Demand Estimation Report

Airlines Merger Simulation

August 19, 2025

1 Introduction

This report presents the results of the demand estimation analysis conducted as part of the Airlines Merger Simulation project. The tables and figures included here summarize the key findings.

The model specification follows a logit and nested-logit framework, where consumer utility is modeled as:

- **Logit Model:** $\ln(s_{jt}) - \ln(s_{0t}) = \alpha p_{jt} + x_{jt}\beta + \xi_t + \xi_{jt} + \epsilon_{ijt}$

- **Nested-Logit Model:** $\ln(s_{jt}) - \ln(s_{0t}) = \alpha p_{jt} + x_{jt}\beta + \sigma \ln(s_{jt|g}) + \xi_t + \xi_{jt} + \epsilon_{ijt}$

where:

- p_{jt} is the average fare (price).

- x_{jt} includes regressors such as share nonstop, average distance, squared distance, and $\log(1 + \text{number of fringe carriers})$.

- ν_t and ξ_{jt} are fixed effects for origin-destination and product-level unobservables.

- $s_{jt|g}$ is the share of product j in group g.

- σ captures the nesting parameter in the nested-logit model.

- Instruments (z_{jt}^D) include average rival presence, average number of markets served by rivals, and the number of rival carriers.

2 Summary Statistics

Table 1: Summary statistics: variables used in demand estimation

	mean	sd	min	p25	p50	p75	max
Market share	0.001	0.006	0.0000	0.0001	0.000	0.001	0.473
Outside share	0.992	0.016	0.3365	0.9910	0.996	0.998	1.000
Inside share sum	0.008	0.016	0.0002	0.0024	0.004	0.009	0.664
Nest share	0.008	0.016	0.0002	0.0024	0.004	0.009	0.664
rival_carriers	5.477	2.274	1.0000	4.0000	5.000	7.000	22.000
num_markets	51.458	31.554	1.0000	27.0000	47.000	75.000	137.000
Average ticket price	226.831	93.858	25.0000	172.4141	212.830	260.995	2489.196
Share nonstop flights	0.195	0.355	0.0000	0.0000	0.000	0.143	1.000
Average Distance (000s miles)	1.491	0.856	0.0670	0.8752	1.298	1.995	10.345
Average Distance sqr (000s miles)	2.958	3.700	0.0045	0.7659	1.686	3.980	107.019
Log(1 + fringe carriers)	0.408	0.469	0.0000	0.0000	0.000	0.693	2.565
Observations	1371742						

3 Demand Estimation Results

Column (1) presents the results of the logit model without instruments, while column (2) shows the logit model results with price instruments. Column (3) shows the nested-logit model without instruments, and column (4) presents the nested-logit model with instruments for both prices and nest shares. The nests are defined as inside goods (carriers that are not the outside good) and outside good. All columns include fixed effects for origin-destination markets. Robust standard errors are reported in parentheses below the coefficients.

Table 2: Demand Estimates (Logit and Nested-Logit)

	(1) ln(s_jt) - ln(s_0t)	(2) ln(s_jt) - ln(s_0t)	(3) ln(s_jt) - ln(s_0t)	(4) ln(s_jt) - ln(s_0t)
Average ticket price	-0.0024***	0.0318***	-0.0004***	-0.0019***
	(0.0000)	(0.0004)	(0.0000)	(0.0001)
Share nonstop flights	1.9793***	1.8355***	0.0946***	0.3154***
	(0.0053)	(0.0130)	(0.0009)	(0.0043)
Average Distance (000s miles)	-4.1108***	-5.6862***	-0.0442***	-0.4475***
	(0.0159)	(0.0692)	(0.0024)	(0.0153)
Average Distance sqr (000s miles)	0.2929***	0.1273***	0.0046***	0.0440***
	(0.0038)	(0.0174)	(0.0005)	(0.0014)
Log(1 + fringe carriers)	-0.4908***	-0.1865***	0.0702***	-0.0056***
	(0.0037)	(0.0083)	(0.0006)	(0.0010)
ln(s_jt) - ln(s_gt)			0.9809***	0.8688***
			(0.0002)	(0.0024)
Observations	1371742	1371742	1371742	1371742
Adjusted R^2	0.486	-1.674	0.985	0.973
F-statistic (IV)		3738.9612		422.5438

4 Elasticities

Table 3: Elasticities: Own-price (Logit and Nested-Logit)

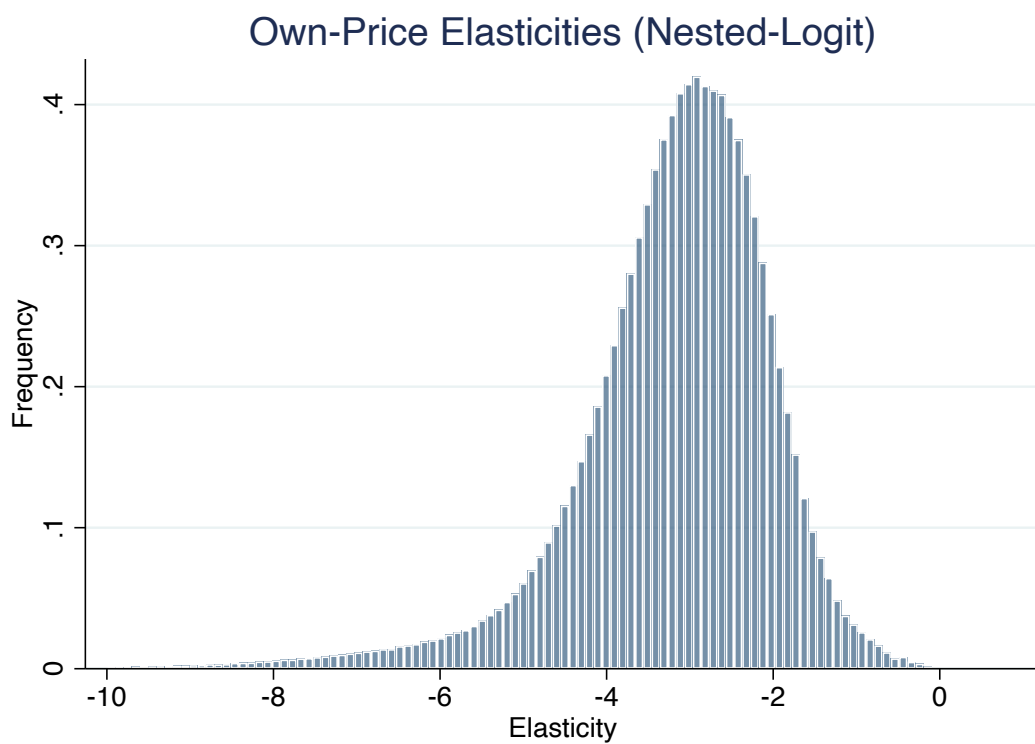|	count	mean	sd	min	p25	p50	p75	max
Logit Elasticity	1371742	-0.548	0.227	-6.021	-0.631	-0.514	-0.417	-0.060
Nested-Logit Elasticity	1371742	-3.224	1.353	-34.953	-3.750	-3.038	-2.422	-0.092
Observations	1371742							

Figure 1: Histogram of Elasticities