

IOWA STATE UNIVERSITY

Debbie and Jerry Ivy College of Business

Stakeholders Perceptions to Sustainable Urban Freight Policies in Emerging Markets

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Acknowledgement

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Outline

- Background
- Methodology
 - Modeling Approach
 - Case Study and Sample
 - Policies Studied
- Modeling Results
 - All Observations
 - By City
 - By Stakeholder
- Implications for Decision Makers

BACKGROUND

Background

- Freight is the motor of the economy but its movement generates negative externalities
- Urban areas are more congested due to:
 - More people living in the cities: locals and foreigners
 - More consumption due to higher income
- Stakeholders perceptions do not always align
 - Each one has own point of view
 - Citizens perceptions are usually excluded
- Urban freight policy needs to identify and assess tradeoffs done by impacted stakeholders

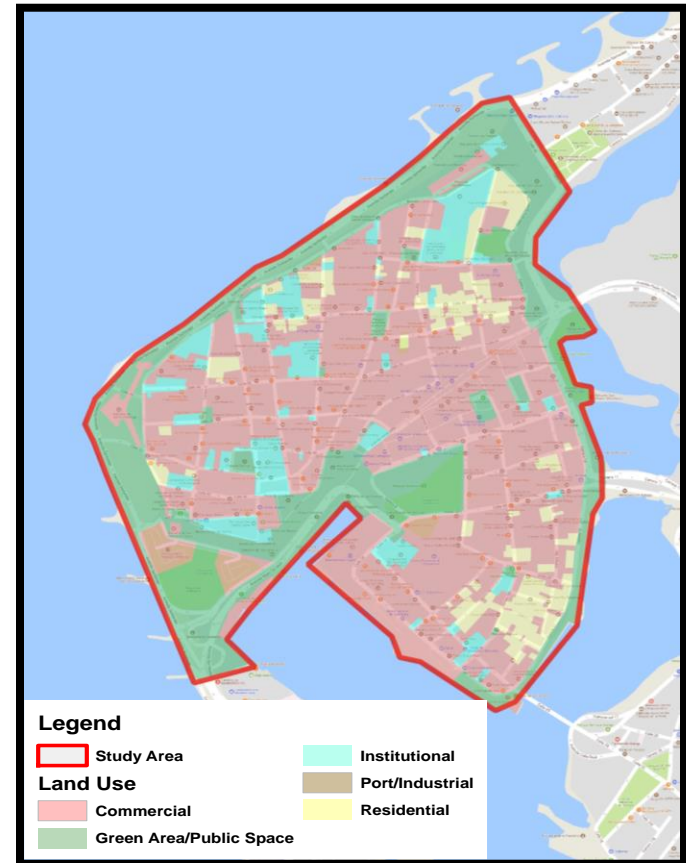
METHODOLOGY

Methodology

- Survey Design
- Experimental design
 - Initiatives identification → 8 initiatives
 - Focus groups → 19 policies
 - Pilot → 2 pilots
 - Policies → 9 final policies
- Data Collection: Rank policies - Luce Model
 - Converts rank data into implicit choices
 - Ranking process can be decomposed into a sequence of independent stages

Study Area - Cartagena

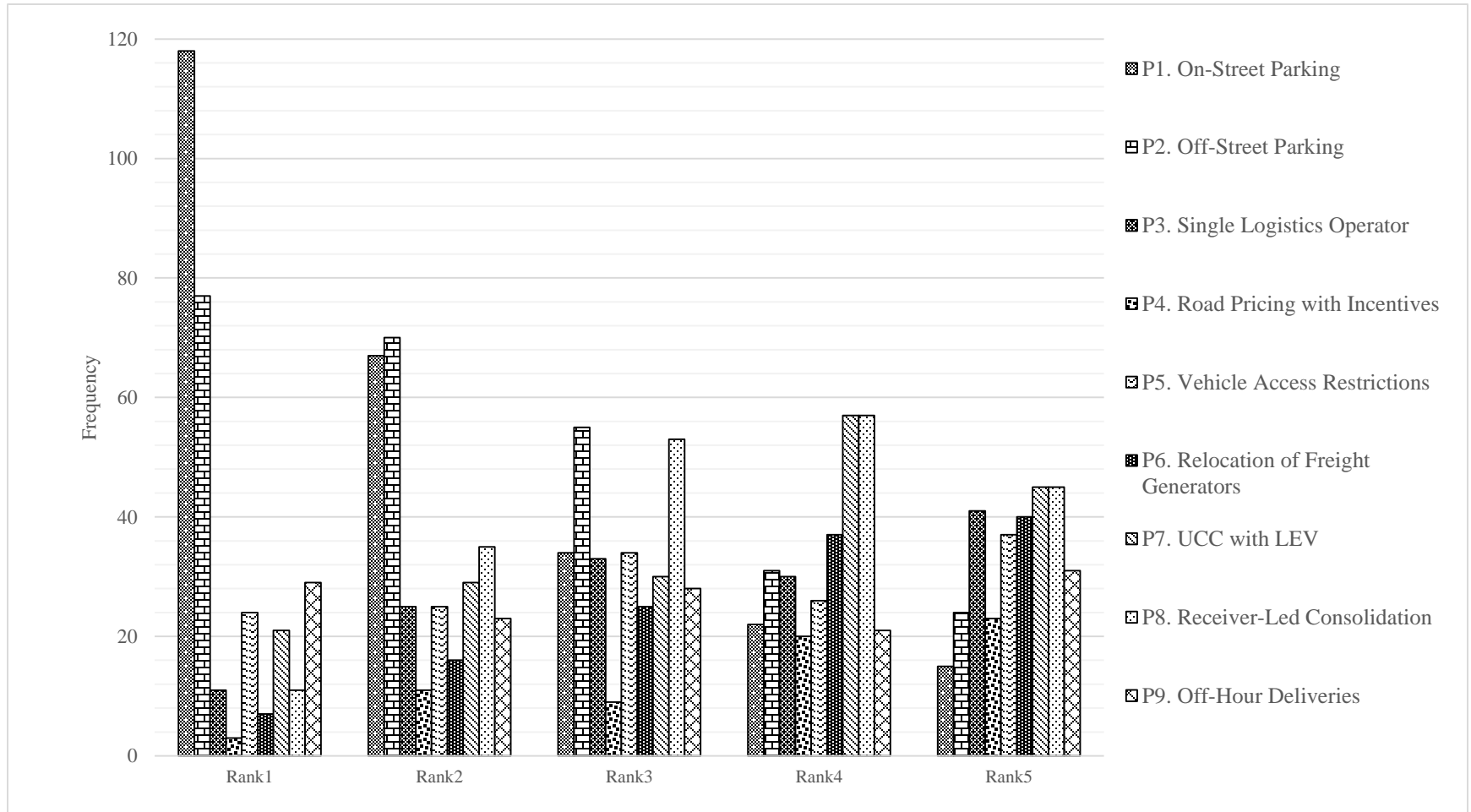
- Data Collection
 - San Diego, La Matuna, and Getsemaní
 - Carriers (50)
 - Receivers (52)
 - Citizens (49)



Policies

- On-street Parking and Loading Areas (P1)
- Off-street Parking and Loading Areas (P2)
- Single Logistics Operator (P3): A single platform centralizes orders and shipments, with all agents able to access it
- Road Pricing with Incentive to Low Emission Vehicles (P4): Electronic toll to enter the area, with residents, low emission (or low noise) vehicles, and establishment owners exempted from the toll
- Vehicle Access Restrictions (P5)
- Relocation of Freight Generators outside City Center (P6)
- UCC with Low Emission Vehicles (P7)
- Receiver-Led Consolidation Program (P8)
- Off-Hour Deliveries (P9)

Most Beneficial Policies (Top 5)



MODELING

Modeling Approach: Luce Model

- Converts rank data into implicit choices
- Ranking process can be decomposed into a sequence of independent stages
- Assumes the probability an individual will rank a given alternative first is greater than the probability of other alternatives being ranked first

$$\begin{aligned} & \text{Prob}(r_1, \dots, r_s) \\ &= \text{Prob}(r_1/S) \text{Prob}(r_2/S - \{r_1\}) \dots \text{Prob}(r_{s-1}/S - \{r_1, \dots, r_{s-2}\}) \end{aligned}$$

Results – Ranking All Observations

Policy	Estimate	Pi	Rank
P1. On-Street Parking	2.410	28.66%	1
P2. Off-Street Parking	2.200	23.23%	2
P3. Single Logistics Operator	0.934	6.55%	6
P4. Road Pricing with Incentives	0.000	2.57%	9
P5. Vehicle Access Restrictions	0.998	6.98%	5
P6. Relocation of Freight Generators	0.772	5.57%	8
P7. UCC with LEV	1.290	9.35%	4
P8. Receiver-Led Consolidation	1.430	10.76%	3
P9. Off-Hour Deliveries	0.899	6.32%	7

Results - Ranking by City

Barranquilla



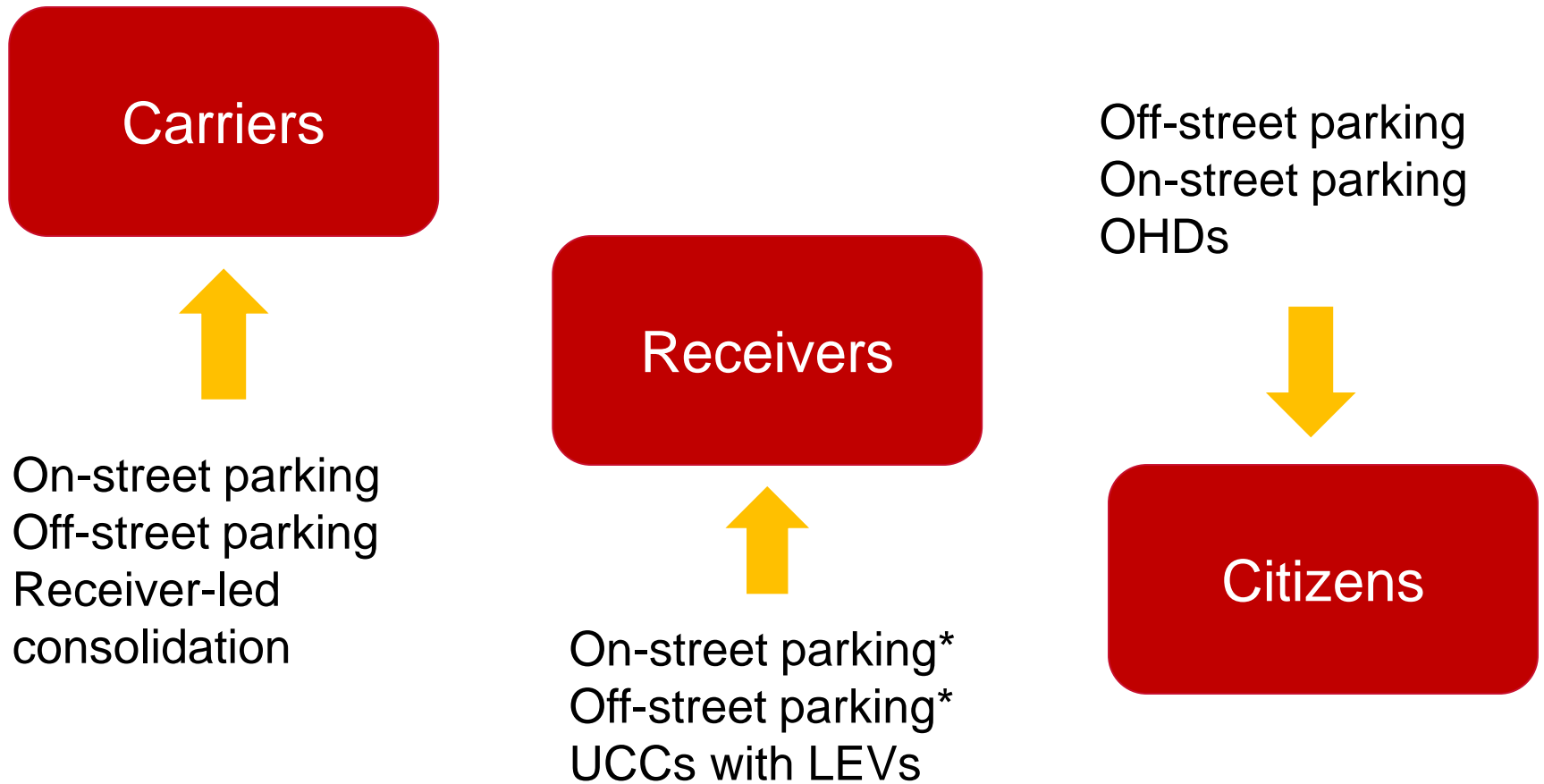
On-street parking
Off-street parking
Receiver-led
consolidation

Off-street parking*
On-street parking*
UCC with LEVs

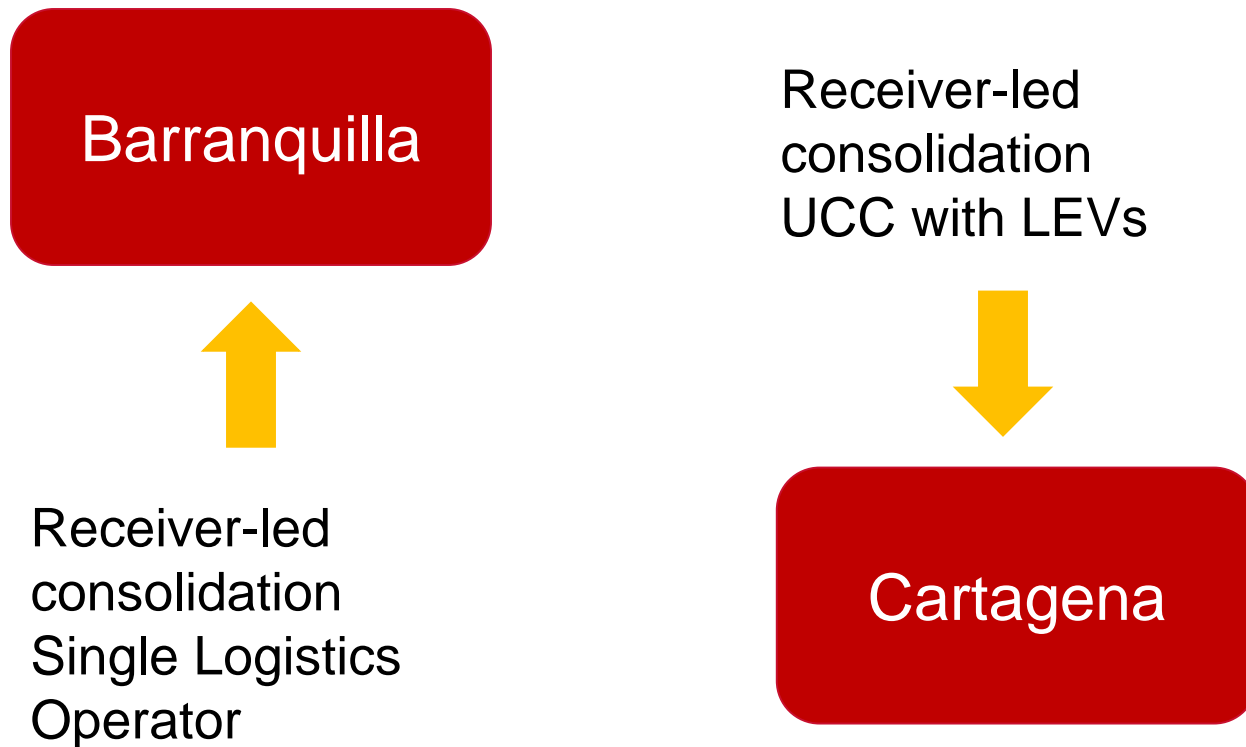


Cartagena

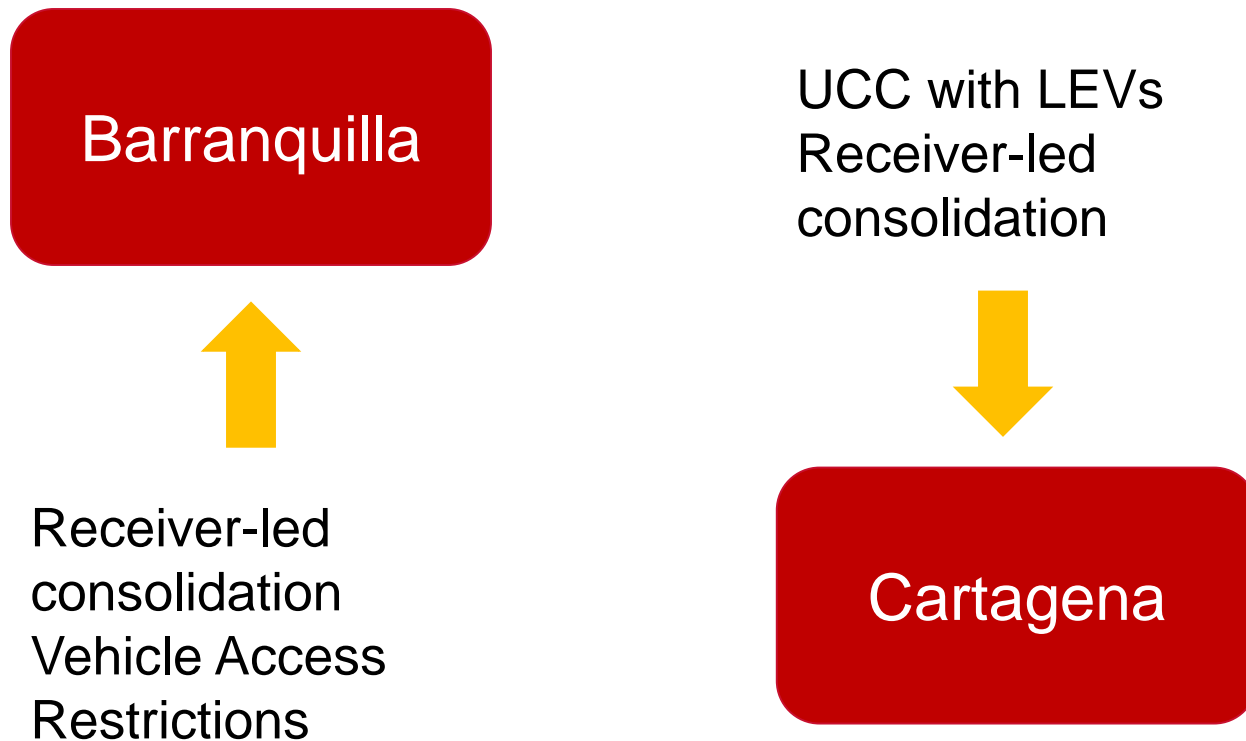
Results – Ranking by Stakeholder



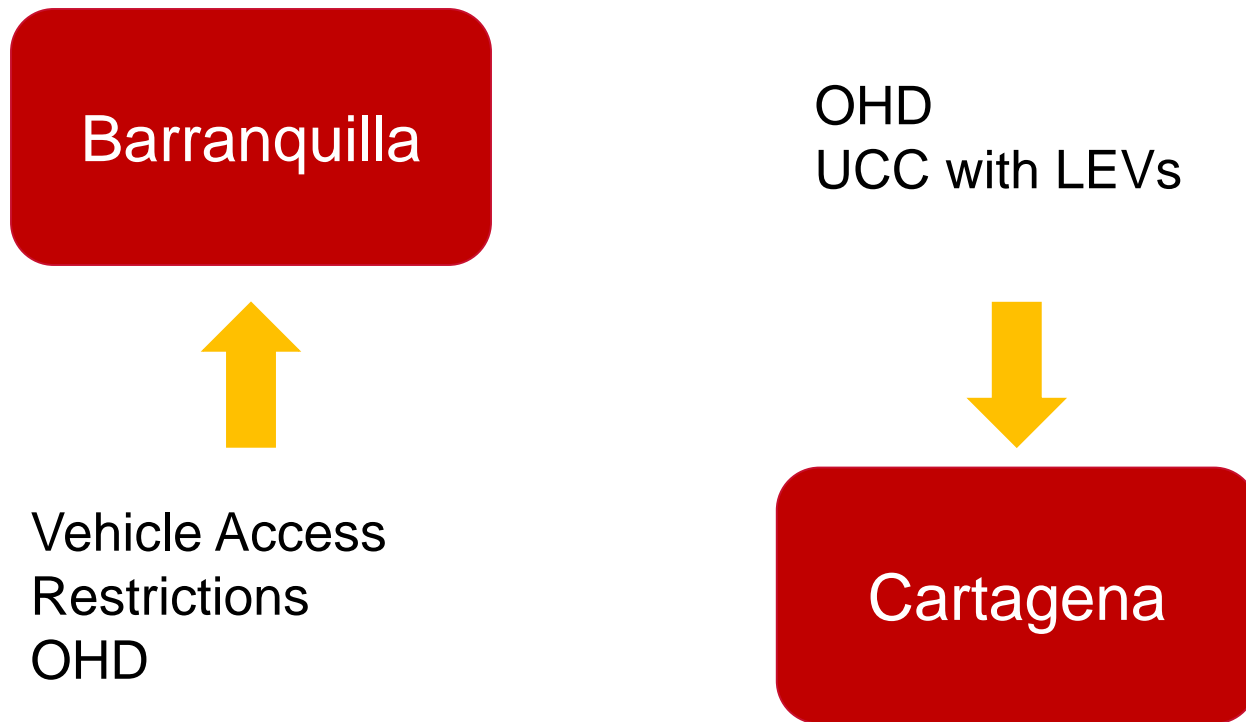
Results – By City and Carriers



Results – By City and Receivers



Results – By City and Citizens



IMPLICATIONS

Implications for Decision Makers

- Stakeholders recognize freight is important and space is needed for loading/unloading operations
- Local context plays a role even between cities in the same region
- Stakeholders prefer:
 - see other supply chain agents playing active roles
 - sustainable policies being implemented
 - to be away from financial and restrictive policies
- Engagement is needed in planning stages
 - Include perceptions and preferences of those impacted
 - Identify and assess tradeoffs before implementation

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Thanks!!

Questions?

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