1 Introduction

the intermediate ‡ight and lowers …nal prices.

The main contribution of this paper is to test Chen and Gayle (2007) theoretical prediction.

in-sample versus out-of-sample markets is statistically signi…cant at conventional levels of statistical signi…cance. In summary, we can conclude that, relative to out-of-sample markets, in-sample markets are: (i) larger in terms oti-

Product characteristics that in‡ue001tsumesrteris’96(air1(ct)-)-1(ra(6)-)-1(ra()-1(raelni)1(sdema)1(t)-41(t)-c

Table 2
Summary Statistics

	Codeshare Products			
Variable	**Mean**	**Standard Deviation**	**Min**	**Max**

4 The Model

I now outline a model of air travel demand and supply. I begin with the demand-side, which is modeled within a discrete choice framework. Speci…cally, I use a random coe¢ cients logit demand model. I then outline the supply-side of the model, which is where the vertical contracting is captured. It must be noted however that the empirical model assumes that the existing menu of products o¤ered in a market, and …rms' choice of whether to form a codeshare alliance, are predetermined at the time of optimal price-setting behavior. Since the focus of this paper is on optimal price-setting behavior conditional on the menu of products that already exists in the market, a more general model in which codeshare alliance formation is endogenous is beyond the scope of this paper and left for future research.

4.1 Demand

Potential passenger i in market t faces a choice between $J_t + 1$

where U_{ijt} is the value of product j to passenger

To obtain an empirical model that allows for double marginalization, I assume that the prices of codeshare products are determined within a sequential price-setting game. In this game the upstream carrier (pure operating carrier) …rst sets the price for its segment of the trip, s, then the downstream carrier (ticketing carrier) sets the …nal round-trip price, p, given the agreed-upon price for the services supplied by an upstream carrier. To solve for the subgame perfect Nash equilibrium in sequential games, it is standard to start by looking at the …nal subgame in the sequential game. The …nal subgame in this vertical model is a Bertrand-Nash game between downstream carriers.

In what follows, I suppress ... [illegible] ...kw)28(e)-1atn

Having characterized the price-cost markup behavior of downstream carriers, as captured by by assuming that online products represent cases where the downstream and upstream carriers specification of the marginal cost function in equation (11) is admittedly simplistic since it does not allow for endogenous aspects of airlines costs such as density economies. However, a more general

distribution of their aircraft ‡eet. In addition, it is reasonable to assume that airlines do not routinely change their aircraft ‡eet with each change in jet fuel price. As such, airlines are likely to di¤er in the intensity with which they use fuel. Given that an airline's marginal cost is correlated with its price, and I assume that shocks to fuel price are uncorrelated with $_{jt}$, then the interaction of fuel price with operating carrier(s) dummies are valid instruments for airline ticket price. In addition, since the marginal cost of servicing an itinerary is assumed to be a positive function of itinerary distance, itinerary distance is also used as an instrument for airline ticket price.

In summary, the demand instruments include: (i) interaction of fuel price with operating carrier(s) dummies; (ii) itinerary distance; (iii) the squared deviation of a product's itinerary distance froiat136(th)-1(e)t136akerg(e)t178(i)1(tine)-1(r)1(ary)t136(distanc)-1(y)t136(of)-178comopenpro(uc)-1(sy)t136(i¤
airline's ma(k)28(et)-315(e(an)-228(i)1(tine)-1(r)1(ary)-207(inc)-1oi)1(n)27ivenintmesur(e,)-323(.e.e,)-323mmarea

here it is not statistically signi...cant at conventional levels of signi...cance.

Table 3
Estimates from Joint Estimation of Demand and Marginal Cost Parameters, when Demand is based on the Random

1991), Berry (1990), Evans and Kessides (1993), and Lederman (2007).

The coe¢ cient on "Inconvenient" is not statistically signi…cant at conventional levels of signifthat it contains at least 10 products with at least lte of these products being a traditional codeshare product. Since traditional codesharing tends to lower prices,[12] it is reasonable to conjecture that competition may be sti¤er, markups lower, and own-price elasticities higher, in markets with a higher prevalence of traditional codeshare products.

Table 4
Non-nested Tests for Model Selection

	***Model 1*: Supply equation allows upstream margin only on integrated codeshare products**	***Model 3*: Supply equation does not allow upstream margin on any codeshare product**
***Model 2* :** Supply equation allows upstream margin on all codeshare products		

Table 5
Price-cost Margins and Recovered Marginal Cost,
by Airline,
for Integrated Codeshare Products

Downstream Carrier Margin	Upstream Carrier Margin	Total Margin	Recovered Marginal Cost

Now for comparing the computed price-cost margins and recovered marginal cost estimates across ticketing carriers/downstream carriers of the integrated codeshare products. First, as ex-

It must be noted however that the counterfactual experiment outlined above assumes that when counterfactual supply equation (18) is used to characterize firms' optimal pricing behavior,

($205.23), as well as the largest mean predicted percent reduction in the price of its integrated

Next, I explore the extent to which consumer welfare is affected by the price-quantity changes

popular. Thus another possible extension to this research is to use the model to study international air travel markets where codeshare partners are distinct national carriers and less likely to offer competing online services in the said market.

Appendix A: Additional Tables.

Table A1
List of Airlines in the Sample
and the Types of Products in the Sample they are Involved in

Airline Name

Table A2
List of Cities, States and Corresponding Airports in the Data

Appendix B: Derivation of 4_f.

Note that 4_f

matrix.   Matrix Z

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