *Aircraft Value News*, Vol. 17; Issue 18, Sept 1, 2008

<sup>8</sup>"Widebody Values Face Increased Weakness." *Aircraft Value News*, Vol. 17; Issue 23, Nov 10, 2008

commercial fleet has benefitted widebody values, especially the Boeing 767-300ER.

### **Regional Aircraft**

Weak economic conditions and relative operating inefficiency undermine values for smaller regional jets. Regional jets cost more to fly on a per-seat-mile basis, and with fuel prices as high as they have been in 2008, some airlines preferred to reduce the frequency of a particular route, park 50-seat regional aircraft, and over-utilize a larger plane<sup>9</sup>. Values for larger, more modern regional jets—the 100-, 120-seaters—have held steady.

### **Overseas Market**

International demand for air travel has been booming in recent years with the growing presence of low-cost carriers in Europe and an expanding middle class rapidly boosting demand in Asia and the Middle East. Aircraft leasing companies have extended their portfolios to customers abroad to take advantage of higher returns and to shield themselves from the struggling legacy carriers in the United States. The prevailing theory in past years was that of decoupling—the idea that rapid growth in emerging markets would be unhindered by trouble in developed economies. As evidenced by the latest disturbance in the U.S. financial markets during the latter quarters of 2008, lack of credit is now a global phenomenon. The liquidity freeze in the U.S. very quickly chilled liquidity around the globe, and the domestic recession in the U.S. mutated into a worldwide economic slowdown, to which emerging markets—despite their impressive growth—were not immune. According to the September 2008 report by the International Air Transport Association (IATA), only airlines in Latin America are expected to show positive growth for 2008<sup>10</sup>. "Non-U.S. airline bankruptcies are occurring at a faster clip than within the U.S.," says Vincent Kolber, president of RESIDCO, a boutique leasing company.

Despite the recent slowdown in the world market, manufacturer order books are heavily skewed toward international customers. Aircraft demand abroad will remain robust, albeit at a slightly lower level than be-

fore the U.S. credit freeze. Areas to watch will be the Middle East, China, and India. There will have to be necessary infrastructure improvements as commercial air traffic increases, but in the long-run, the most growth will originate in these markets. Credits there tend to be stronger, and emerging airlines are keen to invest in newer rather than older aircraft.

### **Focus on Fuel Efficiency**

Jet fuel prices jumped to unparalleled heights during mid-2008, straining many airline budgets and prompting airlines to take older, less-efficient aircraft out of service. Now that oil prices have dropped back below \$70 per barrel, some parked planes will likely remain parked as airlines continue to replenish their fleets with newer, fuel efficient planes. The new shock to the financial crisis and worsening of the economic condition in the U.S. are significant indicators of a prolonged bout of reduced passenger demand. As such, lower fuel prices give airlines leeway in their budgets but do not provide enough reason for them to put planes back into service. Airlines are no longer in crisis mode, but the shift toward more modern aircraft has started in earnest. With the economy in a recession and new aircraft deliveries in the coming years, airlines may not need to reuse any of their older, less fuel-efficient planes.

### **Emerging Engine Technology**

Many industry analysts would agree that the next generation of aircraft will depend on the development of new engine technology. New technology must undergo multiple rounds of rigorous testing and prove sufficient improvement in fuel efficiency. The oil price hikes have created additional incentive for major engine manufacturers, such as Pratt & Whitney, GE, and Rolls-Royce among others, to design new engines.

Pratt & Whitney is the furthest along in the advancement of a new engine. Their geared turbofan engine—PurePower PW1000G—claims a 12-15% reduction in carbon emissions as well as double-digit declines in fuel burn, engine noise, and operating costs for the next generation of aircraft. In the Pratt & Whitney design, the turbine and the fan are allowed to spin

<sup>9</sup>ELFA member interview

<sup>10</sup>Industry Financial Forecast. IATA. September 2008

independently, resulting in an improvement to fuel-efficiency and less noise owing to slower fan speed. The engine is currently enduring a second-phase of testing aboard an Airbus-owned A340<sup>11</sup>. The geared turbofan engine will be featured on the new Bombardier CSeries and Mitsubishi regional jets, both of which are slated to enter service in 2013; Lufthansa signed a letter of interest for up to sixty CSeries aircraft. To those in the aviation industry, the reliability of the engine must still be demonstrated, and there have been some issues regarding the gearing itself. Dennis Neumann, CEO of BNY Capital Funding LLC, says of the new engine:

*"It is one thing to run test flights. It is another to consistently fly routes. [The PurePower PW1000G] has the power to change the industry, but we still need to know how well it performs in the air in regular dispatch service."*

Other engine manufacturers are not quite as far along with their new designs. GE and Rolls-Royce are independently working on open-rotor engines which are more fuel-efficient than the turbojet engines used today. Propeller-driven engines are not new in the aviation industry. The noise factor kept open-rotor engines from entering the mainstream; however, increased focus on environmental concerns has inspired manufacturers to take another look at the open-rotor design. Rolls-Royce is tackling the noise issue by increasing the number of blades and shortening and thinning the blades<sup>12</sup>. GE is still designing their propeller-driven engine and hopes to begin rigorous testing of the engine in a wind tunnel in early 2009<sup>13</sup>.

Given the capital-intensive nature of the research and development stage, the next generation of aircraft is not likely to come into play until 2015 at the earliest. Even then, manufacturers will have considerable influence on when new engines will be incorporated into the production process. It hinges on the amount of resources that manufacturers, primarily Airbus and Boeing, want to invest in the new engines<sup>14</sup>.

### **Alternative Fuels**

Airbus and Boeing are also experimenting with alternative energy sources and composite materials. Partnering with Honeywell, Airbus is developing a biofuel that can meet almost one-third of worldwide fuel demand from commercial aircraft by 2030 without impact on food supplies. Airbus is also trying to find ways to recycle the more than 6,000 planes destined to retire over the next twenty years. Not to be outdone, Boeing is researching hydrogen fuel cells and fuels made from algae while promoting the use of composite material to produce lighter planes<sup>15</sup>. These alternative fuel projects are for the long-term and are still in the design stages.

### **Cargo Market**

For leasing companies, cargo aircraft is not a major market in which to invest, as the cargo fleet represents only about one-tenth of the total global commercial fleet. There are fewer operators in the cargo market and little liquidity, as the market is highly segmented. Cargo traffic has experienced steady growth in the past, but the current global slowdown has tempered it somewhat. With the drop in oil prices, freight rates should fall, making shipping via air more competitive against other modes of cargo shipment.

### **Cargo Aircraft Value**

Cargo planes were in high demand as airlines switched to smaller planes with less cargo space while oil prices were soaring. Larger planes have more cargo space in the lower holds, thus moderating the need for freighters. Even as oil prices have fallen, values for dedicated freighter aircraft remain vulnerable as the number of widebodied aircraft in production growing. Fortunately for freighter values, the availability of passenger conversion slots is slim, which helps to control the supply of cargo aircraft in the market<sup>16</sup>.

### **Passenger-to-Cargo Conversion**

There are very few new dedicated cargo planes. Roughly 95% of cargo planes spend some time in passenger service. Conversion to cargo is a natural retire-

<sup>11</sup>Press release. "Pratt & Whitney PurePower™ PW1000G Engine Completes First Phase of Flight Testing, Prepares for Airbus Flight Test Program." Pratt & Whitney. Aug 21, 2008

<sup>12</sup>Jha, Alok. "Rolls-Royce Brings Propeller Engines Back in Vogue." *The Guardian*. Oct 20, 2008

<sup>13</sup>Bentayou, Frank. "GE, NASA to Develop Fuel-Saving Jet Engine." *Plain Dealer Reporter*. Oct 24, 2008

<sup>14</sup>ELFA member interview

<sup>15</sup>Demerjian, Dave. "Greener Jet Engine Could Reduce Aviation's Carbon Footprint". *Wired*. Jun 24, 2008

<sup>16</sup>"Freighter Values Remain Vulnerable." *Aircraft Value News*, Vol. 17; Issue 19, Sept 15, 2008

ment for older aircraft. Cargo planes have a lower utilization rate, and age of the aircraft is not an issue.

Robert Dahl, Project Director of Air Cargo Management Group, said in an interview with *Air Transport World*<sup>17</sup>:

*"It's a matter of dollars and cents...In most cases, it doesn't make much sense [for an airline] to buy a new cargo plane. The acquisition cost even with conversion is generally 25-40% less. On the passenger side, you have an image issue...Airlines make a point of advertising "Youngest fleet in the industry". But cargo doesn't care whether it's in a new plane or an old plane."*

Demand for cargo conversion is cyclical. Conversion demand swells when the aircraft market is down and values for certain planes dip. Not every aircraft type can be converted. The supply of retired passenger aircraft must match the type of conversion kits that are available, and aircraft values must hit a certain price point before conversion is economical.

## Corporate Aviation

Demand for new corporate aircraft has been so immense in recent years that delivery of the plane may take several years. As a result, a tremendous secondary market has developed for used aircraft. During boom times, demand for private jets was so great that secondary market values were at times higher than values for new planes. Demand for corporate aircraft has slowed given the current economic downturn. The impact of the financial turmoil on new orders should be moderate, as there remains a three- to four-year wait for delivery of new aircraft. However, the secondary market has quieted considerably as evidenced by declining flight hours<sup>18</sup>. Prices in the secondary market are falling as the supply of used jets increases. Lower prices in the secondary market will put downward pressure on new aircraft values; nevertheless, for now, values in the primary market should be well insulated by long backlogs.

## Credit Environment

Corporate aircraft sales have typically been less dependent on financing than their commercial counterparts. The greatest competition for business aviation financing for the past several years has been readily available corporate cash. However, corporations are short on both cash and credit in the present environment. Before the most recent shakeup in the financial markets, corporate clientele in the private aircraft market typically spread out cash payments for new jets over several years. The financial collapse has severely depressed corporate profits—restricting cash flow—and tightened credit—cutting off access to capital. Financing terms in the past have favored the borrower. As banks retrench on lending, finance terms are returning more toward the center and becoming more favorable for the lender than they had been in recent years<sup>19</sup>. Terms are shorter and stricter, and standards are higher. Lack of capital has the potential to drive interested parties to lease, rather than own, corporate aircraft.

The impact of the credit crisis has impacted the value of very-light jets (VLJ)—the newest addition to the overall corporate fleet—more so than it has larger, longer-range jets. The advent of VLJs opened the world of private aviation to a broader set of consumers, particularly smaller companies and entrepreneurs. Credits in the VLJ market tend to be more fragile than those in the larger aircraft market. The smaller aircraft are expected to be the most vulnerable part of the corporate jet market.

The corporate aircraft market is more influenced by overseas demand than the commercial market. Global demand for corporate aircraft is expected to remain strong despite the spell of high fuel prices during the summer of 2008 and tightening credit conditions. Burgeoning emerging markets in the Middle East, Russia, and Asia, provide remarkable potential for growth. With new oil and gas fields opening, the Latin America market will be another rich resource for the corporate jet market.

<sup>17</sup>Karp, Aaron. "Conversion Waiting Game". *Air Transport World*. October 2007, p. 69

<sup>18</sup>"Honeywell Sees '09 Bizjet Sales Up, But Peak Looms." *MSN Money*. Oct 4, 2008

<sup>19</sup>ELFA member interview

## Summary

Overall, the aviation industry is in midst of a transition. The push for greater efficiency received a tremendous boost in 2008, as record-high oil prices forced airlines to examine the practicality of their fleets for the future. Soaring costs and reduced demand caused airlines to cut capacity and park less fuel-efficient aircraft at a rapid rate. Oil prices eventually fell, but the deteriorating economy kept demand down. Thus, airlines have no incentive to renege on announced capacity cuts. Instead, they can take this time to modernize their fleets. The global credit crunch, while harmful in the short run, motivates the industry to concentrate on improving their fleets and invest in the next generation of more efficient aircraft.

## Macroeconomic Environment

### Outlook and Assumptions

The U.S. recession is deepening. We expect real GDP to decline for four quarters in a row beginning in the third quarter of 2008, with the worst declines immediately ahead. The economy is expected to contract 1.0% in 2009. Governments and central banks are trying to unfreeze lending markets; however, credit conditions will ease only slowly, and they cannot prevent a global recession. Inflation is yesterday's problem. We expect headline CPI inflation to be well into negative territory by mid-2009. Monetary policy's potency is limited, but we expect the Fed to keep cutting the federal funds rate, probably to 0.50% by the end of this year; a zero rate is now possible. Fiscal policy has better prospects for success, and we assume that the federal government will inject \$200 billion in fiscal stimulus, during the Obama administration.

Real consumption dropped 3.1% in the third quarter of 2008, the worst decline in 28 years; a similar drop is expected in the fourth. On a calendar-year basis, there was an anemic consumer spending growth of 0.4% in 2008 and we expect a 0.2% growth in 2009. Consumers are getting relief from tumbling oil prices, which we expect to fall to \$50/barrel, and further federal tax cuts are probably on the way, but they cannot outweigh the squeeze from the crumbling labor market, falling home prices, tighter credit availability, and

lower stock-market wealth. Declining consumer and housing demand, coupled with tighter credit, will make businesses pull back on capital spending. In 2008, equipment spending fell 5.5% in the third quarter, worse than the second, and we expect double-digit declines over the first two quarters of 2009. For 2009 overall, we foresee a 9.0% drop in equipment spending.

Perhaps the most important shift in the outlook is on the export side. It became clear in late 2008 that the recession is now a global one, and U.S. producers will no longer be able to rely on rapid export growth to counterbalance falling domestic demand. Although export growth for calendar-year 2009 is still positive (barely) at 0.7%, that reflects the momentum built up the early part of 2008. After a small first-quarter increase (produced by a bounce in aircraft exports, as Boeing production resumes after the strike), we expect exports to decline throughout the rest of 2009. Moreover, the dollar has risen as investors flee risk, eroding the competitive advantage of U.S. producers.

### Growth

The financial crisis worsened dramatically in October, as credit markets froze, and stock markets plunged. It is now clear that the economy was turning down sharply even before the latest and most severe phase of the credit crisis hit it on the head. Recent economic indicators are showing precipitous declines. Consumer spending is falling, and both housing starts and prices continue to decline, with no end in sight. The key ISM-manufacturing index has fallen deeper into the recession zone, and export orders are now falling. The decline in the labor market is accelerating. Employment fell more than 200,000 per month in September and October, and we expect similar losses through the end of the first quarter of 2009. This will be the worst recession since 1982, with four consecutive quarterly declines in GDP—the steepest being an annualized 3.3% drop expected in the fourth quarter of 2008. The GDP forecast for 2008 has been cut to 1.3%, from 1.5% in our October 2008 forecast; likewise, our growth forecast for 2009 is now negative 1.0% rather than positive 0.2%. We see the unemployment rate rising above 8% by then end of 2009, with a peak-to-trough decline in payroll employment of roughly 3 million.

### Labor Markets

Job losses intensified in September 2008, with payrolls falling by 159,000, versus the December-August average loss of 75,000 per month. It was the worst monthly decline since March 2003. The cumulative loss since December 2007 rose to 760,000 positions, leaving payrolls 0.4% below their year-before levels. Sectors showing job gains last month were scarce: government, private education and healthcare, and natural resources (mining). Manufacturing, construction, retailing and finance, insurance and real estate led the payroll declines. Manufacturing hours fell 1.0% in September 2008, even with striking Boeing workers still qualifying as employed because the pay period measured in the September survey included a bit of pre-strike time. The unemployment rate was unchanged at 6.1%, after spiking up 0.4 percentage points in August 2008. The labor force shrank enough to cover most of the job losses without raising the rate.

Annual payroll employment for 2008 will slip only a token amount from last year's 137.6 million, to 137.5 million, but 2009 will see a drop to 136.1 million for a full percentage point decline, the worst since the 1.1% decline of 2002. The labor market should turn around very late in 2009, but payroll gains will not be robust, and 2010 average employment will not regain 2008 levels. Job gains in 2011 and 2012 will be much like those seen during 2005–06. The unemployment rate will spike above 7.5% next year, and retreat only slowly once the recovery finally gets rolling. Downside risks to the labor market remain large, with pessimistic assumptions producing job reductions that take employment levels back to 2005 levels, and the jobless rate shooting to almost 9%. The peak-2007 employment of 138 million is not exceeded until 2012.

### Inflation

The retreat of energy and commodity prices is picking up speed, aided by the global economic slowdown. We currently expect headline CPI inflation of 3.6% y/y in the fourth quarter of 2008, compared with the 4.6% rate in our forecast for September 2008. Inflation peaks at 5.4% y/y in the third quarter of 2008, before falling to 0.2% y/y in the third quarter of 2009. The damage caused by hurricanes Ike and Gustav temporarily dis-

rupted refinery operations on the Gulf Coast, but the limited extent of their impact will only briefly delay the expected, steady decline of consumer prices.

The continually improving inflation fundamentals mean a further and faster decline in core consumer inflation in the outlook. Core PCE inflation—the Fed's preferred inflation gauge—falls from 2.5% y/y to 2.4% during the final two quarters of 2008, before falling back to 1.6% y/y in the fourth quarter of 2009. Long-term inflation expectations remain anchored and keep core PCE inflation below 2.0% into 2012, then hold at this mark for the remainder of the forecast period.

### Monetary Policy

On October 8, 2008, in an emergency inter-meeting move, the Federal Open Market Committee voted unanimously to cut the federal funds rate by 50 basis points, to 1.50%; the discount rate was also cut to 1.75%. The action was coordinated with central banks around the world including the Bank of England, the European Central Bank, the Bank of Canada, the Swiss National Bank, and the central bank of Sweden. The Bank of China also cut rates. The action was taken in response to escalating pressures in the global financial markets, particularly global interbank markets, where LIBOR rates continued to track upwards and interbank borrowing spreads spiked to record levels. Some banks in the United States and Europe have been struck by sudden withdrawals of retail and wholesale deposits in a serious crisis of confidence.

The FOMC emergency action was also taken in response to the recent amplification of deflationary shocks, including contractions in credit availability for consumer loans, mortgage loans, and commercial paper markets, along with sharp drops in asset prices, including global equities, commodities, and home prices. The seizing-up of global credit markets—in conjunction with further deflationary pressure on asset prices—poses significant downside risks to growth not only in the United States, but also in Europe and the emerging markets.

The coordinated rate action by global central banks is long overdue, as world financial markets have been writhing in a crisis mode for over a year, with the latest escalation over the summer of 2008 representing the

most dangerous blow-up in terms of potential deflationary shocks to growth in the world economy. The move to coordinated action by the major central banks represents a new phase in the global financial crisis. Such moves are much more effective than unilateral action in terms of defusing the contagion and negative feedback loops that have been spinning back and forth from one major market to another.

### **Exchange Rates**

The dollar has strengthened as Europe looks weaker amid the financial turmoil. A flight from risk has sent the dollar higher against most currencies except the Japanese yen and Chinese renminbi. We do not see a further surge from current levels. We assume yearend-2008 values of \$1.25/euro, 98 yen/dollar, and C\$1.20/dollar. In 2009 and 2010, we have assumed that (gentle) dollar depreciation resumes. The Chinese renminbi should continue to rise, but more slowly than before, and we assume just a 2% appreciation against the dollar through the end of 2009.

The nominal trade gap narrows sharply to \$435 billion in 2009, as both falling oil prices and falling materials/finished goods demand push the trade gap much lower. Exports still expand in 2009, but by only one-third of the 2008 growth rate, while imports contract sharply. The gap widens again on the backside of the recession as domestic consumption rises, materials demand is reinvigorated, and the oil import bill recovers.

The current account improves sharply as imports collapse, but the global slowdown extracts a toll on income earned abroad by U.S. companies, and the firming of the dollar does not help provide currency translation gains. The income and transfers side of the ledger cuts short the improvements in trade flows. A worse U.S. economy translates to a smaller trade gap and current-account deficit, but reduced consumption means fewer items enjoyed by consumers and fewer imported capital goods. A deteriorating outlook overseas can limit that trade gap reduction by reversing some of the progress the United States has made in exports, since capital goods are a major part of export strength.

## **Outlook for Aircraft Markets**

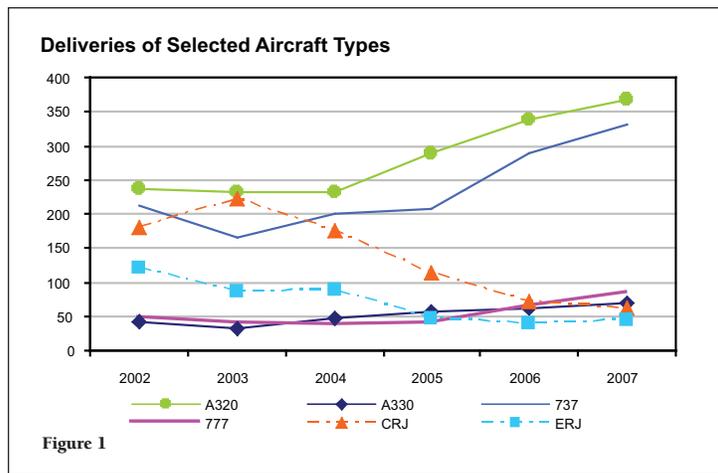
### **Commercial Aircraft**

At the end of 2008, the aircraft industry found itself in the position to ride out a period of global recession. While risks remain as airlines struggle to cope with fuel costs and weak demand; however, aircraft manufacturers do not face the same prospect of decline and uncertainty as most other manufacturing sectors. Years of strong order totals have made backlogs historically large – so large that new orders will not be filled until 2014 or later.

### **Orders and Production**

Orders have been quite cyclical in the past ten years. This was a time when aircraft demand was rebounding from a lull spanning several years. Airlines finished the 1990s strongly and profitably, making orders along the way. Orders then fell deeply as a soft economy and 9/11 served to cut demand in the industry. Airlines struggled and orders dried up. Manufacturers had high production rates in the late 1990s to meet the influx of orders but were forced to scale back when backlogs began to dwindle. The cycle then turned up once again in 2004, following the 2003 recession, and the large current backlogs stem from orders placed in the period of 2005-07.

International airlines started ordering first, beginning in 2004 but really coming on strong in 2005. Orders for commercial aircraft jumped over 155% in 2005, helped along by big orders from Asian airlines. 2006 was a bit weaker for orders, though still very positive, and 2007 set another record. Once again aircraft manufacturers began to increase production rates. Production did not increase as quickly as did orders. Past instances of fast production expansion caused an oversupply situation. Aircraft makers learned a lesson and kept production plans restrained with few drastic jumps in production. Manufacturers are, for the most part, not adding new production lines but are instead speeding up production on existing lines by increasing efficiency and fine-tuning supply chains.



## New Aircraft Programs

Another source for production increases is new aircraft programs. Several new aircraft are in various stages of development. The Airbus A380, a double-decker jumbo jet, entered service in late 2007 after several lengthy delays. By the end of October 2008, nine aircraft have been delivered, and 183 orders remain to be delivered. Airbus hopes to ramp up production to around 45 planes per year. However, the process to serialize production has been delayed and aircraft are still being constructed individually. This has hampered progress towards production goals.

## Midsize Niche Markets

Boeing's 787 is the most popular commercial aviation launch in history, with 895 orders accrued by October 2008, before the first aircraft has even flown. The program has also been delayed several times as Boeing experienced problems with its supply chain. The two-month machinists' strike in the autumn of 2008 has delayed it again. While first flight was anticipated for late 2008 and first delivery for the third quarter of 2009, those targets will not be met. Boeing has not yet announced new targets. The manufacturer has established a complex, global supply chain for the 787 and kinks always remain a risk.

The plane's success has hinged on several features that make it very attractive to airlines. It is a mid-size, twin-aisle aircraft designed to carry 200-300 passengers. It fits the mold for routes whose demand is not strong enough to fill a jumbo jet or Boeing 777, a po-

tentially profitable market niche as airlines look to expand internationally and shift towards point-to-point route maps. Furthermore, the 787 boasts a jump in fuel efficiency by incorporating composite materials into the airframe and lowering its weight. It will be outfitted with fuel-efficient engines.

Airbus's response to the 787 is the slightly larger A350, a program that started haltingly. A lack of customer confidence in the model prompted a redesign in 2005. The move appears to have alleviated concerns as Airbus has secured a large number of orders for it. Fifteen orders were placed in 2006 after the redesign; thereafter, orders leapt to 290 in 2007 and 138 through October 2008. Despite the 787's delays, the Boeing aircraft will beat the Airbus to the market by several years, with the first A350 not scheduled to enter service until 2013.

## New Entries to the Regional Jet Market

Canada-based Bombardier will introduce two new, more fuel-efficient regional jets. The CSeries, scheduled to enter service in 2013, was designed to compete in the 100- to 149-seater airliner market. The CSeries will be composed of advanced materials and will have advertised fuel savings of 20%.<sup>20</sup> With up to 100 seats, the Bombardier's CRJ1000, previously dubbed CRJ900X, will play in a smaller jet market than the CSeries. The CRJ1000 has 45 firm orders in addition to another 17 orders under option. However, Bombardier has delayed its entry into service until the first quarter of 2010, one quarter later than initially planned.<sup>21</sup>

In addition, three new entrants to the aircraft manufacturing market have announced plans to produce regional jets. China's AVIC I is building the ARJ21, a 90 seat aircraft that will initially serve the Chinese domestic market. All but five of its 146 current orders are to Chinese airlines; GE Commercial Aviation Services accounts for the other five. The first delivery should occur in late 2009. While the ARJ21 is primarily domestically-focused for now, AVIC I plans on submitting it to the Federal Aviation Administration for certification. China has bigger plans for the commercial aviation market and the ARJ21 is the first step. Officials there say they are planning on entering the large air-

<sup>20</sup><http://www.bombardier.com/en/aerospace/products/commercial-aircraft/cseries?docID=0901260d800091e6>

<sup>21</sup><http://www.flightglobal.com/articles/2008/11/25/319368/bombardier-pushes-back-crj1000-eis-to-1q-2010.html>

craft market and reportedly aim for a 2020 roll-out.

Japan is also planning an entry into the aircraft manufacturing market via Mitsubishi's MRJ. While the company produces defense products and parts for other programs, such as the wings for the 787, this is Mitsubishi's first foray into commercial aircraft. The MRJ will carry 70-96 passengers and production is slated to begin in 2012. A major feature of the aircraft is widespread use of composite materials. The launch order of 15 aircraft by All Nippon Airways in spring 2009 remains the MRJ's only orders on the books.

Sukhoi, a Russian aerospace company with a long defense history, is making its entry with the Superjet 100, a regional jet carrying 75-95 passengers. It also plans to include composite materials and is expected to enter service in late 2009 or early 2010. While many of its 122 orders are to Russian airlines and leasing corporations, western European airlines have ordered as well. Sukhoi expects to compete by being 10-15% cheaper to operate and by list prices 18-22% lower than competitors.<sup>23</sup>

Ukraine's Antonov has also developed a regional jet, its first new program in quite some time. The An-148 carried 70-80 passengers. Orders are so far restricted to former Soviet republics, Iran, and Cuba as Antonov works towards getting it certified internationally.

**Future Developments**

Further down the line, the new fuel-efficient technologies developed for new aircraft could be applied to existing programs. The appeal of a narrow bodied aircraft comprised of composite material or equipped with new engines would be tremendous. Narrowbodied aircraft, like the A320 or B737, already make up the majority of the world fleet.

**Aircraft Markets**

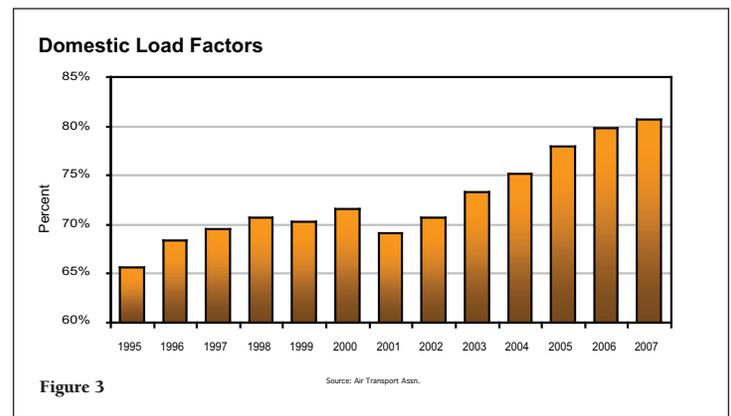
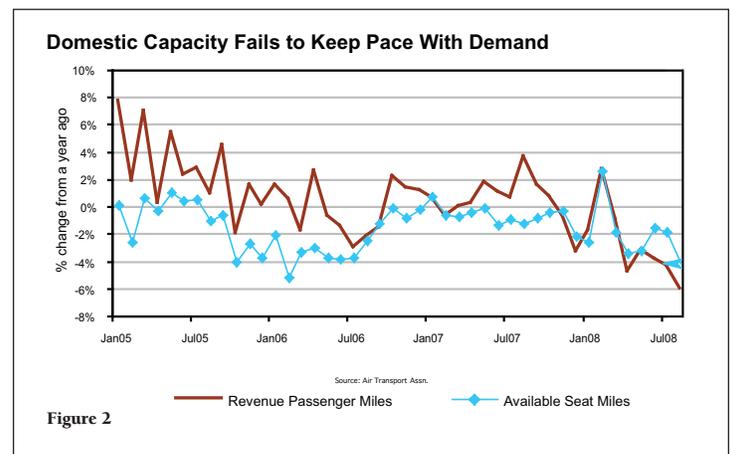
After a profitable end to the 1990s, airlines entered into a period of decline through weak demand and terrorism. The worldwide airlines industry posted net losses every year between 2001 and 2006, though only several large charges related to Delta and Northwest's bankruptcies pushed 2006 into the red. Orders for new aircraft were weak during this time, but by 2004 inter-

national carriers were in better financial shape and started to make orders, leading to the then-record 2005 order boom.

**Cost-cutting Measures**

The return to profitability was accomplished by proactive cost-cutting and resurgent demand. Fuel costs were rising, but demand was strong enough to pass along those costs to customers. Labor contracts were renegotiated to give airlines lower costs and more flexibility. Airlines implemented strategies to conserve fuel, such as only taking the fuel load needed for a flight, taxiing on one engine, and cutting extra weight.

Another strategy for increasing fares was restraining supply growth. As a result of airlines reining in capacity as passenger levels rose considerably, load factors were extraordinarily high.



On the other hand, international expansion was swift. International routes are generally less competitive and more profitable for airlines. The United States

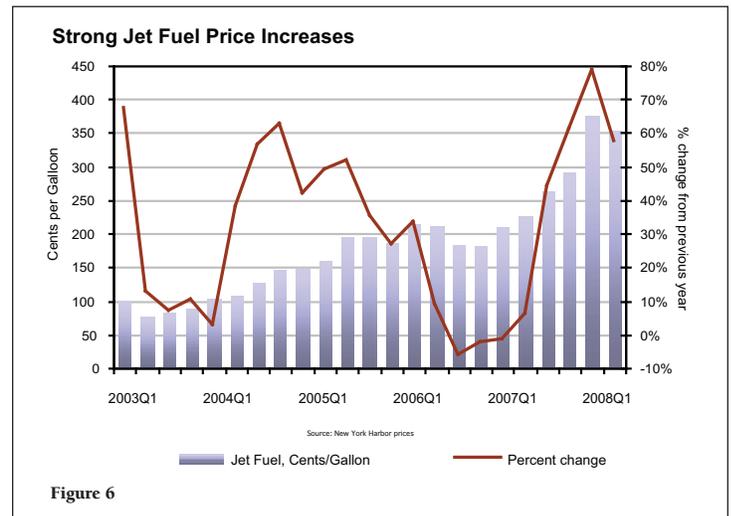
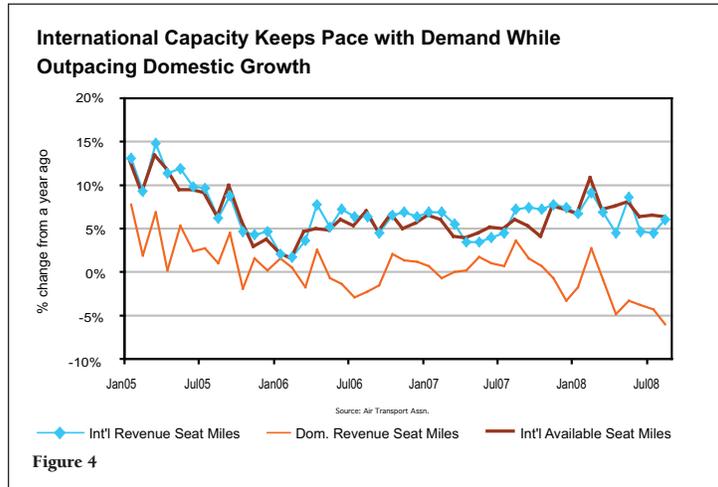
<sup>22</sup><http://english.peopledaily.com.cn/90001/90776/90884/6441328.html>  
<sup>23</sup><http://www.flightglobal.com/articles/2007/02/06/211879/export-driven-the-sukhoi-superjet.html>

and China agreed to expand flight offerings between the two countries and airlines added routes to international cities not often serviced by non-stops from the U.S., including new destinations in Eastern Europe, Middle East, and Africa. This trend marked a shift away from the hub-and-spoke model toward a more point-to-point system. These routes are not the kind whose demand can support a jumbo jet, a point which Boeing and Airbus hope to exploit in their 787 and A350 programs.

ning of 2005. With costs cut, capacity managed, and fares on the rise, profitability returned. In 2007, domestic airlines turned their first outright profit as an industry since 2000. 2006 would have also been profitable except for the Delta and Northwest charges.

**The Turning Point**

A turning point came in 2007 as fuel prices started shooting upwards again. The previous few years had seen historically inflated prices, but this increase was even more severe. At its peak in mid-2008, jet fuel cost over 270% more than it did at the beginning of 2004.



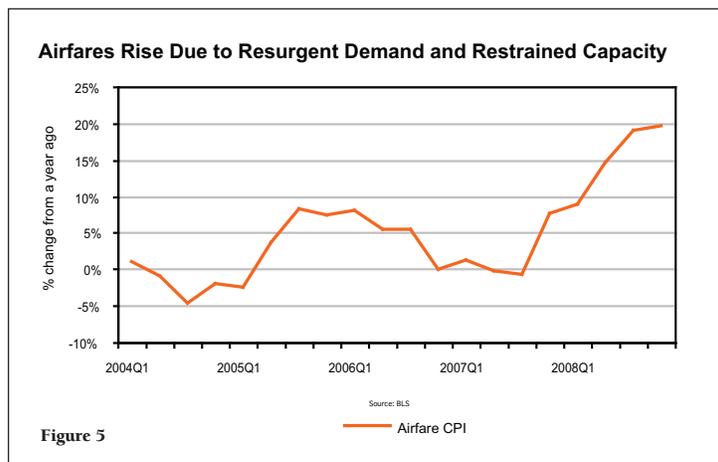
While available seat miles mostly declined, the number of flights shot upwards. This was partly due to the proliferation of regional aircraft, whose use jumped. Airlines looked to match routes to aircraft that most appropriately met demand and so smaller aircraft were used on longer flights not traditionally served by regional jets. The use of smaller aircraft was a step forward in the quest for high load factors.

Higher costs obliterated profitability and U.S. airlines lost billions of dollars in the first half of 2008. Airfares increased to compensate, but the rise in costs coincided with a weakening economy, which in turn hurt demand. In a stronger economy, travelers could absorb rate increases without significantly curtailing demand, but in weaker times when money for leisure or business travel is already tight, strong fare increases are hard to pass along. Nevertheless, airlines increased fares as much as they could. The summer months of 2008 saw the strongest monthly fare increases in decades.

The upshot was increasing fares. By mid-2008, fares in the U.S. were up some 37% compared to the begin-

**Supply-Side Actions**

The response from the industry was on the supply side. If current capacity could not support the fares needed to cover costs, then lower capacity could. Airlines around the world announced slashes in capacity. Underperforming routes and destinations were cut, schedules were redesigned with fewer frequencies, and



older aircraft were grounded. The U.S. fleet is one of the oldest in the world, reflecting how long it took for airlines there to make new aircraft orders. Older and less fuel-efficient aircraft have been parked, shifting the load to newer aircraft with more attractive economics in a time of high fuel prices.

A further result of the groundings is that the trend towards regional jets has reversed. During their heyday in the late 1990s and early 2000s, regional jets serviced smaller destinations, increased frequency on heavy routes, and offered passengers the experience of flying on a jet even for short distances. However, from a per passenger-mile perspective, regional jets tend to be less efficient than larger aircraft. The fuel inefficiency of the 50-seat regional jet was negligible in the 1990s and early 2000s when crude oil prices were typically well below \$40 per barrel. As fuel prices began to climb after 2005, the high fuel-burn of regional jets on short-haul flights proved too costly, and they were moved into longer-haul flights. Turboprops, whose use on short-haul flights had been previously usurped by regional jets, found themselves back in favor due to their superior fuel economy on routes shorter than 500 miles. For trips longer than 500 miles, the advantages of a regional jet still win out. Thus, where once jets were paired with routes to most accurately meet demand, they are now paired to reflect costs. For example, two flights on regional jets may be replaced with one on a larger narrowbody jet, and turboprops are again favored for short routes.

The drive towards cost cutting and capacity reduction has also spurred industry consolidation. The U.S. airline market has seemed on the verge of a round of mergers several times in the past few years. The prospect of a change in power in the 2008 election and the recent crisis helped one merger finally come to fruition: Delta and Northwest. The deal was announced in April 2008 and approved in October. Other pairings were speculated but never went through, though a variety of domestic and international airlines looked into new partnerships that would allow for extensive cooperation on fares and capacity.

With the economies of the European Union evermore integrated, a treaty signed by the EU and U.S. to liberalize transatlantic air travel removed a barrier to mergers for European airlines. Incumbent air travel agreements lim-

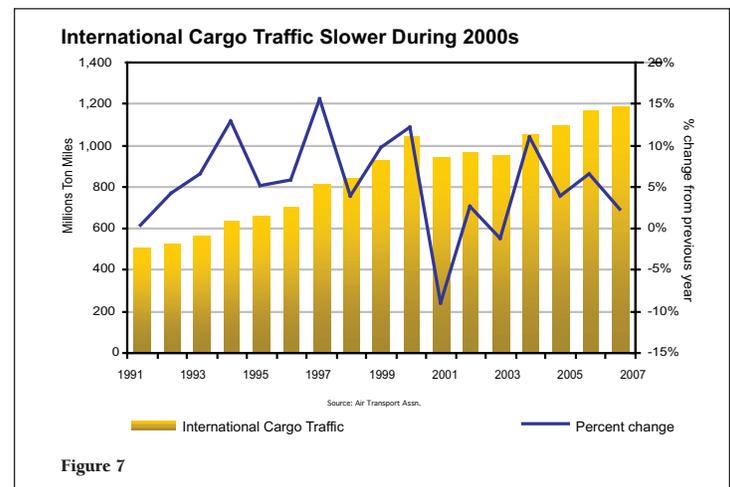
ited flights to the U.S. by a carrier's home country but the new arrangement allows any EU airline to fly from any city within the Union. British Airways and Iberia have announced a merger while Lufthansa is buying bmi (formerly British Midland International). Lufthansa will now be able to fly Lufthansa-branded flights from London's Heathrow airport using bmi's slots.

Not every capacity cut has been voluntary as the industry has had a large number of airlines leave the market. One week in April saw three scheduled passenger airlines go out of business in the U.S. Dozens of airlines around the world have met the same fate, from fairly large airlines and niche low cost carriers to charters and cargo airlines.

These measures were announced in mid-2008 and put into action in the fall of that year. However, oil prices, along with jet fuel prices, have fallen considerably since then. Drastic plans that, a few months prior, were designed to merely keep airlines alive have now put them on track for a somewhat optimistic 2009.

## Cargo

Unsurprisingly, the fate of cargo airlines is intertwined with trade. Increasing globalization and a fairly strong period of world economic growth has pushed cargo traffic upwards. That said, cargo growth has been somewhat underwhelming in recent years.



Trends in passenger aircraft demand have affected freighter demand as well. As passenger airlines looked to expand and fueled an order boom in 2005, so too did cargo airlines. Most cargo planes have been converted passenger aircraft, but orders for new freight

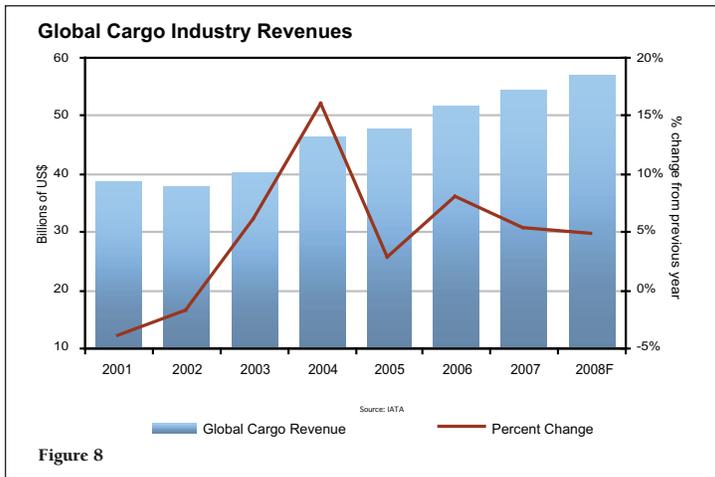


Figure 8

aircraft leapt in 2005 as well. With the demand for passenger aircraft potentially drying up the market for conversions, expansion strategies relied a bit more on new aircraft. Furthermore, the trend of using smaller aircraft for passenger service restricted cargo space and owning their own aircraft gives freighters control over their capacity. Finally, newer aircraft provide fuel efficiency gains.

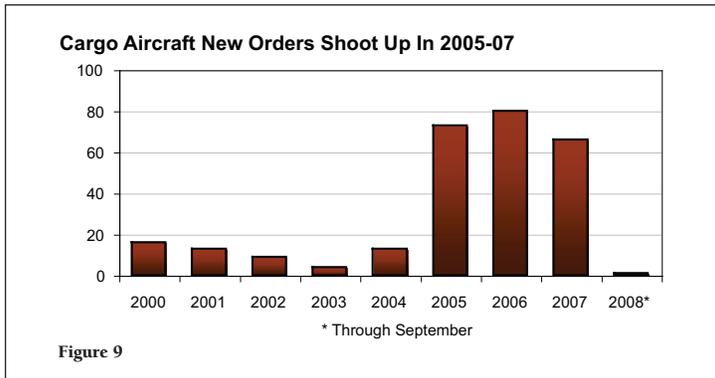


Figure 9

Many of the issues affecting the passenger market also appear in the cargo market. The most important has been fuel prices. Air is a very fuel-intensive mode of transport so the rise in costs has a large impact. Shippers levied significant fuel surcharges in response to escalating fuel prices, and accordingly, air freight rates soared.

By mid-2008, the calculus for freighters was the same as for passenger airlines: rising costs but slackening demand. Capacity cuts are part of the response. The Asia/Pacific region has been particularly hard hit. The export economies in that region are struggling in the face of weakness in their trading partners.

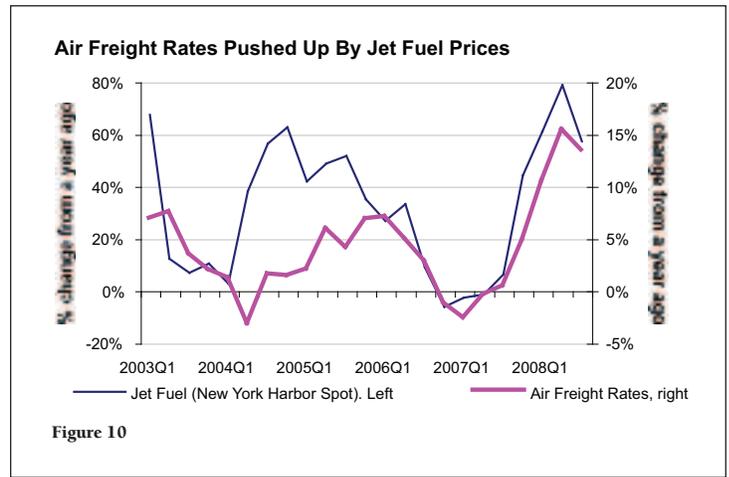


Figure 10

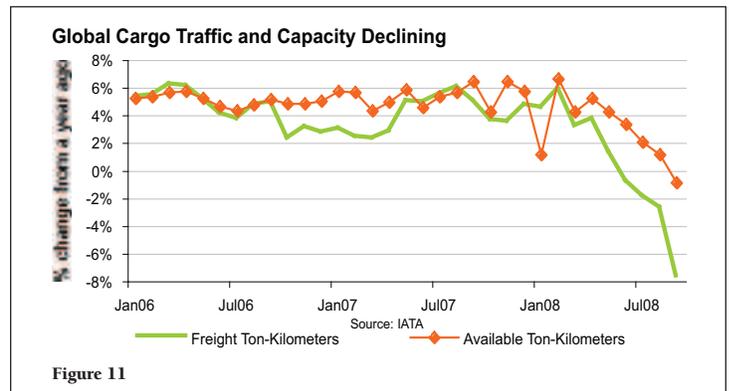


Figure 11

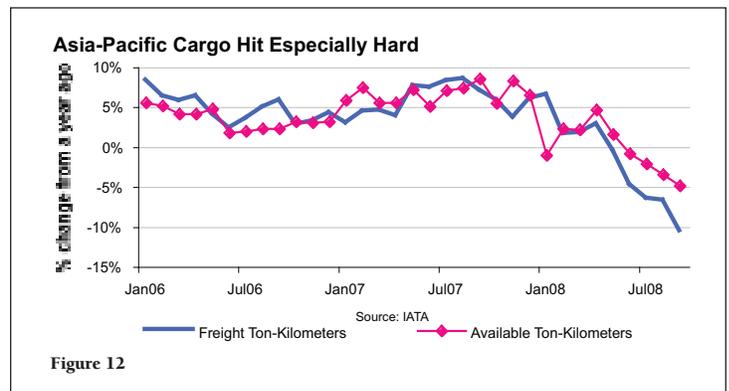


Figure 12

Intermodal competition has played a role in the cargo market as well. Even as demand and fuel costs pushed water transport rates to record highs, the proliferation of fuel surcharges pushed some customers from air to water. The rate of traffic growth for air cargo was outpaced by the rate of international trade, suggesting a shift of market share to other modes of cargo transport.

### Looking Ahead

With commercial backlogs at record highs topping 8000 aircraft, manufacturers have announced a ramp

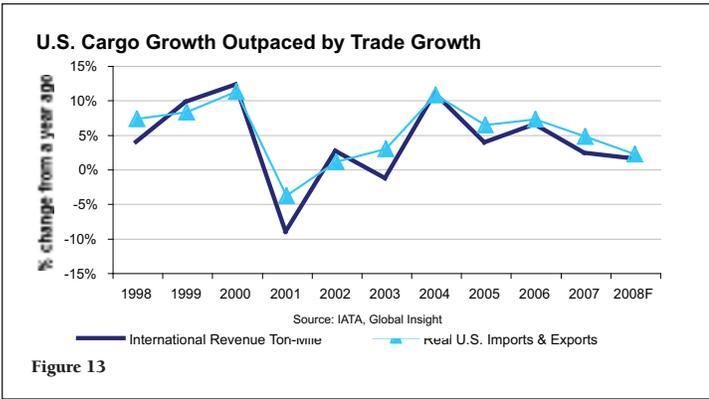


Figure 13

up in production. These planned increases have been in the works for some time; however, the weak economic climate may once again delay action on the part of the manufacturers. Announced production plans have been cautious, looking to increase the output and efficiency of existing production lines. For existing aircraft programs, there are few new production lines, a departure from previous production increases. Airbus is adding an A320 production line in Hamburg, Germany, though it is designed to take the place of one in Toulouse, France. Another A320 line in Tianjin, China, will come online in 2009 to deliver aircraft to Chinese customers and will produce up to four aircraft per month.

By volume, narrowbodied aircraft will see the bigger increase. Airbus plans on increasing production from about 31.5 A320s per month in late 2008 to 40 per month by 2010-11. Likewise for Boeing's 737, the goal is to increase production from 31.5 to 40 aircraft monthly by 2011-12. For twin-aisle aircraft the increase is less dramatic. The 777 has gone from 6 per month in 2006 to about 7 now with an aim for a fraction more. A330/340 production sits around 6.5 per month in 2008, though that could increase to as much as 10, with most of that increase going towards the A330. Boeing is moving from the 747-400 to the 747-8 and production rates should remain relatively stable.

**Obstacles to Increasing Production**

Production increases have been in the works for some time but could be scaled back due to the current economic climate. Airlines are in a precarious position as fuel costs pushed them into the red and demand plummeted. Expansion plans requiring larger fleets are

scrapped, and in fact, aircraft are being grounded. Cancellations and deferrals are distinct risks to aircraft manufacturers. This year Airbus customers have cancelled 119 orders through October 2008, with at least half coming from now-defunct U.S. carrier SkyBus.<sup>24</sup> As of September 2008, Boeing expected 5-10% of its backlog to be at risk.<sup>25</sup> The extent and depth of the economic downturn and its effect on demand, energy prices, and the tumult in credit markets provide some significant risks in the near-term and manufacturers may well choose to rein in production increases to play it safe.

New programs will add to those production totals, but a variety of delays has plagued several high-profile projects. The first Airbus A380 was finally delivered in late 2007, over a year behind schedule, and the implementation of full production remains delayed. At full production Airbus plans on producing 45 per year and hoped to achieve that rate within two years of first delivery. Serializing production has proven difficult, however, and the aircraft are still being manufactured individually, and less than 10 will be delivered in 2008.

Boeing's 787 program has also been hampered by delays. Original plans called for first flight in mid-2007 and first delivery in late 2008. Boeing established an extensive supply chain to design and manufacture components, but it proved too ambitious for the initial timetable. First delivery got pushed back to the end of 2009 but the machinists' strike has delayed it even further to an unspecified time in 2010. As setback after setback besets the program, Boeing is losing its head start on Airbus whose competing A350 is set to enter production in 2013.

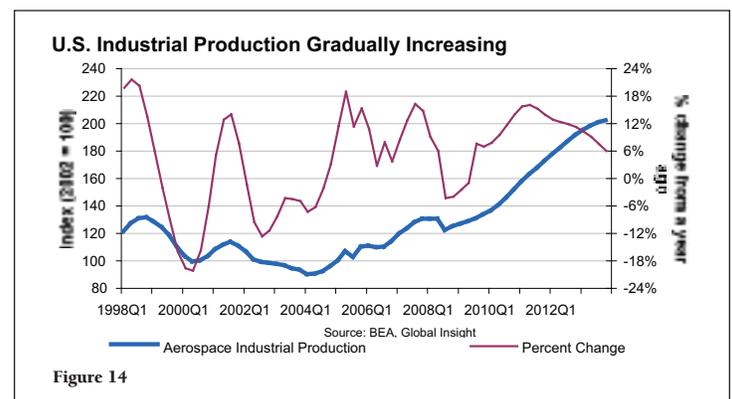


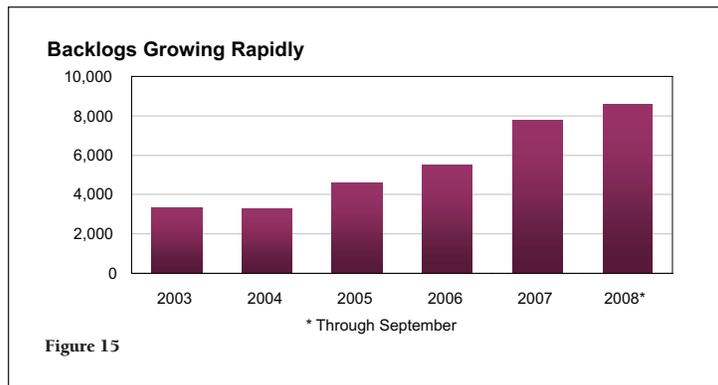
Figure 14

<sup>24</sup><http://afp.google.com/article/ALeqM5i1Pzz4bYZC5nAgNsyrE-Vkwx5oNw>  
<sup>25</sup><http://www.bloomberg.com/apps/news?pid=20601103&sid=aPfrthCgVXYs&refer=us>

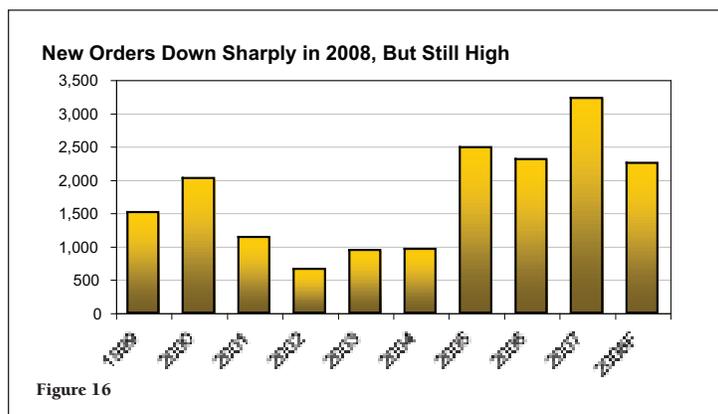
Boeing machinists went on strike for two months in the autumn of 2008, the effect of which causes a trough in the above chart. Also note the trough caused by the strike of 2005. The most recent strike definitively delayed the delivery of dozens of aircraft, pushed back the 787 program, and likely encumbered near-term planned production increases.

**The Upside for Manufacturers**

Despite potential hurdles, the sheer size of order backlogs insulates aircraft manufacturers to some extent. The order boom combined with a slow ramp up in production ensures that it will be years before current orders are completely filled. An airline making an order today will not take delivery for five years or more, depending on the model.



Compared to other manufacturing sectors, aircraft is actually in a decent position. Production plans can be altered in response to changing conditions and a very large number of cancellations would have to occur to significantly damage the manufacturers or their aircraft programs. Another positive sign is the relative strength in orders for 2008. In a very tough environment orders for commercial aircraft were down by almost 25%



through September; however, that still puts the industry on pace for more than double the orders recorded in 2003 or 2004.

Some airlines are clearly still in a position that they want new aircraft, or at least they expect to want new aircraft in five years when they will take delivery. Furthermore, new aircraft help an airline's fuel efficiency, a welcome plus even in lean times.

**Volatility for Manufacturers of Smaller Aircraft**

The calculus is a little more dramatic for the producers of smaller aircraft. Boeing and Airbus's backlogs both approach four thousand; Embraer and Bombardier are each under five hundred. Embraer has been increasing production rates significantly and should deliver over 190 commercial aircraft in 2008, compared to 169 in 2007 and 130 in a 2006 plagued by problems with suppliers. Bombardier's production has remained stable in recent years and down from peaks achieved while now-defunct programs were still active earlier in the decade. The market is also somewhat more volatile for smaller aircraft. Regional jets went through a trendy period earlier in the decade but that has since subsided. Current conditions and their relative fuel inefficiency also eat into their popularity. Order books are sufficiently thick that it will take several years to deliver the aircraft currently on order at current production rates. The time buffer is smaller compared to large jet manufacturers, however, and large cancellations could have a much more damaging effect.

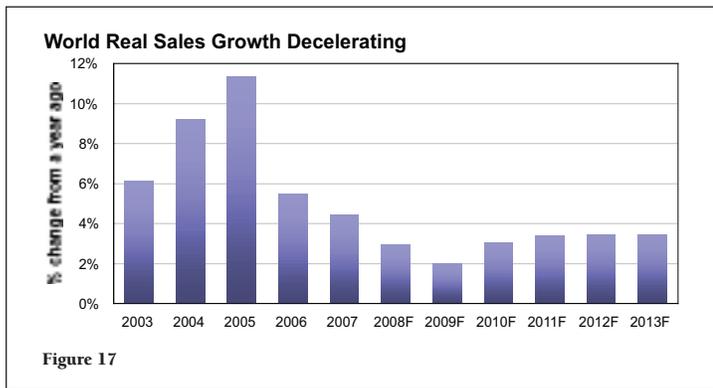
**Regional Demand Outlook**

The airline industry looked to be in a dire position in the first half of 2008 with energy costs sky high and demand slumping. Fleets and capacity were cut in a bid to stay solvent. As energy prices have come down later in the year, the now-leaner airlines are now in a cautiously optimistic position. Demand will play a major role, and a longer and deeper than expected recession will dampen airlines' outlooks.

Narrowbodied aircraft will remain the work horses of the skies, flying shorter routes and comprising the bulk of low cost carriers' fleets. Jumbo jets have a niche that will keep its share of the world fleet rather steady. The A380 opens up possibilities for large-capacity, long-

haul flights but mainly in routes that already exist. The main attraction of the latest iteration of the 747, the 747-8, is its more fuel-efficient engines. Further, the resurgence of point-to-point travel, particularly in the Middle East and Asia, may benefit the future introduction of the Boeing 787 and the A350 to service.

Real world revenue growth for the air transport industry has been decelerating since 2005, the year of the industry's strong resurgence. Growth of 4.4% in 2007 gives way to 2.9% in 2008 and 2% in 2009, reflecting the deteriorating world economy. Real capital expenditure is also on a decelerating trajectory, from 9% in 2007 to 5% in 2008. Outlooks are mixed regionally, with Asian markets expected to remain fairly strong while Europe and North America struggle.

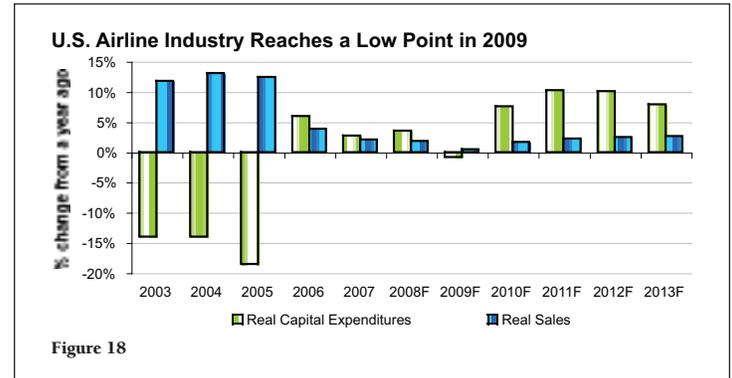


**United States**

U.S. airlines took longer to pull out of their doldrums than their international counterparts and therefore made orders later. Its fleet is also one of the oldest, making it less fuel efficient and more costly to maintain. The good times were short, however, as the U.S. and its weak dollar were hit hard by higher energy prices. Many of those older aircraft have been grounded in the capacity cuts of the second half of 2008. These groundings are not necessarily temporary, either. As airlines look to expand again in coming years, older, less environmentally-friendly aircraft may no longer be attractive, even those owned outright. By then, some of the orders made in 2006-07 will be delivered, providing cost savings. Leasing may also be an attractive option.

The U.S. market is more or less matured. Demand growth in the most recent orders boom came from other parts of the world, and those regions will continue to be the drivers for further growth. Capital ex-

penditure has been weak and will remain so, even declining 2% in 2009. Growth above 10% in 2010 and 2011 is expected as airlines look to take advantage of the economic recovery and take delivery of new aircraft. While demand will be quite weak through 2009, capacity cuts and cost declines – particularly in fuel – give the U.S. industry some relief.

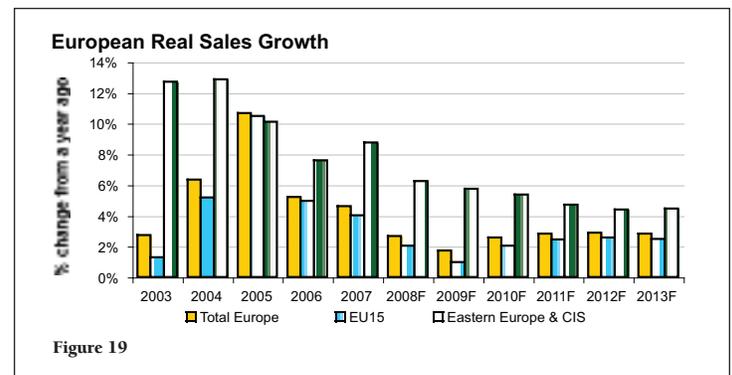


**Europe**

European airlines ordered earlier than their U.S. counterparts as legacy carriers sought to replace aging fleets. The continent has also experienced a rapid proliferation of low-cost carriers, many with leased and/or small fleets looking to expand. These carriers also placed orders, though some did not survive the recent tumult.

More consolidation is likely in Europe as the continent becomes more economically entwined, and the need for every country to have a flag carrier becomes less necessary. The rapid expansion of low-cost carriers is also likely to end. Established budget carriers are looking towards more steady growth while current conditions are not very favorable to new start-ups.

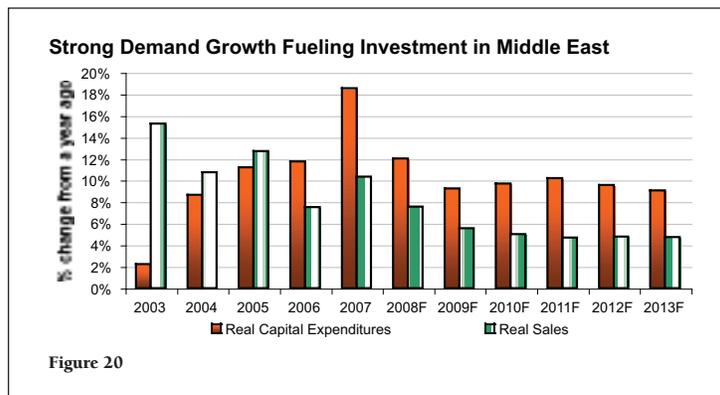
The outlook for Western Europe looks pretty similar to that of the U.S. with mature markets and slow demand growth. Less than 2% real annual revenue



growth is expected during 2007-9. Eastern Europe has more promise, partly boosted by increased wealth in Russia, with investment and sales growth more comparable to that of the Middle East than the EU.

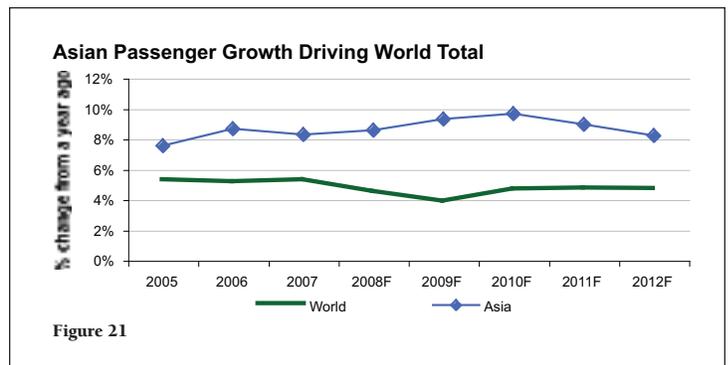
**Middle East**

Fleets in the Middle East have been expanding at a rapid pace with airlines making many large orders. The region is flush with oil money and several airlines are trying to establish themselves as world players. The region's geography also makes it an ideal location for transferring passengers and cargo. The combination of geography and its rising prominence as a travel and business destination fosters strong growth potential for the Middle East. The Middle East is a heavy user of twin-aisle aircraft to connect the region to far-away locales. It accounts for one-third of total A380 orders to date, as well as one-eighth of 787 orders and three-quarters of A350 orders. Declining oil prices and the large number of orders already on the books could dampen the number of new Middle Eastern orders, however.



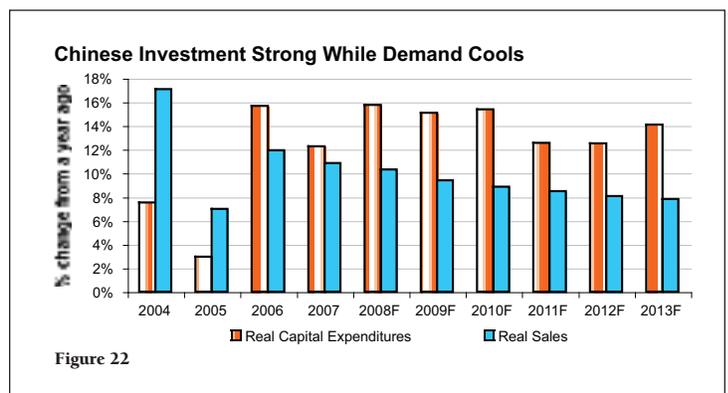
**Asia**

Asia has been the driver for the recent order boom and it is expected to be the engine of the air transport industry in the future. The region's rapid economic growth over the past several decades has taken the GDP of nations like South Korea from roughly equal to that of sub-Saharan African countries to those among the richest in the world. Wealth creation in Asia has spawned an entirely new class of flyers and increasing competition to serve them. Asia is expected to account for 44% of the change in passenger arrivals between 2007 and 2012, primarily driven by intra-regional travel.



China's air transport industry is booming. Its fleet is expanding at a significant rate, tripling since 2000, with the bulk being the addition of narrowbodied aircraft to service the domestic market. Chinese carriers made huge orders in 2005, which are now coming into service. Cargo also plays a very significant role in the country's air transport industry given its export-dependent economy. The economic downturn will have an effect in China as the economies of its export partners struggle. Economic growth is expected to slow from double digit rates to 5-6%. Cargo capacity and traffic has already turned downward. As its infrastructure is a longer-term problem, China is ramping up investment in airports and air traffic control systems.

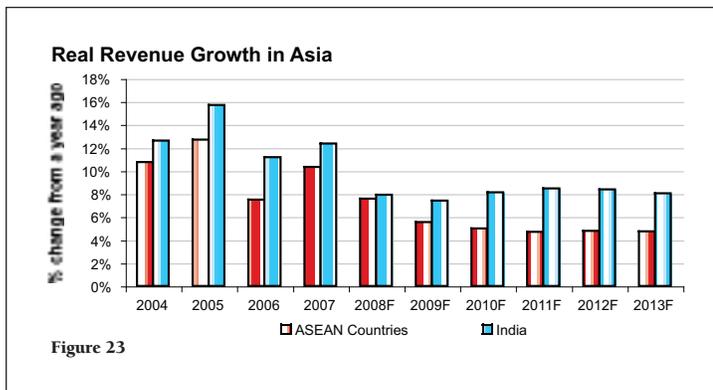
Industry growth in China will slip slightly in 2009-10 as its export-based economy slows, but it will be less affected than economies in other regions. Capital expenditure growth is forecasted to remain above 15% through the end of the decade as China invests in its infrastructure and adds to its air fleet.



India, too, is a very promising growth market. A similar wealth effect has occurred there and a host of new airlines have sprung up to serve the burgeoning new class of flyers, including several low-cost carriers. The nation has also made several large new aircraft orders.

The challenges in India are similar to those in China, with infrastructure sorely lacking. Many of its major airports are already way over capacity, and a dearth of pilots is a continual problem. Onerous regulations prevent Indian airlines from expanding as they wish, and they have restrained several carriers' international ambitions.

The rest of Asia presents strong growth opportunities as well. Southeast Asia has experienced a low-cost carrier boom. Although low cost carriers tend to stick to smaller aircraft, larger aircraft are finding homes in Asian low-cost carrier fleets due to the length of routes served; for instance, Malaysia's AirAsia has an order for 24 A330s. Meanwhile, established airlines are expanding their international presence and many orders for larger aircraft have come from the likes of Singapore Airlines, Qantas, and Cathay Pacific. Asian markets outside of China and India are more developed so they have less potential for explosive growth, but the continent will continue to be a major driver for aircraft demand. Southeast Asian real sales growth will stay above 5% in 2009-10, which, while markedly slower, is significantly stronger than the world average.



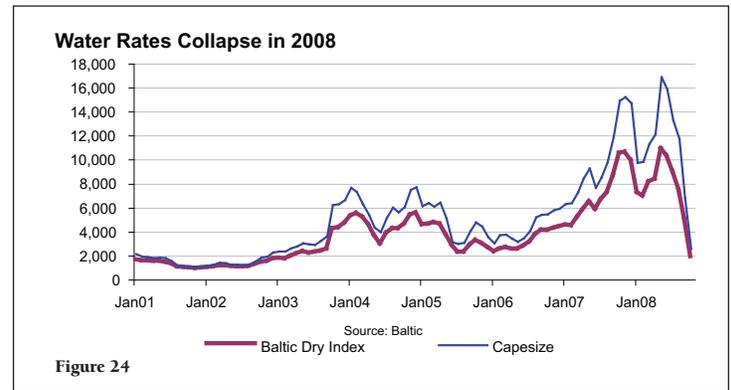
**Aircraft Outlook**

Asian demand is a big factor in the expected rise of twin-aisle aircraft. This is a lucrative sector that aircraft manufacturers are trying to exploit with the Boeing 787 and A350. The increase in air travel within Asia will be a major driver for twin-aisle aircraft. Furthermore, the focus of international expansion – at least until expansion plans slowed to a crawl in 2008 – was on routes underserved by the traditional hub-and-spoke model. New non-stop services connect, and will connect, second-tier destinations to major markets.

Whereas in the hub-and-spoke model passengers would board a jumbo jet from Chicago to Frankfurt before making connections to their ultimate destinations, the new model would take them directly from Chicago to Prague or Portland to Tokyo on a smaller aircraft. A larger trend towards liberalization will also expand options for international expansion. In the past few years the U.S. has signed open skies agreements with the EU and Australia and has agreed with China to significantly expand the flights connecting the two countries.

**Cargo Outlook**

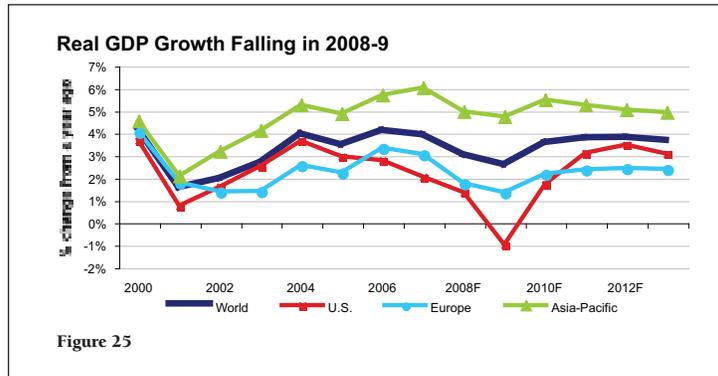
The worldwide economic downturn will have some significant negative impacts on world trade. Most major Western nations are heading towards recession, and Asian markets are sufficiently integrated that they will not be able to decouple. As a result, demand for air cargo will weaken. Furthermore, competition with other transport modes remains fierce. Air lost out to water when fuel costs were high; fuel has gone back down but water rates have utterly collapsed, providing even stronger incentives to use water transport.



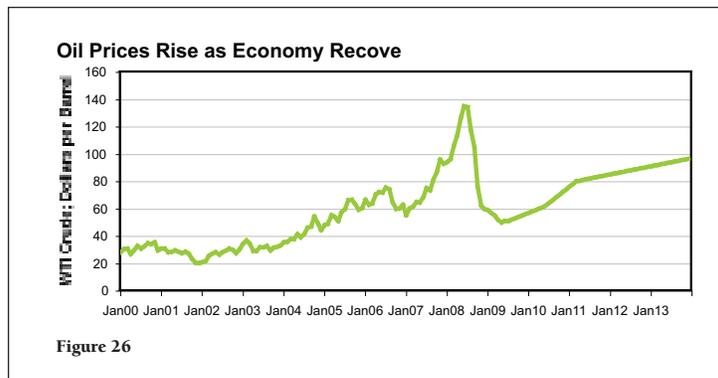
The long term outlook is more optimistic. Long term trends of globalization and liberalization bode well for international trade. As the economy recovers beginning in 2010, cargo carriers will be looking to rebound as well. New aircraft already on order will eventually be delivered and the aircraft that passenger airlines have grounded may provide opportunities for new conversions if they are not put back into service. More than thirty 747s have been parked this year, and Boeing plans on a 787F model at some point down the line. Once Airbus works out the kinks in its A380 passenger model, the A380F program will be reactivated.

### Forecast Risks

In the short-term, the depth and length of the 2008 recession will be the major driver behind the health of airlines. Current forecasts call for real world GDP growth to slow from 3.9% in 2007 to 3% in 2008 and 2.6% in 2009. The U.S. will experience a contraction of 1.0% in 2009 while Europe will see growth of 1.7% and 1.3% in 2008 and 2009, respectively. A further deterioration in the outlook would hurt demand for passengers and cargo even more.



For the longer-term the threat remains fuel costs. Prices have plummeted in the second half of 2008, but that is mostly a response to declining demand. As the recovery begins in late 2010, demand pressures will return. While current forecasts do not expect oil and jet fuel prices to reach their 2008 peaks, they will still be higher than historical averages.

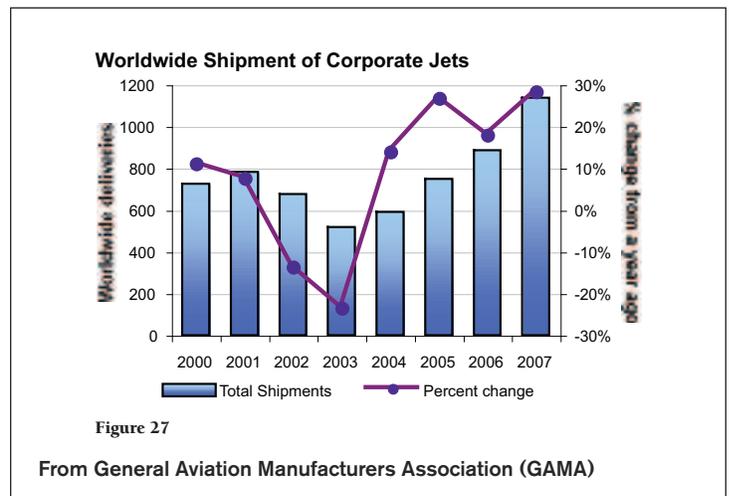


A return to higher prices could put the airline industry back in the same position it was in earlier in 2008. A positive would be that capacity cuts have already occurred so a reaction to a further rise in fuel costs may be a reduction in expansion plans instead of drastic cuts.

## Corporate Aircraft Market

### Background

Corporate aircraft demand took off during the mid-1990s. Estimated market values prior to 1995 had never surpassed \$3.5 billion annually. Manufacturers delivered 653 private jets in 1999 with a combined worth of \$10.5 billion, and by 2000, those figures rose to 726 jets worth \$11.4 billion<sup>26</sup>. Corporate aviation, following the trend in general aviation, took a detour after 9/11; deliveries dropped to 676 jets in 2002 and 518 jets in 2003<sup>27</sup>. The jet market has since rebounded, and deliveries reached 1,138 jets in 2007. Despite weakness creeping into the economy in late 2007 and intensifying throughout 2008, corporate jet deliveries through the first nine months of 2008 are 30% greater than through the same period in 2007. Nonetheless, third quarter 2008 shipments worldwide fell 10.7% compared to previous quarter, indicating that the debilitated economy is taking its toll.



### Jet Markets

Demand for corporate jets generally come from three broad categories: corporation, high net-worth individuals, and operators. The aircraft themselves are wholly-owned, fractionally-owned, or chartered. Fractional companies are the newest advent in the corporate jet market. They allow multiple investors to pool resources and purchase a single jet, thus opening the market for those who do not have enough capital—

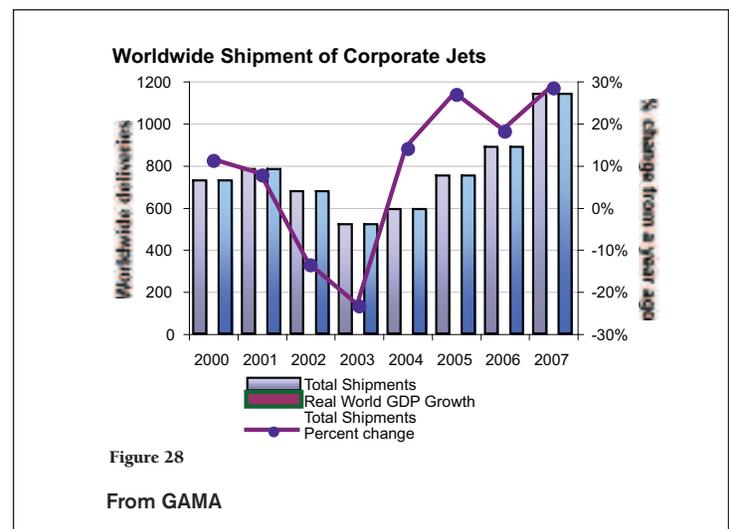
<sup>26</sup>Aboulafia, Richard. "Business Jet Free-fall Ends". *Aerospace America*. May 2005  
<sup>27</sup>Annual shipment reports from the General Aviation Manufacturers Association (GAMA).

or do not wish—to acquire their own jet. The fractional market can also serve as a transition market. Potential jet owners may begin in the fractional market before jumping into owning a corporate jet; in addition, tightening budgets might cause some corporations to migrate back into the fractional market. Fractionals fit a niche and have become very popular since their inception. They are forcing changes in the charter market, which had previously been the sole alternative to owning a jet outright.

The charter segment of the market is enormous. Historically, there have been numerous operators, creating a highly segmented market. Charter companies also had heterogeneous fleet, which created inefficiencies in terms of operational and maintenance costs. In addition, customers could book a charter flight, but they did not have a choice as to the aircraft type. When fractional operations entered the market, this was one of the advantages they had over their charter rivals. Fractional clients always knew what they were flying; and they had access to more modern planes. To improve competitiveness, charter companies are adjusting their fleets to optimize operations. They are shifting to homogeneous fleets, which cuts down on costs because they require common parts and crews do not need to be trained separately. Charter operators are also acquiring later model planes to improve fuel efficiency.<sup>28</sup>

### Demand Factors

Business conditions in the corporate aircraft market are closely tied to world GDP. Deliveries tend to lag GDP growth as a result of long backlogs. More so than commercial aircraft market, corporate aircraft demand is driven in large part by the international market. Rapid growth has created enormous amounts of capital and injected much liquidity into the emerging markets. Demand overseas has slowed with the weakened global economy but remains very strong nonetheless. Though most private jet sales have historically originated in the United States, robust growth in emerging markets has turned the international market into the dominant player in the corporate jet market. Orders from abroad now constitute roughly 60-65% manufacturers' back-



logs<sup>29</sup>. Personal incomes, particularly in the Middle East, China and India, have been exploding, creating a rash of new multi-millionaires with the funds to acquire their own private jets.

Another factor driving up demand for corporate aviation in recent years has been the hassle associated with commercial airlines. Security measures and lines at security gates at airports have increased since 9/11. Corporations and individuals with access to sufficient funds are willing to incur the additional expense of having a private jet available at a moments notice and getting to meetings and other events more quickly. They are keen to forego long security lines, board a ready aircraft, and fly more comfortably than they would on a commercial plane.

### Corporate Aircraft Outlook

Global demand for corporate aircraft is expected to remain strong despite the spell of high fuel prices during the summer of 2008 and tightening credit conditions. The global credit crisis has had some negative impact on the corporate jet market, but there is still tremendous potential for growth, especially in the Middle East, Russia, and Asia<sup>30</sup>. Deliveries during the third quarter of 2008 totaled 327, down from 366 in the second quarter; however, through the end of September 2008, 990 jets had been delivered, up from 761 deliveries during the first nine months of 2007<sup>31</sup>. Bulging backlogs at major manufacturers—including Bom-

<sup>28</sup>ELFA member interview

<sup>29</sup>ELFA member interview

<sup>30</sup>Alcock, Charles. "Slowing World Economies Affect International Charter Operations". *Aviation International News*, Nov 2008

<sup>31</sup>GAMA

bardier, Cessna, Dassault, and Gulfstream—mean that new orders will not be delivered for several years.

A weak economy has affected the smaller-end of the corporate aircraft market more so than the larger, longer-range segment. The smaller, lighter jets are generally preferred by entrepreneurs and small companies, who have been hit hard during the credit crunch. Sales of very-light jets (VLJs) in 2008 were down from their 2007 levels<sup>32</sup>, and smaller models are experiencing reduced flight hours in the U.S.<sup>33</sup>. Credits in the larger, longer-range end of the market are typically stronger, and near-term impacts from oil prices and credit problems should be minimal<sup>34</sup>. Kurosh Tehranchian, CEO of Ocean Sky, divides corporate jet into two core groups<sup>35</sup>:

*“The [prevailing profit-and-loss] client is an aspirer [in terms of his appetite for flying a private aircraft] but as soon as an ill wind blows, he is the first to return to the way he used to fly [the airlines] because his certainty about income goes. The off-balance-sheet people have made a lifestyle decision to use private jets, and they stick with this without first looking at what their net worth is on any particular day.”*

Annual deliveries of VLJs are expected to reach about 300 jets. Overall corporate jet deliveries are forecasted to reach 1,200 in 2008 and increase to 1,300 in 2009. Analysts predict that deliveries will decline for several years after 2009 before climbing to nearly 2,000 planes in 2016.<sup>36</sup>

## Conclusion

The near-term outlook for the commercial aircraft is grim. After battling high fuel costs for most of 2008, airlines must now face mounting credit problems. They will be hard-pressed to find financing or cash to pay for new aircraft, despite looser than expected budgets in the final quarter of 2008 and early 2009. Financiers, if they still have capital to lend, will be reluctant to part with it, and even if they do, they will do so under the strictest of terms for the borrower. Profitability chal-

lenges that have been plaguing the airline industry since September 11<sup>th</sup> have also deterred investors from accepting the risks associated with leverage leasing. That in addition to more stringent risk assessment methods and capital reserve requirements imposed by the Basel II Accord have shrunk the availability of leverage leases, and the U.S. aircraft finance market has shifted to shorter operating leases, which are already favored by the international community.

Lessors find themselves not only competing with other leasing companies, but also with a growing supply of aircraft that were parked when airlines cut capacity. Freight tonnage is also down as a result of the global economic slowdown. One of the bright spots, ironically, comes from production setbacks at the manufacturers, which will delay announced increases in production and the introduction of new aircraft models, such as the Boeing 787 and the Airbus A350, into the market. This should alleviate supply conditions in the present market. Since airlines have already cut capacity and demand will remain suppressed owing to the weakened economy, the current down cycle gives the industry a chance to move back toward profitability while optimizing operating efficiency by right-sizing fleets. The long-term benefit to this will be increased investment in more modern, fuel-efficient aircraft.

The outlook for corporate aircraft is fairly steady. Ailing corporate profits have contributed to slackening demand, particularly in the smaller, shorter-range market. Transactions in the secondary corporate jet market have been few, as potential clients retrench on spending and thus creating an abundance of used jets in the marketplace. As values in the secondary market have fallen, so have values in the primary market. Nevertheless, there is still terrific international demand for corporate jets, and the larger, longer-range portion of the market faces very slight credit issues. International orders comprise about 60-65% of manufacturers' backlogs. Most of the growth in the corporate aircraft market—and the same can be said of the commercial aircraft market—will come from emerging regions of the world, such as the Middle East, Russia, and Asia.

<sup>32</sup>Pasztor, Andy. “Demand for Business Jets Is Holding Up”. *The Wall Street Journal*. Oct 6, 2008

<sup>33</sup>“Honeywell Sees '09 Bizjet Sales Up, But Peak Looms”. *MSN Money*. Oct 4, 2008

<sup>34</sup>Ibid. (32)

<sup>35</sup>Ibid. (30)

<sup>36</sup>Ibid. (32, 34)

## Appendix

**Table 1: U.S. Economic Forecast Summary**

	2007	2008	2009	2010	2011	2012	2013
Real GDP - % Chg.	2.0	1.3	-1.0	1.7	3.1	3.5	3.1
Industrial Output - % Chg.	1.7	-0.9	-3.5	0.9	3.6	3.9	2.9
Light Vehicle Sales – Mil.	16.1	13.3	12.2	14.0	15.2	16.3	16.7
Housing Starts – Mil.	1.3	0.9	0.7	1.1	1.4	1.6	1.7
Consumer Spending - % Chg.	2.8	0.4	0.2	1.8	2.1	2.8	2.6
Business Invest. - % Chg.	4.9	2.7	-11.0	-0.5	9.6	10.0	7.1
Crude Oil WTI - \$/BBL	72.2	101.4	52.7	63.3	80.4	86.8	92.8
CPI, All Urban - % Chg.	2.9	3.9	-0.9	2.4	3.0	2.4	2.4
PPI, Finish. Goods - % Chg.	3.9	6.6	-5.5	1.9	3.1	2.1	2.2
Fed. Funds Rate - %	5.0	2.0	0.5	1.2	3.7	4.8	4.8
3-Month T-Bill Rate - %	4.4	1.5	0.9	1.8	4.0	4.6	4.6
10-Yr. T-Note Yield - %	4.6	3.8	3.6	3.9	5.1	5.4	5.4
Exchange Rate - Major Trading Partners	0.767	0.733	0.783	0.763	0.737	0.725	0.725

**Note: Forecasts begin in 2008.**

**Source: Global Insight**

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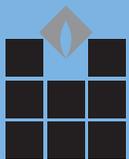
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