STAT 33500 Final

Franklin Joseph and Kelly Zhang

2022-12-07

Introduction

This project aims to investigate late flight arrivals (defined as arriving more than 15 minutes past the scheduled arrival time) in the United States. Pulled from the U.S. Department of Transportation's Bureau of Transportation Statistics, our data set contains the number of flights and delays per month for each U.S. carrier (i.e airline) at a given major U.S. airport collected between January 2018 and September 2022. It also attributes the number of delays due to circumstances within an airline's control, extreme weather, the National Aviation System (NAS), late arrivals of previous flights on the same aircraft, and security. The NAS category is broad and includes but is not limited to non-extreme weather conditions, airport operations, heavy air traffic volume, and air traffic control. And security encompasses security breaches, issues with screening equipment, and long times (29+ minutes per person) at security screening areas. The complete list of all columns in the data set and all 30 major airports covered is enumerated in Appendix I.

This subject is important for air travelers, transportation and aviation agencies, and airlines. For consumers, the results of this project inform them of which airlines and destination airports are most and least reliable. For government agencies, the results highlight which main factors most significantly contribute to flight delays and thus encourage them to further research how to address those causes of delay. And for airlines, the results reveal how their punctuality and reliability compare with those of their competitors. They also provide insight into whether an airline's lack of reliability is due to its own fault, in which case the airline should devise plans to more consistently service on-time flight arrivals.

Data Exploration

Initially, we aimed to examine all U.S. airlines' flight and delay counts at all U.S. airports, but with 92,207 observations our models took far too long to run. Thus, we resorted to focus on counts at 30 major U.S. airports (listed in Appendix I) as the Bureau of Transportation Statistics database has a convenient feature to filter flight delay data by major airports. This smaller subset of data still provides us with 18,710 observations with which to model flight delays. And while it narrows the scope of our research to the 30 largest U.S. airports, these airports on average account for more than 60+% of all flight arrivals and late arrivals in the U.S. as shown below. Note that the plots below depict the share of arrival or delay counts over time at the 30 major airports with respect to all airports.
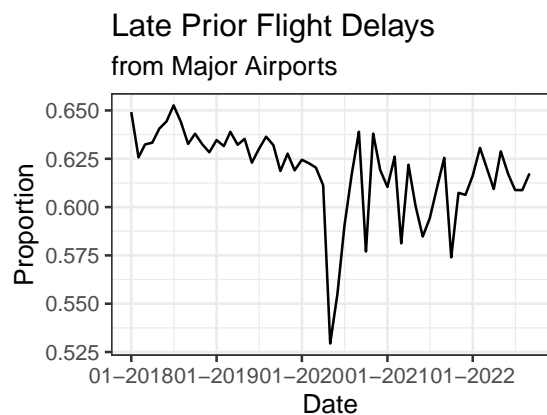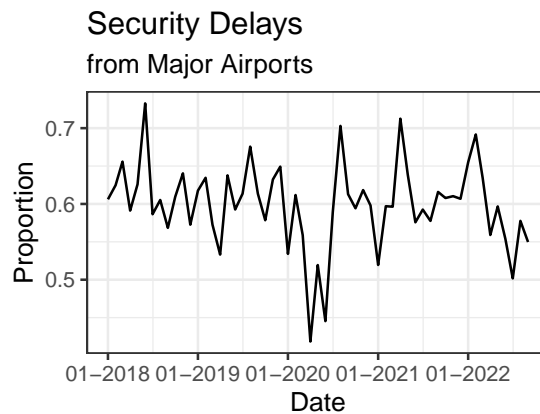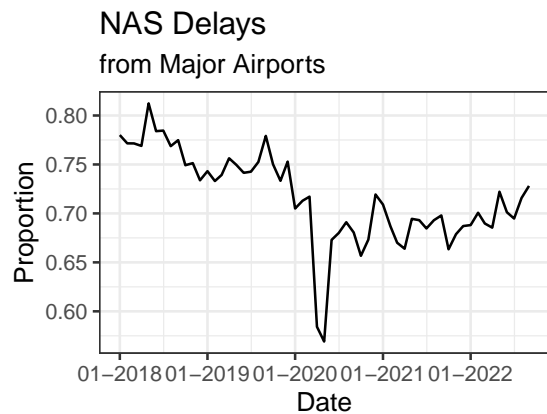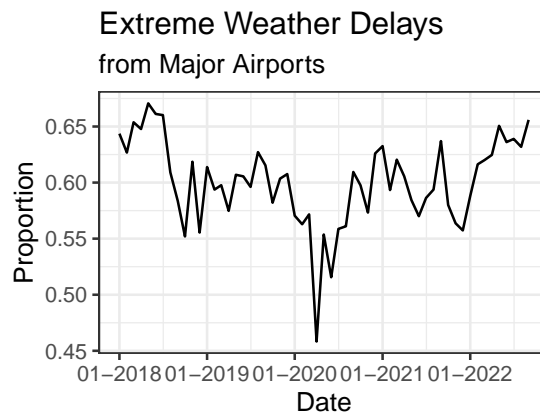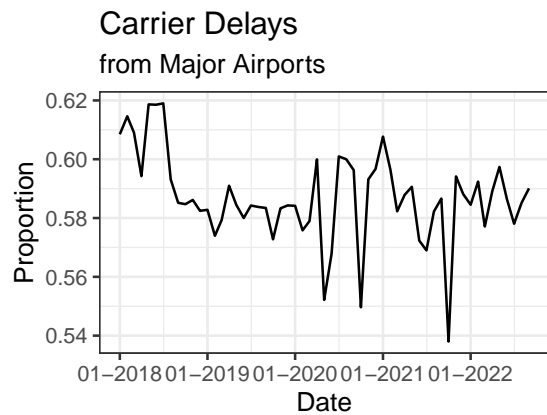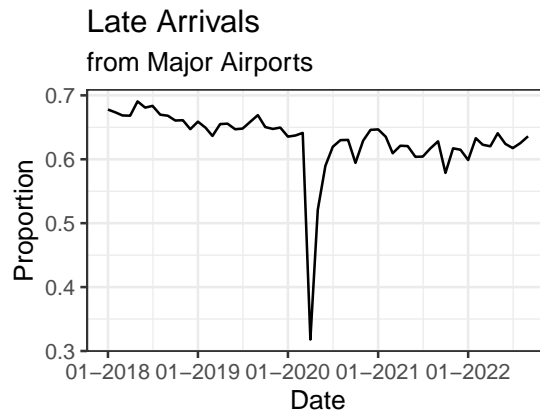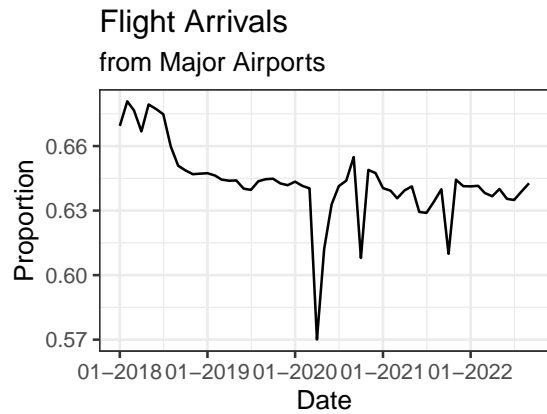
Within our reduced data set, we can examine the total number of flight arrivals and late arrivals by airline to get a better general understanding of our data.

Total Monthly Flight Arrivals by Airline
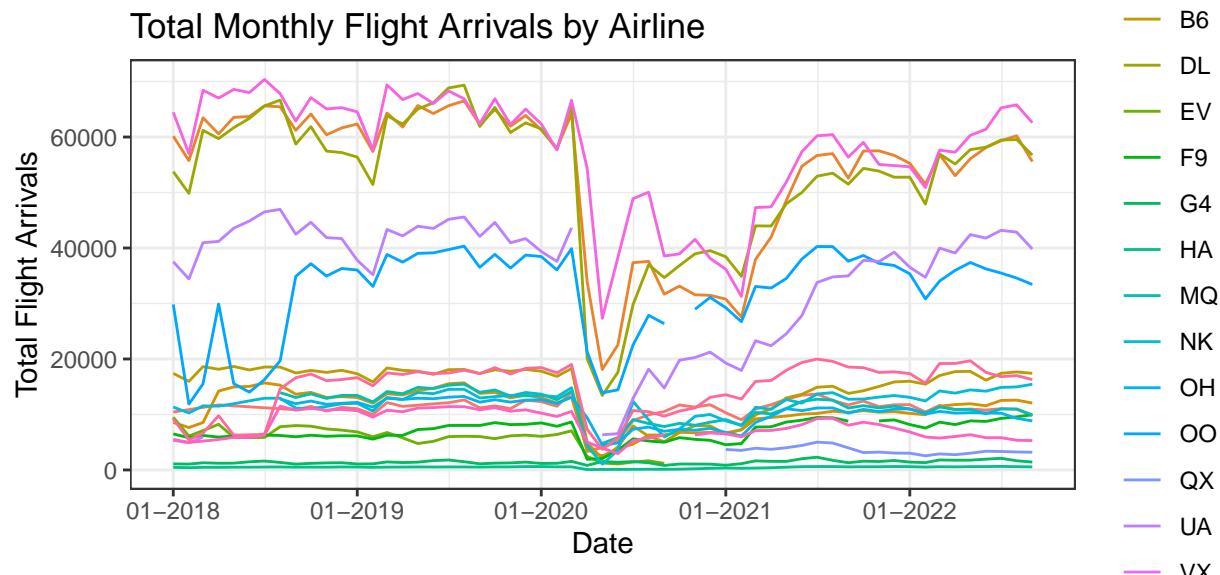
We notice from above that Southwest (WN), Delta (DL), and American (AA) consistently service the highest number of flight arrivals. Pre-Covid-19 (early 2020) travel restrictions, they each delivered about 60,000 to 70,000 flights per month to major U.S. airports and are currently making upward progress to recover to those levels. They are followed by United (UA) and SkyWest (OO), which pre-pandemic delivered about 40,000 arrivals per month to major U.S. airports and are also recovering to those levels now. Note that we were not able to find any definitive events that caused SkyWest's number of arrivals to plummet from 30,000 to below 20,000 a month twice in 2018.

And the plot below reveals that Southwest and American consistently deliver the most number of late arrivals, typically fluctuating between about 10,000 to 17,500 per month. They are followed by Delta, JetBlue (B6), United, and SkyWest, which normally tally anywhere from 2,500 to 12,500 late arrivals a month. Here, "typical" or "normal" times exclude February 2020 to May 2021, when air travel restrictions severely decreased the number of flight arrivals by almost 50%, according to the above graph. That said, the order of which airlines resulted in the most arrivals and late arrivals remained relatively the same.

Total Monthly Late Flights by Airline
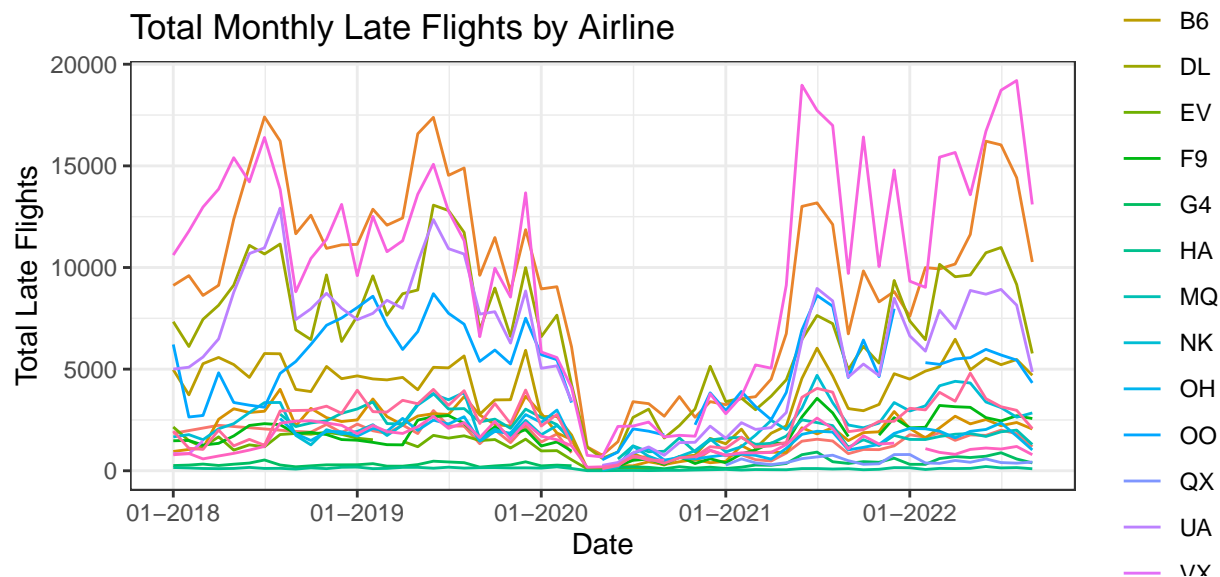
The plots that we have shown thus far help visualize the trends in our data set, but now we move on to actually modeling the data which may produce results that seem to differ from what we have seen so far.

Methods and Results

We want to model the number of delays. And we consider three choices of covariates: airline, airport, and airline-airport combination.

To account for a possible joint effect of an airline-airport combination, we created a new column `carrier_airport` which consists of 5-character-long codes corresponding to a unique airline and airport by concatenating each row's airline code (unique 2-character-long code) and airport code (unique 3-character-long code). We then fit and compared multiple models to examine the relationship between an airline, airport, or the joint impact of an airline-airport combination on the number of flight delays for each airline servicing one of the 30 major U.S. airports.

We originally fit random effect Poisson models offset by the number of flight arrivals for each of these three covariates. We also made sure to include an offset for the row-level number of flight arrivals to adjust for the fact that delay counts are not directly comparable between rows as the number of total flight arrivals in each row varies. But ended up not being able to use the offset Poisson distribution to model the data because each of these models were over dispersed, that is, the variance in the data exceeded the assumed variance in the models. Example annotated base models and random intercept models illustrating this point are in Appendix II in the section titles "POISSON MODELS." Each model has a dispersion ratio greater than 25, which exorbitantly exceeds the threshold 1 and alludes that a Poisson model does not fit the data well, according to the R documentation for the function `check_overdispersion()`.

Thus, we switched to an offset negative binomial model instead. Fitting and comparing multiple models' BIC scores (see the section titled "NEGATIVE BINOMIAL MODELS" in Appendix II), we found that `nb_model1 <- glmmTMB(arr_del15 ~ date + carrier + offset(log(arr_flights)), data = airline_data, family = "nbinom2")` fit the data the best. In mathematical notation, we express this model as shown in the

Our final model is $y_{ij} = B_0 + B_1(CARRIER)_{ij} + B_2(DATE)_{ij} + v_{i0} + e_{ij}$

Our final model had the lowest BIC and surprisingly did not involve any random intercepts. As a result, it does not need to have a level 1 and level 2 model. However, if it did have a random intercept, the following would be the different levels.

We can also represent the model in a multilevel form. The level 1 or within subject model is as follows.

$$y_{ij} = b_{0i} + b_{1i}t_{ij} + \epsilon_{ij}$$

In this equation, y_{ij} represents the count of delayed flights for an individual airport (subscript i) at the time they were measured (subscript j). This is a result of the sum of the following terms in the model. The first term is b_{0i} which represents each airport's individual level of delayed flights at month zero. The second term is $b_{1i}t_{ij}$ which refers to each individual airport's slope. Finally the last term is ϵ_{ij} which refers to the error term for each individual airport at the time they were measured. In addition, the level 2 model or between subject model is as follows.

$$b_{0i} = \beta_0 + v_{0i}$$
$$b_{1i} = \beta_1$$

Here the individual airport's initial level (b_{0i}) is determined by the population level (β_0) and a unique contribution (v_{0i}) that represents the airport's contribution. As a result, each airport has their own unique level. However, in this model each individual's slope is the same ($b_{1i} = \beta_1$) since they are all parallel to the population slope.

following.

4

When interpreting the result of this model, we can exponentiate the coefficient in front of each term to find the individual rate multiplier for that term. This means that, of the airlines in our study, the one that has the strongest effect on increasing delays is F9 with a coefficient of 0.5032 and the resulting rate multiplier of 1.654. This rate multiplier means that, holding all else constant, carrier F9 results in the rate of delays being multiplied by 1.654. On the other hand, the airlines that had the lowest effect are the ones who did not have a statistically significant term at the 5% level. This includes DL, VX, and YX. These airlines have no statistically significant effect on raising the rates of delayed flights when all else is held equal.

We can also observe that the date has a negative coefficient, meaning that as time went on in our data set, there was a correlation with reduced delays. This needs to be interpreted very carefully given that there may be cyclical patterns with delays that we could not track given that we did not have seasonal covariates in our model. Furthermore, COVID occurred during the time period observed in the data set and that also had a severe impact on the number of flights being flown.

It is incredibly interesting that the model that had the lowest BIC did not have a random intercept. Given that multiple airlines can fly with multiple airports and vice versa, we would expect to see a model with crossed random effects model work best. Theoretically, the joint airline-airport combination term could also help us asses this. Given that our the model with the lowest BIC has no random effects, it seems that airlines have more explanatory power as a variable than airports do.

Next, out of curiosity we investigate the number of delays by each of the 5 categories of delay causes: carrier, extreme weather, NAS, security, late previous flight on same aircraft. Again, we use the negative binomial distribution with an offset. Because the delays can be caused by more than one factor, the raw data assigns fractional delay counts for each reason. But to use the negative binomial distribution, our counts must be whole numbers, so we round them off to the nearest integer. Because there are 5 different causes for delay that we wish to look into, for simplicity we only fit fixed-effect models of the form `round(reason_ct) ~ date + carrier + offset(log(arr_flights))` with the `nbinom2` family specification (see the section titled "MODELS OF REASONS FOR DELAY" in Appendix II). The "reason" in the above formula was then filled with each individual type of reason for carrier delay. We found that our model had the lowest BIC for weather delays which shows how strong of a predictive factor it can be. These models are not directly comparable to one another due to varied y values, they were simply a further exploration of the data that we had on hand.

Discussion

Overall, we gather from our final model that airlines have a stronger impact on the rate of delays than airports do. However, the rate at which each airline serves as a rate multiplier is dependent on each of them with some airlines not even have a statistically significant impact. For consumers this helps point them to which airlines they should try to avoid when booking tickets. For transportation and aviation agencies, they can look at our model that use the carrier_ct as the response variable in order to assess if the delay in these flights is due to a pattern of systematic negligence on the part of the airlines. Finally, airlines can use this information as well. The regression involving carrier_ct would be helpful to them to see what is within their control and assess future policies in order to reduce their rate multiplier. Furthermore, the delay regressions would be helpful to see how they compare to their rivals and better understand customer complaints or flagging sales.

We believe that going forward, it would be useful to fit more model variations on this data set to test for random slopes and crossed random intercepts. Additionally, our results would be more insightful if we could do the same for each of the subcounts of delays categorized by cause because it is possible that the number of delays caused by a given reason can be better explained by a random intercept or slope. Furthermore, to make the results of this subject more widely applicable, we could run models on the full data set if we have a more powerful computer. Doing so will allow us to make more generalizations and see the nuanced effects of airlines, airports, and their joint effect on the number of airline delays.

Appendix I: Data Overview

Observation identification information:

- year: year data collected
- month: numeric representation of the month
- carrier: unique 2-character airline code

- carrier_name: name of airline
- airport: unique 3-character airport code
- airport_name: name of airport

Airport statistics:

- arr_flights: number of flights arrived
- arr_del15: number of flights delayed i.e. arriving 15+ minutes late
- carrier_ct: number of flights delayed due to air carrier (e.g. maintenance or crew problems, aircraft cleaning, baggage loading, fueling, etc.)
- weather_ct: number of flights delayed due to extreme weather
- nas_ct: number of flights delayed due to the National Aviation System or NAS (e.g. non-extreme weather conditions, airport operations, heavy traffic volume, and air traffic control)
- security_ct: Number of flights delayed due to security reasons (e.g. evacuation of a terminal or concourse, re-boarding of aircraft due to security breach, inoperative screening equipment, and/or long lines in excess of 29 minutes at screening areas)
- late_aircraft_ct: number of flights delayed due to a previous flight using the same aircraft arriving late
- arr_cancelled: number of cancelled flights
- arr_diverted: number of diverted flights
- arr_delay: total time (minutes) of delayed flights
- carrier_delay: total time (minutes) of delayed flights due to air carrier
- weather_delay: total time (minutes) of delayed flights due to extreme weather
- nas_delay: total time (minutes) of delayed flights due to the NAS
- security_delay: total time (minutes) of delayed flights due to security reasons
- late_aircraft_delay: total time (minutes) of delayed flights due to a previous flight using the same aircraft arriving late

30 Major U.S. airports included:

- Atlanta, GA: Hartsfield-Jackson Atlanta International (ATL)
- Nashville, TN: Nashville International (BNA)
- Boston, MA: Logan International (BOS)
- Baltimore, MD: Baltimore/Washington International Thurgood Marshall (BWI)
- Charlotte, NC: Charlotte Douglas International (CLT)
- Washington, DC: Ronald Reagan Washington National (DCA)
- Detroit, MI: Detroit Metro Wayne County (DTW)
- Newark, NJ: Newark Liberty International (EWR)
- Washington, DC: Washington Dulles International (IAD)
- New York, NY: John F. Kennedy International (JFK)
- New York, NY: LaGuardia (LGA)
- Minneapolis, MN: Minneapolis-St Paul International (MSP)
- Chicago, IL: Chicago O'Hare International (ORD)
- Philadelphia, PA: Philadelphia International (PHL)

- Denver, CO: Denver International (DEN)
- Dallas/Fort Worth, TX: Dallas/Fort Worth International (DFW)
- Fort Lauderdale, FL: Fort Lauderdale-Hollywood International (FLL)
- Houston, TX: George Bush Intercontinental/Houston (IAH)
- Las Vegas, NV: Harry Reid International, formerly McCarran International (LAS)
- Los Angeles, CA: Los Angeles International (LAX)
- Orlando, FL: Orlando International (MCO)
- Miami, FL: Miami International (MIA)
- Phoenix, AZ: Phoenix Sky Harbor International (PHX)
- San Diego, CA: San Diego International (SAN)
- Seattle, WA: Seattle/Tacoma International (SEA)
- San Francisco, CA: San Francisco International (SFO)
- Salt Lake City, UT: Salt Lake City International (SLC)
- Tampa, FL: Tampa International (TPA)
- Dallas, TX: Dallas Love Field (DAL)
- Chicago, IL: Chicago Midway International (MDW)

Appendix II

POISSON MODELS

```
##  Family: poisson  ( log )
## Formula:          arr_del15 ~ date + carrier + offset(log(arr_flights))
## Data: airline_data
##
##      AIC      BIC   logLik deviance df.resid
##  687287.8 687444.5 -343623.9 687247.8    18653
##
##
## Conditional model:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept) -1.743e+00  2.050e-02  -85.06  < 2e-16 ***
## date        -1.642e-05  1.092e-06  -15.04  < 2e-16 ***
## carrierAA    3.196e-01  3.960e-03   80.70  < 2e-16 ***
## carrierAS    3.080e-01  4.788e-03   64.34  < 2e-16 ***
## carrierB6    6.599e-01  4.316e-03  152.90  < 2e-16 ***
## carrierDL    1.990e-02  4.045e-03    4.92 8.64e-07 ***
## carrierEV    5.025e-01  6.249e-03   80.42  < 2e-16 ***
## carrierF9    6.266e-01  4.910e-03  127.63  < 2e-16 ***
## carrierG4    6.570e-01  8.013e-03   82.00  < 2e-16 ***
## carrierHA    5.639e-01  1.340e-02   42.08  < 2e-16 ***
## carrierMQ    2.718e-01  4.911e-03   55.34  < 2e-16 ***
## carrierNK    3.874e-01  4.650e-03   83.33  < 2e-16 ***
## carrierOH    1.650e-01  5.140e-03   32.11  < 2e-16 ***
## carrierOO    1.970e-01  4.162e-03   47.33  < 2e-16 ***
## carrierQX    7.564e-02  1.058e-02    7.15 8.93e-13 ***
## carrierUA    3.140e-01  4.086e-03   76.86  < 2e-16 ***
## carrierVX    3.947e-01  1.824e-02   21.64  < 2e-16 ***
## carrierWN    3.126e-01  3.945e-03   79.25  < 2e-16 ***
## carrierYV    2.978e-01  5.160e-03   57.71  < 2e-16 ***
## carrierYX    1.957e-01  4.623e-03   42.33  < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


## # Overdispersion test
##
##       dispersion ratio =    29.871
##   Pearson's Chi-Squared = 557180.164
##              p-value =   < 0.001


##  Family: poisson  ( log )
## Formula:          arr_del15 ~ date + airport + offset(log(arr_flights))
## Data: airline_data
##
##      AIC      BIC   logLik deviance df.resid
##  693543.1 693786.0 -346740.6 693481.1    18642
##
##
## Conditional model:
##              Estimate Std. Error z value Pr(>|z|)
```

```
## (Intercept) -1.616e+00  1.997e-02  -80.94  < 2e-16 ***
## date          -2.295e-05  1.082e-06  -21.21  < 2e-16 ***
## airportBNA     2.622e-01  4.686e-03   55.94  < 2e-16 ***
## airportBOS     4.423e-01  3.712e-03  119.17  < 2e-16 ***
## airportBWI     1.762e-01  4.498e-03   39.17  < 2e-16 ***
## airportCLT     7.663e-02  3.561e-03   21.52  < 2e-16 ***
## airportDAL     3.452e-01  4.780e-03   72.21  < 2e-16 ***
## airportDCA     2.990e-01  4.055e-03   73.74  < 2e-16 ***
## airportDEN     2.661e-01  3.171e-03   83.90  < 2e-16 ***
## airportDFW     3.298e-01  3.065e-03  107.61  < 2e-16 ***
## airportDTW     2.995e-02  4.120e-03    7.27 3.62e-13 ***
## airportEWR     6.631e-01  3.514e-03  188.73  < 2e-16 ***
## airportFLL     4.423e-01  4.114e-03  107.50  < 2e-16 ***
## airportIAD     1.914e-01  5.336e-03   35.87  < 2e-16 ***
## airportIAH     2.444e-01  3.721e-03   65.68  < 2e-16 ***
## airportJFK     4.069e-01  3.943e-03  103.19  < 2e-16 ***
## airportLAS     3.257e-01  3.574e-03   91.15  < 2e-16 ***
## airportLAX     2.375e-01  3.438e-03   69.09  < 2e-16 ***
## airportLGA     4.798e-01  3.624e-03  132.37  < 2e-16 ***
## airportMCO     4.440e-01  3.591e-03  123.63  < 2e-16 ***
## airportMDW     2.122e-01  4.757e-03   44.61  < 2e-16 ***
## airportMIA     3.311e-01  4.347e-03   76.17  < 2e-16 ***
## airportMSP     1.473e-02  4.184e-03    3.52  0.00043 ***
## airportORD     3.067e-01  3.078e-03   99.62  < 2e-16 ***
## airportPHL     2.887e-01  4.257e-03   67.81  < 2e-16 ***
## airportPHX     2.153e-01  3.653e-03   58.93  < 2e-16 ***
## airportSAN     2.300e-01  4.659e-03   49.36  < 2e-16 ***
## airportSEA     2.071e-01  3.761e-03   55.06  < 2e-16 ***
## airportSFO     4.256e-01  3.586e-03  118.68  < 2e-16 ***
## airportSLC     3.227e-03  4.486e-03    0.72  0.47189
## airportTPA     3.573e-01  4.623e-03   77.28  < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


## # Overdispersion test
##
##        dispersion ratio =      30.595
##    Pearson's Chi-Squared = 570351.380
##                 p-value =    < 0.001


## Warning in fitTMB(TMBStruc): Model convergence problem; function evaluation
## limit reached without convergence (9). See vignette('troubleshooting')


##  Family: poisson  ( log )
## Formula:          arr_del15 ~ date + carrier_airport + offset(log(arr_flights))
## Data: airline_data
##
##      AIC       BIC    logLik  deviance  df.resid
##  604156.1  607485.9 -301653.0  603306.1     18248
##
##
## Conditional model:
##                      Estimate Std. Error z value Pr(>|z|)
```

```
## (Intercept)              -2.009e+00  2.166e-02  -92.74  < 2e-16 ***
## date                     -1.008e-05  1.106e-06   -9.11  < 2e-16 ***
## carrier_airport9EBNA      3.279e-01  3.629e-02    9.04  < 2e-16 ***
## carrier_airport9EBOS      4.560e-01  2.209e-02   20.64  < 2e-16 ***
## carrier_airport9EBWI      3.492e-01  3.170e-02   11.02  < 2e-16 ***
## carrier_airport9ECLT      3.602e-01  2.827e-02   12.74  < 2e-16 ***
## carrier_airport9EDAL      6.666e-02  3.327e-01    0.20 0.841211
## carrier_airport9EDCA      2.626e-01  3.617e-02    7.26 3.85e-13 ***
## carrier_airport9EDEN      3.103e-02  6.930e-01    0.04 0.964290
## carrier_airport9EDFW      4.862e-01  4.011e-02   12.12  < 2e-16 ***
## carrier_airport9EDTW     -1.620e-01  1.253e-02  -12.93  < 2e-16 ***
## carrier_airport9EEWR      5.505e-01  2.891e-02   19.04  < 2e-16 ***
## carrier_airport9EFLL      3.074e-01  1.593e-01    1.93 0.053671 .
## carrier_airport9EIAD      2.452e-01  4.164e-02    5.89 3.91e-09 ***
## carrier_airport9EIAH      4.761e-01  4.887e-02    9.74  < 2e-16 ***
## carrier_airport9EJFK      2.612e-01  1.248e-02   20.93  < 2e-16 ***
## carrier_airport9ELGA      5.699e-01  1.056e-02   53.95  < 2e-16 ***
## carrier_airport9EMCO      2.321e-01  1.369e-01    1.70 0.089927 .
## carrier_airport9EMDW     -5.839e-03  5.963e-02   -0.10 0.921986
## carrier_airport9EMIA      2.737e-01  2.278e-01    1.20 0.229627
## carrier_airport9EMSP     -1.562e-01  1.472e-02  -10.62  < 2e-16 ***
## carrier_airport9EORD      4.501e-01  3.170e-02   14.20  < 2e-16 ***
## carrier_airport9EPHL      2.958e-01  3.565e-02    8.30  < 2e-16 ***
## carrier_airport9ETPA      9.702e-02  9.700e-02    1.00 0.317214
## carrier_airportAAATL      6.143e-01  1.280e-02   48.01  < 2e-16 ***
## carrier_airportAABNA      5.406e-01  1.498e-02   36.10  < 2e-16 ***
## carrier_airportAABOS      5.480e-01  1.020e-02   53.73  < 2e-16 ***
## carrier_airportAABWI      6.174e-01  1.668e-02   37.01  < 2e-16 ***
## carrier_airportAACLT      2.208e-01  8.204e-03   26.92  < 2e-16 ***
## carrier_airportAADCA      4.218e-01  1.041e-02   40.53  < 2e-16 ***
## carrier_airportAADEN      6.289e-01  1.268e-02   49.61  < 2e-16 ***
## carrier_airportAADFW      4.594e-01  7.715e-03   59.55  < 2e-16 ***
## carrier_airportAADTW      5.457e-01  1.768e-02   30.87  < 2e-16 ***
## carrier_airportAAEWR      9.390e-01  1.270e-02   73.92  < 2e-16 ***
## carrier_airportAAFLL      5.832e-01  1.477e-02   39.50  < 2e-16 ***
## carrier_airportAAIAD      6.045e-01  2.587e-02   23.36  < 2e-16 ***
## carrier_airportAAIAH      7.485e-01  1.361e-02   54.98  < 2e-16 ***
## carrier_airportAAJFK      5.169e-01  1.165e-02   44.37  < 2e-16 ***
## carrier_airportAALAS      6.295e-01  1.139e-02   55.28  < 2e-16 ***
## carrier_airportAALAX      4.266e-01  9.418e-03   45.29  < 2e-16 ***
## carrier_airportAALGA      6.354e-01  1.026e-02   61.92  < 2e-16 ***
## carrier_airportAAMCO      5.894e-01  1.079e-02   54.63  < 2e-16 ***
## carrier_airportAAMIA      4.741e-01  8.712e-03   54.42  < 2e-16 ***
## carrier_airportAAMSP      6.190e-01  1.569e-02   39.44  < 2e-16 ***
## carrier_airportAAORD      4.489e-01  8.603e-03   52.18  < 2e-16 ***
## carrier_airportAAPHL      4.280e-01  9.184e-03   46.60  < 2e-16 ***
## carrier_airportAAPHX      3.095e-01  8.920e-03   34.69  < 2e-16 ***
## carrier_airportAASAN      6.167e-01  1.352e-02   45.62  < 2e-16 ***
## carrier_airportAASEA      7.698e-01  1.367e-02   56.31  < 2e-16 ***
## carrier_airportAASFO      7.730e-01  1.160e-02   66.65  < 2e-16 ***
## carrier_airportAASLC      6.952e-01  1.705e-02   40.77  < 2e-16 ***
## carrier_airportAATPA      5.701e-01  1.211e-02   47.08  < 2e-16 ***
## carrier_airportASATL      7.453e-02  5.114e-02    1.46 0.145015
## carrier_airportASBNA      5.149e-01  4.086e-02   12.60  < 2e-16 ***
```

```
## carrier_airportASBOS  4.759e-01  2.422e-02   19.65  < 2e-16 ***
## carrier_airportASBWI  2.599e-01  4.122e-02    6.30 2.89e-10 ***
## carrier_airportASDAL  6.724e-01  4.060e-02   16.56  < 2e-16 ***
## carrier_airportASDCA  3.675e-01  2.962e-02   12.41  < 2e-16 ***
## carrier_airportASDEN  5.291e-01  2.618e-02   20.21  < 2e-16 ***
## carrier_airportASDFW  4.220e-01  2.985e-02   14.14  < 2e-16 ***
## carrier_airportASDTW  1.599e-01  5.974e-02    2.68 0.007455 **
## carrier_airportASEWR  7.778e-01  1.836e-02   42.35  < 2e-16 ***
## carrier_airportASFLL  4.672e-01  3.619e-02   12.91  < 2e-16 ***
## carrier_airportASIAD  5.277e-01  3.096e-02   17.04  < 2e-16 ***
## carrier_airportASIAH  3.858e-01  4.753e-02    8.12 4.74e-16 ***
## carrier_airportASJFK  5.858e-01  1.912e-02   30.63  < 2e-16 ***
## carrier_airportASLAS  4.737e-01  1.623e-02   29.19  < 2e-16 ***
## carrier_airportASLAX  4.693e-01  1.188e-02   39.49  < 2e-16 ***
## carrier_airportASMCO  4.429e-01  2.814e-02   15.74  < 2e-16 ***
## carrier_airportASMIA  2.399e-01  2.580e-01    0.93 0.352302
## carrier_airportASMSP  3.941e-01  4.014e-02    9.82  < 2e-16 ***
## carrier_airportASORD  4.464e-01  2.197e-02   20.32  < 2e-16 ***
## carrier_airportASPHL  3.443e-01  4.294e-02    8.02 1.08e-15 ***
## carrier_airportASPHX  2.525e-01  2.282e-02   11.06  < 2e-16 ***
## carrier_airportASSAN  3.828e-01  1.514e-02   25.30  < 2e-16 ***
## carrier_airportASSEA  3.825e-01  8.460e-03   45.21  < 2e-16 ***
## carrier_airportASSFO  6.912e-01  1.087e-02   63.58  < 2e-16 ***
## carrier_airportASSLC  4.402e-01  3.448e-02   12.77  < 2e-16 ***
## carrier_airportASTPA  1.738e-01  5.206e-02    3.34 0.000842 ***
## carrier_airportB6ATL  7.900e-01  1.958e-02   40.34  < 2e-16 ***
## carrier_airportB6BNA  8.830e-01  2.746e-02   32.16  < 2e-16 ***
## carrier_airportB6BOS  7.600e-01  8.520e-03   89.20  < 2e-16 ***
## carrier_airportB6BWI  7.729e-01  2.873e-02   26.90  < 2e-16 ***
## carrier_airportB6CLT  6.583e-01  3.246e-02   20.28  < 2e-16 ***
## carrier_airportB6DCA  7.183e-01  1.299e-02   55.31  < 2e-16 ***
## carrier_airportB6DEN  8.256e-01  2.738e-02   30.15  < 2e-16 ***
## carrier_airportB6DFW  7.087e-01  3.948e-02   17.95  < 2e-16 ***
## carrier_airportB6DTW  7.154e-01  3.166e-02   22.60  < 2e-16 ***
## carrier_airportB6EWR  1.125e+00  1.085e-02  103.70  < 2e-16 ***
## carrier_airportB6FLL  8.304e-01  9.606e-03   86.45  < 2e-16 ***
## carrier_airportB6IAD  8.853e-01  4.338e-02   20.41  < 2e-16 ***
## carrier_airportB6IAH  6.672e-01  5.224e-02   12.77  < 2e-16 ***
## carrier_airportB6JFK  7.985e-01  8.631e-03   92.52  < 2e-16 ***
## carrier_airportB6LAS  7.438e-01  1.766e-02   42.12  < 2e-16 ***
## carrier_airportB6LAX  6.383e-01  1.361e-02   46.91  < 2e-16 ***
## carrier_airportB6LGA  9.598e-01  1.311e-02   73.21  < 2e-16 ***
## carrier_airportB6MCO  8.656e-01  1.004e-02   86.18  < 2e-16 ***
## carrier_airportB6MIA  1.013e+00  2.311e-02   43.86  < 2e-16 ***
## carrier_airportB6MSP  7.987e-01  3.599e-02   22.19  < 2e-16 ***
## carrier_airportB6ORD  9.798e-01  2.148e-02   45.61  < 2e-16 ***
## carrier_airportB6PHL  7.540e-01  2.198e-02   34.31  < 2e-16 ***
## carrier_airportB6PHX  1.016e+00  2.781e-02   36.51  < 2e-16 ***
## carrier_airportB6SAN  3.876e-01  2.913e-02   13.31  < 2e-16 ***
## carrier_airportB6SEA  6.600e-01  2.736e-02   24.12  < 2e-16 ***
## carrier_airportB6SFO  6.302e-01  1.628e-02   38.71  < 2e-16 ***
## carrier_airportB6SLC  7.403e-01  2.194e-02   33.74  < 2e-16 ***
## carrier_airportB6TPA  8.171e-01  1.529e-02   53.45  < 2e-16 ***
## carrier_airportDLATL  3.012e-02  7.720e-03    3.90 9.56e-05 ***
```

```
## carrier_airportDLBNA   1.083e-01  1.781e-02    6.08 1.22e-09 ***
## carrier_airportDLBOS   4.538e-01  1.127e-02   40.26  < 2e-16 ***
## carrier_airportDLBWI   7.127e-02  1.935e-02    3.68 0.000231 ***
## carrier_airportDLCLT   2.526e-02  1.961e-02    1.29 0.197732
## carrier_airportDLDAL   3.866e-01  2.927e-02   13.21  < 2e-16 ***
## carrier_airportDLDCA   2.905e-01  1.536e-02   18.92  < 2e-16 ***
## carrier_airportDLDEN   2.592e-01  1.378e-02   18.82  < 2e-16 ***
## carrier_airportDLDFW   4.873e-01  1.352e-02   36.04  < 2e-16 ***
## carrier_airportDLDTW   8.485e-03  9.400e-03    0.90 0.366745
## carrier_airportDLEWR   7.109e-01  1.577e-02   45.07  < 2e-16 ***
## carrier_airportDLFLL   4.117e-01  1.309e-02   31.44  < 2e-16 ***
## carrier_airportDLIAD   8.794e-02  2.683e-02    3.28 0.001047 **
## carrier_airportDLIAH   4.538e-01  1.776e-02   25.55  < 2e-16 ***
## carrier_airportDLJFK   3.569e-01  1.017e-02   35.09  < 2e-16 ***
## carrier_airportDLLAS   1.388e-01  1.357e-02   10.23  < 2e-16 ***
## carrier_airportDLLAX   3.006e-01  9.852e-03   30.51  < 2e-16 ***
## carrier_airportDLLGA   5.347e-01  1.011e-02   52.88  < 2e-16 ***
## carrier_airportDLMCO   3.701e-01  1.132e-02   32.69  < 2e-16 ***
## carrier_airportDLMDW   4.699e-02  3.692e-02    1.27 0.203072
## carrier_airportDLMIA   4.108e-01  1.442e-02   28.49  < 2e-16 ***
## carrier_airportDLMSP   2.166e-02  9.176e-03    2.36 0.018243 *
## carrier_airportDLORD   5.177e-01  1.315e-02   39.36  < 2e-16 ***
## carrier_airportDLPHL   2.206e-01  1.886e-02   11.70  < 2e-16 ***
## carrier_airportDLPHX   2.512e-01  1.503e-02   16.71  < 2e-16 ***
## carrier_airportDLSAN   1.862e-01  1.617e-02   11.52  < 2e-16 ***
## carrier_airportDLSEA   1.496e-01  1.060e-02   14.12  < 2e-16 ***
## carrier_airportDLSFO   4.803e-01  1.250e-02   38.43  < 2e-16 ***
## carrier_airportDLSLC   3.063e-02  9.542e-03    3.21 0.001329 **
## carrier_airportDLTPA   2.795e-01  1.345e-02   20.78  < 2e-16 ***
## carrier_airportEVATL   4.504e-01  3.833e-02   11.75  < 2e-16 ***
## carrier_airportEVBNA   7.242e-01  4.177e-02   17.34  < 2e-16 ***
## carrier_airportEVBOS   5.611e-01  6.390e-02    8.78  < 2e-16 ***
## carrier_airportEVBWI   5.055e-01  9.175e-02    5.51 3.59e-08 ***
## carrier_airportEVCLT   5.354e-01  5.206e-02   10.28  < 2e-16 ***
## carrier_airportEVDCA   5.961e-01  2.851e-02   20.91  < 2e-16 ***
## carrier_airportEVDEN  -3.186e+00  1.002e+00   -3.18 0.001478 **
## carrier_airportEVDFW   7.457e-01  3.191e-02   23.37  < 2e-16 ***
## carrier_airportEVDTW   7.105e-01  6.316e-02   11.25  < 2e-16 ***
## carrier_airportEVEWR   1.120e+00  1.136e-02   98.62  < 2e-16 ***
## carrier_airportEVIAD   8.609e-01  5.316e-02   16.19  < 2e-16 ***
## carrier_airportEVIAH   3.472e-01  1.101e-02   31.53  < 2e-16 ***
## carrier_airportEVLGA   7.591e-01  2.736e-02   27.75  < 2e-16 ***
## carrier_airportEVMCO   1.048e+00  1.766e+00    0.59 0.553075
## carrier_airportEVMDW   2.538e+00  4.195e-01    6.05 1.46e-09 ***
## carrier_airportEVMSP   7.161e-01  7.819e-02    9.16  < 2e-16 ***
## carrier_airportEVORD   6.450e-01  1.467e-02   43.96  < 2e-16 ***
## carrier_airportEVPHL   3.441e-01  2.449e-01    1.41 0.159989
## carrier_airportEVSLC   3.855e-01  2.262e-01    1.70 0.088339 .
## carrier_airportF9ATL   8.378e-01  1.549e-02   54.08  < 2e-16 ***
## carrier_airportF9BNA   7.374e-01  3.274e-02   22.52  < 2e-16 ***
## carrier_airportF9BOS   6.523e-01  4.884e-02   13.35  < 2e-16 ***
## carrier_airportF9BWI   9.660e-01  3.655e-02   26.43  < 2e-16 ***
## carrier_airportF9CLT   8.086e-01  2.728e-02   29.65  < 2e-16 ***
## carrier_airportF9DCA   6.363e-01  3.308e-02   19.24  < 2e-16 ***
```

```
## carrier_airportF9DEN    6.051e-01  9.931e-03   60.93  < 2e-16 ***
## carrier_airportF9DFW    7.741e-01  2.417e-02   32.04  < 2e-16 ***
## carrier_airportF9DTW    7.063e-01  3.253e-02   21.71  < 2e-16 ***
## carrier_airportF9EWR    8.410e-01  3.163e-02   26.59  < 2e-16 ***
## carrier_airportF9FLL    1.056e+00  3.677e-02   28.71  < 2e-16 ***
## carrier_airportF9IAD    8.043e-01  4.228e-02   19.02  < 2e-16 ***
## carrier_airportF9IAH    7.496e-01  3.181e-02   23.57  < 2e-16 ***
## carrier_airportF9LAS    8.439e-01  1.134e-02   74.40  < 2e-16 ***
## carrier_airportF9LAX    5.032e-01  3.685e-02   13.65  < 2e-16 ***
## carrier_airportF9LGA    8.944e-01  2.954e-02   30.28  < 2e-16 ***
## carrier_airportF9MCO    9.088e-01  1.034e-02   87.87  < 2e-16 ***
## carrier_airportF9MDW    7.429e-01  5.801e-02   12.81  < 2e-16 ***
## carrier_airportF9MIA    8.821e-01  1.833e-02   48.12  < 2e-16 ***
## carrier_airportF9MSP    6.819e-01  3.107e-02   21.95  < 2e-16 ***
## carrier_airportF9ORD    8.021e-01  2.040e-02   39.31  < 2e-16 ***
## carrier_airportF9PHL    8.892e-01  1.378e-02   64.55  < 2e-16 ***
## carrier_airportF9PHX    6.539e-01  1.891e-02   34.57  < 2e-16 ***
## carrier_airportF9SAN    6.525e-01  2.587e-02   25.23  < 2e-16 ***
## carrier_airportF9SEA    8.156e-01  3.724e-02   21.90  < 2e-16 ***
## carrier_airportF9SFO    8.180e-01  2.549e-02   32.09  < 2e-16 ***
## carrier_airportF9SLC    6.700e-01  2.680e-02   25.00  < 2e-16 ***
## carrier_airportF9TPA    8.016e-01  1.707e-02   46.97  < 2e-16 ***
## carrier_airportG4BNA    8.993e-01  2.436e-02   36.92  < 2e-16 ***
## carrier_airportG4BOS    5.081e-01  6.985e-02    7.27 3.49e-13 ***
## carrier_airportG4BWI    6.714e-01  5.137e-02   13.07  < 2e-16 ***
## carrier_airportG4DEN    7.649e-01  6.174e-02   12.39  < 2e-16 ***
## carrier_airportG4EWR   -1.428e-01  6.117e-02   -2.33 0.019555 *
## carrier_airportG4FLL    1.066e+00  1.619e-02   65.87  < 2e-16 ***
## carrier_airportG4IAD    7.081e-01  1.328e-01    5.33 9.78e-08 ***
## carrier_airportG4LAS    7.394e-01  1.245e-02   59.37  < 2e-16 ***
## carrier_airportG4LAX    7.368e-01  2.557e-02   28.82  < 2e-16 ***
## carrier_airportG4MDW    7.045e-01  6.831e-02   10.31  < 2e-16 ***
## carrier_airportG4MSP    9.648e-01  8.823e-02   10.94  < 2e-16 ***
## carrier_airportG4PHX    7.628e-01  1.273e-01    5.99 2.04e-09 ***
## carrier_airportG4SAN    8.085e-01  5.370e-02   15.05  < 2e-16 ***
## carrier_airportHABOS    7.546e-01  8.255e-02    9.14  < 2e-16 ***
## carrier_airportHAJFK    9.395e-01  5.080e-02   18.49  < 2e-16 ***
## carrier_airportHALAS    3.634e-01  3.897e-02    9.33  < 2e-16 ***
## carrier_airportHALAX    6.294e-01  2.425e-02   25.95  < 2e-16 ***
## carrier_airportHAMCO    9.360e-01  1.297e-01    7.22 5.34e-13 ***
## carrier_airportHAPHX    4.812e-01  6.060e-02    7.94 2.01e-15 ***
## carrier_airportHASAN    8.141e-01  3.758e-02   21.66  < 2e-16 ***
## carrier_airportHASEA    1.099e+00  3.090e-02   35.59  < 2e-16 ***
## carrier_airportHASFO    6.887e-01  3.692e-02   18.65  < 2e-16 ***
## carrier_airportMQATL    3.636e-01  5.026e-02    7.23 4.70e-13 ***
## carrier_airportMQBNA    5.469e-01  3.063e-02   17.85  < 2e-16 ***
## carrier_airportMQBOS    3.811e-01  5.241e-02    7.27 3.56e-13 ***
## carrier_airportMQBWI    3.143e-01  5.243e-02    6.00 2.03e-09 ***
## carrier_airportMQCLT    2.912e-01  2.296e-02   12.69  < 2e-16 ***
## carrier_airportMQDCA    3.049e-01  2.989e-02   10.20  < 2e-16 ***
## carrier_airportMQDEN   -8.547e-01  7.281e-01   -1.17 0.240423
## carrier_airportMQDFW    3.907e-01  8.674e-03   45.04  < 2e-16 ***
## carrier_airportMQDTW    5.256e-01  3.962e-02   13.27  < 2e-16 ***
## carrier_airportMQEWR    7.863e-01  6.225e-02   12.63  < 2e-16 ***
```

```
## carrier_airportMQIAD  3.647e-01  1.851e-01   1.97 0.048752 *
## carrier_airportMQIAH  6.037e-01  4.380e-02  13.78  < 2e-16 ***
## carrier_airportMQJFK  5.737e-01  2.595e-02  22.11  < 2e-16 ***
## carrier_airportMQLGA  8.128e-01  1.563e-02  52.01  < 2e-16 ***
## carrier_airportMQMIA  3.964e-01  1.356e-02  29.23  < 2e-16 ***
## carrier_airportMQMSP  4.070e-01  5.064e-02   8.04 9.22e-16 ***
## carrier_airportMQORD  4.017e-01  8.959e-03  44.84  < 2e-16 ***
## carrier_airportMQPHL  7.376e-01  9.320e-02   7.91 2.49e-15 ***
## carrier_airportMQPHX -7.224e-02  6.899e-02  -1.05 0.295055
## carrier_airportMQSLC  3.554e-01  1.153e-01   3.08 0.002051 **
## carrier_airportMQTPA  3.538e-01  7.538e-02   4.69 2.69e-06 ***
## carrier_airportNKATL  4.868e-01  1.376e-02  35.38  < 2e-16 ***
## carrier_airportNKBNA  4.601e-01  3.378e-02  13.62  < 2e-16 ***
## carrier_airportNKBOS  6.211e-01  1.763e-02  35.23  < 2e-16 ***
## carrier_airportNKBWI  5.014e-01  1.470e-02  34.10  < 2e-16 ***
## carrier_airportNKCLT  8.380e-01  3.482e-02  24.07  < 2e-16 ***
## carrier_airportNKDEN  5.420e-01  2.056e-02  26.36  < 2e-16 ***
## carrier_airportNKDFW  5.575e-01  1.402e-02  39.76  < 2e-16 ***
## carrier_airportNKDTW  4.101e-01  1.356e-02  30.24  < 2e-16 ***
## carrier_airportNKEWR  7.720e-01  1.530e-02  50.46  < 2e-16 ***
## carrier_airportNKFLL  5.363e-01  1.041e-02  51.52  < 2e-16 ***
## carrier_airportNKIAH  4.775e-01  1.533e-02  31.14  < 2e-16 ***
## carrier_airportNKLAS  4.571e-01  1.114e-02  41.03  < 2e-16 ***
## carrier_airportNKLAX  4.555e-01  1.405e-02  32.41  < 2e-16 ***
## carrier_airportNKLGA  6.589e-01  1.789e-02  36.83  < 2e-16 ***
## carrier_airportNKMCO  5.924e-01  1.056e-02  56.08  < 2e-16 ***
## carrier_airportNKMIA  6.451e-01  2.740e-02  23.55  < 2e-16 ***
## carrier_airportNKMSP  3.637e-01  2.316e-02  15.71  < 2e-16 ***
## carrier_airportNKORD  6.680e-01  1.321e-02  50.58  < 2e-16 ***
## carrier_airportNKPHL  5.680e-01  1.808e-02  31.41  < 2e-16 ***
## carrier_airportNKPHX  5.936e-01  3.587e-02  16.55  < 2e-16 ***
## carrier_airportNKSAN  4.771e-01  2.808e-02  16.99  < 2e-16 ***
## carrier_airportNKSEA  6.095e-01  2.950e-02  20.66  < 2e-16 ***
## carrier_airportNKSLC  7.545e-01  9.142e-02   8.25  < 2e-16 ***
## carrier_airportNKTPA  4.516e-01  1.578e-02  28.63  < 2e-16 ***
## carrier_airportOHATL  3.282e-01  3.568e-02   9.20  < 2e-16 ***
## carrier_airportOHBNA  4.456e-01  3.514e-02  12.68  < 2e-16 ***
## carrier_airportOHBOS  1.452e+00  2.896e-01   5.02 5.28e-07 ***
## carrier_airportOHBWI  8.932e-02  9.413e-02   0.95 0.342632
## carrier_airportOHCLT  1.855e-01  8.553e-03  21.69  < 2e-16 ***
## carrier_airportOHDCA  5.730e-01  1.022e-02  56.08  < 2e-16 ***
## carrier_airportOHDFW  5.685e-01  3.261e-02  17.44  < 2e-16 ***
## carrier_airportOHDTW  3.276e-01  3.589e-02   9.13  < 2e-16 ***
## carrier_airportOHEWR  1.060e+00  2.948e-01   3.60 0.000323 ***
## carrier_airportOHIAD  4.619e-01  3.068e-02  15.06  < 2e-16 ***
## carrier_airportOHIAH  6.640e-01  1.968e-01   3.37 0.000741 ***
## carrier_airportOHJFK  5.093e-01  1.040e-01   4.90 9.81e-07 ***
## carrier_airportOHLGA  7.964e-01  3.649e-02  21.83  < 2e-16 ***
## carrier_airportOHMSP  5.470e-01  8.312e-02   6.58 4.69e-11 ***
## carrier_airportOHORD  3.221e-01  6.513e-02   4.94 7.62e-07 ***
## carrier_airportOHPHL  3.811e-01  1.227e-02  31.06  < 2e-16 ***
## carrier_airportOOATL  4.785e-01  1.257e-02  38.08  < 2e-16 ***
## carrier_airportOOBNA  5.691e-01  1.586e-02  35.88  < 2e-16 ***
## carrier_airportOOBOS  6.906e-01  3.541e-02  19.50  < 2e-16 ***
```

```
## carrier_airport00BWI   3.705e-01  6.043e-02    6.13 8.72e-10 ***
## carrier_airport00CLT   5.610e-01  2.583e-02   21.72  < 2e-16 ***
## carrier_airport00DAL   5.041e-01  2.681e-02   18.80  < 2e-16 ***
## carrier_airport00DCA   5.963e-01  3.439e-02   17.34  < 2e-16 ***
## carrier_airport00DEN   4.028e-01  8.517e-03   47.30  < 2e-16 ***
## carrier_airport00DFW   5.537e-01  1.046e-02   52.92  < 2e-16 ***
## carrier_airport00DTW   3.465e-01  1.004e-02   34.52  < 2e-16 ***
## carrier_airport00EWR   7.431e-01  3.641e-02   20.41  < 2e-16 ***
## carrier_airport00FLL   7.097e-01  2.643e-01    2.69 0.007250 **
## carrier_airport00IAD   3.870e-01  2.069e-02   18.70  < 2e-16 ***
## carrier_airport00IAH   4.795e-01  1.168e-02   41.06  < 2e-16 ***
## carrier_airport00JFK   6.398e-01  3.605e-02   17.75  < 2e-16 ***
## carrier_airport00LAS   1.808e-01  2.570e-02    7.04 1.99e-12 ***
## carrier_airport00LAX   1.799e-01  9.848e-03   18.27  < 2e-16 ***
## carrier_airport00LGA   8.044e-01  1.581e-02   50.87  < 2e-16 ***
## carrier_airport00MCO   1.491e+00  2.837e-01    5.25 1.49e-07 ***
## carrier_airport00MDW   4.357e-01  3.191e-02   13.65  < 2e-16 ***
## carrier_airport00MSP   1.535e-01  9.967e-03   15.40  < 2e-16 ***
## carrier_airport00ORD   5.294e-01  8.507e-03   62.24  < 2e-16 ***
## carrier_airport00PHL   4.300e-01  4.613e-02    9.32  < 2e-16 ***
## carrier_airport00PHX   8.257e-02  1.318e-02    6.27 3.72e-10 ***
## carrier_airport00SAN   1.001e-01  1.624e-02    6.17 6.95e-10 ***
## carrier_airport00SEA  -2.173e-02  1.321e-02   -1.64 0.100053
## carrier_airport00SFO   4.895e-01  9.164e-03   53.41  < 2e-16 ***
## carrier_airport00SLC  -4.097e-02  1.002e-02   -4.09 4.32e-05 ***
## carrier_airport00TPA   9.667e-01  1.428e-01    6.77 1.28e-11 ***
## carrier_airportQXDAL   6.761e-01  1.997e-01    3.39 0.000710 ***
## carrier_airportQXDFW   8.733e-01  2.289e-01    3.82 0.000136 ***
## carrier_airportQXLAS   3.343e-01  6.123e-02    5.46 4.77e-08 ***
## carrier_airportQXLAX   2.960e-01  3.520e-02    8.41  < 2e-16 ***
## carrier_airportQXMSP  -1.190e-01  1.923e-01   -0.62 0.536031
## carrier_airportQXORD   6.225e-01  1.053e-01    5.91 3.36e-09 ***
## carrier_airportQXPHX   3.665e-01  6.532e-02    5.61 2.02e-08 ***
## carrier_airportQXSAN   4.356e-02  4.913e-02    0.89 0.375216
## carrier_airportQXSEA   1.869e-01  1.370e-02   13.64  < 2e-16 ***
## carrier_airportQXSFO   3.382e-01  3.639e-02    9.29  < 2e-16 ***
## carrier_airportQXSLC   3.813e-01  9.861e-02    3.87 0.000110 ***
## carrier_airportUAATL   5.730e-01  1.893e-02   30.27  < 2e-16 ***
## carrier_airportUABNA   5.917e-01  2.168e-02   27.29  < 2e-16 ***
## carrier_airportUABOS   5.749e-01  1.237e-02   46.47  < 2e-16 ***
## carrier_airportUABWI   5.153e-01  2.205e-02   23.37  < 2e-16 ***
## carrier_airportUACLT   9.645e-01  3.158e-02   30.54  < 2e-16 ***
## carrier_airportUADCA   5.360e-01  1.964e-02   27.29  < 2e-16 ***
## carrier_airportUADEN   2.789e-01  8.567e-03   32.55  < 2e-16 ***
## carrier_airportUADFW   6.823e-01  1.555e-02   43.87  < 2e-16 ***
## carrier_airportUADTW   6.462e-01  3.271e-02   19.76  < 2e-16 ***
## carrier_airportUAEWR   7.648e-01  8.309e-03   92.04  < 2e-16 ***
## carrier_airportUAFLL   5.756e-01  1.442e-02   39.92  < 2e-16 ***
## carrier_airportUAIAD   3.063e-01  1.052e-02   29.11  < 2e-16 ***
## carrier_airportUAIAH   3.122e-01  8.828e-03   35.37  < 2e-16 ***
## carrier_airportUAJFK   4.641e-01  5.339e-02    8.69  < 2e-16 ***
## carrier_airportUALAS   4.409e-01  1.273e-02   34.62  < 2e-16 ***
## carrier_airportUALAX   3.442e-01  1.053e-02   32.70  < 2e-16 ***
## carrier_airportUALGA   7.378e-01  1.404e-02   52.55  < 2e-16 ***
```

```
## carrier_airportUAMCO   4.888e-01  1.240e-02   39.44  < 2e-16 ***
## carrier_airportUAMIA   6.545e-01  1.636e-02   40.01  < 2e-16 ***
## carrier_airportUAMSP   5.890e-01  2.017e-02   29.20  < 2e-16 ***
## carrier_airportUAORD   3.840e-01  8.472e-03   45.33  < 2e-16 ***
## carrier_airportUAPHL   6.310e-01  1.950e-02   32.36  < 2e-16 ***
## carrier_airportUAPHX   4.448e-01  1.488e-02   29.89  < 2e-16 ***
## carrier_airportUASAN   3.443e-01  1.455e-02   23.66  < 2e-16 ***
## carrier_airportUASEA   5.701e-01  1.375e-02   41.45  < 2e-16 ***
## carrier_airportUASFO   5.019e-01  8.802e-03   57.02  < 2e-16 ***
## carrier_airportUASLC   5.431e-01  2.604e-02   20.86  < 2e-16 ***
## carrier_airportUATPA   5.233e-01  1.472e-02   35.55  < 2e-16 ***
## carrier_airportVXBNA   2.834e-01  2.730e-01    1.04 0.299139
## carrier_airportVXBOS   1.111e-01  1.679e-01    0.66 0.508057
## carrier_airportVXBWI  -2.616e+00  1.163e+00   -2.25 0.024484 *
## carrier_airportVXDAL   3.955e-01  9.200e-02    4.30 1.71e-05 ***
## carrier_airportVXDCA   3.378e-02  1.906e-01    0.18 0.859347
## carrier_airportVXDEN   3.514e-01  1.915e-01    1.84 0.066430 .
## carrier_airportVXEWR   6.716e-01  9.094e-02    7.38 1.53e-13 ***
## carrier_airportVXFLL   3.187e-01  1.400e-01    2.28 0.022787 *
## carrier_airportVXIAD  -2.708e-01  1.854e-01   -1.46 0.143971
## carrier_airportVXJFK   2.911e-01  8.024e-02    3.63 0.000286 ***
## carrier_airportVXLAS   4.770e-01  7.357e-02    6.48 8.90e-11 ***
## carrier_airportVXLAX   4.245e-01  4.062e-02   10.45  < 2e-16 ***
## carrier_airportVXMCO   3.081e-01  1.907e-01    1.62 0.106128
## carrier_airportVXORD   4.121e-01  1.685e-01    2.45 0.014431 *
## carrier_airportVXPHL  -3.399e-01  2.643e-01   -1.29 0.198485
## carrier_airportVXSAN   6.194e-01  9.983e-02    6.20 5.49e-10 ***
## carrier_airportVXSEA   8.182e-01  6.846e-02   11.95  < 2e-16 ***
## carrier_airportVXSFO   7.686e-01  2.773e-02   27.72  < 2e-16 ***
## carrier_airportWNATL   3.559e-01  9.430e-03   37.74  < 2e-16 ***
## carrier_airportWNBNA   3.579e-01  9.253e-03   38.68  < 2e-16 ***
## carrier_airportWNBOS   6.105e-01  1.366e-02   44.70  < 2e-16 ***
## carrier_airportWNBWI   2.812e-01  8.566e-03   32.83  < 2e-16 ***
## carrier_airportWNCLT   6.594e-01  2.016e-02   32.71  < 2e-16 ***
## carrier_airportWNDAL   5.071e-01  8.350e-03   60.73  < 2e-16 ***
## carrier_airportWNDCA   5.070e-01  1.176e-02   43.11  < 2e-16 ***
## carrier_airportWNDEN   4.731e-01  8.194e-03   57.74  < 2e-16 ***
## carrier_airportWNDTW   6.176e-01  1.627e-02   37.96  < 2e-16 ***
## carrier_airportWNEWR   1.104e+00  1.785e-02   61.81  < 2e-16 ***
## carrier_airportWNFLL   3.661e-01  1.086e-02   33.71  < 2e-16 ***
## carrier_airportWNIAD   6.050e-01  2.459e-02   24.60  < 2e-16 ***
## carrier_airportWNIAH   7.779e-01  2.185e-02   35.60  < 2e-16 ***
## carrier_airportWNLAS   4.028e-01  8.381e-03   48.06  < 2e-16 ***
## carrier_airportWNLAX   5.038e-01  9.350e-03   53.88  < 2e-16 ***
## carrier_airportWNLGA   7.445e-01  1.186e-02   62.79  < 2e-16 ***
## carrier_airportWNMCO   4.726e-01  9.048e-03   52.24  < 2e-16 ***
## carrier_airportWNMDW   3.735e-01  8.323e-03   44.88  < 2e-16 ***
## carrier_airportWNMIA   8.735e-01  1.866e-02   46.80  < 2e-16 ***
## carrier_airportWNMSP   6.127e-01  1.466e-02   41.79  < 2e-16 ***
## carrier_airportWNORD   1.043e+00  1.671e-02   62.45  < 2e-16 ***
## carrier_airportWNPHL   6.214e-01  1.467e-02   42.36  < 2e-16 ***
## carrier_airportWNPHX   4.695e-01  8.470e-03   55.43  < 2e-16 ***
## carrier_airportWNSAN   4.048e-01  9.542e-03   42.42  < 2e-16 ***
## carrier_airportWNSEA   6.811e-01  1.231e-02   55.32  < 2e-16 ***
```

```
## carrier_airportWNSFO   7.826e-01  1.138e-02   68.79  < 2e-16 ***
## carrier_airportWNSLC   6.574e-01  1.224e-02   53.70  < 2e-16 ***
## carrier_airportWNTPA   4.796e-01  9.950e-03   48.20  < 2e-16 ***
## carrier_airportYVATL   5.669e-01  2.652e-02   21.37  < 2e-16 ***
## carrier_airportYVBNA   3.910e-01  3.739e-02   10.46  < 2e-16 ***
## carrier_airportYVBOS   2.057e-01  1.797e-01    1.14 0.252350
## carrier_airportYVBWI  -2.041e-01  1.312e-01   -1.56 0.119817
## carrier_airportYVCLT   4.984e-01  2.620e-02   19.03  < 2e-16 ***
## carrier_airportYVDCA   3.395e-01  3.953e-02    8.59  < 2e-16 ***
## carrier_airportYVDFW   6.308e-01  9.424e-03   66.94  < 2e-16 ***
## carrier_airportYVDTW   4.366e-01  2.918e-02   14.96  < 2e-16 ***
## carrier_airportYVFLL  -2.455e+00  9.931e-01   -2.47 0.013433 *
## carrier_airportYVIAD   3.368e-01  1.175e-02   28.68  < 2e-16 ***
## carrier_airportYVIAH   3.505e-01  9.800e-03   35.77  < 2e-16 ***
## carrier_airportYVLGA   6.524e-01  2.606e-02   25.04  < 2e-16 ***
## carrier_airportYVMIA   7.608e-01  8.654e-02    8.79  < 2e-16 ***
## carrier_airportYVMSP   4.890e-01  3.252e-02   15.03  < 2e-16 ***
## carrier_airportYVORD   2.833e-01  5.769e-02    4.91 9.12e-07 ***
## carrier_airportYVPHL   3.770e-01  4.162e-02    9.06  < 2e-16 ***
## carrier_airportYVPHX   3.605e-01  1.269e-02   28.41  < 2e-16 ***
## carrier_airportYVSAN  -8.003e-01  1.085e+00   -0.74 0.460759
## carrier_airportYVSLC   5.653e-01  5.259e-02   10.75  < 2e-16 ***
## carrier_airportYVTPA  -4.594e-02  2.417e-01   -0.19 0.849222
## carrier_airportYXATL   2.883e-01  1.633e-02   17.66  < 2e-16 ***
## carrier_airportYXBNA   2.810e-01  1.871e-02   15.02  < 2e-16 ***
## carrier_airportYXBOS   2.921e-01  1.313e-02   22.25  < 2e-16 ***
## carrier_airportYXBWI   2.197e-01  5.414e-02    4.06 4.96e-05 ***
## carrier_airportYXCLT   1.171e-01  1.389e-02    8.43  < 2e-16 ***
## carrier_airportYXDCA   2.721e-01  1.070e-02   25.42  < 2e-16 ***
## carrier_airportYXDEN   2.400e-01  2.567e-02    9.35  < 2e-16 ***
## carrier_airportYXDFW   5.903e-01  3.019e-02   19.56  < 2e-16 ***
## carrier_airportYXDTW   1.541e-01  1.614e-02    9.55  < 2e-16 ***
## carrier_airportYXEWR   6.889e-01  9.692e-03   71.08  < 2e-16 ***
## carrier_airportYXFLL  -3.461e-01  3.095e-01   -1.12 0.263401
## carrier_airportYXIAD   2.438e-01  2.114e-02   11.53  < 2e-16 ***
## carrier_airportYXIAH   4.440e-01  1.521e-02   29.19  < 2e-16 ***
## carrier_airportYXJFK   3.572e-01  1.584e-02   22.55  < 2e-16 ***
## carrier_airportYXLGA   4.879e-01  9.775e-03   49.92  < 2e-16 ***
## carrier_airportYXMCO   1.465e-01  1.335e-01    1.10 0.272641
## carrier_airportYXMDW   2.100e-01  8.895e-02    2.36 0.018220 *
## carrier_airportYXMIA  -4.849e-02  1.929e-02   -2.51 0.011939 *
## carrier_airportYXMSP   3.762e-01  2.150e-02   17.49  < 2e-16 ***
## carrier_airportYXORD   2.598e-01  1.113e-02   23.34  < 2e-16 ***
## carrier_airportYXPHL   7.167e-02  1.358e-02    5.28 1.32e-07 ***
## carrier_airportYXSEA   6.410e-01  6.271e-01    1.02 0.306663
## carrier_airportYXSLC   4.764e-01  6.442e-02    7.40 1.41e-13 ***
## carrier_airportYXTPA   7.943e-02  6.132e-02    1.30 0.195177
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


## # Overdispersion test
##
##        dispersion ratio =     25.268
##    Pearson's Chi-Squared = 461092.336
```

```
##                  p-value =     < 0.001


## Warning in (function (start, objective, gradient = NULL, hessian = NULL, : NA/
## NaN function evaluation


## Warning in (function (start, objective, gradient = NULL, hessian = NULL, : NA/
## NaN function evaluation


## Warning in fitTMB(TMBStruc): Model convergence problem; non-positive-definite
## Hessian matrix. See vignette('troubleshooting')


## Warning in fitTMB(TMBStruc): Model convergence problem; function evaluation
## limit reached without convergence (9). See vignette('troubleshooting')


##  Family: poisson  ( log )
## Formula:
## arr_del15 ~ date + carrier_airport + offset(log(arr_flights)) +
##     (1 | carrier)
## Data: airline_data
##
##      AIC      BIC   logLik deviance df.resid
##       NA       NA       NA       NA    18247
##
## Random effects:
##
## Conditional model:
##  Groups  Name        Variance Std.Dev.
##  carrier (Intercept) 1.329    1.153
## Number of obs: 18673, groups:  carrier, 19
##
## Conditional model:
##                      Estimate Std. Error z value Pr(>|z|)
## (Intercept)         -9.066e-01  9.420e-01   -0.96  0.33585
## date                -1.073e-05  1.136e-06   -9.45  < 2e-16 ***
## carrier_airport9EBNA  3.055e-01  3.739e-02    8.17 3.06e-16 ***
## carrier_airport9EBOS  5.036e-01  2.204e-02   22.85  < 2e-16 ***
## carrier_airport9EBWI  2.341e-01  3.413e-02    6.86 6.88e-12 ***
## carrier_airport9ECLT  3.691e-01  2.869e-02   12.86  < 2e-16 ***
## carrier_airport9EDAL -1.721e-02  3.537e-01   -0.05  0.96119
## carrier_airport9EDCA  2.704e-01  3.673e-02    7.36 1.80e-13 ***
## carrier_airport9EDEN -9.972e-05  7.172e-01    0.00  0.99989
## carrier_airport9EDFW  4.933e-01  4.074e-02   12.11  < 2e-16 ***
## carrier_airport9EDTW -2.725e-01  1.327e-02  -20.54  < 2e-16 ***
## carrier_airport9EEWR  5.823e-01  2.903e-02   20.06  < 2e-16 ***
## carrier_airport9EFLL  4.167e-01  1.537e-01    2.71  0.00672 **
## carrier_airport9EIAD  1.921e-01  4.355e-02    4.41 1.03e-05 ***
## carrier_airport9EIAH  5.321e-01  4.845e-02   10.98  < 2e-16 ***
## carrier_airport9EJFK  3.385e-01  1.240e-02   27.30  < 2e-16 ***
## carrier_airport9ELGA  7.467e-01  1.028e-02   72.64  < 2e-16 ***
## carrier_airport9EMCO  3.609e-01  1.308e-01    2.76  0.00580 **
## carrier_airport9EMDW -2.111e-02  6.124e-02   -0.34  0.73028
## carrier_airport9EMIA  2.356e-01  2.366e-01    1.00  0.31936
## carrier_airport9EMSP -2.351e-01  1.547e-02  -15.20  < 2e-16 ***
```

```
## carrier_airport9EORD  3.686e-01  3.358e-02  10.97  < 2e-16 ***
## carrier_airport9EPHL  3.110e-01  3.606e-02   8.62  < 2e-16 ***
## carrier_airport9ETPA -4.144e-02  1.059e-01  -0.39  0.69558
## carrier_airportAAATL  5.693e-02  1.590e+00   0.04  0.97145
## carrier_airportAABNA -3.383e-02  1.590e+00  -0.02  0.98303
## carrier_airportAABOS -8.389e-02  1.590e+00  -0.05  0.95793
## carrier_airportAABWI  6.657e-02  1.590e+00   0.04  0.96661
## carrier_airportAACLT -3.100e-01  1.590e+00  -0.19  0.84547
## carrier_airportAADCA -2.501e-01  1.590e+00  -0.16  0.87502
## carrier_airportAADEN  7.209e-02  1.590e+00   0.05  0.96385
## carrier_airportAADFW -2.877e-02  1.590e+00  -0.02  0.98557
## carrier_airportAADTW -3.890e-02  1.591e+00  -0.02  0.98049
## carrier_airportAAEWR  4.642e-01  1.590e+00   0.29  0.77038
## carrier_airportAAFLL  5.143e-03  1.590e+00   0.00  0.99742
## carrier_airportAAIAD  3.647e-02  1.591e+00   0.02  0.98171
## carrier_airportAAIAH  2.487e-01  1.590e+00   0.16  0.87572
## carrier_airportAAJFK -9.773e-02  1.590e+00  -0.06  0.95100
## carrier_airportAALAS  5.185e-02  1.590e+00   0.03  0.97399
## carrier_airportAALAX -2.617e-01  1.590e+00  -0.16  0.86930
## carrier_airportAALGA  5.587e-02  1.590e+00   0.04  0.97198
## carrier_airportAAMCO -2.497e-02  1.590e+00  -0.02  0.98747
## carrier_airportAAMIA -1.499e-01  1.590e+00  -0.09  0.92489
## carrier_airportAAMSP  7.665e-02  1.590e+00   0.05  0.96156
## carrier_airportAAORD -1.810e-01  1.590e+00  -0.11  0.90942
## carrier_airportAAPHL -1.956e-01  1.590e+00  -0.12  0.90209
## carrier_airportAAPHX -3.032e-01  1.590e+00  -0.19  0.84883
## carrier_airportAASAN  6.535e-02  1.590e+00   0.04  0.96723
## carrier_airportAASEA  2.695e-01  1.590e+00   0.17  0.86545
## carrier_airportAASFO  2.681e-01  1.590e+00   0.17  0.86612
## carrier_airportAASLC  1.438e-01  1.590e+00   0.09  0.92798
## carrier_airportAATPA  3.386e-02  1.590e+00   0.02  0.98302
## carrier_airportASATL -2.181e-01  1.609e+00  -0.14  0.89217
## carrier_airportASBNA  7.761e-02  1.609e+00   0.05  0.96152
## carrier_airportASBOS  4.036e-02  1.608e+00   0.03  0.97998
## carrier_airportASBWI -1.736e-01  1.609e+00  -0.11  0.91404
## carrier_airportASDAL  2.333e-01  1.609e+00   0.15  0.88469
## carrier_airportASDCA -3.946e-02  1.609e+00  -0.02  0.98043
## carrier_airportASDEN  1.023e-01  1.608e+00   0.06  0.94928
## carrier_airportASDFW -1.151e-01  1.609e+00  -0.07  0.94294
## carrier_airportASDTW -2.182e-01  1.609e+00  -0.14  0.89215
## carrier_airportASEWR  4.160e-01  1.608e+00   0.26  0.79589
## carrier_airportASFLL  1.847e-02  1.609e+00   0.01  0.99084
## carrier_airportASIAD  4.095e-02  1.609e+00   0.03  0.97969
## carrier_airportASIAH  1.450e-02  1.609e+00   0.01  0.99281
## carrier_airportASJFK  1.801e-01  1.608e+00   0.11  0.91085
## carrier_airportASLAS  5.496e-02  1.608e+00   0.03  0.97274
## carrier_airportASLAX  4.247e-02  1.608e+00   0.03  0.97893
## carrier_airportASMCO  2.703e-03  1.608e+00   0.00  0.99866
## carrier_airportASMIA -2.155e-01  1.630e+00  -0.13  0.89477
## carrier_airportASMSP -2.745e-02  1.609e+00  -0.02  0.98638
## carrier_airportASORD -2.373e-03  1.608e+00   0.00  0.99882
## carrier_airportASPHL -1.167e-01  1.609e+00  -0.07  0.94215
## carrier_airportASPHX -2.516e-01  1.608e+00  -0.16  0.87571
## carrier_airportASSAN -8.277e-02  1.608e+00  -0.05  0.95895
```

```
## carrier_airportASSEA -3.740e-02  1.608e+00   -0.02  0.98144
## carrier_airportASSFO  3.711e-01  1.608e+00    0.23  0.81751
## carrier_airportASSLC  1.769e-02  1.609e+00    0.01  0.99122
## carrier_airportASTPA -1.639e-01  1.609e+00   -0.10  0.91888
## carrier_airportB6ATL -7.851e-03  1.558e+00   -0.01  0.99598
## carrier_airportB6BNA  7.318e-02  1.558e+00    0.05  0.96253
## carrier_airportB6BOS -3.060e-02  1.557e+00   -0.02  0.98432
## carrier_airportB6BWI -4.212e-02  1.558e+00   -0.03  0.97843
## carrier_airportB6CLT -1.640e-01  1.558e+00   -0.11  0.91613
## carrier_airportB6DCA -1.108e-01  1.558e+00   -0.07  0.94329
## carrier_airportB6DEN  4.888e-02  1.558e+00    0.03  0.97497
## carrier_airportB6DFW -7.632e-02  1.558e+00   -0.05  0.96093
## carrier_airportB6DTW -1.486e-02  1.558e+00   -0.01  0.99239
## carrier_airportB6EWR  4.423e-01  1.557e+00    0.28  0.77644
## carrier_airportB6FLL  3.408e-02  1.557e+00    0.02  0.98254
## carrier_airportB6IAD  6.300e-02  1.558e+00    0.04  0.96775
## carrier_airportB6IAH -1.050e-01  1.558e+00   -0.07  0.94630
## carrier_airportB6JFK  3.496e-02  1.557e+00    0.02  0.98209
## carrier_airportB6LAS -7.529e-02  1.558e+00   -0.05  0.96145
## carrier_airportB6LAX -2.317e-01  1.558e+00   -0.15  0.88176
## carrier_airportB6LGA  2.271e-01  1.558e+00    0.15  0.88406
## carrier_airportB6MCO  8.255e-02  1.557e+00    0.05  0.95773
## carrier_airportB6MIA  2.223e-01  1.558e+00    0.14  0.88650
## carrier_airportB6MSP  2.689e-02  1.558e+00    0.02  0.98623
## carrier_airportB6ORD  2.213e-01  1.558e+00    0.14  0.88704
## carrier_airportB6PHL -3.405e-02  1.558e+00   -0.02  0.98256
## carrier_airportB6PHX  1.896e-01  1.558e+00    0.12  0.90314
## carrier_airportB6SAN -4.447e-01  1.558e+00   -0.29  0.77527
## carrier_airportB6SEA -1.359e-01  1.558e+00   -0.09  0.93046
## carrier_airportB6SFO -2.176e-01  1.558e+00   -0.14  0.88888
## carrier_airportB6SLC -5.517e-02  1.558e+00   -0.04  0.97174
## carrier_airportB6TPA  4.422e-02  1.558e+00    0.03  0.97735
## carrier_airportDLATL -2.206e-01  1.620e+00   -0.14  0.89171
## carrier_airportDLBNA -1.961e-01  1.620e+00   -0.12  0.90367
## carrier_airportDLBOS  2.373e-01  1.620e+00    0.15  0.88355
## carrier_airportDLBWI -2.646e-01  1.620e+00   -0.16  0.87027
## carrier_airportDLCLT -3.219e-01  1.620e+00   -0.20  0.84254
## carrier_airportDLDAL -6.943e-02  1.621e+00   -0.04  0.96583
## carrier_airportDLDCA  1.580e-02  1.620e+00    0.01  0.99222
## carrier_airportDLDEN -1.886e-02  1.620e+00   -0.01  0.99071
## carrier_airportDLDFW  3.084e-01  1.620e+00    0.19  0.84908
## carrier_airportDLDTW -3.438e-01  1.620e+00   -0.21  0.83197
## carrier_airportDLEWR  5.410e-01  1.620e+00    0.33  0.73850
## carrier_airportDLFLL  1.974e-01  1.620e+00    0.12  0.90304
## carrier_airportDLIAD -1.880e-01  1.621e+00   -0.12  0.90765
## carrier_airportDLIAH  2.284e-01  1.620e+00    0.14  0.88793
## carrier_airportDLJFK  8.736e-02  1.620e+00    0.05  0.95700
## carrier_airportDLLAS -1.959e-01  1.620e+00   -0.12  0.90378
## carrier_airportDLLAX -2.192e-02  1.620e+00   -0.01  0.98921
## carrier_airportDLLGA  3.439e-01  1.620e+00    0.21  0.83191
## carrier_airportDLMCO  1.232e-01  1.620e+00    0.08  0.93938
## carrier_airportDLMDW -1.752e-01  1.621e+00   -0.11  0.91391
## carrier_airportDLMIA  2.041e-01  1.620e+00    0.13  0.89976
## carrier_airportDLMSP -3.025e-01  1.620e+00   -0.19  0.85190
```

```
## carrier_airportDLORD  3.389e-01  1.620e+00    0.21  0.83434
## carrier_airportDLPHL -2.979e-02  1.620e+00   -0.02  0.98533
## carrier_airportDLPHX -6.651e-03  1.620e+00    0.00  0.99673
## carrier_airportDLSAN -1.117e-01  1.620e+00   -0.07  0.94503
## carrier_airportDLSEA -2.049e-01  1.620e+00   -0.13  0.89939
## carrier_airportDLSFO  3.027e-01  1.620e+00    0.19  0.85181
## carrier_airportDLSLC -3.391e-01  1.620e+00   -0.21  0.83425
## carrier_airportDLTPA  2.568e-02  1.620e+00    0.02  0.98735
## carrier_airportEVATL -1.159e-01  1.591e+00   -0.07  0.94193
## carrier_airportEVBNA  1.619e-01  1.591e+00    0.10  0.91896
## carrier_airportEVBOS  2.872e-02  1.592e+00    0.02  0.98560
## carrier_airportEVBWI -1.261e-01  1.593e+00   -0.08  0.93691
## carrier_airportEVCLT -6.351e-03  1.591e+00    0.00  0.99682
## carrier_airportEVDCA  7.760e-03  1.591e+00    0.00  0.99611
## carrier_airportEVDEN -1.237e+00  1.616e+00   -0.77  0.44381
## carrier_airportEVDFW  2.490e-01  1.591e+00    0.16  0.87562
## carrier_airportEVDTW  1.599e-01  1.592e+00    0.10  0.91999
## carrier_airportEVEWR  6.970e-01  1.590e+00    0.44  0.66121
## carrier_airportEVIAD  2.805e-01  1.591e+00    0.18  0.86006
## carrier_airportEVIAH -3.523e-01  1.590e+00   -0.22  0.82468
## carrier_airportEVLGA  2.168e-01  1.591e+00    0.14  0.89156
## carrier_airportEVMCO  4.180e-02  2.711e+00    0.02  0.98770
## carrier_airportEVMDW  1.132e-01  1.911e+00    0.06  0.95275
## carrier_airportEVMSP  1.554e-01  1.592e+00    0.10  0.92225
## carrier_airportEVORD  6.494e-02  1.590e+00    0.04  0.96743
## carrier_airportEVPHL -2.388e-01  1.609e+00   -0.15  0.88202
## carrier_airportEVSLC -1.423e-01  1.606e+00   -0.09  0.92936
## carrier_airportF9ATL  6.813e-02  1.558e+00    0.04  0.96511
## carrier_airportF9BNA -8.233e-02  1.558e+00   -0.05  0.95786
## carrier_airportF9BOS -1.114e-01  1.558e+00   -0.07  0.94299
## carrier_airportF9BWI  2.095e-01  1.558e+00    0.13  0.89302
## carrier_airportF9CLT  6.789e-02  1.558e+00    0.04  0.96524
## carrier_airportF9DCA -1.660e-01  1.558e+00   -0.11  0.91514
## carrier_airportF9DEN -2.216e-01  1.558e+00   -0.14  0.88689
## carrier_airportF9DFW -7.626e-03  1.558e+00    0.00  0.99609
## carrier_airportF9DTW -1.054e-01  1.558e+00   -0.07  0.94607
## carrier_airportF9EWR  6.616e-02  1.558e+00    0.04  0.96613
## carrier_airportF9FLL  2.363e-01  1.558e+00    0.15  0.87947
## carrier_airportF9IAD  3.766e-02  1.558e+00    0.02  0.98072
## carrier_airportF9IAH -1.643e-02  1.558e+00   -0.01  0.99159
## carrier_airportF9LAS  7.748e-02  1.558e+00    0.05  0.96033
## carrier_airportF9LAX -2.745e-01  1.558e+00   -0.18  0.86015
## carrier_airportF9LGA  1.530e-01  1.558e+00    0.10  0.92175
## carrier_airportF9MCO  1.687e-01  1.558e+00    0.11  0.91377
## carrier_airportF9MDW -2.260e-02  1.559e+00   -0.01  0.98843
## carrier_airportF9MIA  1.015e-01  1.558e+00    0.07  0.94804
## carrier_airportF9MSP -4.666e-02  1.558e+00   -0.03  0.97611
## carrier_airportF9ORD  4.575e-02  1.558e+00    0.03  0.97657
## carrier_airportF9PHL  1.438e-01  1.558e+00    0.09  0.92645
## carrier_airportF9PHX -1.650e-01  1.558e+00   -0.11  0.91562
## carrier_airportF9SAN -1.452e-01  1.558e+00   -0.09  0.92576
## carrier_airportF9SEA  3.856e-02  1.558e+00    0.02  0.98026
## carrier_airportF9SFO  4.063e-02  1.558e+00    0.03  0.97919
## carrier_airportF9SLC -1.096e-01  1.558e+00   -0.07  0.94389
```

```
## carrier_airportF9TPA -1.693e-02  1.558e+00   -0.01  0.99133
## carrier_airportG4BNA   1.597e-01  1.563e+00    0.10  0.91859
## carrier_airportG4BOS  -2.336e-01  1.564e+00   -0.15  0.88131
## carrier_airportG4BWI  -4.122e-02  1.564e+00   -0.03  0.97897
## carrier_airportG4DEN   2.179e-02  1.564e+00    0.01  0.98888
## carrier_airportG4EWR  -7.992e-01  1.564e+00   -0.51  0.60932
## carrier_airportG4FLL   3.578e-01  1.563e+00    0.23  0.81891
## carrier_airportG4IAD   1.292e-01  1.567e+00    0.08  0.93429
## carrier_airportG4LAS  -2.552e-02  1.563e+00   -0.02  0.98697
## carrier_airportG4LAX  -4.067e-02  1.563e+00   -0.03  0.97924
## carrier_airportG4MDW  -5.370e-02  1.564e+00   -0.03  0.97262
## carrier_airportG4MSP   2.209e-01  1.565e+00    0.14  0.88775
## carrier_airportG4PHX   2.050e-01  1.567e+00    0.13  0.89589
## carrier_airportG4SAN   6.058e-02  1.564e+00    0.04  0.96909
## carrier_airportHABOS  -3.817e-02  1.559e+00   -0.02  0.98046
## carrier_airportHAJFK   1.712e-01  1.557e+00    0.11  0.91248
## carrier_airportHALAS  -4.089e-01  1.557e+00   -0.26  0.79285
## carrier_airportHALAX  -1.690e-01  1.557e+00   -0.11  0.91352
## carrier_airportHAMCO   4.211e-01  1.561e+00    0.27  0.78727
## carrier_airportHAPHX  -2.473e-01  1.558e+00   -0.16  0.87382
## carrier_airportHASAN   1.292e-02  1.557e+00    0.01  0.99338
## carrier_airportHASEA   3.114e-01  1.557e+00    0.20  0.84147
## carrier_airportHASFO  -9.059e-02  1.557e+00   -0.06  0.95360
## carrier_airportMQATL  -2.066e-02  1.604e+00   -0.01  0.98972
## carrier_airportMQBNA   5.880e-02  1.603e+00    0.04  0.97074
## carrier_airportMQBOS  -4.285e-02  1.604e+00   -0.03  0.97868
## carrier_airportMQBWI  -9.564e-02  1.604e+00   -0.06  0.95244
## carrier_airportMQCLT  -1.995e-01  1.603e+00   -0.12  0.90094
## carrier_airportMQDCA  -1.133e-01  1.603e+00   -0.07  0.94365
## carrier_airportMQDEN  -1.907e-01  1.655e+00   -0.12  0.90830
## carrier_airportMQDFW  -6.543e-02  1.603e+00   -0.04  0.96744
## carrier_airportMQDTW   6.939e-02  1.603e+00    0.04  0.96548
## carrier_airportMQEWR   2.799e-01  1.604e+00    0.17  0.86150
## carrier_airportMQIAD   5.004e-03  1.612e+00    0.00  0.99752
## carrier_airportMQIAH   1.329e-01  1.603e+00    0.08  0.93395
## carrier_airportMQJFK   1.318e-01  1.603e+00    0.08  0.93446
## carrier_airportMQLGA   4.557e-01  1.603e+00    0.28  0.77620
## carrier_airportMQMIA  -7.313e-02  1.603e+00   -0.05  0.96361
## carrier_airportMQMSP   5.934e-03  1.604e+00    0.00  0.99705
## carrier_airportMQORD  -8.764e-02  1.603e+00   -0.05  0.95640
## carrier_airportMQPHL   2.927e-01  1.606e+00    0.18  0.85533
## carrier_airportMQPHX  -4.259e-01  1.604e+00   -0.27  0.79063
## carrier_airportMQSLC  -6.238e-02  1.607e+00   -0.04  0.96903
## carrier_airportMQTPA  -1.044e-01  1.605e+00   -0.07  0.94810
## carrier_airportNKATL  -9.192e-02  1.591e+00   -0.06  0.95393
## carrier_airportNKBNA  -9.151e-02  1.592e+00   -0.06  0.95415
## carrier_airportNKBOS   6.585e-02  1.591e+00    0.04  0.96699
## carrier_airportNKBWI  -7.742e-02  1.591e+00   -0.05  0.96119
## carrier_airportNKCLT   2.487e-01  1.592e+00    0.16  0.87583
## carrier_airportNKDEN  -1.990e-02  1.591e+00   -0.01  0.99002
## carrier_airportNKDFW   5.992e-03  1.591e+00    0.00  0.99700
## carrier_airportNKDTW  -1.947e-01  1.591e+00   -0.12  0.90264
## carrier_airportNKEWR   2.700e-01  1.591e+00    0.17  0.86529
## carrier_airportNKFLL  -2.341e-02  1.591e+00   -0.01  0.98826
```

```
## carrier_airportNKIAH -1.074e-01  1.591e+00   -0.07  0.94620
## carrier_airportNKLAS -1.362e-01  1.591e+00   -0.09  0.93180
## carrier_airportNKLAX -1.411e-01  1.591e+00   -0.09  0.92936
## carrier_airportNKLGA  1.236e-01  1.591e+00    0.08  0.93811
## carrier_airportNKMCO  4.599e-02  1.591e+00    0.03  0.97694
## carrier_airportNKMIA  9.596e-02  1.591e+00    0.06  0.95192
## carrier_airportNKMSP -2.336e-01  1.591e+00   -0.15  0.88327
## carrier_airportNKORD  1.460e-01  1.591e+00    0.09  0.92689
## carrier_airportNKPHL  1.566e-02  1.591e+00    0.01  0.99215
## carrier_airportNKPHX  2.834e-02  1.592e+00    0.02  0.98580
## carrier_airportNKSAN -9.100e-02  1.591e+00   -0.06  0.95440
## carrier_airportNKSEA  5.713e-02  1.591e+00    0.04  0.97136
## carrier_airportNKSLC  1.840e-01  1.594e+00    0.12  0.90810
## carrier_airportNKTPA -1.240e-01  1.591e+00   -0.08  0.93788
## carrier_airportOHATL -1.085e-01  1.601e+00   -0.07  0.94598
## carrier_airportOHBNA -1.029e-02  1.601e+00   -0.01  0.99487
## carrier_airportOHBOS  8.374e-02  1.663e+00    0.05  0.95983
## carrier_airportOHBWI -5.329e-01  1.604e+00   -0.33  0.73964
## carrier_airportOHCLT -3.083e-01  1.601e+00   -0.19  0.84726
## carrier_airportOHDCA  1.115e-01  1.601e+00    0.07  0.94445
## carrier_airportOHDFW  8.204e-02  1.601e+00    0.05  0.95913
## carrier_airportOHDTW -1.167e-01  1.601e+00   -0.07  0.94189
## carrier_airportOHEWR  2.337e-01  1.638e+00    0.14  0.88654
## carrier_airportOHIAD -1.192e-01  1.601e+00   -0.07  0.94062
## carrier_airportOHIAH  4.674e-01  1.610e+00    0.29  0.77153
## carrier_airportOHJFK  2.556e-02  1.604e+00    0.02  0.98729
## carrier_airportOHLGA  3.050e-01  1.601e+00    0.19  0.84893
## carrier_airportOHMSP  7.111e-02  1.603e+00    0.04  0.96461
## carrier_airportOHORD -1.364e-01  1.602e+00   -0.09  0.93212
## carrier_airportOHPHL -9.764e-02  1.601e+00   -0.06  0.95135
## carrier_airportOOATL  9.948e-02  1.604e+00    0.06  0.95054
## carrier_airportOOBNA  1.879e-01  1.604e+00    0.12  0.90674
## carrier_airportOOBOS  2.269e-01  1.604e+00    0.14  0.88752
## carrier_airportOOBWI -5.688e-02  1.605e+00   -0.04  0.97173
## carrier_airportOOCLT  1.380e-01  1.604e+00    0.09  0.93143
## carrier_airportOODAL  6.886e-02  1.604e+00    0.04  0.96575
## carrier_airportOODCA  1.455e-01  1.604e+00    0.09  0.92770
## carrier_airportOODEN -4.849e-02  1.604e+00   -0.03  0.97588
## carrier_airportOODFW  1.945e-01  1.604e+00    0.12  0.90349
## carrier_airportOODTW -7.909e-02  1.604e+00   -0.05  0.96066
## carrier_airportOOEWR  2.799e-01  1.604e+00    0.17  0.86147
## carrier_airportOOFLL  2.362e-01  1.626e+00    0.15  0.88446
## carrier_airportOOIAD -4.711e-02  1.604e+00   -0.03  0.97656
## carrier_airportOOIAH  9.727e-02  1.604e+00    0.06  0.95163
## carrier_airportOOJFK  1.824e-01  1.604e+00    0.11  0.90945
## carrier_airportOOLAS -2.818e-01  1.604e+00   -0.18  0.86052
## carrier_airportOOLAX -2.805e-01  1.604e+00   -0.17  0.86115
## carrier_airportOOLGA  4.545e-01  1.604e+00    0.28  0.77687
## carrier_airportOOMCO  1.858e-01  1.661e+00    0.11  0.91094
## carrier_airportOOMDW -5.263e-02  1.604e+00   -0.03  0.97382
## carrier_airportOOMSP -3.289e-01  1.604e+00   -0.21  0.83752
## carrier_airportOOORD  3.499e-02  1.604e+00    0.02  0.98259
## carrier_airportOOPHL  1.228e-02  1.604e+00    0.01  0.99389
## carrier_airportOOPHX -4.881e-01  1.604e+00   -0.30  0.76085
```

```
## carrier_airport00SAN -4.455e-01  1.604e+00   -0.28  0.78116
## carrier_airport00SEA -6.419e-01  1.604e+00   -0.40  0.68898
## carrier_airport00SF0  5.716e-02  1.604e+00    0.04  0.97157
## carrier_airport00SLC -5.791e-01  1.604e+00   -0.36  0.71804
## carrier_airport00TPA  6.776e-01  1.609e+00    0.42  0.67364
## carrier_airportQXDAL  5.384e-01  1.618e+00    0.33  0.73925
## carrier_airportQXDFW  4.708e-01  1.624e+00    0.29  0.77194
## carrier_airportQXLAS -6.414e-02  1.609e+00   -0.04  0.96821
## carrier_airportQXLAX -6.530e-02  1.609e+00   -0.04  0.96762
## carrier_airportQXMSP -4.703e-01  1.619e+00   -0.29  0.77144
## carrier_airportQXORD  2.653e-01  1.611e+00    0.16  0.86925
## carrier_airportQXPHX -7.890e-02  1.610e+00   -0.05  0.96090
## carrier_airportQXSAN -2.162e-01  1.609e+00   -0.13  0.89311
## carrier_airportQXSEA -2.335e-01  1.608e+00   -0.15  0.88457
## carrier_airportQXSF0 -7.973e-02  1.609e+00   -0.05  0.96047
## carrier_airportQXSLC -1.201e-01  1.612e+00   -0.07  0.94058
## carrier_airportUAATL  6.072e-02  1.592e+00    0.04  0.96958
## carrier_airportUABNA  7.278e-02  1.592e+00    0.05  0.96354
## carrier_airportUABOS  8.175e-02  1.592e+00    0.05  0.95905
## carrier_airportUABWI -1.751e-02  1.592e+00   -0.01  0.99122
## carrier_airportUACLT  3.287e-01  1.592e+00    0.21  0.83648
## carrier_airportUADCA  1.124e-02  1.592e+00    0.01  0.99437
## carrier_airportUADEN -2.466e-01  1.592e+00   -0.15  0.87689
## carrier_airportUADFW  1.976e-01  1.592e+00    0.12  0.90124
## carrier_airportUADTW  9.775e-02  1.592e+00    0.06  0.95105
## carrier_airportUAEWR  1.145e-01  1.592e+00    0.07  0.94267
## carrier_airportUAFLL  8.867e-02  1.592e+00    0.06  0.95558
## carrier_airportUAIAD -2.975e-01  1.592e+00   -0.19  0.85174
## carrier_airportUAIAH -2.144e-01  1.592e+00   -0.13  0.89285
## carrier_airportUAJFK -5.213e-02  1.593e+00   -0.03  0.97389
## carrier_airportUALAS -1.198e-01  1.592e+00   -0.08  0.94002
## carrier_airportUALAX -2.419e-01  1.592e+00   -0.15  0.87921
## carrier_airportUALGA  2.810e-01  1.592e+00    0.18  0.85992
## carrier_airportUAMCO -5.459e-02  1.592e+00   -0.03  0.97265
## carrier_airportUAMIA  1.491e-01  1.592e+00    0.09  0.92538
## carrier_airportUAMSP  7.300e-02  1.592e+00    0.05  0.96343
## carrier_airportUAORD -1.620e-01  1.592e+00   -0.10  0.91895
## carrier_airportUAPHL  1.281e-01  1.592e+00    0.08  0.93586
## carrier_airportUAPHX -1.040e-01  1.592e+00   -0.07  0.94794
## carrier_airportUASAN -2.169e-01  1.592e+00   -0.14  0.89164
## carrier_airportUASEA  6.555e-02  1.592e+00    0.04  0.96716
## carrier_airportUASF0 -7.878e-02  1.592e+00   -0.05  0.96053
## carrier_airportUASLC  1.742e-02  1.592e+00    0.01  0.99127
## carrier_airportUATPA -8.039e-03  1.592e+00   -0.01  0.99597
## carrier_airportVXBNA -1.627e-01  1.645e+00   -0.10  0.92125
## carrier_airportVXBOS -2.409e-01  1.628e+00   -0.15  0.88236
## carrier_airportVXBWI -4.733e-01  1.655e+00   -0.29  0.77490
## carrier_airportVXDAL  6.339e-02  1.621e+00    0.04  0.96881
## carrier_airportVXDCA -2.946e-01  1.630e+00   -0.18  0.85662
## carrier_airportVXDEN  8.081e-02  1.630e+00    0.05  0.96045
## carrier_airportVXEWR  4.131e-01  1.621e+00    0.25  0.79889
## carrier_airportVXFLL -1.432e-02  1.625e+00   -0.01  0.99297
## carrier_airportVXIAD -6.729e-01  1.631e+00   -0.41  0.67985
## carrier_airportVXJFK  3.322e-02  1.621e+00    0.02  0.98364
```

```
## carrier_airportVXLAS   1.959e-01  1.620e+00    0.12  0.90378
## carrier_airportVXLAX   1.335e-01  1.619e+00    0.08  0.93429
## carrier_airportVXMCO   2.943e-02  1.630e+00    0.02  0.98559
## carrier_airportVXORD   1.437e-01  1.627e+00    0.09  0.92964
## carrier_airportVXPHL  -5.569e-01  1.639e+00   -0.34  0.73398
## carrier_airportVXSAN   3.335e-01  1.622e+00    0.21  0.83708
## carrier_airportVXSEA   4.857e-01  1.620e+00    0.30  0.76437
## carrier_airportVXSFO   4.516e-01  1.619e+00    0.28  0.78030
## carrier_airportWNATL  -2.764e-01  1.584e+00   -0.17  0.86147
## carrier_airportWNBNA  -2.995e-01  1.584e+00   -0.19  0.85006
## carrier_airportWNBOS   6.329e-02  1.584e+00    0.04  0.96813
## carrier_airportWNBWI  -3.074e-01  1.584e+00   -0.19  0.84612
## carrier_airportWNCLT   9.779e-02  1.584e+00    0.06  0.95078
## carrier_airportWNDAL  -1.297e-01  1.584e+00   -0.08  0.93476
## carrier_airportWNDCA  -1.142e-01  1.584e+00   -0.07  0.94251
## carrier_airportWNDEN  -1.815e-01  1.584e+00   -0.11  0.90880
## carrier_airportWNDTW   6.300e-02  1.584e+00    0.04  0.96828
## carrier_airportWNEWR   6.046e-01  1.584e+00    0.38  0.70274
## carrier_airportWNFLL  -2.943e-01  1.584e+00   -0.19  0.85260
## carrier_airportWNIAD   2.958e-02  1.584e+00    0.02  0.98510
## carrier_airportWNIAH   1.887e-01  1.584e+00    0.12  0.90519
## carrier_airportWNLAS  -2.073e-01  1.584e+00   -0.13  0.89589
## carrier_airportWNLAX  -1.376e-01  1.584e+00   -0.09  0.93080
## carrier_airportWNLGA   2.184e-01  1.584e+00    0.14  0.89034
## carrier_airportWNMCO  -1.731e-01  1.584e+00   -0.11  0.91300
## carrier_airportWNMDW  -2.184e-01  1.584e+00   -0.14  0.89032
## carrier_airportWNMIA   3.215e-01  1.584e+00    0.20  0.83921
## carrier_airportWNMSP   7.224e-02  1.584e+00    0.05  0.96363
## carrier_airportWNORD   5.384e-01  1.584e+00    0.34  0.73398
## carrier_airportWNPHL   9.708e-02  1.584e+00    0.06  0.95114
## carrier_airportWNPHX  -1.827e-01  1.584e+00   -0.12  0.90818
## carrier_airportWNSAN  -2.421e-01  1.584e+00   -0.15  0.87855
## carrier_airportWNSEA   1.642e-01  1.584e+00    0.10  0.91742
## carrier_airportWNSFO   2.818e-01  1.584e+00    0.18  0.85883
## carrier_airportWNSLC   1.196e-01  1.584e+00    0.08  0.93982
## carrier_airportWNTPA  -1.406e-01  1.584e+00   -0.09  0.92930
## carrier_airportYVATL   2.242e-01  1.614e+00    0.14  0.88954
## carrier_airportYVBNA   1.258e-02  1.614e+00    0.01  0.99378
## carrier_airportYVBOS  -1.455e-01  1.624e+00   -0.09  0.92860
## carrier_airportYVBWI  -5.802e-01  1.619e+00   -0.36  0.72015
## carrier_airportYVCLT   1.529e-01  1.614e+00    0.09  0.92455
## carrier_airportYVDCA  -4.210e-03  1.614e+00    0.00  0.99792
## carrier_airportYVDFW   3.012e-01  1.614e+00    0.19  0.85194
## carrier_airportYVDTW   1.054e-01  1.614e+00    0.07  0.94794
## carrier_airportYVFLL  -5.387e-01  1.645e+00   -0.33  0.74337
## carrier_airportYVIAD  -6.444e-02  1.614e+00   -0.04  0.96815
## carrier_airportYVIAH  -6.895e-03  1.614e+00    0.00  0.99659
## carrier_airportYVLGA   3.169e-01  1.614e+00    0.20  0.84435
## carrier_airportYVMIA   4.235e-01  1.616e+00    0.26  0.79329
## carrier_airportYVMSP   1.052e-01  1.614e+00    0.07  0.94806
## carrier_airportYVORD  -3.294e-02  1.615e+00   -0.02  0.98373
## carrier_airportYVPHL  -1.250e-02  1.614e+00   -0.01  0.99382
## carrier_airportYVPHX  -3.061e-02  1.614e+00   -0.02  0.98487
## carrier_airportYVSAN  -9.413e-02  1.736e+00   -0.05  0.95676
```

```
## carrier_airportYVSLC   2.226e-01  1.615e+00    0.14  0.89037
## carrier_airportYVTPA  -4.052e-01  1.632e+00   -0.25  0.80393
## carrier_airportYXATL   5.701e-03  1.622e+00    0.00  0.99720
## carrier_airportYXBNA   2.295e-02  1.622e+00    0.01  0.98871
## carrier_airportYXBOS   3.965e-02  1.622e+00    0.02  0.98050
## carrier_airportYXBWI  -3.648e-02  1.623e+00   -0.02  0.98206
## carrier_airportYXCLT  -2.333e-01  1.622e+00   -0.14  0.88564
## carrier_airportYXDCA   8.375e-03  1.622e+00    0.01  0.99588
## carrier_airportYXDEN  -3.695e-02  1.622e+00   -0.02  0.98183
## carrier_airportYXDFW   3.514e-01  1.622e+00    0.22  0.82852
## carrier_airportYXDTW  -1.386e-01  1.622e+00   -0.09  0.93188
## carrier_airportYXEWR   5.400e-01  1.622e+00    0.33  0.73917
## carrier_airportYXFLL  -3.512e-01  1.645e+00   -0.21  0.83093
## carrier_airportYXIAD  -1.030e-02  1.622e+00   -0.01  0.99493
## carrier_airportYXIAH   1.847e-01  1.622e+00    0.11  0.90936
## carrier_airportYXJFK   1.149e-01  1.622e+00    0.07  0.94353
## carrier_airportYXLGA   3.042e-01  1.622e+00    0.19  0.85123
## carrier_airportYXMCO  -8.677e-02  1.627e+00   -0.05  0.95748
## carrier_airportYXMDW  -1.323e-01  1.625e+00   -0.08  0.93510
## carrier_airportYXMIA  -4.591e-01  1.622e+00   -0.28  0.77716
## carrier_airportYXMSP   1.310e-01  1.622e+00    0.08  0.93562
## carrier_airportYXORD  -1.462e-02  1.622e+00   -0.01  0.99281
## carrier_airportYXPHL  -2.946e-01  1.622e+00   -0.18  0.85590
## carrier_airportYXSEA   1.176e-02  1.792e+00    0.01  0.99476
## carrier_airportYXSLC   1.594e-01  1.623e+00    0.10  0.92178
## carrier_airportYXTPA  -1.353e-01  1.623e+00   -0.08  0.93355
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


## # Overdispersion test
##
##        dispersion ratio =     25.855
##    Pearson's Chi-Squared = 471772.080
##                 p-value =    < 0.001


## Warning in (function (start, objective, gradient = NULL, hessian = NULL, : NA/
## NaN function evaluation


## Warning in (function (start, objective, gradient = NULL, hessian = NULL, : NA/
## NaN function evaluation


## Warning in fitTMB(TMBStruc): Model convergence problem; non-positive-definite
## Hessian matrix. See vignette('troubleshooting')


## Warning in fitTMB(TMBStruc): Model convergence problem; function evaluation
## limit reached without convergence (9). See vignette('troubleshooting')


##  Family: poisson  ( log )
## Formula:
## arr_del15 ~ date + carrier_airport + offset(log(arr_flights)) +
##     (1 | airport)
## Data: airline_data
```

```
##
##      AIC      BIC   logLik deviance df.resid
##       NA       NA       NA       NA    18247
##
## Random effects:
##
## Conditional model:
##  Groups  Name        Variance Std.Dev.
##  airport (Intercept) 0.2154   0.4641
## Number of obs: 18673, groups:  airport, 30
##
## Conditional model:
##                       Estimate Std. Error z value Pr(>|z|)
## (Intercept)          -1.965e+00  4.631e-01   -4.24 2.20e-05 ***
## date                 -8.400e-06  1.134e-06   -7.41 1.30e-13 ***
## carrier_airport9EBNA -2.081e-01  6.377e-01   -0.33   0.7441
## carrier_airport9EBOS -7.214e-02  6.373e-01   -0.11   0.9099
## carrier_airport9EBWI -1.254e-01  6.469e-01   -0.19   0.8463
## carrier_airport9ECLT -1.422e-01  6.378e-01   -0.22   0.8236
## carrier_airport9EDAL -4.100e-01  7.180e-01   -0.57   0.5680
## carrier_airport9EDCA -1.734e-01  6.430e-01   -0.27   0.7874
## carrier_airport9EDEN -1.062e-01  9.005e-01   -0.12   0.9061
## carrier_airport9EDFW -1.391e-01  6.294e-01   -0.22   0.8251
## carrier_airport9EDTW -6.701e-01  6.414e-01   -1.04   0.2962
## carrier_airport9EEWR -2.394e-01  6.177e-01   -0.39   0.6983
## carrier_airport9EFLL -2.251e-01  6.630e-01   -0.34   0.7342
## carrier_airport9EIAD -2.776e-01  6.423e-01   -0.43   0.6656
## carrier_airport9EIAH -4.127e-02  6.331e-01   -0.07   0.9480
## carrier_airport9EJFK -3.237e-01  6.355e-01   -0.51   0.6105
## carrier_airport9ELGA -2.031e-01  6.176e-01   -0.33   0.7423
## carrier_airport9EMCO -4.326e-01  6.487e-01   -0.67   0.5049
## carrier_airport9EMDW -5.185e-01  6.480e-01   -0.80   0.4236
## carrier_airport9EMIA -3.178e-01  6.786e-01   -0.47   0.6395
## carrier_airport9EMSP -5.913e-01  6.399e-01   -0.92   0.3555
## carrier_airport9EORD -1.851e-01  6.346e-01   -0.29   0.7705
## carrier_airport9EPHL -9.036e-02  6.443e-01   -0.14   0.8885
## carrier_airport9ETPA -5.213e-01  6.512e-01   -0.80   0.4234
## carrier_airportAAATL  7.242e-01  1.274e-02   56.86  < 2e-16 ***
## carrier_airportAABNA  4.557e-02  6.369e-01    0.07   0.9430
## carrier_airportAABOS  7.232e-02  6.370e-01    0.11   0.9096
## carrier_airportAABWI  2.959e-01  6.462e-01    0.46   0.6470
## carrier_airportAACLT -2.804e-01  6.372e-01   -0.44   0.6599
## carrier_airportAADCA -3.254e-02  6.420e-01   -0.05   0.9596
## carrier_airportAADEN  3.121e-01  6.469e-01    0.48   0.6295
## carrier_airportAADFW -1.808e-01  6.282e-01   -0.29   0.7735
## carrier_airportAADTW  1.210e-01  6.416e-01    0.19   0.8504
## carrier_airportAAEWR  1.538e-01  6.171e-01    0.25   0.8032
## carrier_airportAAFLL  1.411e-01  6.418e-01    0.22   0.8259
## carrier_airportAAIAD  1.682e-01  6.413e-01    0.26   0.7931
## carrier_airportAAIAH  2.161e-01  6.315e-01    0.34   0.7322
## carrier_airportAAJFK  2.297e-02  6.355e-01    0.04   0.9712
## carrier_airportAALAS  1.592e-01  6.398e-01    0.25   0.8035
## carrier_airportAALAX -5.293e-02  6.393e-01   -0.08   0.9340
## carrier_airportAALGA -1.187e-01  6.176e-01   -0.19   0.8476
```

```
## carrier_airportAAMCO    1.752e-02  6.327e-01    0.03   0.9779
## carrier_airportAAMIA   -4.850e-02  6.363e-01   -0.08   0.9392
## carrier_airportAAMSP    2.195e-01  6.400e-01    0.34   0.7316
## carrier_airportAAORD   -1.109e-01  6.338e-01   -0.17   0.8611
## carrier_airportAAPHL    2.283e-02  6.434e-01    0.04   0.9717
## carrier_airportAAPHX   -9.111e-02  6.419e-01   -0.14   0.8871
## carrier_airportAASAN    1.842e-01  6.405e-01    0.29   0.7736
## carrier_airportAASEA    2.106e-01  6.306e-01    0.33   0.7384
## carrier_airportAASFO    1.736e-01  6.268e-01    0.28   0.7819
## carrier_airportAASLC    1.980e-01  6.366e-01    0.31   0.7558
## carrier_airportAATPA    1.862e-01  6.425e-01    0.29   0.7720
## carrier_airportASATL    2.296e-01  4.897e-02    4.69 2.75e-06 ***
## carrier_airportASBNA    1.735e-02  6.380e-01    0.03   0.9783
## carrier_airportASBOS   -4.385e-02  6.374e-01   -0.07   0.9452
## carrier_airportASBWI   -1.349e-01  6.474e-01   -0.21   0.8350
## carrier_airportASDAL    2.109e-01  6.392e-01    0.33   0.7415
## carrier_airportASDCA   -3.611e-02  6.426e-01   -0.06   0.9552
## carrier_airportASDEN    2.079e-01  6.473e-01    0.32   0.7481
## carrier_airportASDFW   -3.308e-01  6.290e-01   -0.53   0.5989
## carrier_airportASDTW   -2.958e-01  6.441e-01   -0.46   0.6460
## carrier_airportASEWR    1.903e-02  6.172e-01    0.03   0.9754
## carrier_airportASFLL   -1.039e-02  6.426e-01   -0.02   0.9871
## carrier_airportASIAD    5.046e-02  6.416e-01    0.08   0.9373
## carrier_airportASIAH   -1.194e-01  6.330e-01   -0.19   0.8504
## carrier_airportASJFK    5.975e-02  6.356e-01    0.09   0.9251
## carrier_airportASLAS    5.925e-03  6.399e-01    0.01   0.9926
## carrier_airportASLAX    2.903e-02  6.393e-01    0.05   0.9638
## carrier_airportASMCO   -1.500e-01  6.333e-01   -0.24   0.8127
## carrier_airportASMIA   -4.927e-01  6.978e-01   -0.71   0.4801
## carrier_airportASMSP   -3.452e-02  6.410e-01   -0.05   0.9570
## carrier_airportASORD   -1.178e-01  6.341e-01   -0.19   0.8526
## carrier_airportASPHL   -1.107e-01  6.449e-01   -0.17   0.8637
## carrier_airportASPHX   -2.006e-01  6.423e-01   -0.31   0.7547
## carrier_airportASSAN   -8.025e-02  6.406e-01   -0.13   0.9003
## carrier_airportASSEA   -2.282e-01  6.305e-01   -0.36   0.7174
## carrier_airportASSFO    8.111e-02  6.268e-01    0.13   0.8970
## carrier_airportASSLC   -2.442e-02  6.372e-01   -0.04   0.9694
## carrier_airportASTPA   -1.491e-01  6.443e-01   -0.23   0.8170
## carrier_airportB6ATL    9.489e-01  1.890e-02   50.21  < 2e-16 ***
## carrier_airportB6BNA    4.070e-01  6.373e-01    0.64   0.5230
## carrier_airportB6BOS    2.252e-01  6.370e-01    0.35   0.7238
## carrier_airportB6BWI    4.327e-01  6.466e-01    0.67   0.5034
## carrier_airportB6CLT    1.962e-01  6.380e-01    0.31   0.7584
## carrier_airportB6DCA    3.331e-01  6.421e-01    0.52   0.6039
## carrier_airportB6DEN    5.148e-01  6.474e-01    0.80   0.4265
## carrier_airportB6DFW    1.163e-01  6.294e-01    0.18   0.8534
## carrier_airportB6DTW    3.957e-01  6.420e-01    0.62   0.5376
## carrier_airportB6EWR    3.439e-01  6.171e-01    0.56   0.5773
## carrier_airportB6FLL    3.862e-01  6.417e-01    0.60   0.5472
## carrier_airportB6IAD    4.589e-01  6.422e-01    0.71   0.4749
## carrier_airportB6IAH    1.241e-01  6.334e-01    0.20   0.8447
## carrier_airportB6JFK    2.700e-01  6.354e-01    0.42   0.6709
## carrier_airportB6LAS    2.757e-01  6.399e-01    0.43   0.6665
## carrier_airportB6LAX    2.172e-01  6.393e-01    0.34   0.7340
```

```
## carrier_airportB6LGA    2.655e-01  6.176e-01    0.43   0.6673
## carrier_airportB6MCO    3.301e-01  6.327e-01    0.52   0.6019
## carrier_airportB6MIA    5.190e-01  6.367e-01    0.82   0.4150
## carrier_airportB6MSP    4.233e-01  6.407e-01    0.66   0.5088
## carrier_airportB6ORD    5.104e-01  6.341e-01    0.80   0.4209
## carrier_airportB6PHL    4.162e-01  6.437e-01    0.65   0.5180
## carrier_airportB6PHX    5.381e-01  6.425e-01    0.84   0.4023
## carrier_airportB6SAN   -2.785e-02  6.410e-01   -0.04   0.9654
## carrier_airportB6SEA    1.347e-01  6.310e-01    0.21   0.8310
## carrier_airportB6SFO   -8.488e-03  6.269e-01   -0.01   0.9892
## carrier_airportB6SLC    3.091e-01  6.367e-01    0.49   0.6273
## carrier_airportB6TPA    4.213e-01  6.426e-01    0.66   0.5120
## carrier_airportDLATL    7.981e-02  7.947e-03   10.04   < 2e-16 ***
## carrier_airportDLBNA   -4.579e-01  6.369e-01   -0.72   0.4722
## carrier_airportDLBOS   -5.341e-02  6.371e-01   -0.08   0.9332
## carrier_airportDLBWI   -3.362e-01  6.463e-01   -0.52   0.6029
## carrier_airportDLCLT   -5.615e-01  6.375e-01   -0.88   0.3784
## carrier_airportDLDAL   -3.558e-01  6.388e-01   -0.56   0.5775
## carrier_airportDLDCA   -1.657e-01  6.421e-01   -0.26   0.7963
## carrier_airportDLDEN   -1.011e-01  6.470e-01   -0.16   0.8758
## carrier_airportDLDFW   -1.259e-01  6.283e-01   -0.20   0.8412
## carrier_airportDLDTW   -4.567e-01  6.414e-01   -0.71   0.4764
## carrier_airportDLEWR   -3.869e-02  6.172e-01   -0.06   0.9500
## carrier_airportDLFLL   -3.815e-02  6.417e-01   -0.06   0.9526
## carrier_airportDLIAD   -3.745e-01  6.414e-01   -0.58   0.5593
## carrier_airportDLIAH   -1.265e-01  6.316e-01   -0.20   0.8413
## carrier_airportDLJFK   -1.706e-01  6.354e-01   -0.27   0.7884
## carrier_airportDLLAS   -3.978e-01  6.398e-01   -0.62   0.5341
## carrier_airportDLLAX   -2.047e-01  6.393e-01   -0.32   0.7488
## carrier_airportDLLGA   -2.381e-01  6.176e-01   -0.39   0.6999
## carrier_airportDLMCO   -2.729e-01  6.327e-01   -0.43   0.6663
## carrier_airportDLMDW   -3.452e-01  6.459e-01   -0.53   0.5931
## carrier_airportDLMIA   -9.664e-02  6.364e-01   -0.15   0.8793
## carrier_airportDLMSP   -4.717e-01  6.398e-01   -0.74   0.4610
## carrier_airportDLORD   -2.040e-03  6.339e-01    0.00   0.9974
## carrier_airportDLPHL   -2.075e-01  6.436e-01   -0.32   0.7471
## carrier_airportDLPHX   -1.790e-01  6.420e-01   -0.28   0.7804
## carrier_airportDLSAN   -3.064e-01  6.406e-01   -0.48   0.6325
## carrier_airportDLSEA   -5.063e-01  6.306e-01   -0.80   0.4220
## carrier_airportDLSFO   -1.890e-01  6.268e-01   -0.30   0.7630
## carrier_airportDLSLC   -5.451e-01  6.364e-01   -0.86   0.3918
## carrier_airportDLTPA   -1.566e-01  6.425e-01   -0.24   0.8075
## carrier_airportEVATL    5.349e-01  3.804e-02   14.06   < 2e-16 ***
## carrier_airportEVBNA    2.714e-01  6.380e-01    0.43   0.6705
## carrier_airportEVBOS    7.137e-02  6.401e-01    0.11   0.9112
## carrier_airportEVBWI    1.333e-01  6.526e-01    0.20   0.8382
## carrier_airportEVCLT    8.677e-02  6.392e-01    0.14   0.8920
## carrier_airportEVDCA    1.839e-01  6.426e-01    0.29   0.7747
## carrier_airportEVDEN   -1.642e+00  7.557e-01   -2.17   0.0298 *
## carrier_airportEVDFW    2.506e-01  6.289e-01    0.40   0.6902
## carrier_airportEVDTW    3.821e-01  6.441e-01    0.59   0.5530
## carrier_airportEVEWR    3.750e-01  6.171e-01    0.61   0.5434
## carrier_airportEVIAD    4.567e-01  6.429e-01    0.71   0.4774
## carrier_airportEVIAH   -2.475e-01  6.314e-01   -0.39   0.6951
```

```
## carrier_airportEVLGA   5.728e-02  6.181e-01    0.09   0.9262
## carrier_airportEVMCO   7.960e-02  2.247e+00    0.04   0.9717
## carrier_airportEVMDW   2.319e-01  1.275e+00    0.18   0.8557
## carrier_airportEVMSP   2.830e-01  6.444e-01    0.44   0.6606
## carrier_airportEVORD   1.243e-01  6.339e-01    0.20   0.8446
## carrier_airportEVPHL  -1.642e-01  6.930e-01   -0.24   0.8127
## carrier_airportEVSLC  -2.470e-02  6.715e-01   -0.04   0.9707
## carrier_airportF9ATL   9.509e-01  1.532e-02   62.08   < 2e-16 ***
## carrier_airportF9BNA   2.208e-01  6.375e-01    0.35   0.7291
## carrier_airportF9BOS   1.712e-01  6.388e-01    0.27   0.7887
## carrier_airportF9BWI   7.150e-01  6.469e-01    1.11   0.2691
## carrier_airportF9CLT   3.752e-01  6.377e-01    0.59   0.5563
## carrier_airportF9DCA   2.105e-01  6.428e-01    0.33   0.7433
## carrier_airportF9DEN   2.544e-01  6.469e-01    0.39   0.6941
## carrier_airportF9DFW   1.841e-01  6.286e-01    0.29   0.7696
## carrier_airportF9DTW   2.807e-01  6.421e-01    0.44   0.6620
## carrier_airportF9EWR   9.157e-02  6.178e-01    0.15   0.8822
## carrier_airportF9FLL   6.700e-01  6.426e-01    1.04   0.2971
## carrier_airportF9IAD   4.398e-01  6.421e-01    0.68   0.4933
## carrier_airportF9IAH   2.385e-01  6.321e-01    0.38   0.7059
## carrier_airportF9LAS   4.341e-01  6.398e-01    0.68   0.4974
## carrier_airportF9LAX   2.857e-02  6.403e-01    0.04   0.9644
## carrier_airportF9LGA   2.141e-01  6.182e-01    0.35   0.7290
## carrier_airportF9MCO   3.713e-01  6.327e-01    0.59   0.5574
## carrier_airportF9MDW   4.082e-01  6.473e-01    0.63   0.5283
## carrier_airportF9MIA   3.768e-01  6.365e-01    0.59   0.5538
## carrier_airportF9MSP   3.224e-01  6.405e-01    0.50   0.6146
## carrier_airportF9ORD   3.140e-01  6.341e-01    0.50   0.6205
## carrier_airportF9PHL   5.254e-01  6.435e-01    0.82   0.4143
## carrier_airportF9PHX   2.412e-01  6.421e-01    0.38   0.7072
## carrier_airportF9SAN   2.464e-01  6.409e-01    0.38   0.7007
## carrier_airportF9SEA   2.873e-01  6.315e-01    0.45   0.6491
## carrier_airportF9SFO   2.101e-01  6.272e-01    0.34   0.7376
## carrier_airportF9SLC   2.210e-01  6.369e-01    0.35   0.7286
## carrier_airportF9TPA   3.643e-01  6.426e-01    0.57   0.5708
## carrier_airportG4BNA   4.853e-01  6.371e-01    0.76   0.4462
## carrier_airportG4BOS  -1.924e-02  6.408e-01   -0.03   0.9760
## carrier_airportG4BWI   3.564e-01  6.480e-01    0.55   0.5824
## carrier_airportG4DEN   5.271e-01  6.495e-01    0.81   0.4170
## carrier_airportG4EWR  -1.211e+00  6.211e-01   -1.95   0.0512 .
## carrier_airportG4FLL   6.426e-01  6.418e-01    1.00   0.3167
## carrier_airportG4IAD   4.908e-01  6.516e-01    0.75   0.4513
## carrier_airportG4LAS   3.150e-01  6.398e-01    0.49   0.6224
## carrier_airportG4LAX   3.078e-01  6.397e-01    0.48   0.6304
## carrier_airportG4MDW   3.436e-01  6.484e-01    0.53   0.5962
## carrier_airportG4MSP   4.095e-01  6.464e-01    0.63   0.5264
## carrier_airportG4PHX   5.313e-01  6.521e-01    0.81   0.4152
## carrier_airportG4SAN   3.913e-01  6.426e-01    0.61   0.5426
## carrier_airportHABOS   2.177e-01  6.424e-01    0.34   0.7347
## carrier_airportHAJFK   4.393e-01  6.373e-01    0.69   0.4906
## carrier_airportHALAS  -1.544e-01  6.409e-01   -0.24   0.8096
## carrier_airportHALAX   1.924e-01  6.396e-01    0.30   0.7635
## carrier_airportHAMCO   6.569e-01  6.425e-01    1.02   0.3066
## carrier_airportHAPHX   7.794e-02  6.446e-01    0.12   0.9038
```

30

```
## carrier_airportHASAN   4.093e-01  6.414e-01   0.64   0.5235
## carrier_airportHASEA   6.079e-01  6.311e-01   0.96   0.3354
## carrier_airportHASFO   7.698e-02  6.277e-01   0.12   0.9024
## carrier_airportMQATL   4.546e-01  4.965e-02   9.16   < 2e-16 ***
## carrier_airportMQBNA   7.346e-03  6.374e-01   0.01   0.9908
## carrier_airportMQBOS  -1.038e-01  6.391e-01  -0.16   0.8710
## carrier_airportMQBWI   6.726e-03  6.480e-01   0.01   0.9917
## carrier_airportMQCLT  -2.297e-01  6.376e-01  -0.36   0.7186
## carrier_airportMQDCA  -1.034e-01  6.426e-01  -0.16   0.8722
## carrier_airportMQDEN  -3.330e-01  8.013e-01  -0.42   0.6778
## carrier_airportMQDFW  -2.109e-01  6.282e-01  -0.34   0.7371
## carrier_airportMQDTW   1.220e-01  6.425e-01   0.19   0.8494
## carrier_airportMQEWR   5.842e-02  6.200e-01   0.09   0.9249
## carrier_airportMQIAD   4.762e-03  6.647e-01   0.01   0.9943
## carrier_airportMQIAH   3.381e-02  6.328e-01   0.05   0.9574
## carrier_airportMQJFK   5.246e-02  6.359e-01   0.08   0.9343
## carrier_airportMQLGA   1.082e-01  6.177e-01   0.18   0.8610
## carrier_airportMQMIA  -1.115e-01  6.364e-01  -0.18   0.8609
## carrier_airportMQMSP   3.807e-02  6.416e-01   0.06   0.9527
## carrier_airportMQORD  -1.496e-01  6.338e-01  -0.24   0.8134
## carrier_airportMQPHL   2.555e-01  6.506e-01   0.39   0.6945
## carrier_airportMQPHX  -6.172e-01  6.460e-01  -0.96   0.3393
## carrier_airportMQSLC  -7.417e-02  6.458e-01  -0.11   0.9086
## carrier_airportMQTPA  -1.310e-01  6.470e-01  -0.20   0.8395
## carrier_airportNKATL   5.837e-01  1.373e-02  42.52   < 2e-16 ***
## carrier_airportNKBNA  -3.892e-02  6.376e-01  -0.06   0.9513
## carrier_airportNKBOS   1.177e-01  6.372e-01   0.18   0.8535
## carrier_airportNKBWI   1.628e-01  6.462e-01   0.25   0.8011
## carrier_airportNKCLT   3.987e-01  6.380e-01   0.62   0.5321
## carrier_airportNKDEN   2.221e-01  6.471e-01   0.34   0.7314
## carrier_airportNKDFW  -5.605e-02  6.283e-01  -0.09   0.9289
## carrier_airportNKDTW   4.271e-02  6.415e-01   0.07   0.9469
## carrier_airportNKEWR   9.899e-03  6.171e-01   0.02   0.9872
## carrier_airportNKFLL   1.166e-01  6.417e-01   0.18   0.8559
## carrier_airportNKIAH  -9.488e-02  6.315e-01  -0.15   0.8806
## carrier_airportNKLAS  -5.066e-02  6.398e-01  -0.08   0.9369
## carrier_airportNKLAX   1.432e-03  6.393e-01   0.00   0.9982
## carrier_airportNKLGA  -6.957e-02  6.178e-01  -0.11   0.9103
## carrier_airportNKMCO   2.655e-02  6.327e-01   0.04   0.9665
## carrier_airportNKMIA   1.376e-01  6.368e-01   0.22   0.8289
## carrier_airportNKMSP  -6.466e-02  6.402e-01  -0.10   0.9195
## carrier_airportNKORD   1.619e-01  6.339e-01   0.26   0.7984
## carrier_airportNKPHL   1.780e-01  6.436e-01   0.28   0.7822
## carrier_airportNKPHX   1.746e-01  6.428e-01   0.27   0.7859
## carrier_airportNKSAN   4.683e-02  6.410e-01   0.07   0.9418
## carrier_airportNKSEA   3.981e-02  6.311e-01   0.06   0.9497
## carrier_airportNKSLC   1.927e-01  6.431e-01   0.30   0.7645
## carrier_airportNKTPA   3.162e-02  6.426e-01   0.05   0.9608
## carrier_airportOHATL   4.264e-01  3.516e-02  12.13   < 2e-16 ***
## carrier_airportOHBNA  -4.275e-02  6.376e-01  -0.07   0.9466
## carrier_airportOHBOS   1.121e-01  7.733e-01   0.14   0.8847
## carrier_airportOHBWI  -3.103e-01  6.531e-01  -0.48   0.6347
## carrier_airportOHCLT  -3.306e-01  6.372e-01  -0.52   0.6039
## carrier_airportOHDCA   1.560e-01  6.420e-01   0.24   0.8080
```

```
## carrier_airport0HDFW -6.615e-02  6.290e-01    -0.11    0.9162
## carrier_airport0HDTW -8.235e-02  6.423e-01    -0.13    0.8980
## carrier_airport0HEWR  1.988e-01  6.912e-01     0.29    0.7737
## carrier_airport0HIAD -9.314e-02  6.416e-01    -0.15    0.8846
## carrier_airport0HIAH  5.071e-01  6.510e-01     0.78    0.4360
## carrier_airport0HJFK -5.450e-02  6.441e-01    -0.08    0.9326
## carrier_airport0HLGA  1.104e-01  6.185e-01     0.18    0.8583
## carrier_airport0HMSP  1.194e-01  6.449e-01     0.19    0.8531
## carrier_airport0HORD -2.831e-01  6.373e-01    -0.44    0.6568
## carrier_airport0HPHL -1.901e-02  6.435e-01    -0.03    0.9764
## carrier_airport0OATL  5.642e-01  1.262e-02    44.72  < 2e-16 ***
## carrier_airport0OBNA  9.346e-02  6.369e-01     0.15    0.8833
## carrier_airport0OBOS  2.036e-01  6.379e-01     0.32    0.7496
## carrier_airport0OBWI  2.649e-02  6.488e-01     0.04    0.9674
## carrier_airport0OCLT  1.094e-01  6.377e-01     0.17    0.8638
## carrier_airport0ODAL  9.743e-03  6.385e-01     0.02    0.9878
## carrier_airport0ODCA  1.778e-01  6.428e-01     0.28    0.7820
## carrier_airport0ODEN  5.350e-02  6.469e-01     0.08    0.9341
## carrier_airport0ODFW -6.715e-02  6.282e-01    -0.11    0.9149
## carrier_airport0ODTW -9.090e-02  6.414e-01    -0.14    0.8873
## carrier_airport0OEWR -6.102e-03  6.180e-01    -0.01    0.9921
## carrier_airport0OFLL  2.915e-01  6.930e-01     0.42    0.6740
## carrier_airport0OIAD -6.367e-02  6.411e-01    -0.10    0.9209
## carrier_airport0OIAH -8.663e-02  6.314e-01    -0.14    0.8909
## carrier_airport0OJFK  1.300e-01  6.364e-01     0.20    0.8381
## carrier_airport0OLAS -3.360e-01  6.402e-01    -0.52    0.5997
## carrier_airport0OLAX -2.964e-01  6.393e-01    -0.46    0.6429
## carrier_airport0OLGA  1.149e-01  6.177e-01     0.19    0.8524
## carrier_airport0OMCO  2.688e-01  7.448e-01     0.36    0.7182
## carrier_airport0OMDW -6.554e-03  6.457e-01    -0.01    0.9919
## carrier_airport0OMSP -3.449e-01  6.398e-01    -0.54    0.5899
## carrier_airport0OORD -4.310e-02  6.338e-01    -0.07    0.9458
## carrier_airport0OPHL  5.562e-02  6.450e-01     0.09    0.9313
## carrier_airport0OPHX -3.940e-01  6.420e-01    -0.61    0.5394
## carrier_airport0OSAN -4.231e-01  6.406e-01    -0.66    0.5089
## carrier_airport0OSEA -6.605e-01  6.306e-01    -1.05    0.2949
## carrier_airport0OSFO -1.670e-01  6.268e-01    -0.27    0.7898
## carrier_airport0OSLC -6.236e-01  6.364e-01    -0.98    0.3271
## carrier_airport0OTPA  8.243e-01  6.543e-01     1.26    0.2077
## carrier_airportQXDAL  6.224e-01  6.577e-01     0.95    0.3440
## carrier_airportQXDFW  5.062e-01  6.595e-01     0.77    0.4427
## carrier_airportQXLAS -1.646e-01  6.427e-01    -0.26    0.7979
## carrier_airportQXLAX -1.472e-01  6.401e-01    -0.23    0.8182
## carrier_airportQXMSP -7.559e-01  6.731e-01    -1.12    0.2614
## carrier_airportQXORD  4.663e-02  6.426e-01     0.07    0.9421
## carrier_airportQXPHX -1.209e-01  6.453e-01    -0.19    0.8514
## carrier_airportQXSAN -2.865e-01  6.421e-01    -0.45    0.6555
## carrier_airportQXSEA -4.126e-01  6.306e-01    -0.65    0.5129
## carrier_airportQXSFO -3.749e-01  6.278e-01    -0.60    0.5504
## carrier_airportQXSLC -1.532e-01  6.441e-01    -0.24    0.8120
## carrier_airportUAATL  6.991e-01  1.854e-02    37.71  < 2e-16 ***
## carrier_airportUABNA  1.248e-01  6.370e-01     0.20    0.8447
## carrier_airportUABOS  1.075e-01  6.371e-01     0.17    0.8660
## carrier_airportUABWI  2.085e-01  6.464e-01     0.32    0.7471
```

```
## carrier_airportUACLT   4.530e-01  6.379e-01    0.71   0.4777
## carrier_airportUADCA   1.213e-01  6.422e-01    0.19   0.8502
## carrier_airportUADEN  -2.888e-02  6.469e-01   -0.04   0.9644
## carrier_airportUADFW   7.684e-02  6.283e-01    0.12   0.9027
## carrier_airportUADTW   2.237e-01  6.421e-01    0.35   0.7275
## carrier_airportUAEWR   2.307e-02  6.170e-01    0.04   0.9702
## carrier_airportUAFLL   1.585e-01  6.417e-01    0.25   0.8049
## carrier_airportUAIAD  -1.440e-01  6.409e-01   -0.22   0.8222
## carrier_airportUAIAH  -2.814e-01  6.314e-01   -0.45   0.6559
## carrier_airportUAJFK  -7.870e-02  6.376e-01   -0.12   0.9018
## carrier_airportUALAS  -5.429e-02  6.398e-01   -0.08   0.9324
## carrier_airportUALAX  -1.392e-01  6.393e-01   -0.22   0.8276
## carrier_airportUALGA   1.588e-02  6.177e-01    0.03   0.9795
## carrier_airportUAMCO  -1.148e-01  6.328e-01   -0.18   0.8560
## carrier_airportUAMIA   1.461e-01  6.365e-01    0.23   0.8184
## carrier_airportUAMSP   1.805e-01  6.401e-01    0.28   0.7779
## carrier_airportUAORD  -1.695e-01  6.338e-01   -0.27   0.7891
## carrier_airportUAPHL   2.664e-01  6.437e-01    0.41   0.6790
## carrier_airportUAPHX   1.607e-02  6.420e-01    0.03   0.9800
## carrier_airportUASAN  -1.016e-01  6.406e-01   -0.16   0.8740
## carrier_airportUASEA   8.357e-03  6.306e-01    0.01   0.9894
## carrier_airportUASFO  -1.525e-01  6.268e-01   -0.24   0.8078
## carrier_airportUASLC   8.459e-02  6.369e-01    0.13   0.8943
## carrier_airportUATPA   9.309e-02  6.426e-01    0.14   0.8848
## carrier_airportVXBNA  -3.995e-01  7.026e-01   -0.57   0.5697
## carrier_airportVXBOS  -5.537e-01  6.623e-01   -0.84   0.4031
## carrier_airportVXBWI  -7.912e-01  7.552e-01   -1.05   0.2948
## carrier_airportVXDAL  -1.548e-01  6.449e-01   -0.24   0.8104
## carrier_airportVXDCA  -5.203e-01  6.732e-01   -0.77   0.4396
## carrier_airportVXDEN   3.610e-02  6.739e-01    0.05   0.9573
## carrier_airportVXEWR  -1.339e-01  6.240e-01   -0.21   0.8301
## carrier_airportVXFLL  -2.016e-01  6.580e-01   -0.31   0.7593
## carrier_airportVXIAD  -1.030e+00  6.763e-01   -1.52   0.1279
## carrier_airportVXJFK  -2.285e-01  6.404e-01   -0.36   0.7212
## carrier_airportVXLAS  -3.415e-02  6.441e-01   -0.05   0.9577
## carrier_airportVXLAX  -4.194e-02  6.405e-01   -0.07   0.9478
## carrier_airportVXMCO  -2.536e-01  6.606e-01   -0.38   0.7011
## carrier_airportVXORD  -8.096e-02  6.545e-01   -0.12   0.9016
## carrier_airportVXPHL  -9.590e-01  7.074e-01   -1.36   0.1752
## carrier_airportVXSAN   1.105e-01  6.486e-01    0.17   0.8647
## carrier_airportVXSEA   3.248e-01  6.338e-01    0.51   0.6083
## carrier_airportVXSFO   1.278e-01  6.273e-01    0.20   0.8385
## carrier_airportWNATL   4.418e-01  9.569e-03   46.17  < 2e-16 ***
## carrier_airportWNBNA  -1.705e-01  6.368e-01   -0.27   0.7889
## carrier_airportWNBOS   1.045e-01  6.371e-01    0.16   0.8698
## carrier_airportWNBWI  -7.943e-02  6.461e-01   -0.12   0.9021
## carrier_airportWNCLT   2.231e-01  6.375e-01    0.35   0.7264
## carrier_airportWNDAL   1.114e-02  6.380e-01    0.02   0.9861
## carrier_airportWNDCA   9.720e-02  6.420e-01    0.15   0.8797
## carrier_airportWNDEN   1.160e-01  6.469e-01    0.18   0.8577
## carrier_airportWNDTW   2.155e-01  6.415e-01    0.34   0.7369
## carrier_airportWNEWR   4.027e-01  6.172e-01    0.65   0.5141
## carrier_airportWNFLL  -8.225e-02  6.417e-01   -0.13   0.8980
## carrier_airportWNIAD   1.815e-01  6.413e-01    0.28   0.7772
```

```
## carrier_airportWNIAH  2.210e-01  6.317e-01   0.35   0.7264
## carrier_airportWNLAS -6.390e-02  6.397e-01  -0.10   0.9204
## carrier_airportWNLAX  3.802e-02  6.393e-01   0.06   0.9526
## carrier_airportWNLGA  4.333e-02  6.176e-01   0.07   0.9441
## carrier_airportWNMCO -1.018e-01  6.327e-01  -0.16   0.8722
## carrier_airportWNMDW -4.920e-03  6.449e-01  -0.01   0.9939
## carrier_airportWNMIA  3.793e-01  6.365e-01   0.60   0.5512
## carrier_airportWNMSP  2.093e-01  6.399e-01   0.33   0.7436
## carrier_airportWNORD  5.519e-01  6.339e-01   0.87   0.3840
## carrier_airportWNPHL  2.397e-01  6.435e-01   0.37   0.7095
## carrier_airportWNPHX  6.066e-03  6.419e-01   0.01   0.9925
## carrier_airportWNSAN -4.882e-02  6.405e-01  -0.08   0.9392
## carrier_airportWNSEA  1.654e-01  6.306e-01   0.26   0.7930
## carrier_airportWNSFO  1.693e-01  6.268e-01   0.27   0.7871
## carrier_airportWNSLC  2.760e-01  6.365e-01   0.43   0.6646
## carrier_airportWNTPA  5.024e-02  6.425e-01   0.08   0.9377
## carrier_airportYVATL  6.249e-01  2.668e-02  23.43  < 2e-16 ***
## carrier_airportYVBNA -1.656e-01  6.378e-01  -0.26   0.7952
## carrier_airportYVBOS -3.745e-01  6.636e-01  -0.56   0.5725
## carrier_airportYVBWI -4.923e-01  6.583e-01  -0.75   0.4546
## carrier_airportYVCLT  4.047e-02  6.377e-01   0.06   0.9494
## carrier_airportYVDCA -1.157e-01  6.432e-01  -0.18   0.8572
## carrier_airportYVDFW -3.448e-03  6.282e-01  -0.01   0.9956
## carrier_airportYVDTW  2.103e-02  6.420e-01   0.03   0.9739
## carrier_airportYVFLL -1.041e+00  7.526e-01  -1.38   0.1667
## carrier_airportYVIAD -1.230e-01  6.409e-01  -0.19   0.8478
## carrier_airportYVIAH -2.604e-01  6.314e-01  -0.41   0.6800
## carrier_airportYVLGA -7.690e-02  6.180e-01  -0.12   0.9010
## carrier_airportYVMIA  2.038e-01  6.423e-01   0.32   0.7510
## carrier_airportYVMSP  3.904e-02  6.406e-01   0.06   0.9514
## carrier_airportYVORD -2.872e-01  6.364e-01  -0.45   0.6518
## carrier_airportYVPHL -9.502e-02  6.448e-01  -0.15   0.8828
## carrier_airportYVPHX -5.370e-02  6.420e-01  -0.08   0.9333
## carrier_airportYVSAN -1.827e-01  9.010e-01  -0.20   0.8393
## carrier_airportYVSLC  1.068e-01  6.384e-01   0.17   0.8672
## carrier_airportYVTPA -6.537e-01  6.948e-01  -0.94   0.3468
## carrier_airportYXATL  3.620e-01  1.637e-02  22.11  < 2e-16 ***
## carrier_airportYXBNA -2.535e-01  6.370e-01  -0.40   0.6906
## carrier_airportYXBOS -2.443e-01  6.371e-01  -0.38   0.7014
## carrier_airportYXBWI -1.428e-01  6.483e-01  -0.22   0.8256
## carrier_airportYXCLT -4.059e-01  6.373e-01  -0.64   0.5242
## carrier_airportYXDCA -2.012e-01  6.420e-01  -0.31   0.7540
## carrier_airportYXDEN -1.028e-01  6.473e-01  -0.16   0.8738
## carrier_airportYXDFW -1.078e-02  6.289e-01  -0.02   0.9863
## carrier_airportYXDTW -2.809e-01  6.415e-01  -0.44   0.6615
## carrier_airportYXEWR -8.897e-02  6.170e-01  -0.14   0.8853
## carrier_airportYXFLL -8.689e-01  7.182e-01  -1.21   0.2264
## carrier_airportYXIAD -2.139e-01  6.412e-01  -0.33   0.7386
## carrier_airportYXIAH -1.439e-01  6.315e-01  -0.23   0.8198
## carrier_airportYXJFK -1.807e-01  6.355e-01  -0.28   0.7761
## carrier_airportYXLGA -2.689e-01  6.176e-01  -0.44   0.6633
## carrier_airportYXMCO -4.831e-01  6.474e-01  -0.75   0.4556
## carrier_airportYXMDW -1.848e-01  6.510e-01  -0.28   0.7766
## carrier_airportYXMIA -7.547e-01  6.366e-01  -1.19   0.2358
```

```
## carrier_airportYXMSP -5.071e-02  6.401e-01   -0.08   0.9369
## carrier_airportYXORD -3.406e-01  6.338e-01   -0.54   0.5911
## carrier_airportYXPHL -3.821e-01  6.435e-01   -0.59   0.5526
## carrier_airportYXSEA -3.171e-02  9.062e-01   -0.03   0.9721
## carrier_airportYXSLC -1.035e-02  6.395e-01   -0.02   0.9871
## carrier_airportYXTPA -4.290e-01  6.455e-01   -0.66   0.5064
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


## # Overdispersion test
##
##        dispersion ratio =     25.392
##   Pearson's Chi-Squared = 463328.125
##                 p-value =    < 0.001


## Warning in (function (start, objective, gradient = NULL, hessian = NULL, : NA/
## NaN function evaluation


## Warning in (function (start, objective, gradient = NULL, hessian = NULL, : NA/
## NaN function evaluation


## Warning in fitTMB(TMBStruc): Model convergence problem; non-positive-definite
## Hessian matrix. See vignette('troubleshooting')


## Warning in fitTMB(TMBStruc): Model convergence problem; function evaluation
## limit reached without convergence (9). See vignette('troubleshooting')


##  Family: poisson  ( log )
## Formula:
## arr_del15 ~ date + carrier_airport + offset(log(arr_flights)) +
##     (1 | airport) + (1 | carrier)
## Data: airline_data
##
##      AIC      BIC   logLik deviance df.resid
##       NA       NA       NA       NA    18246
##
## Random effects:
##
## Conditional model:
##  Groups  Name        Variance Std.Dev.
##  airport (Intercept) 0.01397  0.1182
##  carrier (Intercept) 0.46007  0.6783
## Number of obs: 18673, groups:  airport, 30; carrier, 19
##
## Conditional model:
##                     Estimate Std. Error z value Pr(>|z|)
## (Intercept)        -1.546e+00  5.736e-01  -2.695  0.00704 **
## date               -9.082e-06  1.134e-06  -8.007 1.18e-15 ***
## carrier_airport9EBNA  1.663e-01  1.594e-01   1.044  0.29666
## carrier_airport9EBOS  3.438e-01  1.567e-01   2.194  0.02825 *
## carrier_airport9EBWI  2.477e-01  1.688e-01   1.467  0.14228
## carrier_airport9ECLT  2.423e-01  1.573e-01   1.540  0.12349
```

```
## carrier_airport9EDAL -1.900e-01  3.578e-01  -0.531  0.59542
## carrier_airport9EDCA  1.716e-01  1.640e-01   1.046  0.29560
## carrier_airport9EDEN -1.360e-02  7.324e-01  -0.019  0.98518
## carrier_airport9EDFW  2.167e-01  1.455e-01   1.489  0.13637
## carrier_airport9EDTW -2.883e-01  1.629e-01  -1.769  0.07684 .
## carrier_airport9EEWR  1.550e-01  1.072e-01   1.446  0.14815
## carrier_airport9EFLL  2.566e-01  2.199e-01   1.167  0.24329
## carrier_airport9EIAD  6.369e-02  1.670e-01   0.381  0.70300
## carrier_airport9EIAH  2.928e-01  1.537e-01   1.905  0.05672 .
## carrier_airport9EJFK  3.507e-03  1.483e-01   0.024  0.98114
## carrier_airport9ELGA  2.072e-01  1.129e-01   1.834  0.06660 .
## carrier_airport9EMCO  3.304e-02  1.996e-01   0.166  0.86852
## carrier_airport9EMDW -8.536e-02  1.737e-01  -0.491  0.62320
## carrier_airport9EMIA  1.014e-01  2.689e-01   0.377  0.70620
## carrier_airport9EMSP -2.686e-01  1.626e-01  -1.652  0.09859 .
## carrier_airport9EORD  1.792e-01  1.517e-01   1.181  0.23761
## carrier_airport9EPHL  2.618e-01  1.665e-01   1.572  0.11597
## carrier_airport9ETPA -1.725e-01  1.931e-01  -0.893  0.37178
## carrier_airportAAATL  2.472e-01  8.198e-01   0.301  0.76305
## carrier_airportAABNA -5.899e-02  8.345e-01  -0.071  0.94365
## carrier_airportAABOS -8.340e-02  8.345e-01  -0.100  0.92039
## carrier_airportAABWI  1.999e-01  8.365e-01   0.239  0.81109
## carrier_airportAACLT -3.955e-01  8.344e-01  -0.474  0.63549
## carrier_airportAADCA -1.640e-01  8.354e-01  -0.196  0.84437
## carrier_airportAADEN  2.150e-01  8.367e-01   0.257  0.79723
## carrier_airportAADFW -2.266e-01  8.318e-01  -0.272  0.78531
## carrier_airportAADTW  3.081e-02  8.359e-01   0.037  0.97060
## carrier_airportAAEWR  1.037e-01  8.266e-01   0.125  0.90018
## carrier_airportAAFLL -8.887e-04  8.352e-01  -0.001  0.99915
## carrier_airportAAIAD  8.094e-02  8.359e-01   0.097  0.92287
## carrier_airportAAIAH  9.863e-02  8.329e-01   0.118  0.90574
## carrier_airportAAJFK -1.375e-01  8.332e-01  -0.165  0.86895
## carrier_airportAALAS  1.466e-01  8.362e-01   0.175  0.86083
## carrier_airportAALAX -5.690e-02  8.363e-01  -0.068  0.94576
## carrier_airportAALGA -2.042e-01  8.277e-01  -0.247  0.80511
## carrier_airportAAMCO -6.229e-02  8.331e-01  -0.075  0.94040
## carrier_airportAAMIA -1.834e-01  8.336e-01  -0.220  0.82591
## carrier_airportAAMSP  1.223e-01  8.358e-01   0.146  0.88366
## carrier_airportAAORD -2.290e-01  8.332e-01  -0.275  0.78347
## carrier_airportAAPHL -9.162e-02  8.359e-01  -0.110  0.91271
## carrier_airportAAPHX -1.645e-01  8.364e-01  -0.197  0.84411
## carrier_airportAASAN  1.613e-01  8.364e-01   0.193  0.84707
## carrier_airportAASEA  1.963e-01  8.344e-01   0.235  0.81397
## carrier_airportAASFO  1.311e-01  8.329e-01   0.157  0.87495
## carrier_airportAASLC  1.834e-01  8.351e-01   0.220  0.82620
## carrier_airportAATPA  6.764e-02  8.357e-01   0.081  0.93550
## carrier_airportASATL -6.149e-02  9.075e-01  -0.068  0.94598
## carrier_airportASBNA  7.592e-02  9.204e-01   0.082  0.93426
## carrier_airportASBOS  3.169e-02  9.198e-01   0.034  0.97251
## carrier_airportASBWI -6.306e-02  9.222e-01  -0.068  0.94548
## carrier_airportASDAL  1.301e-01  9.180e-01   0.142  0.88727
## carrier_airportASDCA -4.246e-03  9.208e-01  -0.005  0.99632
## carrier_airportASDEN  2.887e-01  9.219e-01   0.313  0.75412
## carrier_airportASDFW -2.822e-01  9.176e-01  -0.308  0.75842
```

```
## carrier_airportASDTW -2.126e-01  9.227e-01  -0.230  0.81778
## carrier_airportASEWR   1.028e-01  9.124e-01   0.113  0.91026
## carrier_airportASFLL   3.306e-02  9.208e-01   0.036  0.97136
## carrier_airportASIAD   9.882e-02  9.211e-01   0.107  0.91456
## carrier_airportASIAH  -6.849e-02  9.192e-01  -0.075  0.94060
## carrier_airportASJFK   1.098e-01  9.185e-01   0.120  0.90485
## carrier_airportASLAS   1.463e-01  9.212e-01   0.159  0.87379
## carrier_airportASLAX   1.406e-01  9.212e-01   0.153  0.87871
## carrier_airportASMCO  -8.121e-02  9.187e-01  -0.088  0.92956
## carrier_airportASMIA  -3.994e-01  9.600e-01  -0.416  0.67738
## carrier_airportASMSP   3.736e-02  9.215e-01   0.041  0.96766
## carrier_airportASORD  -9.294e-02  9.186e-01  -0.101  0.91941
## carrier_airportASPHL  -6.124e-02  9.218e-01  -0.066  0.94703
## carrier_airportASPHX  -9.066e-02  9.216e-01  -0.098  0.92164
## carrier_airportASSAN   5.815e-02  9.213e-01   0.063  0.94967
## carrier_airportASSEA  -6.892e-02  9.194e-01  -0.075  0.94024
## carrier_airportASSFO   2.122e-01  9.181e-01   0.231  0.81720
## carrier_airportASSLC   6.241e-02  9.206e-01   0.068  0.94595
## carrier_airportASTPA  -1.296e-01  9.220e-01  -0.141  0.88819
## carrier_airportB6ATL   1.811e-01  5.972e-01   0.303  0.76175
## carrier_airportB6BNA   6.526e-02  6.175e-01   0.106  0.91585
## carrier_airportB6BOS  -6.888e-02  6.170e-01  -0.112  0.91112
## carrier_airportB6BWI   9.540e-02  6.202e-01   0.154  0.87775
## carrier_airportB6CLT  -1.534e-01  6.177e-01  -0.248  0.80389
## carrier_airportB6DCA  -5.309e-02  6.183e-01  -0.086  0.93158
## carrier_airportB6DEN   2.247e-01  6.204e-01   0.362  0.71722
## carrier_airportB6DFW  -2.458e-01  6.147e-01  -0.400  0.68922
## carrier_airportB6DTW   5.540e-02  6.195e-01   0.089  0.92874
## carrier_airportB6EWR   4.519e-02  6.063e-01   0.075  0.94059
## carrier_airportB6FLL   5.351e-02  6.179e-01   0.087  0.93099
## carrier_airportB6IAD   1.130e-01  6.201e-01   0.182  0.85543
## carrier_airportB6IAH  -2.027e-01  6.170e-01  -0.329  0.74252
## carrier_airportB6JFK  -6.860e-02  6.152e-01  -0.112  0.91122
## carrier_airportB6LAS  -3.206e-06  6.194e-01   0.000  1.00000
## carrier_airportB6LAX  -8.475e-02  6.195e-01  -0.137  0.89119
## carrier_airportB6LGA  -8.607e-02  6.080e-01  -0.142  0.88743
## carrier_airportB6MCO  -2.417e-03  6.152e-01  -0.004  0.99687
## carrier_airportB6MIA   1.790e-01  6.162e-01   0.290  0.77148
## carrier_airportB6MSP   1.003e-01  6.196e-01   0.162  0.87137
## carrier_airportB6ORD   1.461e-01  6.157e-01   0.237  0.81236
## carrier_airportB6PHL   3.340e-02  6.192e-01   0.054  0.95699
## carrier_airportB6PHX   3.339e-01  6.202e-01   0.538  0.59030
## carrier_airportB6SAN  -3.294e-01  6.201e-01  -0.531  0.59527
## carrier_airportB6SEA  -1.614e-01  6.174e-01  -0.261  0.79379
## carrier_airportB6SFO  -3.093e-01  6.150e-01  -0.503  0.61503
## carrier_airportB6SLC  -7.956e-03  6.181e-01  -0.013  0.98973
## carrier_airportB6TPA   9.628e-02  6.188e-01   0.156  0.87635
## carrier_airportDLATL  -2.697e-02  9.520e-01  -0.028  0.97740
## carrier_airportDLBNA  -2.034e-01  9.648e-01  -0.211  0.83302
## carrier_airportDLBOS   1.813e-01  9.647e-01   0.188  0.85091
## carrier_airportDLBWI  -1.251e-01  9.665e-01  -0.129  0.89700
## carrier_airportDLCLT  -2.824e-01  9.648e-01  -0.293  0.76975
## carrier_airportDLDAL  -2.087e-01  9.629e-01  -0.217  0.82843
## carrier_airportDLDCA   4.291e-02  9.655e-01   0.044  0.96455
```

```
## carrier_airportDLDEN    1.551e-01   9.667e-01    0.160   0.87255
## carrier_airportDLDFW    9.024e-02   9.624e-01    0.094   0.92529
## carrier_airportDLDTW   -2.212e-01   9.658e-01   -0.229   0.81888
## carrier_airportDLEWR    2.389e-01   9.578e-01    0.249   0.80301
## carrier_airportDLFLL    1.658e-01   9.653e-01    0.172   0.86361
## carrier_airportDLIAD   -1.570e-01   9.660e-01   -0.163   0.87086
## carrier_airportDLIAH    1.335e-01   9.634e-01    0.139   0.88975
## carrier_airportDLJFK    2.593e-02   9.635e-01    0.027   0.97853
## carrier_airportDLLAS   -5.472e-02   9.662e-01   -0.057   0.95484
## carrier_airportDLLAX    1.466e-01   9.663e-01    0.152   0.87940
## carrier_airportDLLGA    3.579e-02   9.587e-01    0.037   0.97022
## carrier_airportDLMCO    3.363e-02   9.635e-01    0.035   0.97216
## carrier_airportDLMDW   -1.211e-01   9.666e-01   -0.125   0.90029
## carrier_airportDLMIA    1.116e-01   9.640e-01    0.116   0.90780
## carrier_airportDLMSP   -2.151e-01   9.657e-01   -0.223   0.82378
## carrier_airportDLORD    1.738e-01   9.636e-01    0.180   0.85684
## carrier_airportDLPHL    2.663e-02   9.660e-01    0.028   0.97801
## carrier_airportDLPHX    1.279e-01   9.665e-01    0.132   0.89475
## carrier_airportDLSAN    1.549e-02   9.664e-01    0.016   0.98721
## carrier_airportDLSEA   -1.621e-01   9.646e-01   -0.168   0.86655
## carrier_airportDLSFO    1.353e-01   9.633e-01    0.140   0.88833
## carrier_airportDLSLC   -2.562e-01   9.651e-01   -0.265   0.79065
## carrier_airportDLTPA    8.744e-02   9.658e-01    0.091   0.92786
## carrier_airportEVATL    6.230e-02   8.461e-01    0.074   0.94131
## carrier_airportEVBNA    1.995e-01   8.604e-01    0.232   0.81665
## carrier_airportEVBOS    7.757e-03   8.618e-01    0.009   0.99282
## carrier_airportEVBWI    1.332e-01   8.659e-01    0.154   0.87773
## carrier_airportEVCLT    3.404e-02   8.609e-01    0.040   0.96846
## carrier_airportEVDCA    9.070e-02   8.608e-01    0.105   0.91608
## carrier_airportEVDEN   -1.604e+00   9.404e-01   -1.706   0.08799 .
## carrier_airportEVDFW    1.635e-01   8.574e-01    0.191   0.84876
## carrier_airportEVDTW    2.698e-01   8.630e-01    0.313   0.75459
## carrier_airportEVEWR    3.249e-01   8.518e-01    0.381   0.70288
## carrier_airportEVIAD    3.835e-01   8.622e-01    0.445   0.65645
## carrier_airportEVIAH   -2.784e-01   8.580e-01   -0.324   0.74559
## carrier_airportEVLGA    5.684e-03   8.533e-01    0.007   0.99469
## carrier_airportEVMCO    7.248e-02   2.276e+00    0.032   0.97459
## carrier_airportEVMDW    2.067e-01   1.366e+00    0.151   0.87975
## carrier_airportEVMSP    2.417e-01   8.641e-01    0.280   0.77973
## carrier_airportEVORD    2.700e-02   8.584e-01    0.031   0.97491
## carrier_airportEVPHL   -2.836e-01   9.002e-01   -0.315   0.75274
## carrier_airportEVSLC   -1.276e-01   8.885e-01   -0.144   0.88582
## carrier_airportF9ATL    2.589e-01   6.125e-01    0.423   0.67248
## carrier_airportF9BNA   -1.110e-01   6.328e-01   -0.175   0.86077
## carrier_airportF9BOS   -1.416e-01   6.338e-01   -0.223   0.82321
## carrier_airportF9BWI    3.737e-01   6.353e-01    0.588   0.55636
## carrier_airportF9CLT    8.038e-02   6.324e-01    0.127   0.89885
## carrier_airportF9DCA   -1.605e-01   6.340e-01   -0.253   0.80012
## carrier_airportF9DEN   -2.148e-02   6.348e-01   -0.034   0.97300
## carrier_airportF9DFW   -1.779e-01   6.289e-01   -0.283   0.77731
## carrier_airportF9DTW   -5.155e-02   6.345e-01   -0.081   0.93525
## carrier_airportF9EWR   -2.676e-01   6.223e-01   -0.430   0.66723
## carrier_airportF9FLL    2.886e-01   6.338e-01    0.455   0.64884
## carrier_airportF9IAD    8.239e-02   6.348e-01    0.130   0.89673
```

```
## carrier_airportF9IAH  -1.111e-01   6.306e-01  -0.176   0.86019
## carrier_airportF9LAS   1.381e-01   6.342e-01   0.218   0.82767
## carrier_airportF9LAX  -2.337e-01   6.354e-01  -0.368   0.71296
## carrier_airportF9LGA  -1.170e-01   6.237e-01  -0.188   0.85124
## carrier_airportF9MCO   4.412e-02   6.302e-01   0.070   0.94419
## carrier_airportF9MDW   4.829e-02   6.364e-01   0.076   0.93951
## carrier_airportF9MIA   2.716e-02   6.311e-01   0.043   0.96567
## carrier_airportF9MSP   1.927e-02   6.342e-01   0.030   0.97576
## carrier_airportF9ORD  -5.267e-02   6.306e-01  -0.084   0.93344
## carrier_airportF9PHL   1.913e-01   6.339e-01   0.302   0.76284
## carrier_airportF9PHX  -1.179e-02   6.347e-01  -0.019   0.98518
## carrier_airportF9SAN  -3.492e-02   6.348e-01  -0.055   0.95613
## carrier_airportF9SEA   1.861e-02   6.328e-01   0.029   0.97654
## carrier_airportF9SFO  -7.751e-02   6.303e-01  -0.123   0.90214
## carrier_airportF9SLC  -8.064e-02   6.332e-01  -0.127   0.89866
## carrier_airportF9TPA   2.807e-02   6.338e-01   0.044   0.96467
## carrier_airportG4BNA   1.691e-01   6.914e-01   0.245   0.80674
## carrier_airportG4BOS  -3.012e-01   6.947e-01  -0.434   0.66458
## carrier_airportG4BWI   7.922e-02   6.951e-01   0.114   0.90927
## carrier_airportG4DEN   2.411e-01   6.962e-01   0.346   0.72910
## carrier_airportG4EWR  -1.522e+00   6.854e-01  -2.221   0.02634 *
## carrier_airportG4FLL   3.478e-01   6.920e-01   0.503   0.61523
## carrier_airportG4IAD   1.148e-01   7.037e-01   0.163   0.87046
## carrier_airportG4LAS   9.265e-02   6.931e-01   0.134   0.89367
## carrier_airportG4LAX   9.130e-02   6.936e-01   0.132   0.89527
## carrier_airportG4MDW   3.018e-02   6.961e-01   0.043   0.96542
## carrier_airportG4MSP   1.395e-01   6.988e-01   0.200   0.84180
## carrier_airportG4PHX   2.727e-01   7.035e-01   0.388   0.69830
## carrier_airportG4SAN   1.889e-01   6.952e-01   0.272   0.78582
## carrier_airportHABOS  -4.434e-02   6.417e-01  -0.069   0.94491
## carrier_airportHAJFK   1.143e-01   6.367e-01   0.179   0.85757
## carrier_airportHALAS  -3.997e-01   6.398e-01  -0.625   0.53218
## carrier_airportHALAX  -6.572e-02   6.392e-01  -0.103   0.91810
## carrier_airportHAMCO   2.401e-01   6.457e-01   0.372   0.71000
## carrier_airportHAPHX  -1.792e-01   6.418e-01  -0.279   0.78005
## carrier_airportHASAN   1.433e-01   6.399e-01   0.224   0.82274
## carrier_airportHASEA   3.315e-01   6.370e-01   0.520   0.60280
## carrier_airportHASFO  -1.929e-01   6.354e-01  -0.304   0.76148
## carrier_airportMQATL   1.708e-01   8.944e-01   0.191   0.84854
## carrier_airportMQBNA   7.712e-02   9.071e-01   0.085   0.93225
## carrier_airportMQBOS  -3.479e-02   9.080e-01  -0.038   0.96944
## carrier_airportMQBWI   4.785e-02   9.098e-01   0.053   0.95805
## carrier_airportMQCLT  -1.403e-01   9.068e-01  -0.155   0.87703
## carrier_airportMQDCA  -6.320e-02   9.078e-01  -0.070   0.94450
## carrier_airportMQDEN  -2.653e-01   1.023e+00  -0.259   0.79535
## carrier_airportMQDFW  -2.289e-01   9.041e-01  -0.253   0.80017
## carrier_airportMQDTW   1.647e-01   9.086e-01   0.181   0.85616
## carrier_airportMQEWR   1.153e-01   9.013e-01   0.128   0.89821
## carrier_airportMQIAD   6.456e-02   9.243e-01   0.070   0.94432
## carrier_airportMQIAH   8.214e-02   9.061e-01   0.091   0.92777
## carrier_airportMQJFK   6.551e-02   9.057e-01   0.072   0.94234
## carrier_airportMQLGA   1.781e-01   9.004e-01   0.198   0.84320
## carrier_airportMQMIA  -8.110e-02   9.059e-01  -0.090   0.92867
## carrier_airportMQMSP   9.732e-02   9.090e-01   0.107   0.91473
```

```
## carrier_airportMQORD -9.877e-02  9.054e-01  -0.109  0.91313
## carrier_airportMQPHL  2.708e-01  9.130e-01   0.297  0.76674
## carrier_airportMQPHX -4.239e-01  9.110e-01  -0.465  0.64174
## carrier_airportMQSLC -9.559e-03  9.138e-01  -0.010  0.99165
## carrier_airportMQTPA -7.607e-02  9.109e-01  -0.084  0.93344
## carrier_airportNKATL  9.898e-02  8.239e-01   0.120  0.90437
## carrier_airportNKBNA -1.188e-01  8.390e-01  -0.142  0.88738
## carrier_airportNKBOS  1.371e-02  8.386e-01   0.016  0.98696
## carrier_airportNKBWI  6.359e-02  8.404e-01   0.076  0.93969
## carrier_airportNKCLT  2.931e-01  8.390e-01   0.349  0.72685
## carrier_airportNKDEN  1.573e-01  8.408e-01   0.187  0.85156
## carrier_airportNKDFW -1.605e-01  8.359e-01  -0.192  0.84769
## carrier_airportNKDTW -9.905e-02  8.398e-01  -0.118  0.90611
## carrier_airportNKEWR -5.521e-02  8.306e-01  -0.066  0.94700
## carrier_airportNKFLL -1.854e-02  8.391e-01  -0.022  0.98237
## carrier_airportNKIAH -2.024e-01  8.369e-01  -0.242  0.80889
## carrier_airportNKLAS -4.914e-02  8.401e-01  -0.058  0.95336
## carrier_airportNKLAX -2.294e-02  8.403e-01  -0.027  0.97822
## carrier_airportNKLGA -1.649e-01  8.318e-01  -0.198  0.84285
## carrier_airportNKMCO -7.727e-02  8.371e-01  -0.092  0.92645
## carrier_airportNKMIA  4.556e-02  8.380e-01   0.054  0.95664
## carrier_airportNKMSP -1.572e-01  8.399e-01  -0.187  0.85156
## carrier_airportNKORD  1.114e-02  8.373e-01   0.013  0.98939
## carrier_airportNKPHL  7.921e-02  8.400e-01   0.094  0.92487
## carrier_airportNKPHX  1.568e-01  8.411e-01   0.186  0.85209
## carrier_airportNKSAN  1.942e-02  8.407e-01   0.023  0.98157
## carrier_airportNKSEA  3.527e-02  8.388e-01   0.042  0.96646
## carrier_airportNKSLC  1.473e-01  8.441e-01   0.175  0.86142
## carrier_airportNKTPA -7.010e-02  8.398e-01  -0.083  0.93347
## carrier_airportOHATL  2.774e-02  8.842e-01   0.031  0.97497
## carrier_airportOHBNA -3.867e-02  8.977e-01  -0.043  0.96564
## carrier_airportOHBOS  1.348e-01  9.975e-01   0.135  0.89250
## carrier_airportOHBWI -3.044e-01  9.039e-01  -0.337  0.73631
## carrier_airportOHCLT -3.117e-01  8.970e-01  -0.347  0.72822
## carrier_airportOHDCA  1.375e-01  8.979e-01   0.153  0.87826
## carrier_airportOHDFW -7.688e-02  8.952e-01  -0.086  0.93156
## carrier_airportOHDTW -8.255e-02  8.990e-01  -0.092  0.92684
## carrier_airportOHEWR  2.303e-01  9.417e-01   0.245  0.80681
## carrier_airportOHIAD -9.589e-02  8.987e-01  -0.107  0.91503
## carrier_airportOHIAH  5.417e-01  9.094e-01   0.596  0.55139
## carrier_airportOHJFK -9.960e-02  9.022e-01  -0.110  0.91209
## carrier_airportOHLGA  1.095e-01  8.915e-01   0.123  0.90221
## carrier_airportOHMSP  5.879e-02  9.023e-01   0.065  0.94805
## carrier_airportOHORD -2.886e-01  8.984e-01  -0.321  0.74806
## carrier_airportOHPHL -2.990e-02  8.985e-01  -0.033  0.97345
## carrier_airportOOATL  1.859e-01  8.824e-01   0.211  0.83313
## carrier_airportOOBNA  1.351e-01  8.961e-01   0.151  0.88015
## carrier_airportOOBOS  2.260e-01  8.966e-01   0.252  0.80101
## carrier_airportOOBWI  3.792e-02  8.997e-01   0.042  0.96638
## carrier_airportOOCLT  1.263e-01  8.962e-01   0.141  0.88789
## carrier_airportOODAL -8.063e-02  8.939e-01  -0.090  0.92813
## carrier_airportOODCA  1.652e-01  8.974e-01   0.184  0.85397
## carrier_airportOODEN  9.798e-02  8.980e-01   0.109  0.91311
## carrier_airportOODFW -4.825e-02  8.935e-01  -0.054  0.95693
```

```
## carrier_airport00DTW -4.691e-02  8.972e-01   -0.052  0.95831
## carrier_airport00EWR  2.800e-02  8.892e-01    0.031  0.97488
## carrier_airport00FLL  3.336e-01  9.315e-01    0.358  0.72026
## carrier_airport00IAD -3.557e-02  8.972e-01   -0.040  0.96837
## carrier_airport00IAH -7.397e-02  8.945e-01   -0.083  0.93410
## carrier_airport00JFK  1.071e-01  8.954e-01    0.120  0.90476
## carrier_airport00LAS -2.445e-01  8.979e-01   -0.272  0.78537
## carrier_airport00LAX -2.045e-01  8.977e-01   -0.228  0.81977
## carrier_airport00LGA  1.656e-01  8.897e-01    0.186  0.85235
## carrier_airport00MCO  2.816e-01  9.772e-01    0.288  0.77319
## carrier_airport00MDW -7.820e-03  8.979e-01   -0.009  0.99305
## carrier_airport00MSP -2.598e-01  8.971e-01   -0.290  0.77217
## carrier_airport00ORD -2.469e-02  8.948e-01   -0.028  0.97799
## carrier_airport00PHL  6.505e-02  8.984e-01    0.072  0.94228
## carrier_airport00PHX -3.050e-01  8.979e-01   -0.340  0.73413
## carrier_airport00SAN -3.119e-01  8.978e-01   -0.347  0.72829
## carrier_airport00SEA -5.850e-01  8.959e-01   -0.653  0.51381
## carrier_airport00SFO -6.822e-02  8.945e-01   -0.076  0.93921
## carrier_airport00SLC -5.522e-01  8.965e-01   -0.616  0.53794
## carrier_airport00TPA  8.056e-01  9.058e-01    0.889  0.37381
## carrier_airportQXDAL  5.692e-01  9.259e-01    0.615  0.53869
## carrier_airportQXDFW  5.682e-01  9.339e-01    0.608  0.54290
## carrier_airportQXLAS  1.290e-02  9.179e-01    0.014  0.98879
## carrier_airportQXLAX  1.427e-02  9.167e-01    0.016  0.98758
## carrier_airportQXMSP -6.062e-01  9.375e-01   -0.647  0.51790
## carrier_airportQXORD  6.288e-02  9.196e-01    0.068  0.94549
## carrier_airportQXPHX  3.173e-02  9.186e-01    0.035  0.97245
## carrier_airportQXSAN -1.564e-01  9.173e-01   -0.170  0.86463
## carrier_airportQXSEA -2.837e-01  9.144e-01   -0.310  0.75634
## carrier_airportQXSFO -2.073e-01  9.137e-01   -0.227  0.82049
## carrier_airportQXSLC -9.895e-02  9.205e-01   -0.108  0.91439
## carrier_airportUAATL  2.420e-01  8.397e-01    0.288  0.77317
## carrier_airportUABNA  6.531e-02  8.541e-01    0.076  0.93904
## carrier_airportUABOS  1.833e-02  8.539e-01    0.021  0.98287
## carrier_airportUABWI  1.192e-01  8.560e-01    0.139  0.88920
## carrier_airportUACLT  3.688e-01  8.543e-01    0.432  0.66595
## carrier_airportUADCA  3.998e-02  8.549e-01    0.047  0.96270
## carrier_airportUADEN -9.056e-02  8.560e-01   -0.106  0.91574
## carrier_airportUADFW  1.684e-02  8.513e-01    0.020  0.98422
## carrier_airportUADTW  1.664e-01  8.557e-01    0.194  0.84580
## carrier_airportUAEWR -7.888e-02  8.461e-01   -0.093  0.92572
## carrier_airportUAFLL  5.619e-02  8.546e-01    0.066  0.94757
## carrier_airportUAIAD -2.051e-01  8.550e-01   -0.240  0.81045
## carrier_airportUAIAH -3.308e-01  8.523e-01   -0.388  0.69794
## carrier_airportUAJFK -1.517e-01  8.541e-01   -0.178  0.85904
## carrier_airportUALAS -1.878e-02  8.555e-01   -0.022  0.98249
## carrier_airportUALAX -1.077e-01  8.556e-01   -0.126  0.89981
## carrier_airportUALGA -5.405e-02  8.473e-01   -0.064  0.94913
## carrier_airportUAMCO -1.402e-01  8.526e-01   -0.164  0.86942
## carrier_airportUAMIA  7.472e-02  8.531e-01    0.088  0.93021
## carrier_airportUAMSP  1.291e-01  8.552e-01    0.151  0.87997
## carrier_airportUAORD -2.438e-01  8.526e-01   -0.286  0.77488
## carrier_airportUAPHL  1.816e-01  8.554e-01    0.212  0.83189
## carrier_airportUAPHX  2.228e-02  8.558e-01    0.026  0.97923
```

```
## carrier_airportUASAN -7.894e-02  8.557e-01  -0.092  0.92650
## carrier_airportUASEA  1.110e-02  8.538e-01   0.013  0.98962
## carrier_airportUASFO -1.500e-01  8.523e-01  -0.176  0.86026
## carrier_airportUASLC  4.215e-02  8.547e-01   0.049  0.96067
## carrier_airportUATPA  1.840e-02  8.551e-01   0.022  0.98284
## carrier_airportVXBNA -2.191e-01  1.012e+00  -0.216  0.82860
## carrier_airportVXBOS -2.130e-01  9.799e-01  -0.217  0.82791
## carrier_airportVXBWI -6.118e-01  1.045e+00  -0.585  0.55823
## carrier_airportVXDAL -6.350e-03  9.669e-01  -0.007  0.99476
## carrier_airportVXDCA -2.684e-01  9.855e-01  -0.272  0.78533
## carrier_airportVXDEN  3.282e-01  9.843e-01   0.333  0.73879
## carrier_airportVXEWR  1.463e-01  9.621e-01   0.152  0.87917
## carrier_airportVXFLL  8.419e-02  9.753e-01   0.086  0.93121
## carrier_airportVXIAD -7.223e-01  9.880e-01  -0.731  0.46472
## carrier_airportVXJFK -6.888e-03  9.668e-01  -0.007  0.99432
## carrier_airportVXLAS  2.540e-01  9.691e-01   0.262  0.79321
## carrier_airportVXLAX  2.622e-01  9.671e-01   0.271  0.78632
## carrier_airportVXMCO  2.578e-02  9.812e-01   0.026  0.97904
## carrier_airportVXORD  1.675e-01  9.770e-01   0.171  0.86385
## carrier_airportVXPHL -7.187e-01  1.008e+00  -0.713  0.47604
## carrier_airportVXSAN  4.588e-01  9.715e-01   0.472  0.63678
## carrier_airportVXSEA  5.334e-01  9.670e-01   0.552  0.58121
## carrier_airportVXSFO  4.078e-01  9.637e-01   0.423  0.67216
## carrier_airportWNATL -1.194e-01  8.021e-01  -0.149  0.88171
## carrier_airportWNBNA -2.888e-01  8.171e-01  -0.353  0.72376
## carrier_airportWNBOS  1.051e-02  8.172e-01   0.013  0.98974
## carrier_airportWNBWI -2.188e-01  8.191e-01  -0.267  0.78940
## carrier_airportWNCLT  8.422e-02  8.173e-01   0.103  0.91792
## carrier_airportWNDAL -2.201e-01  8.145e-01  -0.270  0.78700
## carrier_airportWNDCA -5.089e-02  8.181e-01  -0.062  0.95040
## carrier_airportWNDEN  2.638e-02  8.193e-01   0.032  0.97432
## carrier_airportWNDTW  9.055e-02  8.186e-01   0.111  0.91192
## carrier_airportWNEWR  3.087e-01  8.092e-01   0.381  0.70285
## carrier_airportWNFLL -2.486e-01  8.178e-01  -0.304  0.76111
## carrier_airportWNIAD  5.672e-02  8.186e-01   0.069  0.94476
## carrier_airportWNIAH  9.233e-02  8.157e-01   0.113  0.90988
## carrier_airportWNLAS -1.115e-01  8.188e-01  -0.136  0.89173
## carrier_airportWNLAX  2.676e-02  8.190e-01   0.033  0.97393
## carrier_airportWNLGA -9.357e-02  8.103e-01  -0.115  0.90807
## carrier_airportWNMCO -2.135e-01  8.158e-01  -0.262  0.79350
## carrier_airportWNMDW -1.649e-01  8.186e-01  -0.201  0.84035
## carrier_airportWNMIA  2.568e-01  8.164e-01   0.315  0.75313
## carrier_airportWNMSP  6.562e-02  8.185e-01   0.080  0.93610
## carrier_airportWNORD  4.543e-01  8.160e-01   0.557  0.57768
## carrier_airportWNPHL  9.042e-02  8.187e-01   0.110  0.91205
## carrier_airportWNPHX -1.535e-02  8.191e-01  -0.019  0.98505
## carrier_airportWNSAN -9.493e-02  8.190e-01  -0.116  0.90772
## carrier_airportWNSEA  7.542e-02  8.171e-01   0.092  0.92645
## carrier_airportWNSFO  1.047e-01  8.155e-01   0.128  0.89783
## carrier_airportWNSLC  1.097e-01  8.177e-01   0.134  0.89328
## carrier_airportWNTPA -8.468e-02  8.184e-01  -0.103  0.91759
## carrier_airportYVATL  4.328e-01  9.342e-01   0.463  0.64312
## carrier_airportYVBNA  6.884e-03  9.474e-01   0.007  0.99420
## carrier_airportYVBOS -1.603e-01  9.636e-01  -0.166  0.86784
```

```
## carrier_airportYVBWI  -2.743e-01  9.561e-01  -0.287  0.77417
## carrier_airportYVCLT   1.809e-01  9.470e-01   0.191  0.84850
## carrier_airportYVDCA   2.429e-02  9.483e-01   0.026  0.97957
## carrier_airportYVDFW   1.511e-01  9.443e-01   0.160  0.87287
## carrier_airportYVDTW   1.921e-01  9.483e-01   0.203  0.83943
## carrier_airportYVFLL  -8.545e-01  1.020e+00  -0.838  0.40213
## carrier_airportYVIAD   2.748e-02  9.478e-01   0.029  0.97687
## carrier_airportYVIAH  -9.110e-02  9.453e-01  -0.096  0.92322
## carrier_airportYVLGA   7.623e-02  9.410e-01   0.081  0.93543
## carrier_airportYVMIA   2.972e-01  9.501e-01   0.313  0.75444
## carrier_airportYVMSP   2.004e-01  9.483e-01   0.211  0.83265
## carrier_airportYVORD  -1.362e-01  9.473e-01  -0.144  0.88571
## carrier_airportYVPHL   5.612e-02  9.489e-01   0.059  0.95284
## carrier_airportYVPHX   1.405e-01  9.485e-01   0.148  0.88224
## carrier_airportYVSAN  -1.350e-01  1.173e+00  -0.115  0.90834
## carrier_airportYVSLC   2.797e-01  9.485e-01   0.295  0.76812
## carrier_airportYVTPA  -5.064e-01  9.834e-01  -0.515  0.60663
## carrier_airportYXATL   2.092e-01  9.522e-01   0.220  0.82613
## carrier_airportYXBNA   3.482e-02  9.648e-01   0.036  0.97121
## carrier_airportYXBOS   3.194e-02  9.648e-01   0.033  0.97359
## carrier_airportYXBWI   9.628e-02  9.679e-01   0.099  0.92076
## carrier_airportYXCLT  -1.720e-01  9.647e-01  -0.178  0.85849
## carrier_airportYXDCA   2.729e-02  9.655e-01   0.028  0.97745
## carrier_airportYXDEN   1.550e-01  9.670e-01   0.160  0.87267
## carrier_airportYXDFW   2.351e-01  9.628e-01   0.244  0.80710
## carrier_airportYXDTW  -4.515e-02  9.660e-01  -0.047  0.96272
## carrier_airportYXEWR   1.804e-01  9.578e-01   0.188  0.85059
## carrier_airportYXFLL  -5.453e-01  1.012e+00  -0.539  0.58983
## carrier_airportYXIAD   6.311e-02  9.659e-01   0.065  0.94790
## carrier_airportYXIAH   9.603e-02  9.634e-01   0.100  0.92060
## carrier_airportYXJFK   1.754e-02  9.636e-01   0.018  0.98548
## carrier_airportYXLGA  -1.047e-02  9.588e-01  -0.011  0.99129
## carrier_airportYXMCO  -1.771e-01  9.726e-01  -0.182  0.85551
## carrier_airportYXMDW   2.940e-03  9.701e-01   0.003  0.99758
## carrier_airportYXMIA  -4.514e-01  9.641e-01  -0.468  0.63967
## carrier_airportYXMSP   2.284e-01  9.660e-01   0.236  0.81312
## carrier_airportYXORD  -7.703e-02  9.636e-01  -0.080  0.93629
## carrier_airportYXPHL  -1.387e-01  9.660e-01  -0.144  0.88584
## carrier_airportYXSEA   1.855e-02  1.217e+00   0.015  0.98784
## carrier_airportYXSLC   2.534e-01  9.672e-01   0.262  0.79337
## carrier_airportYXTPA  -1.380e-01  9.677e-01  -0.143  0.88659
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


## # Overdispersion test
##
##        dispersion ratio =      25.324
##   Pearson's Chi-Squared = 462061.097
##                 p-value =    < 0.001
```

NEGATIVE BINOMIAL MODELS

```
##  Family: nbinom2  ( log )
```

```
## Formula:          arr_del15 ~ date + carrier + offset(log(arr_flights))
## Data: airline_data
##
##      AIC      BIC   logLik deviance df.resid
## 177392.0 177556.5 -88675.0 177350.0    18652
##
##
## Dispersion parameter for nbinom2 family (): 4.26
##
## Conditional model:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept) -1.051e+00  1.347e-01  -7.804 6.00e-15 ***
## date        -5.017e-05  7.260e-06  -6.910 4.83e-12 ***
## carrierAA    2.929e-01  2.274e-02  12.877  < 2e-16 ***
## carrierAS    1.500e-01  2.375e-02   6.316 2.69e-10 ***
## carrierB6    5.163e-01  2.338e-02  22.089  < 2e-16 ***
## carrierDL    1.148e-02  2.259e-02   0.508  0.61127
## carrierEV    4.205e-01  3.607e-02  11.658  < 2e-16 ***
## carrierF9    5.032e-01  2.363e-02  21.296  < 2e-16 ***
## carrierG4    4.970e-01  3.132e-02  15.871  < 2e-16 ***
## carrierHA    5.124e-01  3.393e-02  15.103  < 2e-16 ***
## carrierMQ    2.018e-01  2.876e-02   7.016 2.28e-12 ***
## carrierNK    2.807e-01  2.397e-02  11.712  < 2e-16 ***
## carrierOH    1.555e-01  3.125e-02   4.977 6.46e-07 ***
## carrierOO    1.619e-01  2.383e-02   6.797 1.07e-11 ***
## carrierQX    1.511e-01  4.741e-02   3.186  0.00144 **
## carrierUA    2.372e-01  2.302e-02  10.303  < 2e-16 ***
## carrierVX    1.085e-01  7.566e-02   1.434  0.15152
## carrierWN    2.979e-01  2.307e-02  12.914  < 2e-16 ***
## carrierYV    1.838e-01  2.717e-02   6.764 1.34e-11 ***
## carrierYX    4.325e-02  2.506e-02   1.726  0.08439 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

## # Overdispersion test
##
##        dispersion ratio =     0.879
##   Pearson's Chi-Squared = 16395.900
##                 p-value =         1

##  Family: nbinom2  ( log )
## Formula:          arr_del15 ~ date + airport + offset(log(arr_flights))
## Data: airline_data
##
##      AIC      BIC   logLik deviance df.resid
## 178743.9 178994.6 -89340.0 178679.9    18641
##
##
## Dispersion parameter for nbinom2 family (): 3.92
##
## Conditional model:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept) -9.238e-01  1.384e-01  -6.674 2.49e-11 ***
## date        -4.586e-05  7.450e-06  -6.156 7.48e-10 ***
```

```
## airportBNA    4.505e-02  2.703e-02   1.666 0.095627 .
## airportBOS    3.723e-02  2.815e-02   1.322 0.186014
## airportBWI   -3.993e-02  2.885e-02  -1.384 0.166327
## airportCLT    5.399e-03  2.812e-02   0.192 0.847741
## airportDAL   -6.754e-03  4.273e-02  -0.158 0.874414
## airportDCA   -3.489e-02  2.753e-02  -1.267 0.205018
## airportDEN    4.147e-02  2.903e-02   1.428 0.153206
## airportDFW    1.066e-01  2.801e-02   3.804 0.000142 ***
## airportDTW   -4.156e-02  2.743e-02  -1.515 0.129708
## airportEWR    2.882e-01  2.805e-02  10.275  < 2e-16 ***
## airportFLL    1.752e-01  3.020e-02   5.800 6.62e-09 ***
## airportIAD   -5.770e-02  2.935e-02  -1.966 0.049282 *
## airportIAH    5.480e-02  2.825e-02   1.940 0.052412 .
## airportJFK    3.321e-02  3.181e-02   1.044 0.296538
## airportLAS    4.718e-02  2.803e-02   1.683 0.092347 .
## airportLAX   -1.105e-02  2.817e-02  -0.392 0.694811
## airportLGA    1.929e-01  2.781e-02   6.935 4.06e-12 ***
## airportMCO    1.279e-01  3.017e-02   4.241 2.23e-05 ***
## airportMDW   -8.727e-02  4.426e-02  -1.972 0.048636 *
## airportMIA    1.318e-01  3.243e-02   4.065 4.81e-05 ***
## airportMSP   -1.700e-02  2.765e-02  -0.615 0.538582
## airportORD    7.501e-02  2.752e-02   2.726 0.006420 **
## airportPHL    2.143e-02  2.781e-02   0.771 0.440890
## airportPHX   -1.252e-02  2.858e-02  -0.438 0.661267
## airportSAN   -3.206e-02  2.887e-02  -1.111 0.266648
## airportSEA    9.260e-02  2.924e-02   3.167 0.001541 **
## airportSFO    1.254e-01  2.960e-02   4.237 2.26e-05 ***
## airportSLC    5.145e-02  3.005e-02   1.712 0.086829 .
## airportTPA    6.084e-02  3.005e-02   2.025 0.042863 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


## # Overdispersion test
##
##        dispersion ratio =     0.908
##    Pearson's Chi-Squared = 16917.510
##                  p-value =         1


##  Family: nbinom2  ( log )
## Formula:          arr_del15 ~ date + carrier_airport + offset(log(arr_flights))
## Data: airline_data
##
##      AIC      BIC   logLik deviance df.resid
## 176392.6 179730.2 -87770.3 175540.6    18247
##
##
## Dispersion parameter for nbinom2 family (): 4.79
##
## Conditional model:
##                    Estimate Std. Error z value Pr(>|z|)
## (Intercept)        -1.347e+00  1.448e-01  -9.298  < 2e-16 ***
## date               -4.368e-05  7.042e-06  -6.203 5.55e-10 ***
## carrier_airport9EBNA  2.441e-01  1.021e-01   2.391 0.016781 *
## carrier_airport9EBOS  2.150e-01  9.627e-02   2.233 0.025518 *
```

```
## carrier_airport9EBWI   1.652e-01  1.000e-01    1.651 0.098701 .
## carrier_airport9ECLT   2.032e-01  9.771e-02    2.080 0.037571 *
## carrier_airport9EDAL  -9.757e-02  4.833e-01   -0.202 0.840014
## carrier_airport9EDCA   1.719e-01  1.010e-01    1.702 0.088719 .
## carrier_airport9EDEN  -8.195e-02  7.393e-01   -0.111 0.911739
## carrier_airport9EDFW   4.285e-01  1.206e-01    3.552 0.000383 ***
## carrier_airport9EDTW  -1.525e-01  9.145e-02   -1.667 0.095467 .
## carrier_airport9EEWR   5.143e-01  9.632e-02    5.339 9.33e-08 ***
## carrier_airport9EFLL   3.559e-01  2.241e-01    1.588 0.112207
## carrier_airport9EIAD   1.486e-01  1.047e-01    1.420 0.155623
## carrier_airport9EIAH   4.614e-01  1.240e-01    3.723 0.000197 ***
## carrier_airport9EJFK   5.834e-02  9.205e-02    0.634 0.526240
## carrier_airport9ELGA   3.421e-01  9.256e-02    3.697 0.000219 ***
## carrier_airport9EMCO   2.146e-01  2.018e-01    1.063 0.287709
## carrier_airport9EMDW  -3.433e-02  1.469e-01   -0.234 0.815203
## carrier_airport9EMIA   3.233e-01  2.864e-01    1.129 0.259012
## carrier_airport9EMSP  -9.129e-02  9.182e-02   -0.994 0.320127
## carrier_airport9EORD   2.447e-01  9.989e-02    2.450 0.014289 *
## carrier_airport9EPHL   2.151e-01  1.022e-01    2.105 0.035312 *
## carrier_airport9ETPA   5.523e-03  1.640e-01    0.034 0.973145
## carrier_airportAAATL   5.369e-01  8.913e-02    6.024 1.70e-09 ***
## carrier_airportAABNA   4.568e-01  8.942e-02    5.109 3.24e-07 ***
## carrier_airportAABOS   3.941e-01  8.874e-02    4.441 8.96e-06 ***
## carrier_airportAABWI   5.241e-01  8.978e-02    5.837 5.31e-09 ***
## carrier_airportAACLT   1.316e-01  8.850e-02    1.487 0.137083
## carrier_airportAADCA   2.830e-01  8.875e-02    3.189 0.001430 **
## carrier_airportAADEN   5.392e-01  8.905e-02    6.056 1.40e-09 ***
## carrier_airportAADFW   3.751e-01  8.845e-02    4.241 2.22e-05 ***
## carrier_airportAADTW   4.548e-01  9.001e-02    5.053 4.35e-07 ***
## carrier_airportAAEWR   7.786e-01  8.909e-02    8.740  < 2e-16 ***
## carrier_airportAAFLL   5.103e-01  8.938e-02    5.709 1.14e-08 ***
## carrier_airportAAIAD   4.964e-01  9.328e-02    5.321 1.03e-07 ***
## carrier_airportAAIAH   6.453e-01  8.925e-02    7.230 4.82e-13 ***
## carrier_airportAAJFK   3.851e-01  8.900e-02    4.328 1.51e-05 ***
## carrier_airportAALAS   5.224e-01  8.887e-02    5.878 4.15e-09 ***
## carrier_airportAALAX   3.094e-01  8.864e-02    3.491 0.000482 ***
## carrier_airportAALGA   4.726e-01  8.876e-02    5.324 1.01e-07 ***
## carrier_airportAAMCO   4.767e-01  8.879e-02    5.369 7.91e-08 ***
## carrier_airportAAMIA   3.640e-01  8.855e-02    4.111 3.94e-05 ***
## carrier_airportAAMSP   5.481e-01  8.964e-02    6.115 9.68e-10 ***
## carrier_airportAAORD   3.143e-01  8.855e-02    3.549 0.000386 ***
## carrier_airportAAPHL   3.101e-01  8.862e-02    3.499 0.000466 ***
## carrier_airportAAPHX   2.133e-01  8.858e-02    2.408 0.016019 *
## carrier_airportAASAN   5.201e-01  8.918e-02    5.832 5.48e-09 ***
## carrier_airportAASEA   6.358e-01  8.925e-02    7.124 1.05e-12 ***
## carrier_airportAASFO   6.398e-01  8.892e-02    7.195 6.22e-13 ***
## carrier_airportAASLC   6.042e-01  8.988e-02    6.723 1.79e-11 ***
## carrier_airportAATPA   4.937e-01  8.895e-02    5.550 2.85e-08 ***
## carrier_airportASATL   1.630e-01  1.012e-01    1.610 0.107420
## carrier_airportASBNA   4.138e-01  9.774e-02    4.233 2.31e-05 ***
## carrier_airportASBOS   3.340e-01  9.211e-02    3.626 0.000288 ***
## carrier_airportASBWI   1.099e-01  9.987e-02    1.101 0.271002
## carrier_airportASDAL   5.367e-01  1.073e-01    5.003 5.64e-07 ***
## carrier_airportASDCA   3.041e-01  9.303e-02    3.269 0.001081 **
```

```
## carrier_airportASDEN   4.344e-01   9.207e-02    4.718 2.38e-06 ***
## carrier_airportASDFW    2.620e-01   9.368e-02    2.797 0.005159 **
## carrier_airportASDTW    1.198e-01   1.078e-01    1.111 0.266583
## carrier_airportASEWR    5.763e-01   9.033e-02    6.380 1.77e-10 ***
## carrier_airportASFLL    3.274e-01   9.707e-02    3.373 0.000743 ***
## carrier_airportASIAD    3.348e-01   9.502e-02    3.524 0.000426 ***
## carrier_airportASIAH    3.699e-01   9.992e-02    3.702 0.000214 ***
## carrier_airportASJFK    4.046e-01   9.103e-02    4.445 8.79e-06 ***
## carrier_airportASLAS    3.490e-01   8.996e-02    3.880 0.000105 ***
## carrier_airportASLAX    3.223e-01   8.907e-02    3.618 0.000297 ***
## carrier_airportASMCO    3.492e-01   9.281e-02    3.763 0.000168 ***
## carrier_airportASMIA    1.042e-01   3.687e-01    0.282 0.777574
## carrier_airportASMSP    3.328e-01   9.732e-02    3.419 0.000627 ***
## carrier_airportASORD    3.247e-01   9.105e-02    3.566 0.000362 ***
## carrier_airportASPHL    1.638e-01   1.005e-01    1.631 0.102907
## carrier_airportASPHX    1.634e-01   9.125e-02    1.790 0.073400 .
## carrier_airportASSAN    2.525e-01   8.957e-02    2.819 0.004814 **
## carrier_airportASSEA    2.873e-01   8.852e-02    3.245 0.001174 **
## carrier_airportASSFO    4.523e-01   8.902e-02    5.081 3.75e-07 ***
## carrier_airportASSLC    4.202e-01   9.778e-02    4.298 1.73e-05 ***
## carrier_airportASTPA    1.944e-01   1.023e-01    1.900 0.057444 .
## carrier_airportB6ATL    7.095e-01   9.056e-02    7.835 4.69e-15 ***
## carrier_airportB6BNA    7.470e-01   9.332e-02    8.005 1.20e-15 ***
## carrier_airportB6BOS    6.217e-01   8.855e-02    7.021 2.20e-12 ***
## carrier_airportB6BWI    6.489e-01   1.087e-01    5.968 2.41e-09 ***
## carrier_airportB6CLT    5.088e-01   9.643e-02    5.276 1.32e-07 ***
## carrier_airportB6DCA    6.011e-01   8.940e-02    6.724 1.77e-11 ***
## carrier_airportB6DEN    7.332e-01   9.279e-02    7.902 2.74e-15 ***
## carrier_airportB6DFW    6.738e-01   9.743e-02    6.915 4.66e-12 ***
## carrier_airportB6DTW    6.354e-01   9.435e-02    6.735 1.64e-11 ***
## carrier_airportB6EWR    9.946e-01   8.884e-02   11.195  < 2e-16 ***
## carrier_airportB6FLL    7.392e-01   8.867e-02    8.336  < 2e-16 ***
## carrier_airportB6IAD    7.894e-01   1.497e-01    5.273 1.34e-07 ***
## carrier_airportB6IAH    6.231e-01   1.146e-01    5.436 5.44e-08 ***
## carrier_airportB6JFK    6.681e-01   8.855e-02    7.544 4.55e-14 ***
## carrier_airportB6LAS    6.550e-01   9.012e-02    7.268 3.64e-13 ***
## carrier_airportB6LAX    5.059e-01   8.925e-02    5.669 1.44e-08 ***
## carrier_airportB6LGA    8.226e-01   9.082e-02    9.057  < 2e-16 ***
## carrier_airportB6MCO    7.735e-01   8.872e-02    8.719  < 2e-16 ***
## carrier_airportB6MIA    9.868e-01   1.230e-01    8.020 1.06e-15 ***
## carrier_airportB6MSP    6.922e-01   9.893e-02    6.997 2.61e-12 ***
## carrier_airportB6ORD    8.629e-01   9.171e-02    9.409  < 2e-16 ***
## carrier_airportB6PHL    6.630e-01   9.158e-02    7.239 4.52e-13 ***
## carrier_airportB6PHX    8.826e-01   9.311e-02    9.479  < 2e-16 ***
## carrier_airportB6SAN    3.185e-01   9.316e-02    3.418 0.000630 ***
## carrier_airportB6SEA    5.926e-01   9.364e-02    6.328 2.49e-10 ***
## carrier_airportB6SFO    4.883e-01   8.980e-02    5.437 5.40e-08 ***
## carrier_airportB6SLC    6.716e-01   9.123e-02    7.362 1.82e-13 ***
## carrier_airportB6TPA    7.566e-01   8.954e-02    8.449  < 2e-16 ***
## carrier_airportDLATL   -7.592e-02   8.846e-02   -0.858 0.390762
## carrier_airportDLBNA    3.457e-02   9.008e-02    0.384 0.701152
## carrier_airportDLBOS    3.112e-01   8.888e-02    3.502 0.000462 ***
## carrier_airportDLBWI   -3.696e-02   9.046e-02   -0.409 0.682889
## carrier_airportDLCLT   -6.939e-02   9.052e-02   -0.767 0.443323
```

```
## carrier_airportDLDAL   1.337e-01  9.397e-02   1.423 0.154748
## carrier_airportDLDCA   1.689e-01  8.954e-02   1.886 0.059310 .
## carrier_airportDLDEN   1.992e-01  8.924e-02   2.232 0.025604 *
## carrier_airportDLDFW   4.230e-01  8.921e-02   4.741 2.13e-06 ***
## carrier_airportDLDTW  -8.882e-02  8.863e-02  -1.002 0.316292
## carrier_airportDLEWR   5.860e-01  8.958e-02   6.541 6.10e-11 ***
## carrier_airportDLFLL   3.343e-01  8.915e-02   3.750 0.000177 ***
## carrier_airportDLIAD   2.442e-02  9.226e-02   0.265 0.791271
## carrier_airportDLIAH   3.751e-01  9.010e-02   4.164 3.13e-05 ***
## carrier_airportDLJFK   2.392e-01  8.874e-02   2.696 0.007027 **
## carrier_airportDLLAS   6.862e-02  8.923e-02   0.769 0.441914
## carrier_airportDLLAX   1.994e-01  8.868e-02   2.248 0.024560 *
## carrier_airportDLLGA   3.795e-01  8.874e-02   4.277 1.90e-05 ***
## carrier_airportDLMCO   2.685e-01  8.889e-02   3.021 0.002521 **
## carrier_airportDLMDW   8.633e-02  9.991e-02   0.864 0.387519
## carrier_airportDLMIA   3.356e-01  8.937e-02   3.755 0.000173 ***
## carrier_airportDLMSP  -8.272e-02  8.861e-02  -0.934 0.350551
## carrier_airportDLORD   4.000e-01  8.924e-02   4.482 7.38e-06 ***
## carrier_airportDLPHL   1.220e-01  9.029e-02   1.351 0.176715
## carrier_airportDLPHX   1.982e-01  8.943e-02   2.217 0.026655 *
## carrier_airportDLSAN   9.140e-02  8.969e-02   1.019 0.308177
## carrier_airportDLSEA   5.379e-02  8.877e-02   0.606 0.544560
## carrier_airportDLSFO   3.350e-01  8.908e-02   3.760 0.000170 ***
## carrier_airportDLSLC  -4.523e-02  8.864e-02  -0.510 0.609834
## carrier_airportDLTPA   2.014e-01  8.919e-02   2.258 0.023924 *
## carrier_airportEVATL   3.847e-01  1.396e-01   2.755 0.005864 **
## carrier_airportEVBNA   6.166e-01  1.177e-01   5.240 1.61e-07 ***
## carrier_airportEVBOS   5.221e-01  1.506e-01   3.466 0.000528 ***
## carrier_airportEVBWI   4.349e-01  1.894e-01   2.296 0.021649 *
## carrier_airportEVCLT   5.133e-01  1.369e-01   3.749 0.000177 ***
## carrier_airportEVDCA   5.616e-01  1.127e-01   4.982 6.29e-07 ***
## carrier_airportEVDEN  -1.370e+00  5.455e-01  -2.511 0.012047 *
## carrier_airportEVDFW   8.126e-01  1.688e-01   4.815 1.47e-06 ***
## carrier_airportEVDTW   5.733e-01  1.624e-01   3.530 0.000416 ***
## carrier_airportEVEWR   1.013e+00  1.082e-01   9.363  < 2e-16 ***
## carrier_airportEVIAD   9.047e-01  1.920e-01   4.712 2.45e-06 ***
## carrier_airportEVIAH   2.641e-01  1.028e-01   2.569 0.010190 *
## carrier_airportEVLGA   6.483e-01  1.134e-01   5.716 1.09e-08 ***
## carrier_airportEVMCO   2.112e+00  1.101e+00   1.918 0.055119 .
## carrier_airportEVMDW   1.829e+00  7.391e-01   2.474 0.013362 *
## carrier_airportEVMSP   6.327e-01  1.643e-01   3.851 0.000118 ***
## carrier_airportEVORD   5.411e-01  1.040e-01   5.203 1.97e-07 ***
## carrier_airportEVPHL   2.975e-01  3.395e-01   0.876 0.380909
## carrier_airportEVSLC   4.321e-01  2.839e-01   1.522 0.127976
## carrier_airportF9ATL   6.859e-01  8.968e-02   7.648 2.04e-14 ***
## carrier_airportF9BNA   5.982e-01  9.486e-02   6.306 2.86e-10 ***
## carrier_airportF9BOS   5.438e-01  1.094e-01   4.971 6.66e-07 ***
## carrier_airportF9BWI   8.253e-01  1.037e-01   7.959 1.73e-15 ***
## carrier_airportF9CLT   7.537e-01  9.293e-02   8.111 5.03e-16 ***
## carrier_airportF9DCA   5.253e-01  9.444e-02   5.562 2.66e-08 ***
## carrier_airportF9DEN   5.116e-01  8.869e-02   5.769 7.97e-09 ***
## carrier_airportF9DFW   7.018e-01  9.321e-02   7.529 5.11e-14 ***
## carrier_airportF9DTW   5.920e-01  9.471e-02   6.250 4.10e-10 ***
## carrier_airportF9EWR   6.456e-01  1.134e-01   5.692 1.26e-08 ***
```

```
## carrier_airportF9FLL   9.687e-01  1.197e-01    8.094 5.76e-16 ***
## carrier_airportF9IAD   6.657e-01  1.100e-01    6.049 1.46e-09 ***
## carrier_airportF9IAH   6.980e-01  9.438e-02    7.396 1.41e-13 ***
## carrier_airportF9LAS   7.469e-01  8.891e-02    8.400  < 2e-16 ***
## carrier_airportF9LAX   4.481e-01  1.016e-01    4.408 1.04e-05 ***
## carrier_airportF9LGA   8.315e-01  9.349e-02    8.893  < 2e-16 ***
## carrier_airportF9MCO   7.985e-01  8.874e-02    8.997  < 2e-16 ***
## carrier_airportF9MDW   8.532e-01  2.145e-01    3.977 6.98e-05 ***
## carrier_airportF9MIA   7.949e-01  9.104e-02    8.732  < 2e-16 ***
## carrier_airportF9MSP   5.879e-01  9.459e-02    6.215 5.13e-10 ***
## carrier_airportF9ORD   7.122e-01  9.100e-02    7.826 5.02e-15 ***
## carrier_airportF9PHL   7.661e-01  8.927e-02    8.581  < 2e-16 ***
## carrier_airportF9PHX   6.294e-01  9.047e-02    6.957 3.48e-12 ***
## carrier_airportF9SAN   5.634e-01  9.206e-02    6.120 9.36e-10 ***
## carrier_airportF9SEA   6.779e-01  9.669e-02    7.011 2.36e-12 ***
## carrier_airportF9SFO   7.578e-01  9.224e-02    8.215  < 2e-16 ***
## carrier_airportF9SLC   6.063e-01  9.228e-02    6.570 5.02e-11 ***
## carrier_airportF9TPA   6.595e-01  9.010e-02    7.320 2.49e-13 ***
## carrier_airportG4BNA   7.691e-01  9.432e-02    8.154 3.52e-16 ***
## carrier_airportG4BOS   3.780e-01  1.346e-01    2.809 0.004963 **
## carrier_airportG4BWI   6.019e-01  1.032e-01    5.835 5.37e-09 ***
## carrier_airportG4DEN   7.773e-01  1.128e-01    6.892 5.49e-12 ***
## carrier_airportG4EWR  -1.942e-01  1.088e-01   -1.785 0.074279 .
## carrier_airportG4FLL   9.797e-01  8.968e-02   10.924  < 2e-16 ***
## carrier_airportG4IAD   8.524e-01  2.027e-01    4.205 2.61e-05 ***
## carrier_airportG4LAS   6.785e-01  8.899e-02    7.625 2.45e-14 ***
## carrier_airportG4LAX   6.418e-01  9.227e-02    6.956 3.50e-12 ***
## carrier_airportG4MDW   6.743e-01  1.274e-01    5.295 1.19e-07 ***
## carrier_airportG4MSP   8.875e-01  1.750e-01    5.070 3.97e-07 ***
## carrier_airportG4PHX   8.824e-01  1.906e-01    4.628 3.69e-06 ***
## carrier_airportG4SAN   6.956e-01  1.157e-01    6.011 1.85e-09 ***
## carrier_airportHABOS   7.026e-01  1.320e-01    5.325 1.01e-07 ***
## carrier_airportHAJFK   9.110e-01  1.047e-01    8.700  < 2e-16 ***
## carrier_airportHALAS   3.067e-01  9.925e-02    3.090 0.002004 **
## carrier_airportHALAX   5.443e-01  9.212e-02    5.909 3.44e-09 ***
## carrier_airportHAMCO   1.038e+00  1.733e-01    5.987 2.14e-09 ***
## carrier_airportHAPHX   4.525e-01  1.092e-01    4.142 3.44e-05 ***
## carrier_airportHASAN   7.463e-01  9.721e-02    7.677 1.63e-14 ***
## carrier_airportHASEA   1.020e+00  9.387e-02   10.870  < 2e-16 ***
## carrier_airportHASFO   6.157e-01  9.585e-02    6.424 1.33e-10 ***
## carrier_airportMQATL   3.706e-01  1.123e-01    3.299 0.000970 ***
## carrier_airportMQBNA   4.157e-01  1.016e-01    4.093 4.26e-05 ***
## carrier_airportMQBOS   3.003e-01  1.291e-01    2.326 0.020005 *
## carrier_airportMQBWI   3.099e-01  1.121e-01    2.763 0.005726 **
## carrier_airportMQCLT   2.168e-01  9.886e-02    2.193 0.028293 *
## carrier_airportMQDCA   1.956e-01  1.007e-01    1.942 0.052098 .
## carrier_airportMQDEN  -3.945e-01  6.663e-01   -0.592 0.553837
## carrier_airportMQDFW   3.437e-01  9.139e-02    3.760 0.000170 ***
## carrier_airportMQDTW   3.933e-01  1.017e-01    3.869 0.000109 ***
## carrier_airportMQEWR   7.797e-01  1.229e-01    6.343 2.26e-10 ***
## carrier_airportMQIAD   3.676e-01  2.921e-01    1.258 0.208237
## carrier_airportMQIAH   5.662e-01  1.024e-01    5.528 3.24e-08 ***
## carrier_airportMQJFK   4.870e-01  1.234e-01    3.945 7.98e-05 ***
## carrier_airportMQLGA   7.014e-01  1.183e-01    5.929 3.04e-09 ***
```

```
## carrier_airportMQMIA   2.913e-01  9.326e-02   3.123 0.001790 **
## carrier_airportMQMSP   4.111e-01  1.095e-01   3.753 0.000175 ***
## carrier_airportMQORD   2.648e-01  9.144e-02   2.896 0.003778 **
## carrier_airportMQPHL   7.094e-01  1.908e-01   3.719 0.000200 ***
## carrier_airportMQPHX  -1.380e-01  1.682e-01  -0.820 0.411938
## carrier_airportMQSLC   2.689e-01  1.888e-01   1.424 0.154472
## carrier_airportMQTPA   4.810e-01  1.579e-01   3.045 0.002323 **
## carrier_airportNKATL   4.045e-01  8.928e-02   4.531 5.88e-06 ***
## carrier_airportNKBNA   4.062e-01  1.061e-01   3.828 0.000129 ***
## carrier_airportNKBOS   5.129e-01  9.021e-02   5.685 1.31e-08 ***
## carrier_airportNKBWI   4.105e-01  8.961e-02   4.580 4.64e-06 ***
## carrier_airportNKCLT   7.376e-01  1.041e-01   7.088 1.36e-12 ***
## carrier_airportNKDEN   4.423e-01  9.103e-02   4.859 1.18e-06 ***
## carrier_airportNKDFW   4.627e-01  8.934e-02   5.179 2.24e-07 ***
## carrier_airportNKDTW   3.316e-01  8.919e-02   3.719 0.000200 ***
## carrier_airportNKEWR   6.969e-01  9.027e-02   7.720 1.16e-14 ***
## carrier_airportNKFLL   4.427e-01  8.876e-02   4.988 6.11e-07 ***
## carrier_airportNKIAH   3.854e-01  8.957e-02   4.302 1.69e-05 ***
## carrier_airportNKLAS   3.456e-01  8.886e-02   3.890 0.000100 ***
## carrier_airportNKLAX   3.731e-01  8.933e-02   4.177 2.96e-05 ***
## carrier_airportNKLGA   5.631e-01  9.050e-02   6.223 4.89e-10 ***
## carrier_airportNKMCO   4.753e-01  8.878e-02   5.354 8.61e-08 ***
## carrier_airportNKMIA   6.015e-01  1.496e-01   4.019 5.83e-05 ***
## carrier_airportNKMSP   3.418e-01  9.230e-02   3.703 0.000213 ***
## carrier_airportNKORD   5.750e-01  8.916e-02   6.449 1.13e-10 ***
## carrier_airportNKPHL   4.856e-01  9.012e-02   5.389 7.10e-08 ***
## carrier_airportNKPHX   4.504e-01  9.748e-02   4.621 3.82e-06 ***
## carrier_airportNKSAN   3.546e-01  9.376e-02   3.782 0.000156 ***
## carrier_airportNKSEA   4.090e-01  9.501e-02   4.305 1.67e-05 ***
## carrier_airportNKSLC   6.663e-01  2.378e-01   2.802 0.005073 **
## carrier_airportNKTPA   3.977e-01  8.983e-02   4.427 9.54e-06 ***
## carrier_airportOHATL   2.800e-01  9.797e-02   2.858 0.004265 **
## carrier_airportOHBNA   3.556e-01  9.900e-02   3.592 0.000328 ***
## carrier_airportOHBOS   7.015e-01  5.189e-01   1.352 0.176397
## carrier_airportOHBWI  -2.035e-02  1.517e-01  -0.134 0.893297
## carrier_airportOHCLT   1.290e-01  9.139e-02   1.412 0.157937
## carrier_airportOHDCA   3.938e-01  9.230e-02   4.267 1.98e-05 ***
## carrier_airportOHDFW   5.288e-01  1.150e-01   4.600 4.23e-06 ***
## carrier_airportOHDTW   2.925e-01  9.840e-02   2.972 0.002958 **
## carrier_airportOHEWR   8.705e-01  4.501e-01   1.934 0.053096 .
## carrier_airportOHIAD   2.316e-01  9.737e-02   2.379 0.017370 *
## carrier_airportOHIAH   7.979e-01  2.597e-01   3.073 0.002121 **
## carrier_airportOHJFK   4.521e-01  2.130e-01   2.122 0.033802 *
## carrier_airportOHLGA   7.658e-01  1.260e-01   6.077 1.22e-09 ***
## carrier_airportOHMSP   5.233e-01  1.598e-01   3.275 0.001058 **
## carrier_airportOHORD   1.919e-01  1.751e-01   1.096 0.273197
## carrier_airportOHPHL   3.037e-01  9.185e-02   3.307 0.000943 ***
## carrier_airportOOATL   4.194e-01  9.209e-02   4.554 5.27e-06 ***
## carrier_airportOOBNA   5.029e-01  8.970e-02   5.607 2.06e-08 ***
## carrier_airportOOBOS   5.239e-01  1.176e-01   4.457 8.33e-06 ***
## carrier_airportOOBWI   3.311e-01  1.166e-01   2.840 0.004508 **
## carrier_airportOOCLT   4.460e-01  9.357e-02   4.766 1.88e-06 ***
## carrier_airportOODAL   4.375e-01  1.015e-01   4.310 1.63e-05 ***
## carrier_airportOODCA   4.913e-01  9.868e-02   4.979 6.41e-07 ***
```

```
## carrier_airportOODEN   3.310e-01  8.853e-02    3.739 0.000185 ***
## carrier_airportOODFW   4.711e-01  8.902e-02    5.293 1.20e-07 ***
## carrier_airportOODTW   3.132e-01  8.930e-02    3.507 0.000454 ***
## carrier_airportOOEWR   6.675e-01  1.036e-01    6.442 1.18e-10 ***
## carrier_airportOOFLL   7.140e-01  3.797e-01    1.880 0.060045 .
## carrier_airportOOIAD   3.172e-01  9.116e-02    3.480 0.000501 ***
## carrier_airportOOIAH   4.509e-01  8.906e-02    5.063 4.13e-07 ***
## carrier_airportOOJFK   6.182e-01  1.366e-01    4.524 6.07e-06 ***
## carrier_airportOOLAS   2.068e-01  9.342e-02    2.214 0.026840 *
## carrier_airportOOLAX   1.018e-01  8.869e-02    1.148 0.251113
## carrier_airportOOLGA   6.549e-01  9.592e-02    6.827 8.64e-12 ***
## carrier_airportOOMCO   1.004e+00  4.808e-01    2.089 0.036737 *
## carrier_airportOOMDW   3.389e-01  1.139e-01    2.976 0.002923 **
## carrier_airportOOMSP   1.064e-01  8.957e-02    1.188 0.234715
## carrier_airportOOORD   4.323e-01  8.854e-02    4.883 1.05e-06 ***
## carrier_airportOOPHL   4.192e-01  1.081e-01    3.879 0.000105 ***
## carrier_airportOOPHX   4.268e-02  8.987e-02    0.475 0.634852
## carrier_airportOOSAN  -3.141e-02  8.983e-02   -0.350 0.726625
## carrier_airportOOSEA   7.168e-02  8.996e-02    0.797 0.425569
## carrier_airportOOSFO   3.907e-01  8.860e-02    4.410 1.03e-05 ***
## carrier_airportOOSLC  -2.032e-02  8.894e-02   -0.229 0.819247
## carrier_airportOOTPA   9.384e-01  2.531e-01    3.708 0.000209 ***
## carrier_airportQXDAL   8.423e-01  2.877e-01    2.928 0.003417 **
## carrier_airportQXDFW   9.775e-01  3.477e-01    2.811 0.004935 **
## carrier_airportQXLAS   3.107e-01  1.342e-01    2.315 0.020590 *
## carrier_airportQXLAX   3.912e-01  1.275e-01    3.068 0.002155 **
## carrier_airportQXMSP  -7.291e-02  2.422e-01   -0.301 0.763419
## carrier_airportQXORD   5.668e-01  1.703e-01    3.328 0.000873 ***
## carrier_airportQXPHX   3.258e-01  1.363e-01    2.390 0.016866 *
## carrier_airportQXSAN   1.587e-01  1.317e-01    1.205 0.228020
## carrier_airportQXSEA   1.756e-01  1.194e-01    1.471 0.141193
## carrier_airportQXSFO   2.989e-01  1.261e-01    2.370 0.017799 *
## carrier_airportQXSLC   5.063e-01  1.783e-01    2.839 0.004526 **
## carrier_airportUAATL   5.003e-01  9.101e-02    5.497 3.87e-08 ***
## carrier_airportUABNA   4.734e-01  9.219e-02    5.135 2.82e-07 ***
## carrier_airportUABOS   4.351e-01  8.917e-02    4.879 1.07e-06 ***
## carrier_airportUABWI   4.120e-01  9.145e-02    4.505 6.62e-06 ***
## carrier_airportUACLT   7.510e-01  9.892e-02    7.593 3.14e-14 ***
## carrier_airportUADCA   3.699e-01  9.129e-02    4.052 5.07e-05 ***
## carrier_airportUADEN   1.739e-01  8.854e-02    1.965 0.049460 *
## carrier_airportUADFW   5.939e-01  8.978e-02    6.615 3.72e-11 ***
## carrier_airportUADTW   5.373e-01  9.864e-02    5.447 5.11e-08 ***
## carrier_airportUAEWR   5.877e-01  8.852e-02    6.640 3.15e-11 ***
## carrier_airportUAFLL   4.980e-01  8.936e-02    5.574 2.50e-08 ***
## carrier_airportUAIAD   1.854e-01  8.877e-02    2.089 0.036709 *
## carrier_airportUAIAH   1.918e-01  8.857e-02    2.165 0.030350 *
## carrier_airportUAJFK   4.299e-01  1.362e-01    3.157 0.001592 **
## carrier_airportUALAS   3.157e-01  8.912e-02    3.542 0.000397 ***
## carrier_airportUALAX   2.225e-01  8.879e-02    2.505 0.012232 *
## carrier_airportUALGA   5.648e-01  8.995e-02    6.279 3.41e-10 ***
## carrier_airportUAMCO   3.788e-01  8.904e-02    4.254 2.10e-05 ***
## carrier_airportUAMIA   5.733e-01  8.979e-02    6.384 1.72e-10 ***
## carrier_airportUAMSP   4.690e-01  9.079e-02    5.166 2.40e-07 ***
## carrier_airportUAORD   2.455e-01  8.854e-02    2.773 0.005557 **
```

```
## carrier_airportUAPHL   5.212e-01  9.131e-02   5.707 1.15e-08 ***
## carrier_airportUAPHX   3.391e-01  8.947e-02   3.790 0.000150 ***
## carrier_airportUASAN   2.327e-01  8.940e-02   2.603 0.009250 **
## carrier_airportUASEA   4.090e-01  8.936e-02   4.577 4.72e-06 ***
## carrier_airportUASFO   3.095e-01  8.859e-02   3.494 0.000475 ***
## carrier_airportUASLC   4.806e-01  9.385e-02   5.121 3.04e-07 ***
## carrier_airportUATPA   4.053e-01  8.942e-02   4.533 5.81e-06 ***
## carrier_airportVXBNA   6.196e-03  4.059e-01   0.015 0.987822
## carrier_airportVXBOS   5.251e-02  3.180e-01   0.165 0.868840
## carrier_airportVXBWI  -1.006e+00  5.691e-01  -1.768 0.077050 .
## carrier_airportVXDAL   3.151e-01  2.879e-01   1.094 0.273753
## carrier_airportVXDCA   1.519e-02  3.354e-01   0.045 0.963884
## carrier_airportVXDEN   3.747e-01  3.274e-01   1.144 0.252543
## carrier_airportVXEWR   5.591e-01  2.869e-01   1.949 0.051316 .
## carrier_airportVXFLL   2.659e-01  3.051e-01   0.871 0.383551
## carrier_airportVXIAD  -3.317e-01  3.274e-01  -1.013 0.310993
## carrier_airportVXJFK   1.921e-01  2.835e-01   0.678 0.498053
## carrier_airportVXLAS   3.758e-01  2.816e-01   1.334 0.182078
## carrier_airportVXLAX   3.388e-01  2.746e-01   1.234 0.217317
## carrier_airportVXMCO   3.303e-01  3.274e-01   1.009 0.313046
## carrier_airportVXORD   4.066e-01  3.172e-01   1.282 0.199885
## carrier_airportVXPHL  -4.498e-01  3.811e-01  -1.180 0.237927
## carrier_airportVXSAN   4.848e-01  2.902e-01   1.670 0.094821 .
## carrier_airportVXSEA   7.195e-01  2.810e-01   2.561 0.010449 *
## carrier_airportVXSFO   6.563e-01  2.730e-01   2.404 0.016219 *
## carrier_airportWNATL   2.906e-01  8.862e-02   3.280 0.001040 **
## carrier_airportWNBNA   2.744e-01  8.860e-02   3.097 0.001954 **
## carrier_airportWNBOS   4.960e-01  8.933e-02   5.552 2.82e-08 ***
## carrier_airportWNBWI   2.128e-01  8.853e-02   2.404 0.016217 *
## carrier_airportWNCLT   5.934e-01  9.047e-02   6.559 5.40e-11 ***
## carrier_airportWNDAL   4.228e-01  8.851e-02   4.777 1.78e-06 ***
## carrier_airportWNDCA   3.933e-01  8.897e-02   4.421 9.82e-06 ***
## carrier_airportWNDEN   3.911e-01  8.850e-02   4.420 9.89e-06 ***
## carrier_airportWNDTW   5.830e-01  8.973e-02   6.497 8.19e-11 ***
## carrier_airportWNEWR   1.079e+00  1.168e-01   9.232  < 2e-16 ***
## carrier_airportWNFLL   3.100e-01  8.881e-02   3.490 0.000482 ***
## carrier_airportWNIAD   5.285e-01  9.164e-02   5.767 8.06e-09 ***
## carrier_airportWNIAH   7.043e-01  1.274e-01   5.531 3.19e-08 ***
## carrier_airportWNLAS   3.020e-01  8.852e-02   3.412 0.000646 ***
## carrier_airportWNLAX   4.064e-01  8.863e-02   4.585 4.54e-06 ***
## carrier_airportWNLGA   6.022e-01  8.898e-02   6.769 1.30e-11 ***
## carrier_airportWNMCO   3.995e-01  8.858e-02   4.510 6.49e-06 ***
## carrier_airportWNMDW   2.864e-01  8.851e-02   3.236 0.001213 **
## carrier_airportWNMIA   7.719e-01  1.165e-01   6.627 3.43e-11 ***
## carrier_airportWNMSP   5.364e-01  8.942e-02   5.998 2.00e-09 ***
## carrier_airportWNORD   9.886e-01  1.218e-01   8.115 4.87e-16 ***
## carrier_airportWNPHL   5.797e-01  8.945e-02   6.480 9.16e-11 ***
## carrier_airportWNPHX   3.767e-01  8.852e-02   4.255 2.09e-05 ***
## carrier_airportWNSAN   3.131e-01  8.865e-02   3.532 0.000413 ***
## carrier_airportWNSEA   5.597e-01  8.903e-02   6.287 3.24e-10 ***
## carrier_airportWNSFO   6.264e-01  8.894e-02   7.043 1.88e-12 ***
## carrier_airportWNSLC   5.672e-01  8.898e-02   6.374 1.84e-10 ***
## carrier_airportWNTPA   4.159e-01  8.869e-02   4.689 2.74e-06 ***
## carrier_airportYVATL   4.708e-01  9.263e-02   5.083 3.72e-07 ***
```

```
## carrier_airportYVBNA   3.080e-01  9.738e-02   3.163 0.001562 **
## carrier_airportYVBOS   2.334e-01  2.050e-01   1.138 0.254924
## carrier_airportYVBWI  -1.291e-01  1.760e-01  -0.734 0.463144
## carrier_airportYVCLT   4.049e-01  9.227e-02   4.388 1.14e-05 ***
## carrier_airportYVDCA   2.557e-01  9.749e-02   2.623 0.008710 **
## carrier_airportYVDFW   5.457e-01  8.890e-02   6.139 8.33e-10 ***
## carrier_airportYVDTW   3.343e-01  9.491e-02   3.522 0.000428 ***
## carrier_airportYVFLL  -7.105e-01  5.603e-01  -1.268 0.204779
## carrier_airportYVIAD   2.194e-01  8.904e-02   2.464 0.013745 *
## carrier_airportYVIAH   2.489e-01  8.868e-02   2.807 0.005003 **
## carrier_airportYVLGA   5.587e-01  9.230e-02   6.054 1.42e-09 ***
## carrier_airportYVMIA   6.156e-01  1.521e-01   4.048 5.16e-05 ***
## carrier_airportYVMSP   3.692e-01  9.575e-02   3.856 0.000115 ***
## carrier_airportYVORD   2.497e-01  1.933e-01   1.292 0.196493
## carrier_airportYVPHL   2.503e-01  1.029e-01   2.432 0.015029 *
## carrier_airportYVPHX   2.509e-01  9.209e-02   2.725 0.006439 **
## carrier_airportYVSAN  -6.980e-01  1.065e+00  -0.655 0.512304
## carrier_airportYVSLC   5.189e-01  1.086e-01   4.778 1.77e-06 ***
## carrier_airportYVTPA   2.724e-02  3.451e-01   0.079 0.937093
## carrier_airportYXATL   2.489e-01  9.043e-02   2.752 0.005924 **
## carrier_airportYXBNA   1.691e-01  9.109e-02   1.857 0.063313 .
## carrier_airportYXBOS   2.027e-01  9.108e-02   2.225 0.026049 *
## carrier_airportYXBWI   1.225e-01  1.176e-01   1.042 0.297340
## carrier_airportYXCLT   1.259e-01  8.955e-02   1.406 0.159840
## carrier_airportYXDCA   1.488e-01  8.906e-02   1.671 0.094733 .
## carrier_airportYXDEN   1.593e-01  1.099e-01   1.449 0.147266
## carrier_airportYXDFW   4.213e-01  9.831e-02   4.286 1.82e-05 ***
## carrier_airportYXDTW   1.604e-01  8.980e-02   1.787 0.074005 .
## carrier_airportYXEWR   5.149e-01  8.868e-02   5.806 6.39e-09 ***
## carrier_airportYXFLL  -2.820e-01  3.724e-01  -0.757 0.448950
## carrier_airportYXIAD   1.090e-01  1.002e-01   1.088 0.276805
## carrier_airportYXIAH   2.997e-01  9.226e-02   3.248 0.001163 **
## carrier_airportYXJFK   1.457e-01  9.323e-02   1.563 0.118000
## carrier_airportYXLGA   3.331e-01  8.947e-02   3.723 0.000197 ***
## carrier_airportYXMCO   2.136e-01  1.894e-01   1.128 0.259500
## carrier_airportYXMDW   1.457e-01  1.818e-01   0.801 0.422990
## carrier_airportYXMIA   1.453e-01  9.923e-02   1.464 0.143241
## carrier_airportYXMSP   2.637e-01  9.151e-02   2.882 0.003954 **
## carrier_airportYXORD   1.966e-01  8.889e-02   2.212 0.026957 *
## carrier_airportYXPHL  -9.644e-03  9.210e-02  -0.105 0.916607
## carrier_airportYXSEA   3.071e-01  7.933e-01   0.387 0.698700
## carrier_airportYXSLC   3.215e-01  1.266e-01   2.540 0.011079 *
## carrier_airportYXTPA   1.036e-01  1.311e-01   0.790 0.429312
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


## # Overdispersion test
##
##        dispersion ratio =      0.877
##   Pearson's Chi-Squared = 16006.540
##               p-value =          1


##  Family: nbinom2  ( log )
## Formula:          arr_del15 ~ date + carrier + offset(log(arr_flights)) + (1 |
```

```
##     airport)
## Data: airline_data
##
##       AIC      BIC   logLik deviance df.resid
## 177018.0 177190.3 -88487.0 176974.0    18651
##
## Random effects:
##
## Conditional model:
##  Groups  Name        Variance Std.Dev.
##  airport (Intercept) 0.006297 0.07935
## Number of obs: 18673, groups:  airport, 30
##
## Dispersion parameter for nbinom2 family (): 4.39
##
## Conditional model:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept) -1.134e+00  1.341e-01  -8.453  < 2e-16 ***
## date        -4.673e-05  7.185e-06  -6.505 7.79e-11 ***
## carrierAA    3.098e-01  2.272e-02  13.637  < 2e-16 ***
## carrierAS    1.740e-01  2.382e-02   7.305 2.78e-13 ***
## carrierB6    5.292e-01  2.335e-02  22.667  < 2e-16 ***
## carrierDL    2.423e-02  2.256e-02   1.074   0.2829
## carrierEV    3.921e-01  3.594e-02  10.910  < 2e-16 ***
## carrierF9    5.260e-01  2.365e-02  22.240  < 2e-16 ***
## carrierG4    5.377e-01  3.185e-02  16.884  < 2e-16 ***
## carrierHA    5.726e-01  3.455e-02  16.571  < 2e-16 ***
## carrierMQ    1.982e-01  2.860e-02   6.928 4.28e-12 ***
## carrierNK    2.946e-01  2.397e-02  12.290  < 2e-16 ***
## carrierOH    1.851e-01  3.110e-02   5.952 2.64e-09 ***
## carrierOO    1.850e-01  2.378e-02   7.782 7.13e-15 ***
## carrierQX    2.096e-01  4.755e-02   4.409 1.04e-05 ***
## carrierUA    2.520e-01  2.300e-02  10.955  < 2e-16 ***
## carrierVX    1.298e-01  7.495e-02   1.732   0.0833 .
## carrierWN    3.275e-01  2.312e-02  14.170  < 2e-16 ***
## carrierYV    2.029e-01  2.710e-02   7.487 7.03e-14 ***
## carrierYX    3.841e-02  2.480e-02   1.548   0.1215
## ---
## Signif. codes:  0 ’***’ 0.001 ’**’ 0.01 ’*’ 0.05 ’.’ 0.1 ’ ’ 1


## # Overdispersion test
##
##        dispersion ratio =     0.866
##   Pearson’s Chi-Squared = 16159.939
##               p-value =         1


##  Family: nbinom2  ( log )
## Formula:          arr_del15 ~ date + airport + offset(log(arr_flights)) + (1 |
##     carrier)
## Data: airline_data
##
##       AIC      BIC   logLik deviance df.resid
## 177031.0 177289.5 -88482.5 176965.0    18640
##
```

```
## Random effects:
##
## Conditional model:
##  Groups  Name        Variance Std.Dev.
##  carrier (Intercept) 0.02917  0.1708
## Number of obs: 18673, groups:  carrier, 19
##
## Dispersion parameter for nbinom2 family ():  4.4
##
## Conditional model:
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept) -9.002e-01  1.389e-01  -6.479 9.26e-11 ***
## date        -4.644e-05  7.177e-06  -6.471 9.73e-11 ***
## airportBNA   3.248e-02  2.576e-02   1.261 0.207378
## airportBOS   3.238e-02  2.678e-02   1.209 0.226702
## airportBWI  -5.277e-02  2.759e-02  -1.913 0.055773 .
## airportCLT   1.049e-02  2.668e-02   0.393 0.694052
## airportDAL   5.953e-02  4.140e-02   1.438 0.150482
## airportDCA  -2.284e-02  2.622e-02  -0.871 0.383617
## airportDEN   2.275e-03  2.766e-02   0.082 0.934436
## airportDFW   1.260e-01  2.660e-02   4.738 2.16e-06 ***
## airportDTW  -3.308e-02  2.601e-02  -1.272 0.203456
## airportEWR   2.914e-01  2.678e-02  10.881  < 2e-16 ***
## airportFLL   1.018e-01  2.915e-02   3.494 0.000476 ***
## airportIAD  -2.624e-02  2.794e-02  -0.939 0.347605
## airportIAH   7.217e-02  2.689e-02   2.684 0.007277 **
## airportJFK   5.113e-02  3.032e-02   1.686 0.091797 .
## airportLAS  -4.002e-02  2.697e-02  -1.484 0.137819
## airportLAX  -8.317e-02  2.706e-02  -3.074 0.002115 **
## airportLGA   1.960e-01  2.637e-02   7.432 1.07e-13 ***
## airportMCO   6.769e-02  2.890e-02   2.342 0.019175 *
## airportMDW  -6.946e-02  4.254e-02  -1.633 0.102519
## airportMIA   1.185e-01  3.102e-02   3.820 0.000134 ***
## airportMSP  -1.185e-02  2.625e-02  -0.451 0.651720
## airportORD   7.763e-02  2.619e-02   2.964 0.003037 **
## airportPHL   1.344e-02  2.652e-02   0.507 0.612202
## airportPHX  -6.441e-02  2.721e-02  -2.367 0.017918 *
## airportSAN  -9.991e-02  2.762e-02  -3.617 0.000298 ***
## airportSEA   2.727e-02  2.799e-02   0.974 0.329873
## airportSFO   7.277e-02  2.833e-02   2.569 0.010204 *
## airportSLC   1.833e-02  2.877e-02   0.637 0.524077
## airportTPA   1.730e-02  2.884e-02   0.600 0.548632
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

## # Overdispersion test
##
##       dispersion ratio =     0.867
##   Pearson's Chi-Squared = 16168.414
##               p-value =         1
```

MODELS FOR REASONS FOR DELAY

```
## Family: nbinom2  ( log )
```

```
## Formula:          round(carrier_ct) ~ date + carrier + offset(log(arr_flights))
## Data: airline_data
##
##      AIC      BIC   logLik deviance df.resid
## 137035.0 137199.6 -68496.5 136993.0    18682
##
##
## Dispersion parameter for nbinom2 family (): 5.26
##
## Conditional model:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept) -8.283e+00  1.369e-01  -60.51  < 2e-16 ***
## date         2.672e-04  7.352e-06   36.34  < 2e-16 ***
## carrierAA    6.510e-01  2.408e-02   27.04  < 2e-16 ***
## carrierAS    3.272e-01  2.625e-02   12.47  < 2e-16 ***
## carrierB6    1.022e+00  2.493e-02   40.99  < 2e-16 ***
## carrierDL    3.970e-01  2.402e-02   16.53  < 2e-16 ***
## carrierEV    3.659e-01  4.028e-02    9.09  < 2e-16 ***
## carrierF9    7.787e-01  2.571e-02   30.29  < 2e-16 ***
## carrierG4    5.229e-01  3.548e-02   14.74  < 2e-16 ***
## carrierHA    1.773e+00  3.402e-02   52.13  < 2e-16 ***
## carrierMQ    4.244e-02  3.194e-02    1.33  0.18401
## carrierNK    2.132e-01  2.574e-02    8.28  < 2e-16 ***
## carrierOH    2.172e-01  3.405e-02    6.38 1.78e-10 ***
## carrierOO    6.023e-01  2.529e-02   23.82  < 2e-16 ***
## carrierQX    1.829e-01  5.316e-02    3.44  0.00058 ***
## carrierUA    3.584e-01  2.461e-02   14.57  < 2e-16 ***
## carrierVX    5.966e-01  8.337e-02    7.16 8.32e-13 ***
## carrierWN    6.665e-01  2.429e-02   27.43  < 2e-16 ***
## carrierYV    5.795e-01  2.952e-02   19.63  < 2e-16 ***
## carrierYX    2.438e-02  2.692e-02    0.91  0.36496
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


##  Family: nbinom2  ( log )
## Formula:          round(weather_ct) ~ date + carrier + offset(log(arr_flights))
## Data: airline_data
##
##      AIC      BIC   logLik deviance df.resid
##  74994.4  75158.9 -37476.2  74952.4    18682
##
##
## Dispersion parameter for nbinom2 family (): 1.97
##
## Conditional model:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept) -6.892e+00  2.678e-01 -25.737  < 2e-16 ***
## date         8.889e-05  1.439e-05   6.177 6.54e-10 ***
## carrierAA    3.448e-01  4.434e-02   7.777 7.45e-15 ***
## carrierAS   -5.654e-01  5.526e-02 -10.231  < 2e-16 ***
## carrierB6   -9.475e-02  4.966e-02  -1.908 0.056378 .
## carrierDL    1.301e-02  4.464e-02   0.292 0.770648
## carrierEV   -3.895e-01  8.094e-02  -4.812 1.50e-06 ***
## carrierF9   -3.330e-01  5.452e-02  -6.108 1.01e-09 ***
```

```
## carrierG4     5.658e-01  6.962e-02   8.127 4.40e-16 ***
## carrierHA    -1.394e+00  1.812e-01  -7.697 1.39e-14 ***
## carrierMQ     5.476e-01  5.762e-02   9.504  < 2e-16 ***
## carrierNK     1.771e-01  4.803e-02   3.686 0.000227 ***
## carrierOH     2.284e-01  6.422e-02   3.557 0.000376 ***
## carrierOO     8.495e-01  4.596e-02  18.485  < 2e-16 ***
## carrierQX    -2.189e-01  1.119e-01  -1.957 0.050386 .
## carrierUA     3.380e-01  4.549e-02   7.431 1.08e-13 ***
## carrierVX    -1.169e+00  2.517e-01  -4.645 3.41e-06 ***
## carrierWN    -5.304e-01  4.572e-02 -11.601  < 2e-16 ***
## carrierYV     9.273e-01  5.349e-02  17.337  < 2e-16 ***
## carrierYX    -7.767e-02  5.010e-02  -1.550 0.121113
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


## Warning in fitTMB(TMBStruc): Model convergence problem; singular convergence
## (7). See vignette('troubleshooting')


##  Family: nbinom2  ( log )
## Formula:
## round(nas_ct) ~ date + carrier_airport + offset(log(arr_flights))
## Data: airline_data
##
##      AIC      BIC   logLik deviance df.resid
## 142153.5 145491.8 -70650.7 141301.5    18277
##
##
## Dispersion parameter for nbinom2 family ():  2.8
##
## Conditional model:
##                     Estimate Std. Error z value Pr(>|z|)
## (Intercept)            2.562e+00       NaN     NaN      NaN
## date                  -3.243e-04       NaN     NaN      NaN
## carrier_airport9EBNA   4.690e-01       NaN     NaN      NaN
## carrier_airport9EBOS   5.481e-01       NaN     NaN      NaN
## carrier_airport9EBWI   2.562e-01       NaN     NaN      NaN
## carrier_airport9ECLT   3.768e-01       NaN     NaN      NaN
## carrier_airport9EDAL   7.435e-01       NaN     NaN      NaN
## carrier_airport9EDCA   6.047e-01       NaN     NaN      NaN
## carrier_airport9EDEN  -1.649e+01       NaN     NaN      NaN
## carrier_airport9EDFW   9.844e-01       NaN     NaN      NaN
## carrier_airport9EDTW  -2.488e-01       NaN     NaN      NaN
## carrier_airport9EEWR   1.303e+00       NaN     NaN      NaN
## carrier_airport9EFLL   8.226e-01       NaN     NaN      NaN
## carrier_airport9EIAD   4.768e-01       NaN     NaN      NaN
## carrier_airport9EIAH   9.327e-01       NaN     NaN      NaN
## carrier_airport9EJFK   4.256e-01       NaN     NaN      NaN
## carrier_airport9ELGA   8.873e-01       NaN     NaN      NaN
## carrier_airport9EMCO   6.589e-02       NaN     NaN      NaN
## carrier_airport9EMDW   3.972e-01       NaN     NaN      NaN
## carrier_airport9EMIA   2.444e-01       NaN     NaN      NaN
## carrier_airport9EMSP  -1.096e-01       NaN     NaN      NaN
## carrier_airport9EORD   7.705e-01       NaN     NaN      NaN
## carrier_airport9EPHL   5.598e-01       NaN     NaN      NaN
```

```
## carrier_airport9ETPA  -4.067e-01        NaN    NaN    NaN
## carrier_airportAAATL    4.164e-01        NaN    NaN    NaN
## carrier_airportAABNA    7.815e-02        NaN    NaN    NaN
## carrier_airportAABOS    4.621e-01        NaN    NaN    NaN
## carrier_airportAABWI    2.691e-01        NaN    NaN    NaN
## carrier_airportAACLT    8.458e-02        NaN    NaN    NaN
## carrier_airportAADCA    2.772e-01        NaN    NaN    NaN
## carrier_airportAADEN    6.079e-01        NaN    NaN    NaN
## carrier_airportAADFW    5.182e-01        NaN    NaN    NaN
## carrier_airportAADTW    8.182e-02        NaN    NaN    NaN
## carrier_airportAAEWR    1.250e+00        NaN    NaN    NaN
## carrier_airportAAFLL    6.309e-01        NaN    NaN    NaN
## carrier_airportAAIAD    2.567e-01        NaN    NaN    NaN
## carrier_airportAAIAH    6.877e-01        NaN    NaN    NaN
## carrier_airportAAJFK    6.214e-01        NaN    NaN    NaN
## carrier_airportAALAS    5.165e-01        NaN    NaN    NaN
## carrier_airportAALAX    3.536e-01        NaN    NaN    NaN
## carrier_airportAALGA    7.683e-01        NaN    NaN    NaN
## carrier_airportAAMCO    5.832e-01        NaN    NaN    NaN
## carrier_airportAAMIA    5.258e-01        NaN    NaN    NaN
## carrier_airportAAMSP    2.928e-01        NaN    NaN    NaN
## carrier_airportAAORD    4.976e-01        NaN    NaN    NaN
## carrier_airportAAPHL    3.674e-01        NaN    NaN    NaN
## carrier_airportAAPHX    2.495e-01        NaN    NaN    NaN
## carrier_airportAASAN    5.257e-01        NaN    NaN    NaN
## carrier_airportAASEA    7.154e-01        NaN    NaN    NaN
## carrier_airportAASFO    9.605e-01        NaN    NaN    NaN
## carrier_airportAASLC    4.170e-01        NaN    NaN    NaN
## carrier_airportAATPA    4.686e-01        NaN    NaN    NaN
## carrier_airportASATL    6.192e-01        NaN    NaN    NaN
## carrier_airportASBNA    7.631e-01        NaN    NaN    NaN
## carrier_airportASBOS    1.007e+00        NaN    NaN    NaN
## carrier_airportASBWI    6.766e-01        NaN    NaN    NaN
## carrier_airportASDAL    1.162e+00        NaN    NaN    NaN
## carrier_airportASDCA    8.485e-01        NaN    NaN    NaN
## carrier_airportASDEN    8.696e-01        NaN    NaN    NaN
## carrier_airportASDFW    6.802e-01        NaN    NaN    NaN
## carrier_airportASDTW    4.089e-01        NaN    NaN    NaN
## carrier_airportASEWR    1.487e+00        NaN    NaN    NaN
## carrier_airportASFLL    8.776e-01        NaN    NaN    NaN
## carrier_airportASIAD    8.724e-01        NaN    NaN    NaN
## carrier_airportASIAH    7.825e-01        NaN    NaN    NaN
## carrier_airportASJFK    1.031e+00        NaN    NaN    NaN
## carrier_airportASLAS    6.268e-01        NaN    NaN    NaN
## carrier_airportASLAX    6.890e-01        NaN    NaN    NaN
## carrier_airportASMCO    1.005e+00        NaN    NaN    NaN
## carrier_airportASMIA    1.139e+00        NaN    NaN    NaN
## carrier_airportASMSP    4.232e-01        NaN    NaN    NaN
## carrier_airportASORD    8.848e-01        NaN    NaN    NaN
## carrier_airportASPHL    6.600e-01        NaN    NaN    NaN
## carrier_airportASPHX    5.380e-01        NaN    NaN    NaN
## carrier_airportASSAN    5.575e-01        NaN    NaN    NaN
## carrier_airportASSEA    8.074e-01        NaN    NaN    NaN
## carrier_airportASSFO    9.148e-01        NaN    NaN    NaN
```

```
## carrier_airportASSLC    5.850e-01        NaN    NaN    NaN
## carrier_airportASTPA    8.218e-01        NaN    NaN    NaN
## carrier_airportB6ATL    5.597e-01        NaN    NaN    NaN
## carrier_airportB6BNA    5.708e-01        NaN    NaN    NaN
## carrier_airportB6BOS    5.646e-01        NaN    NaN    NaN
## carrier_airportB6BWI    1.225e-01        NaN    NaN    NaN
## carrier_airportB6CLT    4.507e-01        NaN    NaN    NaN
## carrier_airportB6DCA    4.688e-01        NaN    NaN    NaN
## carrier_airportB6DEN    7.958e-01        NaN    NaN    NaN
## carrier_airportB6DFW    1.042e+00        NaN    NaN    NaN
## carrier_airportB6DTW    2.530e-01        NaN    NaN    NaN
## carrier_airportB6EWR    1.356e+00        NaN    NaN    NaN
## carrier_airportB6FLL    6.642e-01        NaN    NaN    NaN
## carrier_airportB6IAD    2.796e-01        NaN    NaN    NaN
## carrier_airportB6IAH    1.118e+00        NaN    NaN    NaN
## carrier_airportB6JFK    6.629e-01        NaN    NaN    NaN
## carrier_airportB6LAS    7.729e-01        NaN    NaN    NaN
## carrier_airportB6LAX    8.218e-01        NaN    NaN    NaN
## carrier_airportB6LGA    1.185e+00        NaN    NaN    NaN
## carrier_airportB6MCO    6.389e-01        NaN    NaN    NaN
## carrier_airportB6MIA    1.122e+00        NaN    NaN    NaN
## carrier_airportB6MSP    4.218e-01        NaN    NaN    NaN
## carrier_airportB6ORD    1.073e+00        NaN    NaN    NaN
## carrier_airportB6PHL    5.229e-01        NaN    NaN    NaN
## carrier_airportB6PHX    8.809e-01        NaN    NaN    NaN
## carrier_airportB6SAN    7.231e-01        NaN    NaN    NaN
## carrier_airportB6SEA    9.284e-01        NaN    NaN    NaN
## carrier_airportB6SFO    9.472e-01        NaN    NaN    NaN
## carrier_airportB6SLC    5.863e-01        NaN    NaN    NaN
## carrier_airportB6TPA    7.583e-01        NaN    NaN    NaN
## carrier_airportDLATL    5.405e-02        NaN    NaN    NaN
## carrier_airportDLBNA   -1.283e-01        NaN    NaN    NaN
## carrier_airportDLBOS    6.243e-01        NaN    NaN    NaN
## carrier_airportDLBWI   -8.983e-03        NaN    NaN    NaN
## carrier_airportDLCLT    5.365e-02        NaN    NaN    NaN
## carrier_airportDLDAL    4.706e-01        NaN    NaN    NaN
## carrier_airportDLDCA    3.734e-01        NaN    NaN    NaN
## carrier_airportDLDEN    6.158e-01        NaN    NaN    NaN
## carrier_airportDLDFW    7.349e-01        NaN    NaN    NaN
## carrier_airportDLDTW   -7.334e-02        NaN    NaN    NaN
## carrier_airportDLEWR    1.242e+00        NaN    NaN    NaN
## carrier_airportDLFLL    6.192e-01        NaN    NaN    NaN
## carrier_airportDLIAD   -9.920e-03        NaN    NaN    NaN
## carrier_airportDLIAH    5.627e-01        NaN    NaN    NaN
## carrier_airportDLJFK    5.797e-01        NaN    NaN    NaN
## carrier_airportDLLAS    4.181e-01        NaN    NaN    NaN
## carrier_airportDLLAX    5.918e-01        NaN    NaN    NaN
## carrier_airportDLLGA    8.581e-01        NaN    NaN    NaN
## carrier_airportDLMCO    5.323e-01        NaN    NaN    NaN
## carrier_airportDLMDW   -2.167e-01        NaN    NaN    NaN
## carrier_airportDLMIA    6.484e-01        NaN    NaN    NaN
## carrier_airportDLMSP   -1.164e-03        NaN    NaN    NaN
## carrier_airportDLORD    8.273e-01        NaN    NaN    NaN
## carrier_airportDLPHL    3.588e-01        NaN    NaN    NaN
```

```
## carrier_airportDLPHX   5.072e-01        NaN    NaN    NaN
## carrier_airportDLSAN   3.620e-01        NaN    NaN    NaN
## carrier_airportDLSEA   3.102e-01        NaN    NaN    NaN
## carrier_airportDLSFO   8.759e-01        NaN    NaN    NaN
## carrier_airportDLSLC   2.129e-02        NaN    NaN    NaN
## carrier_airportDLTPA   3.534e-01        NaN    NaN    NaN
## carrier_airportEVATL   4.522e-01        NaN    NaN    NaN
## carrier_airportEVBNA   8.161e-01        NaN    NaN    NaN
## carrier_airportEVBOS   7.955e-01        NaN    NaN    NaN
## carrier_airportEVBWI  -3.720e-01        NaN    NaN    NaN
## carrier_airportEVCLT   5.117e-01        NaN    NaN    NaN
## carrier_airportEVDCA   4.898e-01        NaN    NaN    NaN
## carrier_airportEVDEN  -2.011e+00        NaN    NaN    NaN
## carrier_airportEVDFW   5.916e-01        NaN    NaN    NaN
## carrier_airportEVDTW   7.603e-01        NaN    NaN    NaN
## carrier_airportEVEWR   1.695e+00        NaN    NaN    NaN
## carrier_airportEVIAD   7.544e-01        NaN    NaN    NaN
## carrier_airportEVIAH   7.715e-01        NaN    NaN    NaN
## carrier_airportEVLGA   1.291e+00        NaN    NaN    NaN
## carrier_airportEVMCO  -7.429e+00        NaN    NaN    NaN
## carrier_airportEVMDW  -1.299e+01        NaN    NaN    NaN
## carrier_airportEVMSP   7.366e-01        NaN    NaN    NaN
## carrier_airportEVORD   9.140e-01        NaN    NaN    NaN
## carrier_airportEVPHL   5.196e-01        NaN    NaN    NaN
## carrier_airportEVSLC   1.162e+00        NaN    NaN    NaN
## carrier_airportF9ATL   7.170e-01        NaN    NaN    NaN
## carrier_airportF9BNA   6.292e-01        NaN    NaN    NaN
## carrier_airportF9BOS   9.501e-01        NaN    NaN    NaN
## carrier_airportF9BWI   9.144e-01        NaN    NaN    NaN
## carrier_airportF9CLT   7.766e-01        NaN    NaN    NaN
## carrier_airportF9DCA   6.210e-01        NaN    NaN    NaN
## carrier_airportF9DEN   7.214e-01        NaN    NaN    NaN
## carrier_airportF9DFW   9.870e-01        NaN    NaN    NaN
## carrier_airportF9DTW   4.633e-01        NaN    NaN    NaN
## carrier_airportF9EWR   1.098e+00        NaN    NaN    NaN
## carrier_airportF9FLL   1.346e+00        NaN    NaN    NaN
## carrier_airportF9IAD   5.926e-01        NaN    NaN    NaN
## carrier_airportF9IAH   7.793e-01        NaN    NaN    NaN
## carrier_airportF9LAS   9.462e-01        NaN    NaN    NaN
## carrier_airportF9LAX   4.946e-01        NaN    NaN    NaN
## carrier_airportF9LGA   1.327e+00        NaN    NaN    NaN
## carrier_airportF9MCO   1.058e+00        NaN    NaN    NaN
## carrier_airportF9MDW   1.285e+00        NaN    NaN    NaN
## carrier_airportF9MIA   8.894e-01        NaN    NaN    NaN
## carrier_airportF9MSP   5.720e-01        NaN    NaN    NaN
## carrier_airportF9ORD   8.294e-01        NaN    NaN    NaN
## carrier_airportF9PHL   8.717e-01        NaN    NaN    NaN
## carrier_airportF9PHX   6.720e-01        NaN    NaN    NaN
## carrier_airportF9SAN   7.854e-01        NaN    NaN    NaN
## carrier_airportF9SEA   7.882e-01        NaN    NaN    NaN
## carrier_airportF9SFO   1.075e+00        NaN    NaN    NaN
## carrier_airportF9SLC   5.127e-01        NaN    NaN    NaN
## carrier_airportF9TPA   8.366e-01        NaN    NaN    NaN
## carrier_airportG4BNA   7.045e-01        NaN    NaN    NaN
```

```
## carrier_airportG4BOS   1.079e+00        NaN   NaN   NaN
## carrier_airportG4BWI   3.501e-01        NaN   NaN   NaN
## carrier_airportG4DEN   1.264e+00        NaN   NaN   NaN
## carrier_airportG4EWR   2.074e-01        NaN   NaN   NaN
## carrier_airportG4FLL   1.111e+00        NaN   NaN   NaN
## carrier_airportG4IAD   8.262e-01        NaN   NaN   NaN
## carrier_airportG4LAS   6.033e-01        NaN   NaN   NaN
## carrier_airportG4LAX   5.645e-01        NaN   NaN   NaN
## carrier_airportG4MDW   5.348e-01        NaN   NaN   NaN
## carrier_airportG4MSP   1.312e+00        NaN   NaN   NaN
## carrier_airportG4PHX   7.213e-01        NaN   NaN   NaN
## carrier_airportG4SAN   8.012e-01        NaN   NaN   NaN
## carrier_airportHABOS  -2.284e+00        NaN   NaN   NaN
## carrier_airportHAJFK  -3.863e+00        NaN   NaN   NaN
## carrier_airportHALAS  -3.572e+00        NaN   NaN   NaN
## carrier_airportHALAX  -2.821e+00        NaN   NaN   NaN
## carrier_airportHAMCO  -2.367e+01        NaN   NaN   NaN
## carrier_airportHAPHX  -3.950e+00        NaN   NaN   NaN
## carrier_airportHASAN  -3.489e+00        NaN   NaN   NaN
## carrier_airportHASEA  -3.115e+00        NaN   NaN   NaN
## carrier_airportHASFO  -4.065e+00        NaN   NaN   NaN
## carrier_airportMQATL   7.972e-01        NaN   NaN   NaN
## carrier_airportMQBNA   6.744e-01        NaN   NaN   NaN
## carrier_airportMQBOS   6.047e-01        NaN   NaN   NaN
## carrier_airportMQBWI   5.171e-01        NaN   NaN   NaN
## carrier_airportMQCLT   1.382e-01        NaN   NaN   NaN
## carrier_airportMQDCA   4.591e-01        NaN   NaN   NaN
## carrier_airportMQDEN  -1.755e+01        NaN   NaN   NaN
## carrier_airportMQDFW   6.996e-01        NaN   NaN   NaN
## carrier_airportMQDTW   4.757e-01        NaN   NaN   NaN
## carrier_airportMQEWR   1.452e+00        NaN   NaN   NaN
## carrier_airportMQIAD   2.174e-01        NaN   NaN   NaN
## carrier_airportMQIAH   1.207e+00        NaN   NaN   NaN
## carrier_airportMQJFK   6.940e-01        NaN   NaN   NaN
## carrier_airportMQLGA   1.200e+00        NaN   NaN   NaN
## carrier_airportMQMIA   3.763e-01        NaN   NaN   NaN
## carrier_airportMQMSP   6.980e-01        NaN   NaN   NaN
## carrier_airportMQORD   5.733e-01        NaN   NaN   NaN
## carrier_airportMQPHL   5.815e-01        NaN   NaN   NaN
## carrier_airportMQPHX   3.223e-02        NaN   NaN   NaN
## carrier_airportMQSLC   4.553e-01        NaN   NaN   NaN
## carrier_airportMQTPA   6.040e-01        NaN   NaN   NaN
## carrier_airportNKATL   9.384e-01        NaN   NaN   NaN
## carrier_airportNKBNA   1.056e+00        NaN   NaN   NaN
## carrier_airportNKBOS   1.085e+00        NaN   NaN   NaN
## carrier_airportNKBWI   7.943e-01        NaN   NaN   NaN
## carrier_airportNKCLT   1.075e+00        NaN   NaN   NaN
## carrier_airportNKDEN   1.012e+00        NaN   NaN   NaN
## carrier_airportNKDFW   9.962e-01        NaN   NaN   NaN
## carrier_airportNKDTW   7.209e-01        NaN   NaN   NaN
## carrier_airportNKEWR   1.479e+00        NaN   NaN   NaN
## carrier_airportNKFLL   1.043e+00        NaN   NaN   NaN
## carrier_airportNKIAH   8.954e-01        NaN   NaN   NaN
## carrier_airportNKLAS   8.890e-01        NaN   NaN   NaN
```

```
## carrier_airportNKLAX   9.398e-01        NaN    NaN    NaN
## carrier_airportNKLGA   1.348e+00        NaN    NaN    NaN
## carrier_airportNKMCO   1.048e+00        NaN    NaN    NaN
## carrier_airportNKMIA   1.306e+00        NaN    NaN    NaN
## carrier_airportNKMSP   7.891e-01        NaN    NaN    NaN
## carrier_airportNKORD   1.231e+00        NaN    NaN    NaN
## carrier_airportNKPHL   9.727e-01        NaN    NaN    NaN
## carrier_airportNKPHX   9.932e-01        NaN    NaN    NaN
## carrier_airportNKSAN   8.626e-01        NaN    NaN    NaN
## carrier_airportNKSEA   9.950e-01        NaN    NaN    NaN
## carrier_airportNKSLC   1.564e+00        NaN    NaN    NaN
## carrier_airportNKTPA   8.956e-01        NaN    NaN    NaN
## carrier_airportOHATL   3.503e-01        NaN    NaN    NaN
## carrier_airportOHBNA   3.612e-01        NaN    NaN    NaN
## carrier_airportOHBOS   2.134e-01        NaN    NaN    NaN
## carrier_airportOHBWI  -4.709e-01        NaN    NaN    NaN
## carrier_airportOHCLT   8.087e-02        NaN    NaN    NaN
## carrier_airportOHDCA   4.123e-01        NaN    NaN    NaN
## carrier_airportOHDFW   8.617e-01        NaN    NaN    NaN
## carrier_airportOHDTW   2.729e-01        NaN    NaN    NaN
## carrier_airportOHEWR   1.429e+00        NaN    NaN    NaN
## carrier_airportOHIAD   2.761e-01        NaN    NaN    NaN
## carrier_airportOHIAH   1.432e+00        NaN    NaN    NaN
## carrier_airportOHJFK   6.581e-01        NaN    NaN    NaN
## carrier_airportOHLGA   1.065e+00        NaN    NaN    NaN
## carrier_airportOHMSP   8.050e-01        NaN    NaN    NaN
## carrier_airportOHORD   1.934e-01        NaN    NaN    NaN
## carrier_airportOHPHL   3.424e-01        NaN    NaN    NaN
## carrier_airportOOATL  -2.242e-01        NaN    NaN    NaN
## carrier_airportOOBNA  -3.265e-02        NaN    NaN    NaN
## carrier_airportOOBOS   5.956e-01        NaN    NaN    NaN
## carrier_airportOOBWI  -1.183e+00        NaN    NaN    NaN
## carrier_airportOOCLT   8.912e-02        NaN    NaN    NaN
## carrier_airportOODAL   7.123e-01        NaN    NaN    NaN
## carrier_airportOODCA   5.085e-01        NaN    NaN    NaN
## carrier_airportOODEN   2.938e-02        NaN    NaN    NaN
## carrier_airportOODFW  -1.158e-01        NaN    NaN    NaN
## carrier_airportOODTW  -7.017e-01        NaN    NaN    NaN
## carrier_airportOOEWR   7.175e-01        NaN    NaN    NaN
## carrier_airportOOFLL  -2.150e-01        NaN    NaN    NaN
## carrier_airportOOIAD  -5.692e-01        NaN    NaN    NaN
## carrier_airportOOIAH   2.317e-01        NaN    NaN    NaN
## carrier_airportOOJFK   7.784e-01        NaN    NaN    NaN
## carrier_airportOOLAS  -3.778e-01        NaN    NaN    NaN
## carrier_airportOOLAX  -3.443e-01        NaN    NaN    NaN
## carrier_airportOOLGA   7.996e-01        NaN    NaN    NaN
## carrier_airportOOMCO   1.286e+00        NaN    NaN    NaN
## carrier_airportOOMDW  -4.045e-02        NaN    NaN    NaN
## carrier_airportOOMSP  -6.024e-01        NaN    NaN    NaN
## carrier_airportOOORD   2.811e-01        NaN    NaN    NaN
## carrier_airportOOPHL  -4.498e-01        NaN    NaN    NaN
## carrier_airportOOPHX  -8.353e-01        NaN    NaN    NaN
## carrier_airportOOSAN  -8.265e-01        NaN    NaN    NaN
## carrier_airportOOSEA   1.328e-01        NaN    NaN    NaN
```

```
## carrier_airportOOSFO   5.348e-01        NaN    NaN    NaN
## carrier_airportOOSLC  -6.481e-01        NaN    NaN    NaN
## carrier_airportOOTPA  -2.169e-01        NaN    NaN    NaN
## carrier_airportQXDAL   2.016e+00        NaN    NaN    NaN
## carrier_airportQXDFW   1.870e+00        NaN    NaN    NaN
## carrier_airportQXLAS   7.360e-01        NaN    NaN    NaN
## carrier_airportQXLAX   8.891e-01        NaN    NaN    NaN
## carrier_airportQXMSP  -4.568e-01        NaN    NaN    NaN
## carrier_airportQXORD   1.462e+00        NaN    NaN    NaN
## carrier_airportQXPHX   5.925e-01        NaN    NaN    NaN
## carrier_airportQXSAN   3.161e-01        NaN    NaN    NaN
## carrier_airportQXSEA   4.728e-01        NaN    NaN    NaN
## carrier_airportQXSFO   7.153e-01        NaN    NaN    NaN
## carrier_airportQXSLC   3.259e-01        NaN    NaN    NaN
## carrier_airportUAATL   5.998e-01        NaN    NaN    NaN
## carrier_airportUABNA   4.243e-01        NaN    NaN    NaN
## carrier_airportUABOS   6.302e-01        NaN    NaN    NaN
## carrier_airportUABWI   4.528e-01        NaN    NaN    NaN
## carrier_airportUACLT   4.819e-01        NaN    NaN    NaN
## carrier_airportUADCA   5.050e-01        NaN    NaN    NaN
## carrier_airportUADEN   5.465e-01        NaN    NaN    NaN
## carrier_airportUADFW   8.040e-01        NaN    NaN    NaN
## carrier_airportUADTW   4.070e-01        NaN    NaN    NaN
## carrier_airportUAEWR   1.186e+00        NaN    NaN    NaN
## carrier_airportUAFLL   7.327e-01        NaN    NaN    NaN
## carrier_airportUAIAD   3.404e-01        NaN    NaN    NaN
## carrier_airportUAIAH   4.738e-01        NaN    NaN    NaN
## carrier_airportUAJFK   1.167e+00        NaN    NaN    NaN
## carrier_airportUALAS   4.034e-01        NaN    NaN    NaN
## carrier_airportUALAX   2.668e-01        NaN    NaN    NaN
## carrier_airportUALGA   1.104e+00        NaN    NaN    NaN
## carrier_airportUAMCO   6.062e-01        NaN    NaN    NaN
## carrier_airportUAMIA   8.561e-01        NaN    NaN    NaN
## carrier_airportUAMSP   3.742e-01        NaN    NaN    NaN
## carrier_airportUAORD   5.707e-01        NaN    NaN    NaN
## carrier_airportUAPHL   7.024e-01        NaN    NaN    NaN
## carrier_airportUAPHX   3.250e-01        NaN    NaN    NaN
## carrier_airportUASAN   2.941e-01        NaN    NaN    NaN
## carrier_airportUASEA   6.088e-01        NaN    NaN    NaN
## carrier_airportUASFO   6.680e-01        NaN    NaN    NaN
## carrier_airportUASLC   3.503e-01        NaN    NaN    NaN
## carrier_airportUATPA   5.907e-01        NaN    NaN    NaN
## carrier_airportVXBNA  -6.712e-01        NaN    NaN    NaN
## carrier_airportVXBOS   4.276e-01        NaN    NaN    NaN
## carrier_airportVXBWI  -1.369e+00        NaN    NaN    NaN
## carrier_airportVXDAL   4.861e-01        NaN    NaN    NaN
## carrier_airportVXDCA   2.100e-01        NaN    NaN    NaN
## carrier_airportVXDEN   2.934e-01        NaN    NaN    NaN
## carrier_airportVXEWR   1.151e+00        NaN    NaN    NaN
## carrier_airportVXFLL   2.244e-01        NaN    NaN    NaN
## carrier_airportVXIAD  -6.274e-01        NaN    NaN    NaN
## carrier_airportVXJFK   2.945e-01        NaN    NaN    NaN
## carrier_airportVXLAS   3.467e-01        NaN    NaN    NaN
## carrier_airportVXLAX   6.940e-01        NaN    NaN    NaN
```

```
## carrier_airportVXMCO    6.605e-01         NaN    NaN    NaN
## carrier_airportVXORD    6.526e-01         NaN    NaN    NaN
## carrier_airportVXPHL   -1.278e-01         NaN    NaN    NaN
## carrier_airportVXSAN    4.779e-01         NaN    NaN    NaN
## carrier_airportVXSEA    8.618e-01         NaN    NaN    NaN
## carrier_airportVXSFO    1.170e+00         NaN    NaN    NaN
## carrier_airportWNATL   -6.663e-02         NaN    NaN    NaN
## carrier_airportWNBNA   -3.734e-01         NaN    NaN    NaN
## carrier_airportWNBOS    1.581e-01         NaN    NaN    NaN
## carrier_airportWNBWI   -5.618e-02         NaN    NaN    NaN
## carrier_airportWNCLT    1.711e-01         NaN    NaN    NaN
## carrier_airportWNDAL    3.911e-01         NaN    NaN    NaN
## carrier_airportWNDCA    8.302e-02         NaN    NaN    NaN
## carrier_airportWNDEN    3.897e-01         NaN    NaN    NaN
## carrier_airportWNDTW   -5.145e-01         NaN    NaN    NaN
## carrier_airportWNEWR    1.481e+00         NaN    NaN    NaN
## carrier_airportWNFLL   -6.639e-02         NaN    NaN    NaN
## carrier_airportWNIAD   -4.120e-02         NaN    NaN    NaN
## carrier_airportWNIAH    4.075e-01         NaN    NaN    NaN
## carrier_airportWNLAS    4.787e-02         NaN    NaN    NaN
## carrier_airportWNLAX   -1.248e-01         NaN    NaN    NaN
## carrier_airportWNLGA    7.700e-01         NaN    NaN    NaN
## carrier_airportWNMCO    2.401e-01         NaN    NaN    NaN
## carrier_airportWNMDW   -8.037e-04         NaN    NaN    NaN
## carrier_airportWNMIA    7.489e-01         NaN    NaN    NaN
## carrier_airportWNMSP   -2.616e-01         NaN    NaN    NaN
## carrier_airportWNORD    1.418e+00         NaN    NaN    NaN
## carrier_airportWNPHL    6.853e-02         NaN    NaN    NaN
## carrier_airportWNPHX    2.295e-02         NaN    NaN    NaN
## carrier_airportWNSAN   -3.822e-01         NaN    NaN    NaN
## carrier_airportWNSEA    2.946e-01         NaN    NaN    NaN
## carrier_airportWNSFO    5.501e-01         NaN    NaN    NaN
## carrier_airportWNSLC   -1.644e-01         NaN    NaN    NaN
## carrier_airportWNTPA    7.825e-02         NaN    NaN    NaN
## carrier_airportYVATL    3.938e-01         NaN    NaN    NaN
## carrier_airportYVBNA    1.562e-01         NaN    NaN    NaN
## carrier_airportYVBOS    3.200e-01         NaN    NaN    NaN
## carrier_airportYVBWI   -2.937e-01         NaN    NaN    NaN
## carrier_airportYVCLT    5.178e-01         NaN    NaN    NaN
## carrier_airportYVDCA    2.074e-01         NaN    NaN    NaN
## carrier_airportYVDFW    5.420e-01         NaN    NaN    NaN
## carrier_airportYVDTW    2.970e-01         NaN    NaN    NaN
## carrier_airportYVFLL    8.650e-02         NaN    NaN    NaN
## carrier_airportYVIAD    3.473e-01         NaN    NaN    NaN
## carrier_airportYVIAH    5.077e-01         NaN    NaN    NaN
## carrier_airportYVLGA    9.979e-01         NaN    NaN    NaN
## carrier_airportYVMIA    7.216e-01         NaN    NaN    NaN
## carrier_airportYVMSP    2.278e-01         NaN    NaN    NaN
## carrier_airportYVORD    5.138e-01         NaN    NaN    NaN
## carrier_airportYVPHL    4.458e-01         NaN    NaN    NaN
## carrier_airportYVPHX   -1.735e-01         NaN    NaN    NaN
## carrier_airportYVSAN    5.987e-01         NaN    NaN    NaN
## carrier_airportYVSLC    4.802e-01         NaN    NaN    NaN
## carrier_airportYVTPA    3.500e-01         NaN    NaN    NaN
```

```
## carrier_airportYXATL  5.099e-01       NaN     NaN     NaN
## carrier_airportYXBNA  4.455e-01       NaN     NaN     NaN
## carrier_airportYXBOS  5.618e-01       NaN     NaN     NaN
## carrier_airportYXBWI  2.860e-01       NaN     NaN     NaN
## carrier_airportYXCLT  3.433e-01       NaN     NaN     NaN
## carrier_airportYXDCA  4.530e-01       NaN     NaN     NaN
## carrier_airportYXDEN  3.376e-01       NaN     NaN     NaN
## carrier_airportYXDFW  9.245e-01       NaN     NaN     NaN
## carrier_airportYXDTW  2.131e-01       NaN     NaN     NaN
## carrier_airportYXEWR  1.295e+00       NaN     NaN     NaN
## carrier_airportYXFLL  4.526e-01       NaN     NaN     NaN
## carrier_airportYXIAD  5.334e-01       NaN     NaN     NaN
## carrier_airportYXIAH  8.828e-01       NaN     NaN     NaN
## carrier_airportYXJFK  6.045e-01       NaN     NaN     NaN
## carrier_airportYXLGA  8.940e-01       NaN     NaN     NaN
## carrier_airportYXMCO  8.059e-01       NaN     NaN     NaN
## carrier_airportYXMDW  1.241e-01       NaN     NaN     NaN
## carrier_airportYXMIA  3.857e-01       NaN     NaN     NaN
## carrier_airportYXMSP  5.423e-01       NaN     NaN     NaN
## carrier_airportYXORD  6.954e-01       NaN     NaN     NaN
## carrier_airportYXPHL  3.769e-01       NaN     NaN     NaN
## carrier_airportYXSEA  1.491e+00       NaN     NaN     NaN
## carrier_airportYXSLC  3.402e-01       NaN     NaN     NaN
## carrier_airportYXTPA  3.900e-01       NaN     NaN     NaN


## Warning in fitTMB(TMBStruc): Model convergence problem; non-positive-definite
## Hessian matrix. See vignette('troubleshooting')

## Warning in fitTMB(TMBStruc): Model convergence problem; singular convergence
## (7). See vignette('troubleshooting')


##  Family: nbinom2  ( log )
## Formula:
## round(security_ct) ~ date + carrier_airport + offset(log(arr_flights))
## Data: airline_data
##
##      AIC      BIC   logLik deviance df.resid
##       NA       NA       NA       NA    18277
##
##
## Dispersion parameter for nbinom2 family (): 3.68
##
## Conditional model:
##                      Estimate Std. Error z value Pr(>|z|)
## (Intercept)         -2.163e+01       NaN     NaN     NaN
## date                 6.482e-04       NaN     NaN     NaN
## carrier_airport9EBNA  1.033e+00       NaN     NaN     NaN
## carrier_airport9EBOS -8.688e+01       NaN     NaN     NaN
## carrier_airport9EBWI -6.906e+01       NaN     NaN     NaN
## carrier_airport9ECLT  5.925e-01       NaN     NaN     NaN
## carrier_airport9EDAL -2.612e+01       NaN     NaN     NaN
## carrier_airport9EDCA  1.009e+00       NaN     NaN     NaN
## carrier_airport9EDEN -4.996e+00       NaN     NaN     NaN
## carrier_airport9EDFW -6.815e+01       NaN     NaN     NaN
```

```
## carrier_airport9EDTW -5.339e-01        NaN    NaN    NaN
## carrier_airport9EEWR -6.667e+01        NaN    NaN    NaN
## carrier_airport9EFLL -4.633e+01        NaN    NaN    NaN
## carrier_airport9EIAD  1.377e+00        NaN    NaN    NaN
## carrier_airport9EIAH -6.657e+01        NaN    NaN    NaN
## carrier_airport9EJFK  1.590e-01        NaN    NaN    NaN
## carrier_airport9ELGA -3.625e-01        NaN    NaN    NaN
## carrier_airport9EMCO -5.271e+01        NaN    NaN    NaN
## carrier_airport9EMDW  2.658e+00        NaN    NaN    NaN
## carrier_airport9EMIA -3.866e+01        NaN    NaN    NaN
## carrier_airport9EMSP -7.500e-01        NaN    NaN    NaN
## carrier_airport9EORD  1.026e+00        NaN    NaN    NaN
## carrier_airport9EPHL -6.792e+01        NaN    NaN    NaN
## carrier_airport9ETPA -6.368e+01        NaN    NaN    NaN
## carrier_airportAAATL  2.438e+00        NaN    NaN    NaN
## carrier_airportAABNA  1.892e+00        NaN    NaN    NaN
## carrier_airportAABOS  1.972e+00        NaN    NaN    NaN
## carrier_airportAABWI  2.531e+00        NaN    NaN    NaN
## carrier_airportAACLT  1.898e+00        NaN    NaN    NaN
## carrier_airportAADCA  2.007e+00        NaN    NaN    NaN
## carrier_airportAADEN  2.584e+00        NaN    NaN    NaN
## carrier_airportAADFW  2.035e+00        NaN    NaN    NaN
## carrier_airportAADTW  2.926e+00        NaN    NaN    NaN
## carrier_airportAAEWR  2.592e+00        NaN    NaN    NaN
## carrier_airportAAFLL  2.570e+00        NaN    NaN    NaN
## carrier_airportAAIAD  7.832e-01        NaN    NaN    NaN
## carrier_airportAAIAH  2.100e+00        NaN    NaN    NaN
## carrier_airportAAJFK  2.999e+00        NaN    NaN    NaN
## carrier_airportAALAS  2.905e+00        NaN    NaN    NaN
## carrier_airportAALAX  2.741e+00        NaN    NaN    NaN
## carrier_airportAALGA  2.192e+00        NaN    NaN    NaN
## carrier_airportAAMCO  2.499e+00        NaN    NaN    NaN
## carrier_airportAAMIA  2.579e+00        NaN    NaN    NaN
## carrier_airportAAMSP  2.527e+00        NaN    NaN    NaN
## carrier_airportAAORD  2.065e+00        NaN    NaN    NaN
## carrier_airportAAPHL  2.182e+00        NaN    NaN    NaN
## carrier_airportAAPHX  2.123e+00        NaN    NaN    NaN
## carrier_airportAASAN  2.509e+00        NaN    NaN    NaN
## carrier_airportAASEA  2.156e+00        NaN    NaN    NaN
## carrier_airportAASFO  2.480e+00        NaN    NaN    NaN
## carrier_airportAASLC  2.272e+00        NaN    NaN    NaN
## carrier_airportAATPA  2.540e+00        NaN    NaN    NaN
## carrier_airportASATL  1.516e+00        NaN    NaN    NaN
## carrier_airportASBNA  1.571e+00        NaN    NaN    NaN
## carrier_airportASBOS  1.161e+00        NaN    NaN    NaN
## carrier_airportASBWI  1.467e+00        NaN    NaN    NaN
## carrier_airportASDAL  1.690e+00        NaN    NaN    NaN
## carrier_airportASDCA  2.118e+00        NaN    NaN    NaN
## carrier_airportASDEN  1.724e+00        NaN    NaN    NaN
## carrier_airportASDFW  2.172e+00        NaN    NaN    NaN
## carrier_airportASDTW -6.643e+01        NaN    NaN    NaN
## carrier_airportASEWR  2.070e+00        NaN    NaN    NaN
## carrier_airportASFLL  2.397e+00        NaN    NaN    NaN
## carrier_airportASIAD  1.748e+00        NaN    NaN    NaN
```

```
## carrier_airportASIAH -6.621e+01          NaN    NaN    NaN
## carrier_airportASJFK  1.983e+00          NaN    NaN    NaN
## carrier_airportASLAS  1.958e+00          NaN    NaN    NaN
## carrier_airportASLAX  2.153e+00          NaN    NaN    NaN
## carrier_airportASMCO  1.375e+00          NaN    NaN    NaN
## carrier_airportASMIA -4.102e+01          NaN    NaN    NaN
## carrier_airportASMSP  1.391e+00          NaN    NaN    NaN
## carrier_airportASORD  1.274e+00          NaN    NaN    NaN
## carrier_airportASPHL  2.279e+00          NaN    NaN    NaN
## carrier_airportASPHX  2.090e+00          NaN    NaN    NaN
## carrier_airportASSAN  1.872e+00          NaN    NaN    NaN
## carrier_airportASSEA  2.390e+00          NaN    NaN    NaN
## carrier_airportASSFO  2.120e+00          NaN    NaN    NaN
## carrier_airportASSLC  2.809e+00          NaN    NaN    NaN
## carrier_airportASTPA  2.330e+00          NaN    NaN    NaN
## carrier_airportB6ATL  3.117e+00          NaN    NaN    NaN
## carrier_airportB6BNA  3.869e+00          NaN    NaN    NaN
## carrier_airportB6BOS  1.857e+00          NaN    NaN    NaN
## carrier_airportB6BWI  2.770e+00          NaN    NaN    NaN
## carrier_airportB6CLT -6.671e+01          NaN    NaN    NaN
## carrier_airportB6DCA  2.785e+00          NaN    NaN    NaN
## carrier_airportB6DEN  3.389e+00          NaN    NaN    NaN
## carrier_airportB6DFW  1.646e+00          NaN    NaN    NaN
## carrier_airportB6DTW  3.211e+00          NaN    NaN    NaN
## carrier_airportB6EWR  2.816e+00          NaN    NaN    NaN
## carrier_airportB6FLL  2.626e+00          NaN    NaN    NaN
## carrier_airportB6IAD -6.591e+01          NaN    NaN    NaN
## carrier_airportB6IAH  2.683e+00          NaN    NaN    NaN
## carrier_airportB6JFK  2.719e+00          NaN    NaN    NaN
## carrier_airportB6LAS  2.882e+00          NaN    NaN    NaN
## carrier_airportB6LAX  2.317e+00          NaN    NaN    NaN
## carrier_airportB6LGA  2.508e+00          NaN    NaN    NaN
## carrier_airportB6MCO  2.444e+00          NaN    NaN    NaN
## carrier_airportB6MIA  2.476e+00          NaN    NaN    NaN
## carrier_airportB6MSP  2.968e+00          NaN    NaN    NaN
## carrier_airportB6ORD  3.078e+00          NaN    NaN    NaN
## carrier_airportB6PHL  3.834e+00          NaN    NaN    NaN
## carrier_airportB6PHX  3.899e+00          NaN    NaN    NaN
## carrier_airportB6SAN  2.510e+00          NaN    NaN    NaN
## carrier_airportB6SEA  2.070e+00          NaN    NaN    NaN
## carrier_airportB6SFO  1.749e+00          NaN    NaN    NaN
## carrier_airportB6SLC  3.519e+00          NaN    NaN    NaN
## carrier_airportB6TPA  2.532e+00          NaN    NaN    NaN
## carrier_airportDLATL  1.045e+00          NaN    NaN    NaN
## carrier_airportDLBNA  9.570e-01          NaN    NaN    NaN
## carrier_airportDLBOS  1.233e+00          NaN    NaN    NaN
## carrier_airportDLBWI  9.424e-01          NaN    NaN    NaN
## carrier_airportDLCLT  6.168e-01          NaN    NaN    NaN
## carrier_airportDLDAL  1.413e+00          NaN    NaN    NaN
## carrier_airportDLDCA  1.277e+00          NaN    NaN    NaN
## carrier_airportDLDEN  1.418e+00          NaN    NaN    NaN
## carrier_airportDLDFW  1.288e+00          NaN    NaN    NaN
## carrier_airportDLDTW  1.311e+00          NaN    NaN    NaN
## carrier_airportDLEWR  1.758e+00          NaN    NaN    NaN
```

```
## carrier_airportDLFLL  1.945e+00    NaN    NaN    NaN
## carrier_airportDLIAD  1.661e+00    NaN    NaN    NaN
## carrier_airportDLIAH  1.394e+00    NaN    NaN    NaN
## carrier_airportDLJFK  2.088e+00    NaN    NaN    NaN
## carrier_airportDLLAS  1.449e+00    NaN    NaN    NaN
## carrier_airportDLLAX  1.897e+00    NaN    NaN    NaN
## carrier_airportDLLGA  1.530e+00    NaN    NaN    NaN
## carrier_airportDLMCO  1.609e+00    NaN    NaN    NaN
## carrier_airportDLMDW  9.962e-01    NaN    NaN    NaN
## carrier_airportDLMIA  2.126e+00    NaN    NaN    NaN
## carrier_airportDLMSP  1.014e+00    NaN    NaN    NaN
## carrier_airportDLORD  1.490e+00    NaN    NaN    NaN
## carrier_airportDLPHL  1.258e+00    NaN    NaN    NaN
## carrier_airportDLPHX  1.534e+00    NaN    NaN    NaN
## carrier_airportDLSAN  1.277e+00    NaN    NaN    NaN
## carrier_airportDLSEA  8.597e-01    NaN    NaN    NaN
## carrier_airportDLSFO  1.259e+00    NaN    NaN    NaN
## carrier_airportDLSLC  8.240e-01    NaN    NaN    NaN
## carrier_airportDLTPA  1.441e+00    NaN    NaN    NaN
## carrier_airportEVATL -7.505e+01    NaN    NaN    NaN
## carrier_airportEVBNA -6.651e+01    NaN    NaN    NaN
## carrier_airportEVBOS -6.212e+01    NaN    NaN    NaN
## carrier_airportEVBWI -5.354e+01    NaN    NaN    NaN
## carrier_airportEVCLT -6.687e+01    NaN    NaN    NaN
## carrier_airportEVDCA -7.323e+01    NaN    NaN    NaN
## carrier_airportEVDEN -4.380e+01    NaN    NaN    NaN
## carrier_airportEVDFW -7.818e+01    NaN    NaN    NaN
## carrier_airportEVDTW -6.381e+01    NaN    NaN    NaN
## carrier_airportEVEWR -1.762e+02    NaN    NaN    NaN
## carrier_airportEVIAD -6.585e+01    NaN    NaN    NaN
## carrier_airportEVIAH -1.113e+02    NaN    NaN    NaN
## carrier_airportEVLGA -7.513e+01    NaN    NaN    NaN
## carrier_airportEVMCO -2.562e-01    NaN    NaN    NaN
## carrier_airportEVMDW -1.070e+00    NaN    NaN    NaN
## carrier_airportEVMSP -5.924e+01    NaN    NaN    NaN
## carrier_airportEVORD -1.751e+02    NaN    NaN    NaN
## carrier_airportEVPHL -2.803e+01    NaN    NaN    NaN
## carrier_airportEVSLC -2.828e+01    NaN    NaN    NaN
## carrier_airportF9ATL -1.025e+02    NaN    NaN    NaN
## carrier_airportF9BNA -6.595e+01    NaN    NaN    NaN
## carrier_airportF9BOS -6.709e+01    NaN    NaN    NaN
## carrier_airportF9BWI -6.683e+01    NaN    NaN    NaN
## carrier_airportF9CLT -6.609e+01    NaN    NaN    NaN
## carrier_airportF9DCA -6.574e+01    NaN    NaN    NaN
## carrier_airportF9DEN -1.031e+02    NaN    NaN    NaN
## carrier_airportF9DFW -6.675e+01    NaN    NaN    NaN
## carrier_airportF9DTW -6.584e+01    NaN    NaN    NaN
## carrier_airportF9EWR -6.760e+01    NaN    NaN    NaN
## carrier_airportF9FLL -6.742e+01    NaN    NaN    NaN
## carrier_airportF9IAD -6.581e+01    NaN    NaN    NaN
## carrier_airportF9IAH -6.576e+01    NaN    NaN    NaN
## carrier_airportF9LAS -2.077e+02    NaN    NaN    NaN
## carrier_airportF9LAX -6.636e+01    NaN    NaN    NaN
## carrier_airportF9LGA -6.586e+01    NaN    NaN    NaN
```

```
## carrier_airportF9MCO -1.796e+02          NaN     NaN     NaN
## carrier_airportF9MDW -6.881e+01          NaN     NaN     NaN
## carrier_airportF9MIA -7.649e+01          NaN     NaN     NaN
## carrier_airportF9MSP -6.675e+01          NaN     NaN     NaN
## carrier_airportF9ORD -7.423e+01          NaN     NaN     NaN
## carrier_airportF9PHL -1.399e+02          NaN     NaN     NaN
## carrier_airportF9PHX -8.069e+01          NaN     NaN     NaN
## carrier_airportF9SAN -6.658e+01          NaN     NaN     NaN
## carrier_airportF9SEA -6.620e+01          NaN     NaN     NaN
## carrier_airportF9SFO -6.598e+01          NaN     NaN     NaN
## carrier_airportF9SLC -6.637e+01          NaN     NaN     NaN
## carrier_airportF9TPA -8.942e+01          NaN     NaN     NaN
## carrier_airportG4BNA  2.059e+00          NaN     NaN     NaN
## carrier_airportG4BOS  3.417e+00          NaN     NaN     NaN
## carrier_airportG4BWI  3.939e+00          NaN     NaN     NaN
## carrier_airportG4DEN  3.609e+00          NaN     NaN     NaN
## carrier_airportG4EWR  2.800e+00          NaN     NaN     NaN
## carrier_airportG4FLL  3.393e+00          NaN     NaN     NaN
## carrier_airportG4IAD -5.698e+01          NaN     NaN     NaN
## carrier_airportG4LAS  3.123e+00          NaN     NaN     NaN
## carrier_airportG4LAX  2.966e+00          NaN     NaN     NaN
## carrier_airportG4MDW  2.550e+00          NaN     NaN     NaN
## carrier_airportG4MSP  3.170e+00          NaN     NaN     NaN
## carrier_airportG4PHX -5.716e+01          NaN     NaN     NaN
## carrier_airportG4SAN  3.380e+00          NaN     NaN     NaN
## carrier_airportHABOS -6.362e+01          NaN     NaN     NaN
## carrier_airportHAJFK  4.239e+00          NaN     NaN     NaN
## carrier_airportHALAS  3.362e+00          NaN     NaN     NaN
## carrier_airportHALAX  3.932e+00          NaN     NaN     NaN
## carrier_airportHAMCO -5.193e+01          NaN     NaN     NaN
## carrier_airportHAPHX  3.935e+00          NaN     NaN     NaN
## carrier_airportHASAN  4.438e+00          NaN     NaN     NaN
## carrier_airportHASEA  4.207e+00          NaN     NaN     NaN
## carrier_airportHASFO  4.159e+00          NaN     NaN     NaN
## carrier_airportMQATL  1.635e+00          NaN     NaN     NaN
## carrier_airportMQBNA  9.499e-01          NaN     NaN     NaN
## carrier_airportMQBOS -6.801e+01          NaN     NaN     NaN
## carrier_airportMQBWI  1.976e+00          NaN     NaN     NaN
## carrier_airportMQCLT  1.903e+00          NaN     NaN     NaN
## carrier_airportMQDCA  1.589e+00          NaN     NaN     NaN
## carrier_airportMQDEN -1.945e+01          NaN     NaN     NaN
## carrier_airportMQDFW  1.954e+00          NaN     NaN     NaN
## carrier_airportMQDTW  2.170e+00          NaN     NaN     NaN
## carrier_airportMQEWR -6.530e+01          NaN     NaN     NaN
## carrier_airportMQIAD -4.737e+01          NaN     NaN     NaN
## carrier_airportMQIAH  2.409e+00          NaN     NaN     NaN
## carrier_airportMQJFK  1.643e+00          NaN     NaN     NaN
## carrier_airportMQLGA  1.421e+00          NaN     NaN     NaN
## carrier_airportMQMIA  2.134e+00          NaN     NaN     NaN
## carrier_airportMQMSP  1.761e+00          NaN     NaN     NaN
## carrier_airportMQORD  1.247e+00          NaN     NaN     NaN
## carrier_airportMQPHL -5.468e+01          NaN     NaN     NaN
## carrier_airportMQPHX  1.804e+00          NaN     NaN     NaN
## carrier_airportMQSLC -6.299e+01          NaN     NaN     NaN
```

```
## carrier_airportMQTPA   2.222e+00        NaN    NaN    NaN
## carrier_airportNKATL    3.498e+00        NaN    NaN    NaN
## carrier_airportNKBNA    3.381e+00        NaN    NaN    NaN
## carrier_airportNKBOS    3.383e+00        NaN    NaN    NaN
## carrier_airportNKBWI    3.758e+00        NaN    NaN    NaN
## carrier_airportNKCLT    4.318e+00        NaN    NaN    NaN
## carrier_airportNKDEN    3.522e+00        NaN    NaN    NaN
## carrier_airportNKDFW    3.422e+00        NaN    NaN    NaN
## carrier_airportNKDTW    3.292e+00        NaN    NaN    NaN
## carrier_airportNKEWR    3.513e+00        NaN    NaN    NaN
## carrier_airportNKFLL    3.445e+00        NaN    NaN    NaN
## carrier_airportNKIAH    3.336e+00        NaN    NaN    NaN
## carrier_airportNKLAS    3.044e+00        NaN    NaN    NaN
## carrier_airportNKLAX    3.097e+00        NaN    NaN    NaN
## carrier_airportNKLGA    3.685e+00        NaN    NaN    NaN
## carrier_airportNKMCO    3.048e+00        NaN    NaN    NaN
## carrier_airportNKMIA    2.517e+00        NaN    NaN    NaN
## carrier_airportNKMSP    3.234e+00        NaN    NaN    NaN
## carrier_airportNKORD    3.280e+00        NaN    NaN    NaN
## carrier_airportNKPHL    4.035e+00        NaN    NaN    NaN
## carrier_airportNKPHX    1.976e+00        NaN    NaN    NaN
## carrier_airportNKSAN    2.172e+00        NaN    NaN    NaN
## carrier_airportNKSEA    2.217e+00        NaN    NaN    NaN
## carrier_airportNKSLC    2.948e+00        NaN    NaN    NaN
## carrier_airportNKTPA    2.544e+00        NaN    NaN    NaN
## carrier_airportOHATL    2.649e+00        NaN    NaN    NaN
## carrier_airportOHBNA    2.140e+00        NaN    NaN    NaN
## carrier_airportOHBOS   -8.614e+00        NaN    NaN    NaN
## carrier_airportOHBWI   -6.649e+01        NaN    NaN    NaN
## carrier_airportOHCLT    1.763e+00        NaN    NaN    NaN
## carrier_airportOHDCA    1.551e+00        NaN    NaN    NaN
## carrier_airportOHDFW    2.400e+00        NaN    NaN    NaN
## carrier_airportOHDTW    2.126e+00        NaN    NaN    NaN
## carrier_airportOHEWR   -1.838e+01        NaN    NaN    NaN
## carrier_airportOHIAD    1.618e+00        NaN    NaN    NaN
## carrier_airportOHIAH   -2.795e+01        NaN    NaN    NaN
## carrier_airportOHJFK   -5.271e+01        NaN    NaN    NaN
## carrier_airportOHLGA    1.874e+00        NaN    NaN    NaN
## carrier_airportOHMSP   -6.727e+01        NaN    NaN    NaN
## carrier_airportOHORD   -6.558e+01        NaN    NaN    NaN
## carrier_airportOHPHL    1.498e+00        NaN    NaN    NaN
## carrier_airportOOATL    2.061e+00        NaN    NaN    NaN
## carrier_airportOOBNA    1.157e+00        NaN    NaN    NaN
## carrier_airportOOBOS    3.097e+00        NaN    NaN    NaN
## carrier_airportOOBWI   -6.713e+01        NaN    NaN    NaN
## carrier_airportOOCLT    1.430e+00        NaN    NaN    NaN
## carrier_airportOODAL    9.148e-01        NaN    NaN    NaN
## carrier_airportOODCA    1.302e+00        NaN    NaN    NaN
## carrier_airportOODEN    1.345e+00        NaN    NaN    NaN
## carrier_airportOODFW    2.158e+00        NaN    NaN    NaN
## carrier_airportOODTW    2.147e+00        NaN    NaN    NaN
## carrier_airportOOEWR    1.509e+00        NaN    NaN    NaN
## carrier_airportOOFLL   -1.821e+01        NaN    NaN    NaN
## carrier_airportOOIAD    1.983e+00        NaN    NaN    NaN
```

```
## carrier_airport00IAH   1.370e+00        NaN   NaN   NaN
## carrier_airport00JFK  -6.998e+01        NaN   NaN   NaN
## carrier_airport00LAS   2.280e+00        NaN   NaN   NaN
## carrier_airport00LAX   1.538e+00        NaN   NaN   NaN
## carrier_airport00LGA   1.782e+00        NaN   NaN   NaN
## carrier_airport00MCO  -7.313e+00        NaN   NaN   NaN
## carrier_airport00MDW   2.175e+00        NaN   NaN   NaN
## carrier_airport00MSP   1.988e+00        NaN   NaN   NaN
## carrier_airport00ORD   1.199e+00        NaN   NaN   NaN
## carrier_airport00PHL   1.605e+00        NaN   NaN   NaN
## carrier_airport00PHX   2.111e+00        NaN   NaN   NaN
## carrier_airport00SAN   8.722e-01        NaN   NaN   NaN
## carrier_airport00SEA   1.540e+00        NaN   NaN   NaN
## carrier_airport00SFO   1.111e+00        NaN   NaN   NaN
## carrier_airport00SLC   9.518e-01        NaN   NaN   NaN
## carrier_airport00TPA  -3.286e+01        NaN   NaN   NaN
## carrier_airportQXDAL  -3.624e+01        NaN   NaN   NaN
## carrier_airportQXDFW  -3.024e+01        NaN   NaN   NaN
## carrier_airportQXLAS  -6.770e+01        NaN   NaN   NaN
## carrier_airportQXLAX   7.963e-01        NaN   NaN   NaN
## carrier_airportQXMSP  -5.576e+01        NaN   NaN   NaN
## carrier_airportQXORD  -6.335e+01        NaN   NaN   NaN
## carrier_airportQXPHX  -6.778e+01        NaN   NaN   NaN
## carrier_airportQXSAN  -6.786e+01        NaN   NaN   NaN
## carrier_airportQXSEA   8.404e-01        NaN   NaN   NaN
## carrier_airportQXSFO   1.525e+00        NaN   NaN   NaN
## carrier_airportQXSLC  -6.514e+01        NaN   NaN   NaN
## carrier_airportUAATL  -9.414e+01        NaN   NaN   NaN
## carrier_airportUABNA   2.960e-01        NaN   NaN   NaN
## carrier_airportUABOS  -4.016e-01        NaN   NaN   NaN
## carrier_airportUABWI  -7.815e+01        NaN   NaN   NaN
## carrier_airportUACLT  -6.655e+01        NaN   NaN   NaN
## carrier_airportUADCA   6.697e-02        NaN   NaN   NaN
## carrier_airportUADEN  -5.683e-01        NaN   NaN   NaN
## carrier_airportUADFW  -1.355e+02        NaN   NaN   NaN
## carrier_airportUADTW  -6.693e+01        NaN   NaN   NaN
## carrier_airportUAEWR  -1.050e+00        NaN   NaN   NaN
## carrier_airportUAFLL   3.746e-01        NaN   NaN   NaN
## carrier_airportUAIAD  -1.259e+00        NaN   NaN   NaN
## carrier_airportUAIAH  -5.239e-01        NaN   NaN   NaN
## carrier_airportUAJFK  -6.760e+01        NaN   NaN   NaN
## carrier_airportUALAS  -1.169e+00        NaN   NaN   NaN
## carrier_airportUALAX   6.653e-02        NaN   NaN   NaN
## carrier_airportUALGA  -1.757e+02        NaN   NaN   NaN
## carrier_airportUAMCO   1.685e-01        NaN   NaN   NaN
## carrier_airportUAMIA  -1.155e+02        NaN   NaN   NaN
## carrier_airportUAMSP  -8.164e+01        NaN   NaN   NaN
## carrier_airportUAORD  -6.961e-01        NaN   NaN   NaN
## carrier_airportUAPHL  -8.734e+01        NaN   NaN   NaN
## carrier_airportUAPHX  -1.890e+02        NaN   NaN   NaN
## carrier_airportUASAN  -2.071e+02        NaN   NaN   NaN
## carrier_airportUASEA  -8.060e-01        NaN   NaN   NaN
## carrier_airportUASFO  -4.336e-01        NaN   NaN   NaN
## carrier_airportUASLC   6.594e-01        NaN   NaN   NaN
```

```
## carrier_airportUATPA   8.888e-01        NaN   NaN   NaN
## carrier_airportVXBNA  -1.752e+01        NaN   NaN   NaN
## carrier_airportVXBOS   4.602e+00        NaN   NaN   NaN
## carrier_airportVXBWI  -1.752e+01        NaN   NaN   NaN
## carrier_airportVXDAL  -5.541e+01        NaN   NaN   NaN
## carrier_airportVXDCA  -3.381e+01        NaN   NaN   NaN
## carrier_airportVXDEN  -2.773e+01        NaN   NaN   NaN
## carrier_airportVXEWR  -5.076e+01        NaN   NaN   NaN
## carrier_airportVXFLL  -4.059e+01        NaN   NaN   NaN
## carrier_airportVXIAD  -4.113e+01        NaN   NaN   NaN
## carrier_airportVXJFK   3.983e+00        NaN   NaN   NaN
## carrier_airportVXLAS   3.313e+00        NaN   NaN   NaN
## carrier_airportVXLAX   2.730e+00        NaN   NaN   NaN
## carrier_airportVXMCO   5.049e+00        NaN   NaN   NaN
## carrier_airportVXORD  -3.140e+01        NaN   NaN   NaN
## carrier_airportVXPHL  -2.855e+01        NaN   NaN   NaN
## carrier_airportVXSAN  -4.815e+01        NaN   NaN   NaN
## carrier_airportVXSEA   3.462e+00        NaN   NaN   NaN
## carrier_airportVXSFO   3.652e+00        NaN   NaN   NaN
## carrier_airportWNATL   2.294e+00        NaN   NaN   NaN
## carrier_airportWNBNA   2.124e+00        NaN   NaN   NaN
## carrier_airportWNBOS   2.459e+00        NaN   NaN   NaN
## carrier_airportWNBWI   2.142e+00        NaN   NaN   NaN
## carrier_airportWNCLT   2.158e+00        NaN   NaN   NaN
## carrier_airportWNDAL   2.332e+00        NaN   NaN   NaN
## carrier_airportWNDCA   2.053e+00        NaN   NaN   NaN
## carrier_airportWNDEN   2.272e+00        NaN   NaN   NaN
## carrier_airportWNDTW   2.119e+00        NaN   NaN   NaN
## carrier_airportWNEWR   3.147e+00        NaN   NaN   NaN
## carrier_airportWNFLL   2.732e+00        NaN   NaN   NaN
## carrier_airportWNIAD   2.671e+00        NaN   NaN   NaN
## carrier_airportWNIAH   1.233e+00        NaN   NaN   NaN
## carrier_airportWNLAS   2.338e+00        NaN   NaN   NaN
## carrier_airportWNLAX   2.507e+00        NaN   NaN   NaN
## carrier_airportWNLGA   2.353e+00        NaN   NaN   NaN
## carrier_airportWNMCO   2.394e+00        NaN   NaN   NaN
## carrier_airportWNMDW   2.371e+00        NaN   NaN   NaN
## carrier_airportWNMIA   2.218e+00        NaN   NaN   NaN
## carrier_airportWNMSP   2.200e+00        NaN   NaN   NaN
## carrier_airportWNORD   2.555e+00        NaN   NaN   NaN
## carrier_airportWNPHL   2.301e+00        NaN   NaN   NaN
## carrier_airportWNPHX   2.432e+00        NaN   NaN   NaN
## carrier_airportWNSAN   2.419e+00        NaN   NaN   NaN
## carrier_airportWNSEA   2.081e+00        NaN   NaN   NaN
## carrier_airportWNSFO   1.390e+00        NaN   NaN   NaN
## carrier_airportWNSLC   2.253e+00        NaN   NaN   NaN
## carrier_airportWNTPA   2.526e+00        NaN   NaN   NaN
## carrier_airportYVATL   2.531e+00        NaN   NaN   NaN
## carrier_airportYVBNA   1.266e+00        NaN   NaN   NaN
## carrier_airportYVBOS   4.359e+00        NaN   NaN   NaN
## carrier_airportYVBWI  -6.450e+01        NaN   NaN   NaN
## carrier_airportYVCLT   2.267e+00        NaN   NaN   NaN
## carrier_airportYVDCA  -6.580e+01        NaN   NaN   NaN
## carrier_airportYVDFW   2.206e+00        NaN   NaN   NaN
```

```
## carrier_airportYVDTW  9.451e-01        NaN     NaN      NaN
## carrier_airportYVFLL -3.039e+01        NaN     NaN      NaN
## carrier_airportYVIAD  1.288e+00        NaN     NaN      NaN
## carrier_airportYVIAH  1.818e+00        NaN     NaN      NaN
## carrier_airportYVLGA  1.394e+00        NaN     NaN      NaN
## carrier_airportYVMIA -6.317e+01        NaN     NaN      NaN
## carrier_airportYVMSP  2.251e+00        NaN     NaN      NaN
## carrier_airportYVORD -6.888e+01        NaN     NaN      NaN
## carrier_airportYVPHL  2.296e+00        NaN     NaN      NaN
## carrier_airportYVPHX  1.374e+00        NaN     NaN      NaN
## carrier_airportYVSAN -7.735e+00        NaN     NaN      NaN
## carrier_airportYVSLC -6.672e+01        NaN     NaN      NaN
## carrier_airportYVTPA -3.852e+01        NaN     NaN      NaN
## carrier_airportYXATL  1.699e+00        NaN     NaN      NaN
## carrier_airportYXBNA  1.135e+00        NaN     NaN      NaN
## carrier_airportYXBOS -3.378e-02        NaN     NaN      NaN
## carrier_airportYXBWI  1.596e+00        NaN     NaN      NaN
## carrier_airportYXCLT  1.773e+00        NaN     NaN      NaN
## carrier_airportYXDCA  1.147e+00        NaN     NaN      NaN
## carrier_airportYXDEN  2.366e+00        NaN     NaN      NaN
## carrier_airportYXDFW  1.177e+00        NaN     NaN      NaN
## carrier_airportYXDTW  9.216e-01        NaN     NaN      NaN
## carrier_airportYXEWR  1.261e+00        NaN     NaN      NaN
## carrier_airportYXFLL -3.997e+01        NaN     NaN      NaN
## carrier_airportYXIAD  7.507e-01        NaN     NaN      NaN
## carrier_airportYXIAH  1.537e+00        NaN     NaN      NaN
## carrier_airportYXJFK  1.257e+00        NaN     NaN      NaN
## carrier_airportYXLGA  8.651e-01        NaN     NaN      NaN
## carrier_airportYXMCO -5.997e+01        NaN     NaN      NaN
## carrier_airportYXMDW  3.351e+00        NaN     NaN      NaN
## carrier_airportYXMIA  2.004e+00        NaN     NaN      NaN
## carrier_airportYXMSP  1.763e+00        NaN     NaN      NaN
## carrier_airportYXORD  1.207e+00        NaN     NaN      NaN
## carrier_airportYXPHL  9.848e-01        NaN     NaN      NaN
## carrier_airportYXSEA -4.523e+00        NaN     NaN      NaN
## carrier_airportYXSLC -6.498e+01        NaN     NaN      NaN
## carrier_airportYXTPA  2.483e+00        NaN     NaN      NaN


## Warning in fitTMB(TMBStruc): Model convergence problem; false convergence (8).
## See vignette('troubleshooting')

##  Family: nbinom2  ( log )
## Formula:
## round(late_aircraft_ct) ~ date + carrier_airport + offset(log(arr_flights))
## Data: airline_data
##
##      AIC      BIC   logLik deviance df.resid
## 138016.5 141354.8 -68582.2 137164.5    18277
##
##
## Dispersion parameter for nbinom2 family (): 2.59
##
## Conditional model:
##                      Estimate Std. Error z value Pr(>|z|)
```

```
## (Intercept)             -0.3887948      NaN    NaN    NaN
## date                    -0.0001433      NaN    NaN    NaN
## carrier_airport9EBNA     0.0425727      NaN    NaN    NaN
## carrier_airport9EBOS     0.0317329      NaN    NaN    NaN
## carrier_airport9EBWI    -0.1747352      NaN    NaN    NaN
## carrier_airport9ECLT     0.0409771      NaN    NaN    NaN
## carrier_airport9EDAL    -0.1808980      NaN    NaN    NaN
## carrier_airport9EDCA    -0.2812503      NaN    NaN    NaN
## carrier_airport9EDEN    -5.8873040      NaN    NaN    NaN
## carrier_airport9EDFW    -0.3617030      NaN    NaN    NaN
## carrier_airport9EDTW    -0.1154910      NaN    NaN    NaN
## carrier_airport9EEWR    -0.7205484      NaN    NaN    NaN
## carrier_airport9EFLL    -0.7593908      NaN    NaN    NaN
## carrier_airport9EIAD    -0.2018367      NaN    NaN    NaN
## carrier_airport9EIAH    -0.5154961      NaN    NaN    NaN
## carrier_airport9EJFK    -0.1928877      NaN    NaN    NaN
## carrier_airport9ELGA    -0.0111209      NaN    NaN    NaN
## carrier_airport9EMCO    -0.0961989      NaN    NaN    NaN
## carrier_airport9EMDW    -1.2686158      NaN    NaN    NaN
## carrier_airport9EMIA    -0.4220183      NaN    NaN    NaN
## carrier_airport9EMSP    -0.0960924      NaN    NaN    NaN
## carrier_airport9EORD    -0.3221199      NaN    NaN    NaN
## carrier_airport9EPHL    -0.2401109      NaN    NaN    NaN
## carrier_airport9ETPA    -0.0835021      NaN    NaN    NaN
## carrier_airportAAATL     0.2471896      NaN    NaN    NaN
## carrier_airportAABNA     0.3155203      NaN    NaN    NaN
## carrier_airportAABOS     0.1556363      NaN    NaN    NaN
## carrier_airportAABWI     0.2937700      NaN    NaN    NaN
## carrier_airportAACLT    -0.0002683      NaN    NaN    NaN
## carrier_airportAADCA     0.1294525      NaN    NaN    NaN
## carrier_airportAADEN     0.1233139      NaN    NaN    NaN
## carrier_airportAADFW     0.2212410      NaN    NaN    NaN
## carrier_airportAADTW     0.2199834      NaN    NaN    NaN
## carrier_airportAAEWR     0.1920710      NaN    NaN    NaN
## carrier_airportAAFLL     0.0833579      NaN    NaN    NaN
## carrier_airportAAIAD     0.2338804      NaN    NaN    NaN
## carrier_airportAAIAH     0.2431831      NaN    NaN    NaN
## carrier_airportAAJFK    -0.1889494      NaN    NaN    NaN
## carrier_airportAALAS     0.1750035      NaN    NaN    NaN
## carrier_airportAALAX    -0.0921114      NaN    NaN    NaN
## carrier_airportAALGA     0.0458146      NaN    NaN    NaN
## carrier_airportAAMCO     0.0756316      NaN    NaN    NaN
## carrier_airportAAMIA    -0.0108039      NaN    NaN    NaN
## carrier_airportAAMSP     0.3514642      NaN    NaN    NaN
## carrier_airportAAORD     0.0756029      NaN    NaN    NaN
## carrier_airportAAPHL     0.0573048      NaN    NaN    NaN
## carrier_airportAAPHX    -0.0695877      NaN    NaN    NaN
## carrier_airportAASAN     0.1408050      NaN    NaN    NaN
## carrier_airportAASEA     0.1749698      NaN    NaN    NaN
## carrier_airportAASFO     0.1129928      NaN    NaN    NaN
## carrier_airportAASLC     0.3337332      NaN    NaN    NaN
## carrier_airportAATPA     0.1855994      NaN    NaN    NaN
## carrier_airportASATL    -0.4795107      NaN    NaN    NaN
## carrier_airportASBNA    -0.0549689      NaN    NaN    NaN
```

```
## carrier_airportASBOS -0.8767113          NaN    NaN    NaN
## carrier_airportASBWI -0.9234936          NaN    NaN    NaN
## carrier_airportASDAL -0.0990132          NaN    NaN    NaN
## carrier_airportASDCA -0.6970981          NaN    NaN    NaN
## carrier_airportASDEN -0.2020227          NaN    NaN    NaN
## carrier_airportASDFW -0.4843648          NaN    NaN    NaN
## carrier_airportASDTW -0.8492993          NaN    NaN    NaN
## carrier_airportASEWR -0.9417601          NaN    NaN    NaN
## carrier_airportASFLL -0.6526450          NaN    NaN    NaN
## carrier_airportASIAD -0.5076916          NaN    NaN    NaN
## carrier_airportASIAH -0.2826575          NaN    NaN    NaN
## carrier_airportASJFK -0.5453084          NaN    NaN    NaN
## carrier_airportASLAS -0.0236442          NaN    NaN    NaN
## carrier_airportASLAX -0.0535501          NaN    NaN    NaN
## carrier_airportASMCO -0.7338949          NaN    NaN    NaN
## carrier_airportASMIA -1.5453167          NaN    NaN    NaN
## carrier_airportASMSP  0.0036783          NaN    NaN    NaN
## carrier_airportASORD -0.5954636          NaN    NaN    NaN
## carrier_airportASPHL -0.6386334          NaN    NaN    NaN
## carrier_airportASPHX -0.3996060          NaN    NaN    NaN
## carrier_airportASSAN -0.0084723          NaN    NaN    NaN
## carrier_airportASSEA -0.1334158          NaN    NaN    NaN
## carrier_airportASSFO  0.1104943          NaN    NaN    NaN
## carrier_airportASSLC  0.1509988          NaN    NaN    NaN
## carrier_airportASTPA -0.7041868          NaN    NaN    NaN
## carrier_airportB6ATL  0.0472143          NaN    NaN    NaN
## carrier_airportB6BNA  0.1254834          NaN    NaN    NaN
## carrier_airportB6BOS  0.5443596          NaN    NaN    NaN
## carrier_airportB6BWI  0.3529962          NaN    NaN    NaN
## carrier_airportB6CLT -0.0317702          NaN    NaN    NaN
## carrier_airportB6DCA  0.2574229          NaN    NaN    NaN
## carrier_airportB6DEN  0.1200380          NaN    NaN    NaN
## carrier_airportB6DFW -0.3620002          NaN    NaN    NaN
## carrier_airportB6DTW  0.1554529          NaN    NaN    NaN
## carrier_airportB6EWR  0.5908899          NaN    NaN    NaN
## carrier_airportB6FLL  0.4769078          NaN    NaN    NaN
## carrier_airportB6IAD  0.5157537          NaN    NaN    NaN
## carrier_airportB6IAH -0.7670443          NaN    NaN    NaN
## carrier_airportB6JFK  0.5484518          NaN    NaN    NaN
## carrier_airportB6LAS  0.1393130          NaN    NaN    NaN
## carrier_airportB6LAX -0.2082327          NaN    NaN    NaN
## carrier_airportB6LGA  0.3253743          NaN    NaN    NaN
## carrier_airportB6MCO  0.6487628          NaN    NaN    NaN
## carrier_airportB6MIA  0.2828578          NaN    NaN    NaN
## carrier_airportB6MSP  0.1904284          NaN    NaN    NaN
## carrier_airportB6ORD  0.1360944          NaN    NaN    NaN
## carrier_airportB6PHL  0.1970505          NaN    NaN    NaN
## carrier_airportB6PHX  0.3167217          NaN    NaN    NaN
## carrier_airportB6SAN -0.9550695          NaN    NaN    NaN
## carrier_airportB6SEA -0.2024453          NaN    NaN    NaN
## carrier_airportB6SFO -0.4635479          NaN    NaN    NaN
## carrier_airportB6SLC  0.0644162          NaN    NaN    NaN
## carrier_airportB6TPA  0.2627127          NaN    NaN    NaN
## carrier_airportDLATL -0.3420778          NaN    NaN    NaN
```

```
## carrier_airportDLBNA -0.5223931        NaN    NaN    NaN
## carrier_airportDLBOS -0.1788017        NaN    NaN    NaN
## carrier_airportDLBWI -0.8327442        NaN    NaN    NaN
## carrier_airportDLCLT -0.8393745        NaN    NaN    NaN
## carrier_airportDLDAL -0.6739612        NaN    NaN    NaN
## carrier_airportDLDCA -0.6025566        NaN    NaN    NaN
## carrier_airportDLDEN -0.7043058        NaN    NaN    NaN
## carrier_airportDLDFW -0.3124223        NaN    NaN    NaN
## carrier_airportDLDTW -0.2948743        NaN    NaN    NaN
## carrier_airportDLEWR -0.7094984        NaN    NaN    NaN
## carrier_airportDLFLL -0.4145934        NaN    NaN    NaN
## carrier_airportDLIAD -0.6432847        NaN    NaN    NaN
## carrier_airportDLIAH -0.3421296        NaN    NaN    NaN
## carrier_airportDLJFK -0.2608599        NaN    NaN    NaN
## carrier_airportDLLAS -0.7734692        NaN    NaN    NaN
## carrier_airportDLLAX -0.5885014        NaN    NaN    NaN
## carrier_airportDLLGA -0.1554236        NaN    NaN    NaN
## carrier_airportDLMCO -0.4030428        NaN    NaN    NaN
## carrier_airportDLMDW -0.5700763        NaN    NaN    NaN
## carrier_airportDLMIA -0.3930477        NaN    NaN    NaN
## carrier_airportDLMSP -0.4038798        NaN    NaN    NaN
## carrier_airportDLORD -0.4198889        NaN    NaN    NaN
## carrier_airportDLPHL -0.8057839        NaN    NaN    NaN
## carrier_airportDLPHX -0.6394428        NaN    NaN    NaN
## carrier_airportDLSAN -0.8207859        NaN    NaN    NaN
## carrier_airportDLSEA -0.5045178        NaN    NaN    NaN
## carrier_airportDLSFO -0.7661604        NaN    NaN    NaN
## carrier_airportDLSLC -0.3526453        NaN    NaN    NaN
## carrier_airportDLTPA -0.4745882        NaN    NaN    NaN
## carrier_airportEVATL  0.1655998        NaN    NaN    NaN
## carrier_airportEVBNA  0.2489897        NaN    NaN    NaN
## carrier_airportEVBOS  0.0796738        NaN    NaN    NaN
## carrier_airportEVBWI  0.6496962        NaN    NaN    NaN
## carrier_airportEVCLT  0.1327943        NaN    NaN    NaN
## carrier_airportEVDCA  0.4865333        NaN    NaN    NaN
## carrier_airportEVDEN -1.7169894        NaN    NaN    NaN
## carrier_airportEVDFW  0.6619567        NaN    NaN    NaN
## carrier_airportEVDTW  0.1860193        NaN    NaN    NaN
## carrier_airportEVEWR  0.4058058        NaN    NaN    NaN
## carrier_airportEVIAD  0.9508707        NaN    NaN    NaN
## carrier_airportEVIAH -0.0786862        NaN    NaN    NaN
## carrier_airportEVLGA -0.0936182        NaN    NaN    NaN
## carrier_airportEVMCO  2.8969348        NaN    NaN    NaN
## carrier_airportEVMDW -3.8628371        NaN    NaN    NaN
## carrier_airportEVMSP  0.3181013        NaN    NaN    NaN
## carrier_airportEVORD  0.3298828        NaN    NaN    NaN
## carrier_airportEVPHL -0.1035079        NaN    NaN    NaN
## carrier_airportEVSLC -0.7566165        NaN    NaN    NaN
## carrier_airportF9ATL  0.5912399        NaN    NaN    NaN
## carrier_airportF9BNA  0.2801762        NaN    NaN    NaN
## carrier_airportF9BOS -0.2629238        NaN    NaN    NaN
## carrier_airportF9BWI  0.5776873        NaN    NaN    NaN
## carrier_airportF9CLT  0.5219586        NaN    NaN    NaN
## carrier_airportF9DCA  0.2974571        NaN    NaN    NaN
```

```
## carrier_airportF9DEN   0.4378046      NaN   NaN   NaN
## carrier_airportF9DFW   0.4359795      NaN   NaN   NaN
## carrier_airportF9DTW   0.1447533      NaN   NaN   NaN
## carrier_airportF9EWR   0.0785434      NaN   NaN   NaN
## carrier_airportF9FLL   0.6283378      NaN   NaN   NaN
## carrier_airportF9IAD   0.4156871      NaN   NaN   NaN
## carrier_airportF9IAH   0.4834273      NaN   NaN   NaN
## carrier_airportF9LAS   0.7067052      NaN   NaN   NaN
## carrier_airportF9LAX   0.0787428      NaN   NaN   NaN
## carrier_airportF9LGA   0.2529945      NaN   NaN   NaN
## carrier_airportF9MCO   0.6847784      NaN   NaN   NaN
## carrier_airportF9MDW   0.2090890      NaN   NaN   NaN
## carrier_airportF9MIA   0.6006049      NaN   NaN   NaN
## carrier_airportF9MSP   0.2352801      NaN   NaN   NaN
## carrier_airportF9ORD   0.5317800      NaN   NaN   NaN
## carrier_airportF9PHL   0.6856627      NaN   NaN   NaN
## carrier_airportF9PHX   0.4516919      NaN   NaN   NaN
## carrier_airportF9SAN   0.1540996      NaN   NaN   NaN
## carrier_airportF9SEA   0.2831430      NaN   NaN   NaN
## carrier_airportF9SFO   0.3566424      NaN   NaN   NaN
## carrier_airportF9SLC   0.4213614      NaN   NaN   NaN
## carrier_airportF9TPA   0.4691972      NaN   NaN   NaN
## carrier_airportG4BNA   0.9068119      NaN   NaN   NaN
## carrier_airportG4BOS  -1.8810477      NaN   NaN   NaN
## carrier_airportG4BWI   0.7068724      NaN   NaN   NaN
## carrier_airportG4DEN   0.2919731      NaN   NaN   NaN
## carrier_airportG4EWR  -2.5454077      NaN   NaN   NaN
## carrier_airportG4FLL   1.0177384      NaN   NaN   NaN
## carrier_airportG4IAD   0.8771102      NaN   NaN   NaN
## carrier_airportG4LAS   0.8047737      NaN   NaN   NaN
## carrier_airportG4LAX   0.5900164      NaN   NaN   NaN
## carrier_airportG4MDW   0.6524857      NaN   NaN   NaN
## carrier_airportG4MSP   0.7774747      NaN   NaN   NaN
## carrier_airportG4PHX   1.1170737      NaN   NaN   NaN
## carrier_airportG4SAN   0.6083955      NaN   NaN   NaN
## carrier_airportHABOS  -2.6775722      NaN   NaN   NaN
## carrier_airportHAJFK  -1.2771234      NaN   NaN   NaN
## carrier_airportHALAS  -1.2518623      NaN   NaN   NaN
## carrier_airportHALAX  -0.5244349      NaN   NaN   NaN
## carrier_airportHAMCO  -2.2514998      NaN   NaN   NaN
## carrier_airportHAPHX  -2.0208647      NaN   NaN   NaN
## carrier_airportHASAN  -0.2710590      NaN   NaN   NaN
## carrier_airportHASEA   0.1189078      NaN   NaN   NaN
## carrier_airportHASFO  -0.6817445      NaN   NaN   NaN
## carrier_airportMQATL   0.0979098      NaN   NaN   NaN
## carrier_airportMQBNA   0.2870485      NaN   NaN   NaN
## carrier_airportMQBOS   0.1331765      NaN   NaN   NaN
## carrier_airportMQBWI   0.1880268      NaN   NaN   NaN
## carrier_airportMQCLT   0.2037051      NaN   NaN   NaN
## carrier_airportMQDCA   0.0759912      NaN   NaN   NaN
## carrier_airportMQDEN  -6.7084012      NaN   NaN   NaN
## carrier_airportMQDFW   0.1352055      NaN   NaN   NaN
## carrier_airportMQDTW   0.3071482      NaN   NaN   NaN
## carrier_airportMQEWR   0.0828313      NaN   NaN   NaN
```

```
## carrier_airportMQIAD  0.5880956     NaN    NaN    NaN
## carrier_airportMQIAH -0.0921632     NaN    NaN    NaN
## carrier_airportMQJFK  0.4066444     NaN    NaN    NaN
## carrier_airportMQLGA  0.3841736     NaN    NaN    NaN
## carrier_airportMQMIA  0.1198725     NaN    NaN    NaN
## carrier_airportMQMSP  0.0887523     NaN    NaN    NaN
## carrier_airportMQORD  0.1158001     NaN    NaN    NaN
## carrier_airportMQPHL  0.9788007     NaN    NaN    NaN
## carrier_airportMQPHX -0.2202648     NaN    NaN    NaN
## carrier_airportMQSLC  0.2107553     NaN    NaN    NaN
## carrier_airportMQTPA  0.4337517     NaN    NaN    NaN
## carrier_airportNKATL -0.2008909     NaN    NaN    NaN
## carrier_airportNKBNA -0.2051335     NaN    NaN    NaN
## carrier_airportNKBOS -0.2289975     NaN    NaN    NaN
## carrier_airportNKBWI -0.1334329     NaN    NaN    NaN
## carrier_airportNKCLT  0.1673200     NaN    NaN    NaN
## carrier_airportNKDEN -0.2085701     NaN    NaN    NaN
## carrier_airportNKDFW -0.1048509     NaN    NaN    NaN
## carrier_airportNKDTW -0.1169930     NaN    NaN    NaN
## carrier_airportNKEWR -0.4897967     NaN    NaN    NaN
## carrier_airportNKFLL -0.1396080     NaN    NaN    NaN
## carrier_airportNKIAH -0.2426095     NaN    NaN    NaN
## carrier_airportNKLAS -0.1625232     NaN    NaN    NaN
## carrier_airportNKLAX -0.3247385     NaN    NaN    NaN
## carrier_airportNKLGA -0.7539635     NaN    NaN    NaN
## carrier_airportNKMCO -0.0781707     NaN    NaN    NaN
## carrier_airportNKMIA  0.0600198     NaN    NaN    NaN
## carrier_airportNKMSP -0.1851486     NaN    NaN    NaN
## carrier_airportNKORD -0.1274480     NaN    NaN    NaN
## carrier_airportNKPHL -0.1541169     NaN    NaN    NaN
## carrier_airportNKPHX -0.0428745     NaN    NaN    NaN
## carrier_airportNKSAN -0.0985309     NaN    NaN    NaN
## carrier_airportNKSEA -0.1515253     NaN    NaN    NaN
## carrier_airportNKSLC -0.3116722     NaN    NaN    NaN
## carrier_airportNKTPA -0.1583683     NaN    NaN    NaN
## carrier_airportOHATL  0.0382218     NaN    NaN    NaN
## carrier_airportOHBNA  0.2062254     NaN    NaN    NaN
## carrier_airportOHBOS  0.7508130     NaN    NaN    NaN
## carrier_airportOHBWI -0.1309795     NaN    NaN    NaN
## carrier_airportOHCLT  0.2264824     NaN    NaN    NaN
## carrier_airportOHDCA  0.4943884     NaN    NaN    NaN
## carrier_airportOHDFW  0.3550831     NaN    NaN    NaN
## carrier_airportOHDTW  0.1164348     NaN    NaN    NaN
## carrier_airportOHEWR  0.5010424     NaN    NaN    NaN
## carrier_airportOHIAD  0.0339120     NaN    NaN    NaN
## carrier_airportOHIAH -0.7398647     NaN    NaN    NaN
## carrier_airportOHJFK  0.0584294     NaN    NaN    NaN
## carrier_airportOHLGA  0.4411886     NaN    NaN    NaN
## carrier_airportOHMSP  0.3925713     NaN    NaN    NaN
## carrier_airportOHORD  0.0260447     NaN    NaN    NaN
## carrier_airportOHPHL  0.2670225     NaN    NaN    NaN
## carrier_airportOOATL  0.0242660     NaN    NaN    NaN
## carrier_airportOOBNA  0.2123438     NaN    NaN    NaN
## carrier_airportOOBOS  0.2881042     NaN    NaN    NaN
```

```
## carrier_airport00BWI  0.0234941          NaN    NaN    NaN
## carrier_airport00CLT -0.2091552          NaN    NaN    NaN
## carrier_airport00DAL -0.0816915          NaN    NaN    NaN
## carrier_airport00DCA -0.1441401          NaN    NaN    NaN
## carrier_airport00DEN -0.0916860          NaN    NaN    NaN
## carrier_airport00DFW  0.3661415          NaN    NaN    NaN
## carrier_airport00DTW -0.2442711          NaN    NaN    NaN
## carrier_airport00EWR -0.7407151          NaN    NaN    NaN
## carrier_airport00FLL  0.7724649          NaN    NaN    NaN
## carrier_airport00IAD -0.3875052          NaN    NaN    NaN
## carrier_airport00IAH  0.0060551          NaN    NaN    NaN
## carrier_airport00JFK  0.3807090          NaN    NaN    NaN
## carrier_airport00LAS -0.0382317          NaN    NaN    NaN
## carrier_airport00LAX -0.0696068          NaN    NaN    NaN
## carrier_airport00LGA  0.1565730          NaN    NaN    NaN
## carrier_airport00MCO -0.3001120          NaN    NaN    NaN
## carrier_airport00MDW -0.2702990          NaN    NaN    NaN
## carrier_airport00MSP -0.6641782          NaN    NaN    NaN
## carrier_airport00ORD  0.2533121          NaN    NaN    NaN
## carrier_airport00PHL -0.7822336          NaN    NaN    NaN
## carrier_airport00PHX -0.0333082          NaN    NaN    NaN
## carrier_airport00SAN  0.0619962          NaN    NaN    NaN
## carrier_airport00SEA -0.6611249          NaN    NaN    NaN
## carrier_airport00SFO  0.1010490          NaN    NaN    NaN
## carrier_airport00SLC -0.5045073          NaN    NaN    NaN
## carrier_airport00TPA  0.7971213          NaN    NaN    NaN
## carrier_airportQXDAL -0.5782814          NaN    NaN    NaN
## carrier_airportQXDFW -7.3745281          NaN    NaN    NaN
## carrier_airportQXLAS -0.1722410          NaN    NaN    NaN
## carrier_airportQXLAX  0.1309420          NaN    NaN    NaN
## carrier_airportQXMSP -0.8457777          NaN    NaN    NaN
## carrier_airportQXORD -1.1812792          NaN    NaN    NaN
## carrier_airportQXPHX -0.1294948          NaN    NaN    NaN
## carrier_airportQXSAN -0.0631555          NaN    NaN    NaN
## carrier_airportQXSEA  0.1166084          NaN    NaN    NaN
## carrier_airportQXSFO  0.1356357          NaN    NaN    NaN
## carrier_airportQXSLC  0.0836516          NaN    NaN    NaN
## carrier_airportUAATL  0.2003152          NaN    NaN    NaN
## carrier_airportUABNA  0.3849110          NaN    NaN    NaN
## carrier_airportUABOS  0.1700090          NaN    NaN    NaN
## carrier_airportUABWI  0.1960234          NaN    NaN    NaN
## carrier_airportUACLT  0.7868978          NaN    NaN    NaN
## carrier_airportUADCA  0.2226966          NaN    NaN    NaN
## carrier_airportUADEN -0.1983789          NaN    NaN    NaN
## carrier_airportUADFW  0.3367265          NaN    NaN    NaN
## carrier_airportUADTW  0.5123547          NaN    NaN    NaN
## carrier_airportUAEWR  0.0620262          NaN    NaN    NaN
## carrier_airportUAFLL  0.2631119          NaN    NaN    NaN
## carrier_airportUAIAD -0.0945227          NaN    NaN    NaN
## carrier_airportUAIAH -0.1123842          NaN    NaN    NaN
## carrier_airportUAJFK -0.4026344          NaN    NaN    NaN
## carrier_airportUALAS  0.1535996          NaN    NaN    NaN
## carrier_airportUALAX -0.1496285          NaN    NaN    NaN
## carrier_airportUALGA  0.0958065          NaN    NaN    NaN
```

```
## carrier_airportUAMCO   0.0388389        NaN    NaN    NaN
## carrier_airportUAMIA   0.2388794        NaN    NaN    NaN
## carrier_airportUAMSP   0.3959651        NaN    NaN    NaN
## carrier_airportUAORD  -0.0769824        NaN    NaN    NaN
## carrier_airportUAPHL   0.2931099        NaN    NaN    NaN
## carrier_airportUAPHX   0.1667654        NaN    NaN    NaN
## carrier_airportUASAN  -0.0260014        NaN    NaN    NaN
## carrier_airportUASEA   0.1173855        NaN    NaN    NaN
## carrier_airportUASFO  -0.1474413        NaN    NaN    NaN
## carrier_airportUASLC   0.3564714        NaN    NaN    NaN
## carrier_airportUATPA   0.1551907        NaN    NaN    NaN
## carrier_airportVXBNA   0.0104589        NaN    NaN    NaN
## carrier_airportVXBOS  -1.1616111        NaN    NaN    NaN
## carrier_airportVXBWI  -7.9450094        NaN    NaN    NaN
## carrier_airportVXDAL  -0.1515570        NaN    NaN    NaN
## carrier_airportVXDCA  -0.8254686        NaN    NaN    NaN
## carrier_airportVXDEN  -0.3024208        NaN    NaN    NaN
## carrier_airportVXEWR  -1.3369989        NaN    NaN    NaN
## carrier_airportVXFLL  -0.1124680        NaN    NaN    NaN
## carrier_airportVXIAD  -0.7542994        NaN    NaN    NaN
## carrier_airportVXJFK  -0.4645679        NaN    NaN    NaN
## carrier_airportVXLAS   0.1088952        NaN    NaN    NaN
## carrier_airportVXLAX  -0.2477098        NaN    NaN    NaN
## carrier_airportVXMCO  -0.9039359        NaN    NaN    NaN
## carrier_airportVXORD  -0.5259756        NaN    NaN    NaN
## carrier_airportVXPHL  -2.2872286        NaN    NaN    NaN
## carrier_airportVXSAN   0.1412600        NaN    NaN    NaN
## carrier_airportVXSEA   0.2786540        NaN    NaN    NaN
## carrier_airportVXSFO  -0.1442007        NaN    NaN    NaN
## carrier_airportWNATL   0.3028565        NaN    NaN    NaN
## carrier_airportWNBNA   0.4035954        NaN    NaN    NaN
## carrier_airportWNBOS   0.2673759        NaN    NaN    NaN
## carrier_airportWNBWI   0.2840794        NaN    NaN    NaN
## carrier_airportWNCLT   0.3889161        NaN    NaN    NaN
## carrier_airportWNDAL   0.3961359        NaN    NaN    NaN
## carrier_airportWNDCA   0.4022939        NaN    NaN    NaN
## carrier_airportWNDEN   0.3469439        NaN    NaN    NaN
## carrier_airportWNDTW   0.5772417        NaN    NaN    NaN
## carrier_airportWNEWR   0.4187528        NaN    NaN    NaN
## carrier_airportWNFLL   0.2204409        NaN    NaN    NaN
## carrier_airportWNIAD   0.4798862        NaN    NaN    NaN
## carrier_airportWNIAH   0.7676844        NaN    NaN    NaN
## carrier_airportWNLAS   0.4039232        NaN    NaN    NaN
## carrier_airportWNLAX   0.4370673        NaN    NaN    NaN
## carrier_airportWNLGA   0.2435074        NaN    NaN    NaN
## carrier_airportWNMCO   0.3483725        NaN    NaN    NaN
## carrier_airportWNMDW   0.3387218        NaN    NaN    NaN
## carrier_airportWNMIA   0.6203854        NaN    NaN    NaN
## carrier_airportWNMSP   0.5548741        NaN    NaN    NaN
## carrier_airportWNORD   0.6101748        NaN    NaN    NaN
## carrier_airportWNPHL   0.4817328        NaN    NaN    NaN
## carrier_airportWNPHX   0.4447739        NaN    NaN    NaN
## carrier_airportWNSAN   0.4456519        NaN    NaN    NaN
## carrier_airportWNSEA   0.4627207        NaN    NaN    NaN
```

```
## carrier_airportWNSFO  0.6537122      NaN   NaN   NaN
## carrier_airportWNSLC  0.6046059      NaN   NaN   NaN
## carrier_airportWNTPA  0.4166236      NaN   NaN   NaN
## carrier_airportYVATL -0.3573998      NaN   NaN   NaN
## carrier_airportYVBNA -0.3646790      NaN   NaN   NaN
## carrier_airportYVBOS -1.3183691      NaN   NaN   NaN
## carrier_airportYVBWI -2.6907206      NaN   NaN   NaN
## carrier_airportYVCLT -0.5759667      NaN   NaN   NaN
## carrier_airportYVDCA -1.1223879      NaN   NaN   NaN
## carrier_airportYVDFW  0.5492133      NaN   NaN   NaN
## carrier_airportYVDTW -0.5072315      NaN   NaN   NaN
## carrier_airportYVFLL -1.4680078      NaN   NaN   NaN
## carrier_airportYVIAD  0.0551526      NaN   NaN   NaN
## carrier_airportYVIAH -0.2199349      NaN   NaN   NaN
## carrier_airportYVLGA -0.8082554      NaN   NaN   NaN
## carrier_airportYVMIA -0.6192460      NaN   NaN   NaN
## carrier_airportYVMSP -0.6761508      NaN   NaN   NaN
## carrier_airportYVORD -0.3163851      NaN   NaN   NaN
## carrier_airportYVPHL -1.0027431      NaN   NaN   NaN
## carrier_airportYVPHX  0.5029397      NaN   NaN   NaN
## carrier_airportYVSAN -5.7037121      NaN   NaN   NaN
## carrier_airportYVSLC -0.2260391      NaN   NaN   NaN
## carrier_airportYVTPA -1.3824351      NaN   NaN   NaN
## carrier_airportYXATL -0.1160368      NaN   NaN   NaN
## carrier_airportYXBNA -0.0801002      NaN   NaN   NaN
## carrier_airportYXBOS -0.3282673      NaN   NaN   NaN
## carrier_airportYXBWI  0.0620283      NaN   NaN   NaN
## carrier_airportYXCLT -0.0372827      NaN   NaN   NaN
## carrier_airportYXDCA -0.0368225      NaN   NaN   NaN
## carrier_airportYXDEN -0.0652362      NaN   NaN   NaN
## carrier_airportYXDFW -0.2533727      NaN   NaN   NaN
## carrier_airportYXDTW -0.0980022      NaN   NaN   NaN
## carrier_airportYXEWR -0.1383832      NaN   NaN   NaN
## carrier_airportYXFLL -8.3377583      NaN   NaN   NaN
## carrier_airportYXIAD -0.1248325      NaN   NaN   NaN
## carrier_airportYXIAH -0.1829257      NaN   NaN   NaN
## carrier_airportYXJFK -0.4285424      NaN   NaN   NaN
## carrier_airportYXLGA -0.2531985      NaN   NaN   NaN
## carrier_airportYXMCO  0.0637648      NaN   NaN   NaN
## carrier_airportYXMDW -1.1117031      NaN   NaN   NaN
## carrier_airportYXMIA -0.2967977      NaN   NaN   NaN
## carrier_airportYXMSP -0.0413632      NaN   NaN   NaN
## carrier_airportYXORD -0.1714077      NaN   NaN   NaN
## carrier_airportYXPHL -0.3238486      NaN   NaN   NaN
## carrier_airportYXSEA -5.3170195      NaN   NaN   NaN
## carrier_airportYXSLC -0.0273041      NaN   NaN   NaN
## carrier_airportYXTPA -0.0257388      NaN   NaN   NaN
```