CASE **102**

DEN Revenues

The Denver International Airport (DEN) resides on 53 square miles of land 23 miles east of Denver, Colorado. The airport's trademark roof, made of Teflon-coated fiberglass, is designed to invoke images of the Rocky Mountains to the west. Artwork in the terminals, and even in the train tunnels, a solar farm, and adoption of green methods marks DEN as one of the more innovative airports around the world.

Management at DEN routinely collects information about its monthly revenues. *Airline revenues* include things like landing fees, fuel charges, and rents paid by airlines. *Non-airline revenues*, the focus of this study, come from concessions, parking, rental cars, and ground transportation. Non-airline revenues typically include a fixed fee, like a monthly charge for using DEN facilities, and a variable, revenue-based fee.

The data set named DEN Revenues includes the following information about non-airline revenues (with all revenue figures in dollars). `Rental Car` revenues include rent paid by rental car companies for their use of DEN facilities and land, a fixed fee called ground rent. `Rental Car` also includes the so-called minimum annual guarantee (MAG) from which DEN receives a percentage of the rental car companies' revenues including a required minimum. The percentage of revenue paid as part of the MAG, and rent paid, can be different for different rental car companies, as the specifics are negotiated at the time a contract is struck with DEN. Terms of a contract can also change at the time of renegotiation after lease agreements expire.

`Parking` measures revenues from parking garages owned and operated by DEN. These include long-term, short-term, and valet parking facilities at the airport.

Concessionaires pay a monthly fixed fee based on square footage. Leases vary by location, with, for example, restaurants located in busier terminals paying a higher "terminal fee" than those located elsewhere. `Concession` also includes the revenue-based MAG. As with rental car companies, the rate paid varies by company, with fast food franchises, for example, paying a smaller percentage of their revenues than higher-end restaurants. Some concessionaires also have a maximum annual guarantee that caps revenues paid. DEN sometimes uses maximum annual guarantees to induce organizations to sign longer-term contracts.

These unaudited data are the property of Denver International Airport (DEN) and subject to revision. The data and scenario were originally provided by Amy Madsen, Senior Financial Management Analyst, Denver International Airport. Subsequent revisions were provided by various DEN finance personnel. For more information about the Denver International Airport, go to http://flydenver.com/. Copyright © 2017 by Marlene A. Smith. All rights reserved.

The variable `Ground` represents revenues from ground transportation. These are services provided by operators dropping off or picking up passengers at the airport such as Uber, Lyft, taxis, limos, shuttle buses, and off-airport parking lots. These dollars are based on the quantity of trips for some (e.g., Uber, Lyft, and taxis) and as a percentage of gross revenue for others (e.g., off-airport parking providers like ParkDIA, USAirport).

The data set contains the following information about passenger traffic. `Enplaned` is the number of passengers that flew out of DEN that month; `Deplaned`, into DEN. The number of passengers connecting from one flight to another at DEN is named `Transfers`. An `Originating` passenger begins his or her trip in Denver, whereas `Destination` is the number of passengers whose trips end in Denver. UMCSENT is the consumer sentiment index. We provide different lagged info for this data.

All passenger information is provided to DEN by the airlines and non-airline revenue figures are compiled by DEN.

Your Tasks

For DEN's non-airline revenues:

- Preprocessing the data.
- Use EDA analysis to summarize non-airlines revenues. Any patterns found?Are there differences in non-airline revenues by time of year? From year to year?
- Create models for forecasting 4 types of non-airline revenues. Use them to produce forecasts for the months of March through June of 2017.
- Generate executive summary report (600 words max) and attach the appendix. Prepare 5 slides presentation. And submit report, presentation, peer evaluation report, R and/or Excel files on canvas.