



Cost of Delay Estimates

2019

2019 Results

The table below shows the most recent cost estimates for the four components and the total. For prior years or data in an extractable format, see the attached Excel file.

Total Cost of Delay in the U.S. (dollars, billion)

| | 2016 | 2017 | 2018 | 2019 |
|--------------|-------------|-------------|-------------|-------------|
| Airlines | 5.6 | 6.4 | 7.7 | 8.3 |
| Passengers | 13.3 | 14.8 | 16.4 | 18.1 |
| Lost Demand | 1.8 | 2.0 | 2.2 | 2.4 |
| Indirect | 3.0 | 3.4 | 3.9 | 4.2 |
| Total | 23.7 | 26.6 | 30.2 | 33.0 |

Methodology

The estimates are based on results for 2007 from an FAA-sponsored study, available [here](#) through a page on the A4A website. This study utilized regression models to estimate the costs of the Airline, Passenger and Lost Demand components, and a large-scale macroeconomic model to estimate the Indirect costs. APO-100 extrapolates these 2007 values using price and quantity series to estimate values for subsequent years. The quantity unit, minutes of delay, is extrapolated forward using the Aviation System Performance Metrics (ASPM) total delay minutes. The price unit, implied average cost per minute, is extrapolated forward using three price level indicators as follows: Airlines – Airline Cost Index (A4A); Passengers -- Personal Consumption Expenditure deflator (BEA); and Lost Demand -- Gross Domestic Product deflator (BEA). The Indirect component is derived from the three other components.

The estimates are produced annually, typically in February. When underlying data for prior years is revised, the estimates for those years are revised as well. As a result, estimates for past years may change with future releases.

Delay Component Definitions

Airlines

These costs consist of increased operating expenses such as for crew, fuel, maintenance, and others, and come from two sources: schedule buffers and unforeseen delays. Specifically, for example, typical pilot contracts require that pilots are paid based on the greater of scheduled block time and actual block time. Also, longer scheduled times lead to poorer aircraft utilization and larger fleets. Thus, a schedule buffer directly increases airline costs. Separately, the high

degree of uncertainty associated with delayed arrivals gives it a very different character. Since airline fleet and crew schedules are based largely on the scheduled times, excessive or even moderate amounts of flight delays can be highly disruptive causing extra crew costs, various costs associated with accommodating disrupted passengers and even aircraft repositioning.

Passengers

Passenger costs result from time lost due to schedule buffers, delayed flights, flight cancellations, and missed connections. Also included in this category are so-called "voluntary departure time adjustments". These are adjustments passengers often make to take into account the possibility of arrival delays. If a passenger absolutely needs to be at a destination by 10:00 AM he or she typically would not take a flight scheduled to arrive at 10:00 AM. Rather the passenger would take a flight scheduled to arrive earlier to ensure arrival by 10:00 AM even in the case of significant flight delays. In fact, it is not uncommon for a traveler to fly in the night before, only to ensure timely arrival at a morning meeting.

Lost Demand

This cost is the estimated welfare loss incurred by passengers who avoid air travel as the result of delays. Flight delays degrade the quality of the airline product. While many air travelers choose to "grin and bear it" others respond by switching to alternative transportation modes, or simply not traveling at all. Such travelers do not bear the costs of air travel delay described under the Passenger component, but still incur a loss in welfare. Further, some of the trips are shifted to automobile, and the additional road traffic generates congestion costs on other road users and environmental costs on society at large.

Indirect

This represents the increased cost of doing business for other, non-airline, sectors, making the associated business less productive. The impacts of flight delays are not confined to airlines and their passengers. Other segments of the economy are also affected. Increases in airline costs caused by delay and schedule padding cause passengers to pay higher fares. These higher fares affect not just the demand for leisure travel but also lead to increases in the cost of production for industries that rely on air transportation to conduct business. Demand for the output of such industries in turn decreases. Schedule padding and flight delays also add to the time required for business trips, leaving business travelers with less time to do their work. As a result, delays cause employers to experience a loss in productivity.

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