

Forecast Uncertainties

The forecasts in this document are forecasts of aviation demand, driven by models built on forecasts of economic activity. There are many assumptions in both the economic forecasts and in the FAA models that could affect the degree to which these forecasts are realized. This year's forecast is driven, at least in the short-term, by a number of factors including the strength of the U.S. and global economies. Shifting international dynamics and impacts resulting from the U.S. administration's economic policies could drive further changes. Also, as numerous incidents in the past few years remind us, terrorism remains among the greatest worldwide risks to aviation growth. Any terrorist incident aimed at aviation could have an immediate and significant impact on the demand for aviation services that could be greater than its impact on overall economic activity.

The rapid spread of the novel coronavirus (COVID-19) that began in early 2020 now presents a new risk without clear historical precedent. Although the FAA forecast is a long-term trend forecast and does not focus on short-term perturbations, the great uncertainty surrounding the impact of the virus leaves open the possibility that it could affect values for 2020 and 2021. This uncertainty arises from not being able to assess the spread or intensity of the human consequences, whether within the U.S. or abroad, as well as the breadth and depth of possible economic fallout. If the increase in infections is brought under control relatively quickly, producer supply chains suffer little damage, and worker output and productivity are only slightly depressed, then a one-quarter decline followed by a one-quarter rebound in

aviation activity might be a reasonable outcome. In that case, it could be that the consequence to annual numbers is quite subdued. On the other hand, of course, a less optimistic outcome could occur, resulting in longer term impacts to the industry.

Although oil prices moved lower in 2019 from the previous year, recent volatility reminds us there is still considerable uncertainty as to the future direction of oil prices. The FAA's baseline forecast (derived from economic assumptions in IHS Global Insight's November 2019 U.S. macro forecast and 30-Year Focus released during August 2019) calls for oil prices to decrease to \$46 per barrel in 2021 and rise gradually thereafter. By 2030, oil prices are projected to exceed \$80 per barrel and reach \$104 per barrel by the end of the forecast period in 2040. Some forecasters are calling for a more gradual rebound in the price of oil. In October 2019, the World Bank released its latest commodity price forecast. The forecast calls for oil prices to hold steady at about \$59 per barrel until 2021. After 2021 prices rise gradually and reach \$70 per barrel by 2030. However, there are other oil price forecasts that are considerably more aggressive than the FAA base forecast. The latest Energy Information Administration (EIA) Annual Energy Outlook released in January 2020, sees oil prices rising approximately 4.0% per year between 2019 and 2040. By 2040, the spot price of oil ranges from \$138 per barrel (West Texas Intermediate) to \$146 per barrel (Brent), considerably above the FAA base forecast of \$104. Over the long run, lower oil prices give consumers an impetus for additional spending, including air travel, and should enhance industry profitability. In the case where oil prices turn out to be higher than the FAA forecast, we would

expect lower spending on air travel by consumers, higher costs for fuel to airlines and reduced industry profitability.

The baseline forecast incorporates additional infrastructure spending in 2020 and beyond. However, there is considerable uncertainty as to the magnitude, timing, and nature of these programs that ultimately determines the impact on the future growth of the U.S. economy. In addition, how the U.S. will engage with the rest of the global economy over the next several years continues to evolve. Under the right conditions, a period of sustained high and more inclusive growth along with increased financial stability could occur but there is also the possibility of an outcome that leads to greater global economic fragmentation, slower growth, and increased financial instability.

The baseline forecast assumes that the global economic slowdown that began in 2019 will continue until 2021 as weakness in Europe and a slowdown in China constrains global growth. Thereafter, the baseline forecast assumes that China and India will be growth engines for emerging economies as China successfully transitions the economy from heavy reliance on manufacturing and resource industries to one more oriented towards the services and technology sectors and India continues to implement reforms to make its economy more competitive. In the United States, economic growth has slowed from 2018's level as the effects of the 2017 tax cuts on demand are beginning to wane, and at the same time demand has slowed in Japan and in the European Union as these areas continue to be constrained by structural economic problems (high debt, slow population growth, weak public finances, for example) and political instability. Furthermore, the actions taken to stabilize the global

economy during the Great Recession continue to hamper economic policy makers. In some of the major advanced economies, governments need to shore up their finances and recent actions have many analysts concerned that policy makers will not take the steps needed. There exists a non-trivial possibility that authorities will either act prematurely or be excessively timid and late in taking necessary steps to maintain a healthy global economy. The current forecasts assume strong passenger growth for travel between the United States and other world regions. Further slowing of worldwide economic activity could seriously inhibit the growth in global passenger demand.

The outlook for further consolidation via mergers and acquisitions (M&A) appears to be rather limited. Based on FY 2019 data, the top 6 (American, Delta, United, Southwest plus Alaska/Virgin and JetBlue) accounted for almost 85% of the U.S. airline industry capacity and traffic. For many low cost carriers, the sheer size of merger transactions or the amount of risk associated with a merger makes further merger activity unlikely. For the network carriers, it is unclear how regulatory authorities will respond to any future proposed mergers.

The forecast assumes the addition of sizable numbers of large regional jets (70 to 90 seats) into the fleet of regional carriers. However, network carrier consolidation and new rules on pilot training have left regional carriers saddled with either excess capacity or a lack of pilots. Although air travel demand has been strong, the bankruptcy filings of Republic Airways in 2016, Great Lakes Airlines in 2018 and Trans States Airlines in 2020 (planned) are reminders that financial pressures on regional operators have not abated. Network carriers continue to adjust the size and breadth of their networks and, in many

cases, are significantly reducing the numbers of small regional jets. While these actions may provide some opportunities for well positioned regional carriers, the overall impact so far has been to reduce opportunities for regional flying substantially.

After suffering through a significant downturn in 2009, partial recovery of business and corporate aviation continues. The future pace of the recovery in business and corporate aviation is based largely upon the prospects for economic growth and corporate profits. Uncertainty in these leading indicators poses a risk to the forecast, but the risk is not limited to these factors. Other influences, such as potential environmental regulations and taxes do not seem to be as much of a concern in the short term, but over the long term, uncertainties about the direction of these influences may place downward pressure on the forecast.

Not only is the volume of aircraft operating at most large hubs expected to increase over the next 20 years, but the mix of aircraft is changing for this same period. The expected increases in the numbers of larger regional jets and business jets as well as the anticipated widespread deployment of UAS into the national airspace system will make the FAA's job more challenging. This change in the mix of aircraft will most likely add to workload above and beyond the increasing demand for aviation services resulting from the growth in operations over the forecast period.

While overall activity at FAA and contract towers increased 2.9 percent in 2019, activity at large and medium hub airports (61 in total) increased 1.8 percent and 1.9 percent in 2019 and delays remained at historically high levels at many U.S. airports. FAA forecasts

operations at these airports to grow substantially faster than the overall national trend. As demand continues to grow and workload increases, congestion and delays could become critical limits to growth over the forecast period. FAA's forecasts of both demand and operations are unconstrained in that they assume that there will be sufficient infrastructure to handle the projected levels of activity. Should the infrastructure be inadequate and result in even more congestion and delays, it is likely that the forecasts of both demand and operations would not be achieved.

Increasing concerns about aviation's environmental impacts could potentially limit or delay the ability of the aviation sector to grow to meet national economic and mobility needs. Airspace modernization and airport expansion or new construction are often contentious because of concerns over noise, air quality, water quality, and climate change. Community concerns about aviation noise have led to increasing levels of public debate, political interest, and even litigation. Without effective measures to mitigate and abate aviation noise, the infrastructure projects and airspace redesign efforts needed to achieve aviation growth may be delayed.

The environmental noise and emissions issues associated with overflight operations also present global challenges. In addition to providing economic benefits, technologies to improve aircraft fuel efficiency and reduce fuel consumption provide benefits in terms of reduced emissions; many technologies that improve fuel efficiency also result in reduced noise. The implementation of the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), a global market-based measure for international carbon dioxide emissions, will help ensure an approach

that is economically preferable to a patchwork of State or Regional-level regulations around the world is used. Continued advancements in technologies that result in improved fuel efficiency, reduced fuel consumption, noise reduction and reduced emissions are also required to ensure that access restrictions or operating limitations are not imposed on the in-service fleet, which in turn

may depress growth. The continued deployment of sustainable aviation fuels, (i.e., drop-in fuels that are compatible with today's aviation infrastructure but are derived from biomass or waste resources), will also help to reduce emissions that affect air quality near airports and address concerns about climate change.