Appendix B: FAA Forecast Accuracy

Forecasts, by their nature, have a degree of uncertainty incorporated in them. They involve not only statistical analyses and various scientific methods, but also judgment and reliance on industry knowledge and the forecaster's experience to incorporate industry trends not yet reflected in recent results. The FAA's annual Aerospace Forecast is no exception. Given the volatile nature of the U.S. airline industry, it is not surprising that each year's forecast would contain a certain degree of forecast variance. Therefore, FAA forecasters have tried to build forecast models that give a consistent and predictable pattern of results. Analysts relying on the forecasts produced by the models would then be able to adjust for the predictable variance from actual results.

The table below presents an analysis of the variance from historical results for a primary forecast assumption along with five key forecast metrics during the FY 2010-2019 forecast period. Although many of the forecasts prepared for the period examined were developed while the U.S. airline industry was going through upheaval, the FAA's forecast methodology remained consistent during this time. For this reason, inclusion of prior periods in an analysis of forecast variance might lead to inconclusive or inaccurate implications about the accuracy of FAA's current forecast methodology.

The table below contains the mean absolute percent errors for the projected values versus the actual results for U.S. carriers' system operations along with the projected values versus actual results for U.S. GDP. Each metric has five values showing the relative forecast variance by the number of years in advance the preparation of the forecast took place. For example, the "3 Years" column for ASMs shows that the mean absolute percent error was 4.7 percent for ASM forecasts prepared 3 years in advance. For the period under examination, preparation of the forecasts for FY 2010 through FY 2019 occurred in FY 2009 through FY 2018. [30]

[30] It should be noted that the first forecasted year for each respective fiscal year is that very same year. Therefore, FY 2010's first forecasted year is FY 2010, and the third forecasted year is FY 2012.

U.S. AIR CARRIERS
SYSTEM SCHEDULED PASSENGER ACTIVITY
FORECAST EVALUATION

Forecast Variable	Mean Absolute Percent Error (Combined FY 2010 - FY 2019) (Forecast Variance from Actual) Forecast Performed Years Prior to Actual				
	1 Year	2 Years	3 Years	4 Years	5 Years
U.S. Real GDP	1.0%	2.3%	4.6%	6.5%	8.1%
ASMs	0.8%	1.9%	4.7%	8.2%	11.7%
RPMs	0.8%	1.6%	4.0%	7.1%	9.9%
Passenger Enplanements	0.6%	1.5%	4.2%	7.3%	9.9%
Mainline Domestic Yield	2.3%	4.7%	7.1%	8.9%	10.1%
Commercial Operations at FAA/Contract Towers	0.8%	2.7%	6.2%	10.0%	14.7%

*Total - scheduled and nonscheduled commercial plus noncommercial

Presenting forecast variances from actual data in such a manner simplifies a review of longer-term trends. Typically, one would expect the variances to increase as the forecast year is moves away from the year the forecast is prepared. Presenting forecast variances in this way allows an examination of changes in the relative variances by time horizon, signaling when dramatic shifts in accuracy occur.

Examination of the forecast variances reveals several items. First, the forecast variances for GDP, a key exogenous variable, are similar to the variances of the key traffic measures, Passenger Enplanements and RPMs. This suggests that a substantial amount of the forecast variance for the traffic variables is attributable to the forecast error in the exogenous variables. Second, all the metrics examined have increasing variances as the forecast time horizon lengthens. Third, the variance in the Commercial Operations at FAA/Contract Towers relative to ASM variance is stable for the 2 to 5 year out horizon. This suggests that beyond a 2 year forecast horizon carriers are able to accommodate changes in capacity by means other than adjusting operations. Many carriers have been systematically reducing the number of smaller regional jets in their fleets, replacing them with larger 70-90 seat aircraft. This has allowed carriers to increase capacity without increasing flights.