



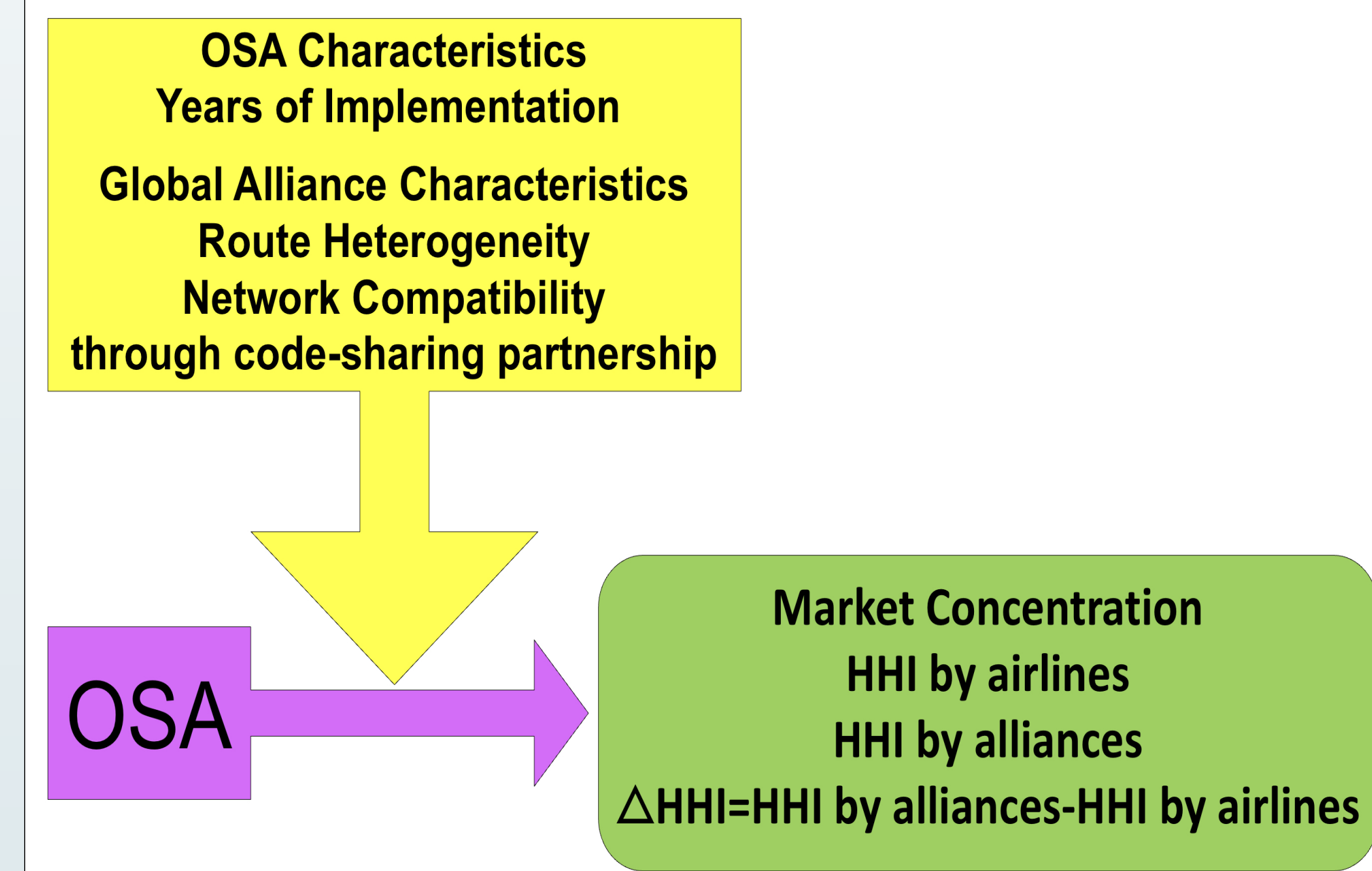
# A Comparative Analysis of the Air Transport Liberalization and Global Alliances on Market Concentration

Author: Cheng-Chien, Shih  
Faculty Advisor: Dr. Li Zou

## Research Motivation

As a leading aviation country in the world, the U.S. has open skies agreements with more than 120 countries around the world. In the last twenty years, the three global alliances- Oneworld, Star and Skyteam have grown in parallel with the increased air service liberalization. Using the three alliances as focal groups, this project investigates market concentration on non-stop international routes to and from the U.S. under open-skies and non-open-skies agreements. Two research questions are studied: 1) What are the impacts of open-skies agreement (OSA) on market concentration? and (2) What are the potential factors that may moderate the impact of OSA on market concentration? Policy and management implications will be drawn and discussed based on the findings of the study.

## Research Model



## Data Source

- U.S. International Air Passenger and Freight Statistics (2019)
- Open Skies Agreements-Full list of Open Skies Partners
- Cirium Diio Mi-U.S. DOT T-100 Dynamic Table Scheduled Dynamic Table for Global Alliances (2019)

## Variable Development

**Herfindahl-Hirschman Index (HHI)**- A common measure of market concentration and is used to determine market competitiveness. (We use **seat capacity** to calculate HHI.)

$$HHI = \sum_{i=1}^n S_i^2$$

**The increase of market concentration (ΔHHI)**

$$\Delta HHI = HHI_{alliance} - HHI_{airlines}$$

## U.S. Open Skies Agreement

### What are U.S. Open Skies Agreements?

- Bilateral agreements provide more rights for airlines to offer international passenger and cargo services.
- Eliminate government interference in commercial airline operations.

	OSA	Non-OSA
Total No. routes	778	348
Total No. countries	60	27

**Note:** Out of 4,505 intl. routes from/to the U.S. in 2019, we select 1,126 routes between 67 U.S. gateway airports and 200 foreign gateway airports in 87 countries, representing the top 25 percentile routes by seat capacity (ranging from 34,904 to 3,083,433 seats).

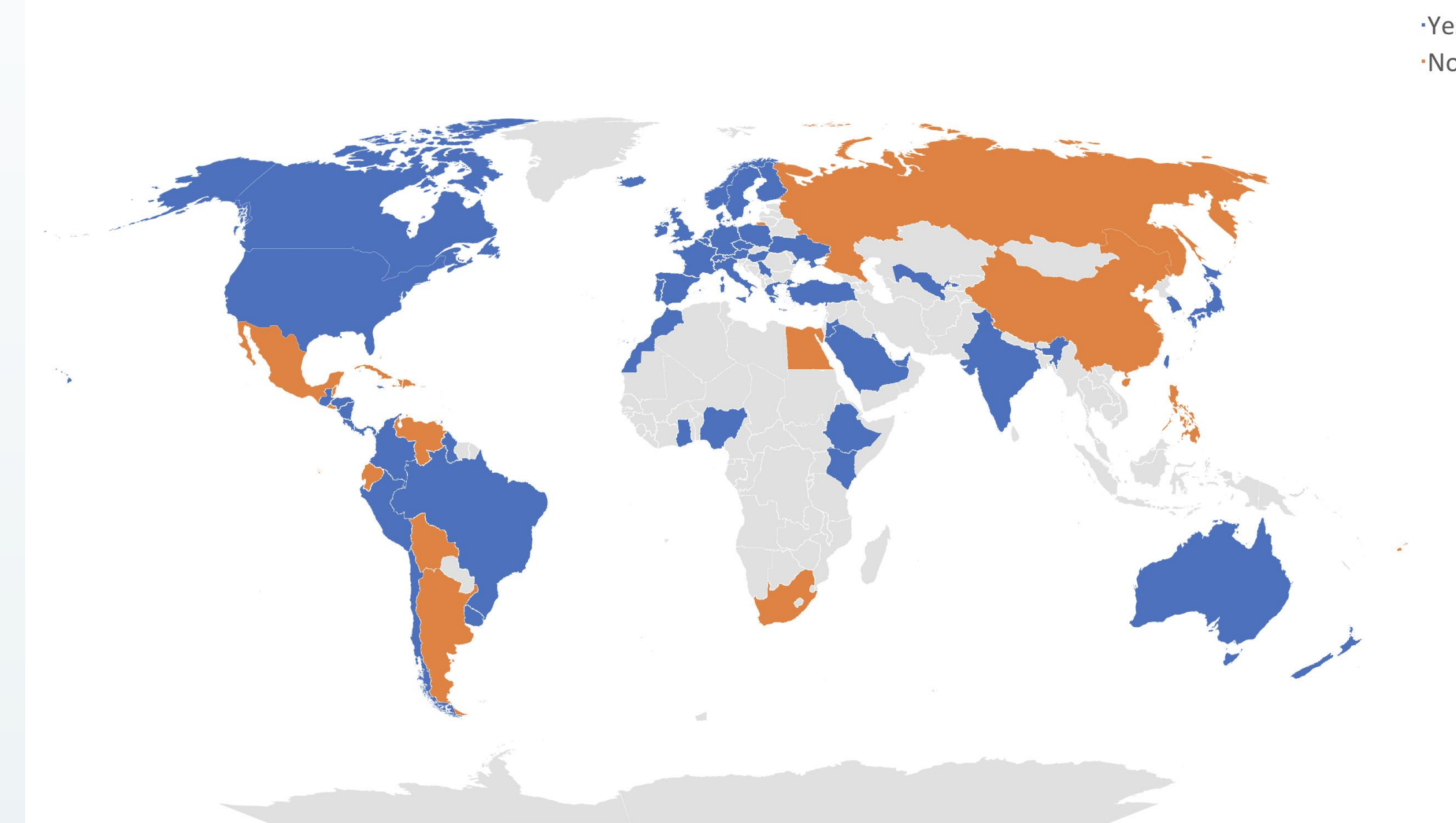
## Global Alliances Overview

We calculate characteristics of global alliances by using the method from the research paper of Cobeña et al. (2018)

- Blau's Index of Route Destination Heterogeneity =  $1 - \sum_{i=1}^m \left( \frac{|A_i|}{|A_1 \cup A_2 \cup \dots \cup A_m|} \right)^2$
- Complementarity of global alliance =  $\frac{|A_1 \cup A_2 \cup \dots \cup A_m| - |A_1 \cap A_2 \cap \dots \cap A_m|}{|A_1| + |A_2| + \dots + |A_m|}$
- Complementarity for  $A_i$  with  $A_j = \frac{|A_i| - |A_i \cap A_j|}{|A_i|}$
- Complementarity between  $A_i$  and  $A_j = \frac{|A_i \cup A_j| - |A_i \cap A_j|}{|A_i| + |A_j|}$

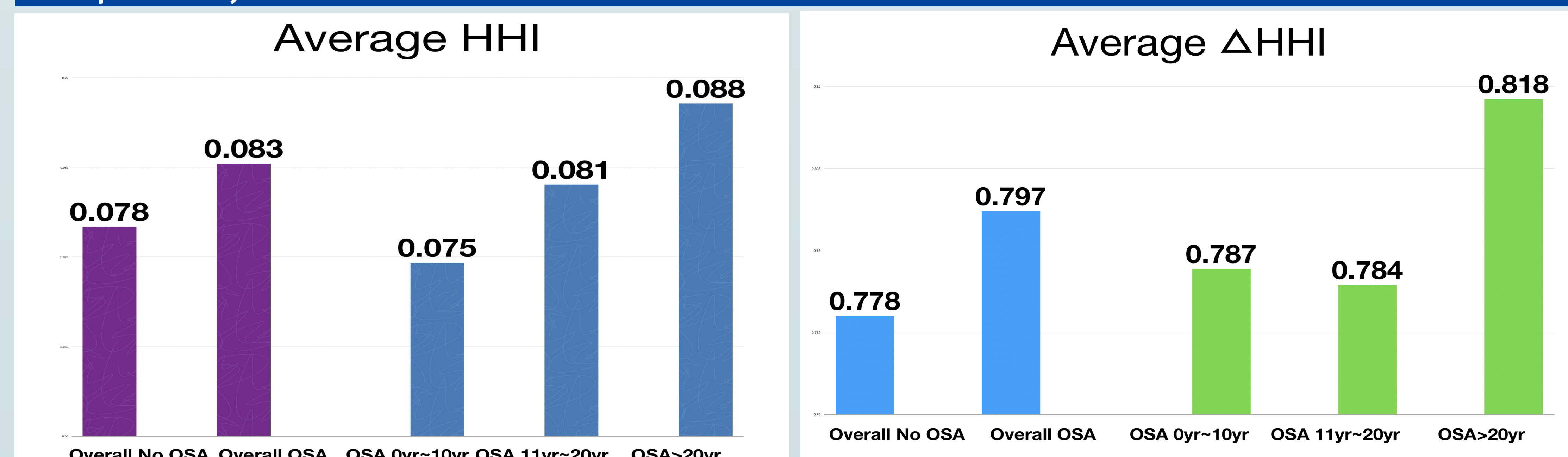
## 1126 Gateway To Gateway Routes And OSA Status

The Country OSA Status on Major Gateway-to-Gateway Routes of the U.S.



	STAR ALLIANCE	SKYTEAM	oneworld
Alliance name	Star	Skyteam	Oneworld
Established since	1997	2000	1999
Full member No.	26	18	13
Market share on global market	23%	20.4%	17.8%
Total alliance airlines on the routes to/from U.S.	25	15	12
Market share of alliance airlines on the routes to/from U.S.	27%	18%	21%
Blau's Index of Destination Heterogeneity	0.6452	0.7126	0.6657
Complementarity by destination airport	0.3586	0.4872	0.4790
Complementarity on the routes from/to the U.S.	0.3769	0.6367	0.4982

## Comparison of HHI and ΔHHI



## Result Summary

	OSA (778 routes)	Non-OSA (348 routes)	Significant (Yes/No) (P-value)
ΔHHI	0.7972	0.7780	Yes (P-value: 0.0561)
Small Markets (0%~25%)	0.8238	0.8435	No (P-value: 0.8824)
Medium Markets (26%~50%)	0.8617	0.8427	No (P-value: 0.1296)
Large Markets (51%~75%)	0.8358	0.7575	Yes (P-value: 0.0005)
X-large Markets (76%~100%)	0.6761	0.6272	Yes (P-value: 0.0537)

## Preliminary Conclusions

Based on t-test and ANOVA test results we find that:

- Δ HHI is greater on OSA routes than on non-OSA routes, and the difference is statistically significant.
- Δ HHIs are significantly different across different OSA groups varying by years of implementation.

For both OSA and non-OSA routes:

- Δ HHI is getting smaller as market size increases from Medium to X-large.
- Δ HHI is higher on OSA routes than on non-OSA routes when market size ranges from Medium to X-large.

## References

- Cobeña, M., Gallego, Á., & Casanueva, C. (2019). Diversity in airline alliance portfolio configuration. *Journal of Air Transport Management*, 75, 16-26. <https://doi.org/10.1016/j.jairtraman.2018.11.004>
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