

Competition Regimes and air transport costs: The effects of open skies agreements

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June 17, 2008

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Literature on Trade Costs

- Obstfeld and Rogoff (2000)
 - Major International macroeconomics puzzles hang on trade costs.
- Vanwincoop et al. (2001)
 - Trade Costs account for an equivalent ad-valorem tariff of 170% per unit product value.
 - They can be decompose in:
 - 1 Transport Costs (21%)
 - 2 Policy Barriers
 - 3 Information Costs
 - 4 Contract enforcement
 - 5 Exchange rate Costs
 - 6 Legal and regulation Costs
 - 7 Local and distribution costs

. . . empirically

1. Iceberg Transport Costs.
2. Distance. - Gravity.
3. Endogenize.
 - Limão and Venables (2001)
 - Distance (40%)
 - Geography.
 - Infrastructure.
 - Quality of Regulation.
 - Administrative Barriers.
 - Structure of Competition.
 - Fink et al. (2002)
 - Private practices and government decision influence cargo pricing in ocean industry.

What do we do in this paper?

1. Using U.S. import data at the 4 digit level - SITC per port for years 1990 – 2003, we estimate the effect of a change in Air Competition Regimes (OSA) on air transport costs.
2. Following previous studies:
 - Based on Cross Sectional Results, we estimate the effect of better infrastructure and Regulatory Quality on Air transport Costs.
 - Then we focus our attention on the effects of OSA through time, and we test for any differential effects of OSA on transport costs and trade per countries.

What do we find?

- Cross Section:
 - As expected: countries with greater access to airports and better regulatory quality reduce transport costs in around 11%.
- Panel Data
 - Liberalization of air cargo markets reduces air transport costs in 9%.
 - The reduction effects of OSA are not restricted exclusively to reductions in freight tariffs. Open Skies Agreement could bring about an increase in trade of about 12%.
 - OSA do not have the same effects in all countries. For developed and upper-middle-income developing countries,

we find that OSA reduce air transport costs.

- For low-income developing countries, we do not find that OSAs can be associated with a fall in freight rates.
- Low-income developing countries cannot take advantage of OSAs either because barriers to competition are binding or because their market size is limited.

Reduced Form

$$p_{i,j,k,t} = mc(i, j, k, t) + \mu(i, j, k, t) \quad (1)$$

Where:

$$\begin{aligned} \rightarrow mc(i, j, k, t) = & \alpha_j + \lambda_k + \psi wv_{ijkt} + \kappa imb_{ijt} \\ & + \delta d_{ij} + \eta q_{ijt} + \omega FAII_i^{type} + \epsilon_{ijkt} \end{aligned} \quad (2)$$

$$\rightarrow \mu(i, j, k, t) = \rho_k + \varphi OSA_{it} \quad (3)$$

$$FAII_i^{type} = \frac{\sum_{\bar{c}} pop_{c,i} \left(\frac{Ra_{\bar{c},i}}{Pop_{\bar{c},i}} \right)^\alpha}{\sum_{c \in C} Pop_{c,i}} Urbanpop_i \quad \forall \quad \alpha = 0, \frac{1}{3}, \frac{1}{2} \quad (4)$$

$$\begin{aligned}
p_{i,j,k,t} = & \alpha_j + \underbrace{\beta_k}_{\lambda_k + \rho_k} + \underbrace{\psi}_+ wv_{ijkt} + \underbrace{\delta}_+ d_{ij} + \underbrace{\eta}_- q_{ijt} + \underbrace{\kappa}_- imb_{ijt} \\
& + \underbrace{\omega}_- FAII_i^{type} + \underbrace{\varphi}_- OSA_{it} + \epsilon_{ijkt}
\end{aligned} \tag{5}$$

Results

- Cross Section following: Clark et. al (2004), Following Fink et al. (2002), Limao and Venables (2001)
- Panel: Focus on OSA effect.
- Furthermore: Control for competition of ocean industry.
- Problems: Endogeneity bias between TC and Volume. IV Volume with GDP.

Cross Section

	(1)	(2)	(3)	(8)	(10)	(11)
	Air Trans. Price per Unit (ln)					
Log Distance	0.244 (0.040)***	0.226 (0.042)***	0.264 (0.053)***	0.223 (0.043)***	0.167 (0.048)***	0.289 (0.037)***
Total Volume (ln)	0.001 (0.020)	0.005 (0.017)	0.006 (0.028)	-0.001 (0.016)	-0.004 (0.026)	-0.002 (0.011)
Product Unit Value (ln)	0.476 (0.011)***	0.482 (0.011)***	0.473 (0.011)***	0.481 (0.011)***	0.499 (0.012)***	0.450 (0.015)***
Unbalance	-0.079 (0.072)	-0.014 (0.063)	-0.126 (0.076)	-0.049 (0.057)	0.108 (0.100)	-0.120 (0.045)***
Open Sky Agreement	-0.040 (0.046)	0.009 (0.037)	-0.025 (0.055)	-0.012 (0.036)	0.067 (0.049)	0.030 (0.032)
FAII, Index II,(0) w ≤ 75 km, l ≥ 2000	-0.390 (0.119)***	-0.236 (0.092)**			-0.129 (0.148)	-0.080 (0.070)
Regulatory Quality		-0.150 (0.035)***		-0.179 (0.037)***	-0.114 (0.092)	-0.172 (0.033)***
Index Limao			-0.071 (0.024)***			
Ort. FAII, Index II,(0) w ≤ 75 km, l ≥ 2000				-0.218 (0.108)**		
Implied Infra. Effect	-0.183***	-0.111***	-0.186***	-0.075***	-0.061	-0.038
Observations	164721	164721	160304	164721	106256	58465
R-squared	0.335	0.337	0.332	0.337	0.364	0.313
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Product FE	Yes	Yes	Yes	Yes	Yes	Yes

Countries All sample Industrialized Developing
 Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Panel Data

	(2)	(3)	(4)	(5)	(6)	(7)
	Air Trans. Price per Unit (ln)					
Total Volume (ln)	-0.011 (0.053)	-0.083 (0.050)*	-0.047 (0.050)	0.008 (0.052)	-0.067 (0.048)	-0.029 (0.050)
Product Unit Value (ln)	0.500 (0.003)***	0.500 (0.003)***	0.500 (0.003)***	0.500 (0.003)***	0.500 (0.003)***	0.500 (0.003)***
Open Sky Agreement	-0.026 (0.009)***	-0.003 (0.009)	-0.013 (0.009)	-0.019 (0.009)**	0.005 (0.009)	-0.005 (0.009)
Vessel Index	0.090 (0.049)*	0.095 (0.046)**	0.097 (0.047)**	0.102 (0.048)**	0.108 (0.045)**	0.109 (0.046)**
Open Sky Agreement, Year since signed		-0.014 (0.002)***			-0.015 (0.002)***	
Open Sky Agreement Three Years or more.			-0.044 (0.010)***			-0.047 (0.010)***
Open Sky Agreement x Distance				-0.110 (0.020)***	-0.109 (0.019)***	-0.109 (0.019)***
Implied Effect OSA	-0.026***	-0.045***	-0.057***	-0.019***	-0.040***	-0.052***
Observations	2006690	2006690	2006690	2006690	2006690	2006690
R-squared	0.409	0.409	0.409	0.409	0.409	0.409
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cty - Product FE	Yes	Yes	Yes	Yes	Yes	Yes
Sample	1990 - 2003					

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Cty. Differences

	(1)	(2)	(3)	(4)	(5)	(6)
	Air Trans. Price per Unit (ln)					
Total Weight (ln)	0.060 (0.336)	0.174 (0.245)	-0.189 (0.053)***	-0.188 (0.051)***	-0.626 (0.195)***	-424 (0.167)***
Product Unit Value (ln)	0.517 (0.003)***	0.517 (0.003)***	0.452 (0.004)***	0.452 (0.004)***	0.465 (0.006)***	0.466 (0.006)***
Vessel Index	-0.016 (0.282)	0.113 (0.222)	0.159 (0.041)***	0.174 (0.039)***	0.106 (0.082)	0.156 (0.086)*
Open Sky Agreement	-0.047 (0.019)**	-0.022 (0.013)*	0.005 (0.014)	0.008 (0.013)	-0.079 (0.036)**	-0.073 (0.025)***
Open Sky Agreement Three Years or more.		-0.046 (0.018)**		-0.016 (0.015)		-0.073 (0.025)***
Open Sky Agreement x Distance		-0.150 (0.029)***		-0.042 (0.018)**		-0.032 (0.042)
Implied Effect OSA	-0.047***	-0.068***	0.005	-0.008	-0.079***	-0.092***
Observations	1382607	1382607	624083	624083	269453	354630
R-squared	0.415	0.415	0.398	0.399	0.401	0.394
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cty - Product FE	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Developed		Developing		Upper middle	

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

OSA Effect Through Time

	(1)	(2)	(4)	(6)	(8)	(10)
	Air Trans. Price per Unit (ln)					
Total Volume (ln)	-0.076 (0.047)	-0.060 (0.046)	-0.061 (0.046)	0.077 (0.221)	-0.188 (0.052)***	-0.436 (0.181)**
Product Unit Value (ln)	0.500 (0.003)***	0.500 (0.003)***	0.500 (0.003)***	0.517 (0.003)***	0.452 (0.004)***	0.465 (0.006)***
OSA	-0.005 (0.010)	0.004 (0.009)	0.003 (0.009)	-0.004 (0.010)	-0.007 (0.017)	-0.031 (0.046)
Year signed						
OSA	-0.016 (0.011)	-0.008 (0.010)	-0.010 (0.009)	-0.026 (0.013)**	0.016 (0.016)	-0.015 (0.037)
One Year After						
OSA	-0.023 (0.015)	-0.015 (0.014)	-0.020 (0.014)	-0.037 (0.021)*	0.017 (0.015)	-0.009 (0.041)
Two Years After						
OSA	-0.029 (0.015)**	-0.022 (0.014)	-0.026 (0.014)*	-0.044 (0.027)	0.005 (0.020)	-0.108 (0.066)
Three Years After						
OSA	-0.051 (0.016)***	-0.045 (0.015)***	-0.047 (0.015)***	-0.060 (0.024)**	0.012 (0.018)	-0.012 (0.037)
Four Years After						
OSA	-0.090 (0.018)***	-0.086 (0.017)***	-0.088 (0.017)***	-0.090 (0.035)***	-0.049 (0.024)**	-0.155 (0.047)***
Five or More After						
OSA		-0.107 (0.018)***	-0.109 (0.019)***	-0.161 (0.028)***	-0.045 (0.018)**	-0.034 (0.047)
x Distance						
Vessel Index			0.107 (0.045)**	0.042 (0.212)	0.175 (0.039)***	0.156 (0.088)*
Observations	2006728	2006728	2006690	1382607	624083	269453
R-squared	0.409	0.409	0.409	0.415	0.399	0.401
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cty - Product FE	Yes	Yes	Yes	Yes	Yes	Yes
Sample	All		Developed		Developing	Upper Middle

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

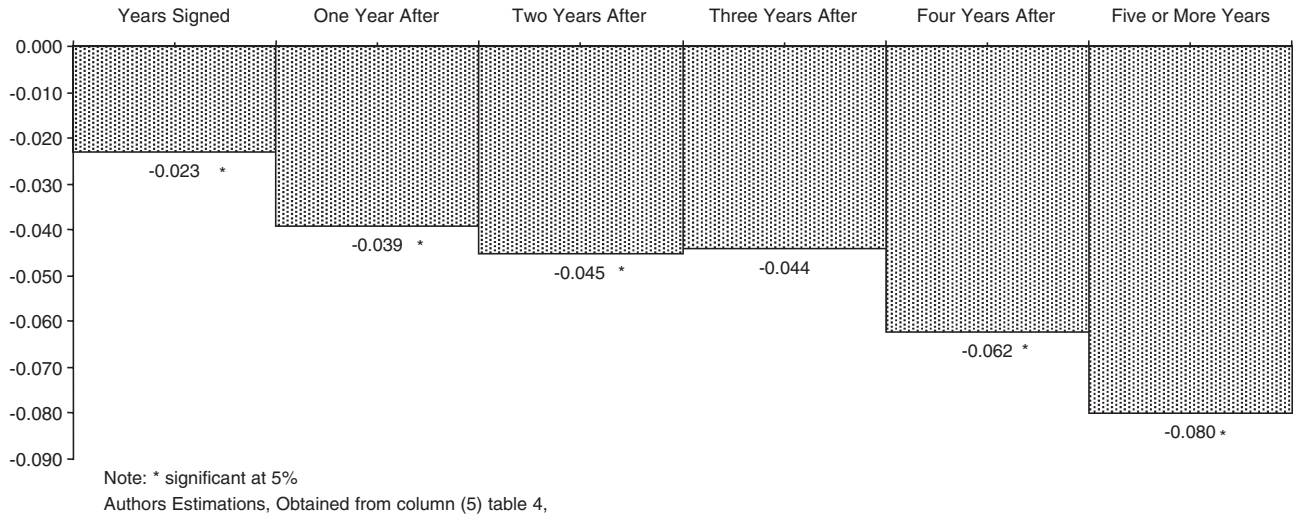


Fig. 2. The effect of OSA on air transport costs over time.

Share of Imports carried by aircraft

	(1)	(2)	(3)	(4)
	Share of Imports Carried by Airlines			
OSA	-0.007 (0.013)	0.020 (0.011)*	0.023 (0.013)*	0.036 (0.021)*
OSA x Distance	(0.015)*** 0.014	(0.022) 0.047	(0.029) 0.058	(0.031)*** 0.026
OSA Three Years or More	(0.013)	(0.011)***	(0.013)***	(0.025)
Implied Effect	0.007	0.067***	0.081***	0.062**
Observations	2268	1064	644	420
R-squared	0.707	0.820	0.853	0.771
Year FE	Yes	Yes	Yes	Yes
Cty - Product FE	Yes	Yes	Yes	Yes
Sample	All	Developed and Developing	Developed	Upper Middle

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Conclusions

- Relying on detailed microdata and the opportunity that Open Skies Agreements provide for evaluating the effect of a change in the competition regime, our estimations show that the liberalization of air cargo markets reduces air transport costs by about 9%.
- The effects of OSAs are not restricted exclusively to reductions in freight tariffs. The evidence indicates that the reduction in tariffs caused an important increase in the share of U.S. imports arriving by air from those countries that signed OSAs. If we use previous estimates of transport cost trade elasticity (1.3) (see Clark et al., 2004), and generalize the estimates of this paper, an Open Skies Agreement could bring about an increase in trade of about 12
- OSA do not have the same effects in all countries. For developed and upper-middle-income developing countries, we find that OSA reduce air transport costs.
- For low-income developing countries, we do not find that OSAs can be associated with a fall in freight rates. We understand this result as an indication that low-income developing countries cannot take advantage of OSAs either because other barriers to competition are binding or because of their limited market size.
- The cross-section analysis of the paper finds that in countries with greater access to airports and better regulatory quality air transport costs are lower. The results obtained in this paper have important policy implications for the airline industry.