Effect of Consolidation in US Airline Sector on ticket prices and Supply

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Introduction

- Concern in recent years regarding consolidation in airline sector resulting in collusive behavior/lack of competition
- Sector looks closer to an oligopoly today as compared to the past
- Top 4 airlines control 68% of total capacity today as compared to 56% in 1995 and less than 50% in 2009
- Airlines have made record profits in last 5 years

Timeline of Mergers

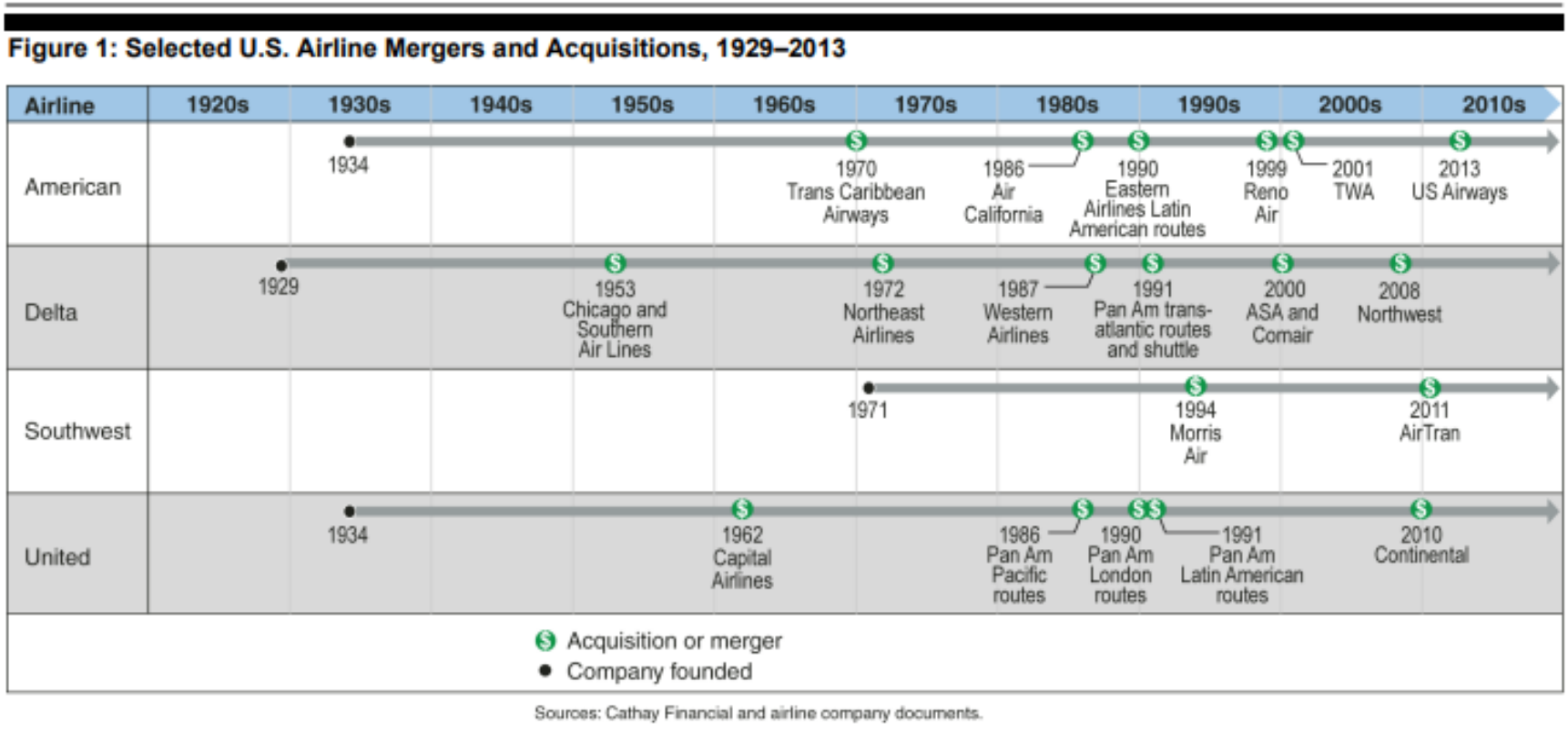

Figure 1: Timeline of mergers in airline industry

Supply/Demand in Airline Sector

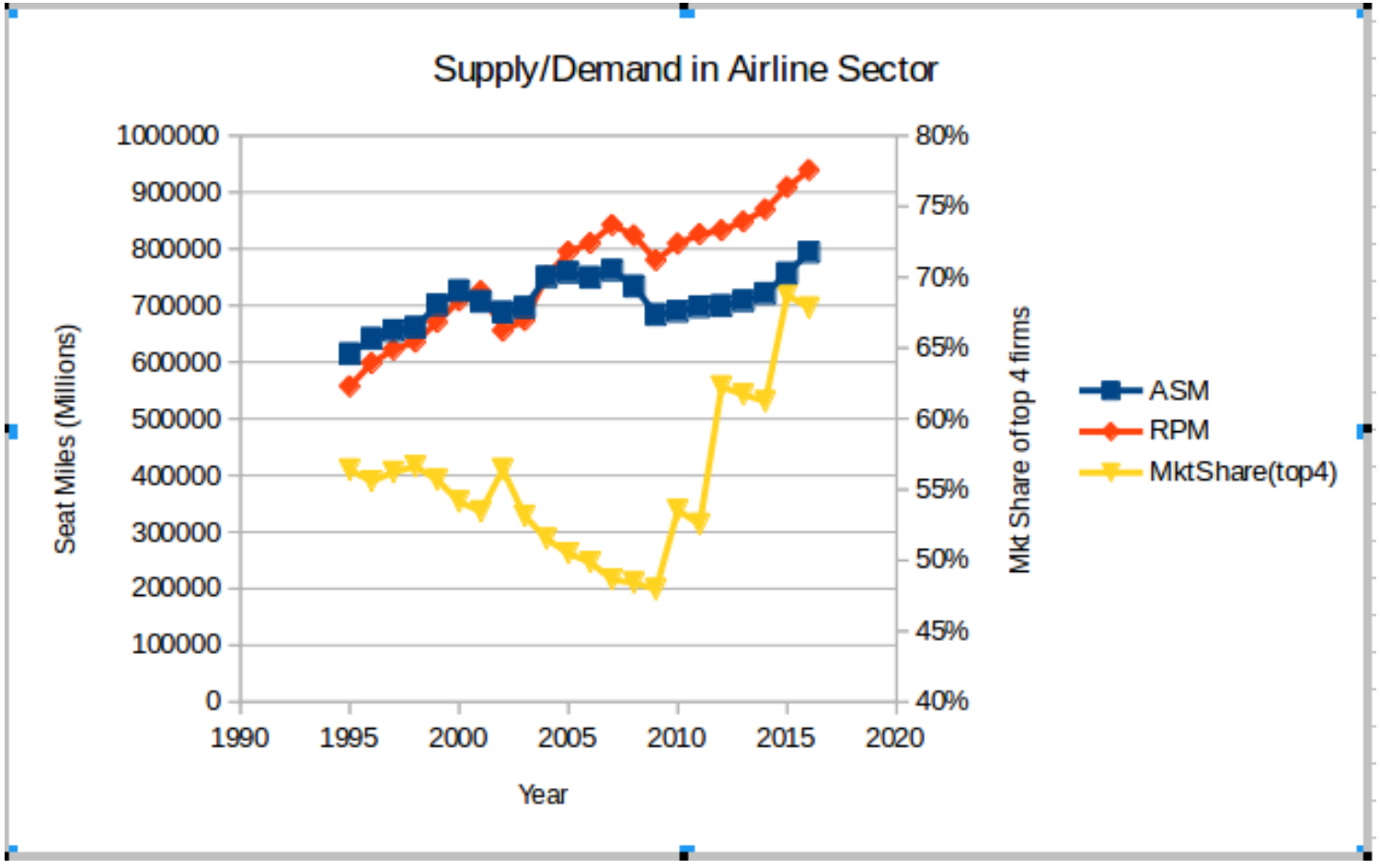

Figure 2: Supply/Demand in airline industry on left axis. Market share of top 4 firms on right axis

OLS:Fixed Effects

$$pyield = \alpha_i + \beta_1 Load + \beta_2 Fuel + \beta_3 Labor + \beta_4 NonLabor + \beta_5 Conc + \epsilon \quad (1)$$

- $pyield = \frac{\text{Total fare paid by passengers}}{\text{Passenger Revenue Miles(PRM)}}$
- $Load = \frac{\text{Passenger Revenue Miles(PRM)}}{\text{Available Seat miles (ASM)}}$
- Fuel - Fuel costs per ASM
- Labor - Labor costs per ASM
- Nonlabor - Costs other than fuel and labor per ASM
- Conc - Herfindahl-Hirschman index (HHI). Measures industry concentration

Fixed and Random Effects: Results

Table 1: Results. *,** and *** signify significance at 10%,5% and 1% respectively

Variable	RE	FE
α	3.34***	-
Load	-0.009***	-0.011***
Fuel	0.133***	0.159**
Labor	0.415***	0.411***
NonLabor	-0.05	-0.138*
Conc	0.24	0.171
R^2	0.36	0.99

Simultaneous Equations

$$\Delta q^D = \alpha_D + \beta_1 \Delta ln(p) + \beta_2 \Delta ln(GDP) + \epsilon_D \tag{2}$$

$$\Delta q^S = \alpha_S + \gamma_1 \Delta ln(p) + \gamma_2 Conc + Z' \gamma_3 \epsilon_S \tag{3}$$

$$q^D = q^S$$

Solution to this system is given by

$$\Delta ln(p) = \frac{\alpha_S - \alpha_D}{\beta_1 - \gamma_1} + \frac{\gamma_2 Conc}{\beta_1 - \gamma_1} + \frac{Z' \gamma_3}{\beta_1 - \gamma_1} - \frac{\beta_2 ln(GDP)}{\beta_1 - \gamma_1} + \frac{\epsilon_S - \epsilon_D}{\beta_1 - \gamma_1} \tag{4}$$

$$\Delta ln(q) = \frac{\beta_1 \alpha_S - \gamma_1 \alpha_D}{\beta_1 - \gamma_1} + \frac{\beta_1 \gamma_2 Conc}{\beta_1 - \gamma_1} + \frac{\beta_1 Z' \gamma_3}{\beta_1 - \gamma_1} - \frac{\beta_2 \gamma_1 ln(GDP)}{\beta_1 - \gamma_1} + \frac{\epsilon_S - \epsilon_D}{\beta_1 - \gamma_1} \tag{5}$$

GMM

- β_1 is over-identified in the simultaneous equations model. Therefore, I resort to the two-step GMM to estimate the supply equation.
- Instrument $X = [\Delta ln(GDP) \quad Conc \quad Z']$

Table 2: Results. *,** and *** signify significance at 10%,5% and 1% respectively

Variable	GMM
α	0.1***
Δ pyield	2.2**
Δ FuelCost	-0.277***
Δ LaborCost	-0.493***
Conc	-0.274
R^2	0.52

Conclusions

- The effect of an increase in industry concentration on ticket prices is positive, but the effect is not statistically significant
- Effect on supply is negative but is not statistically significant