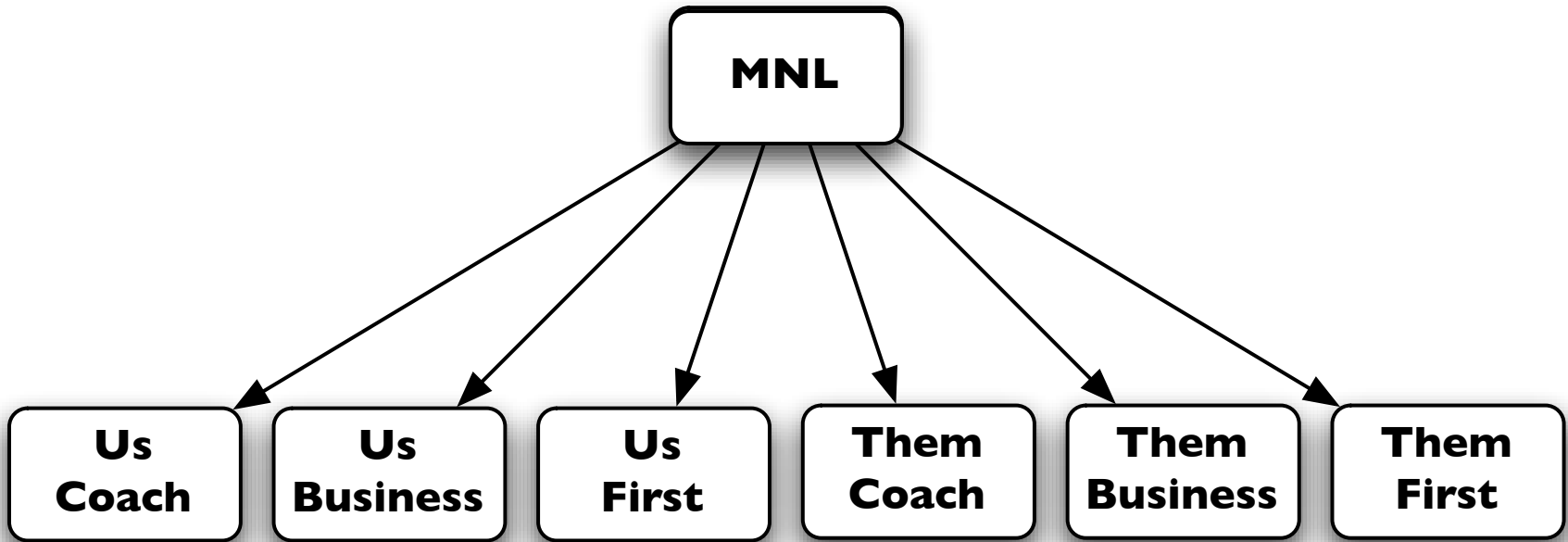
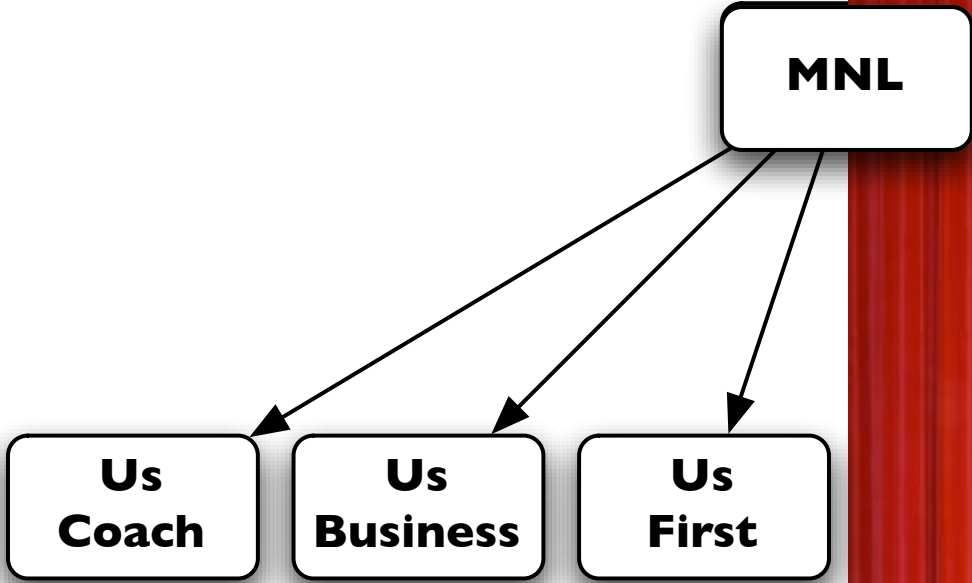


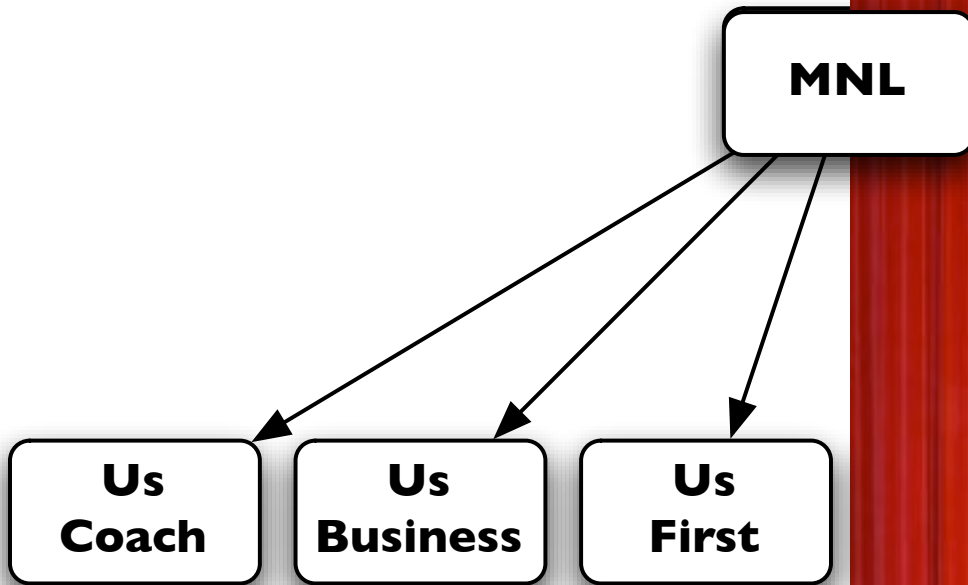
# Pay no attention to the alternatives behind the curtain

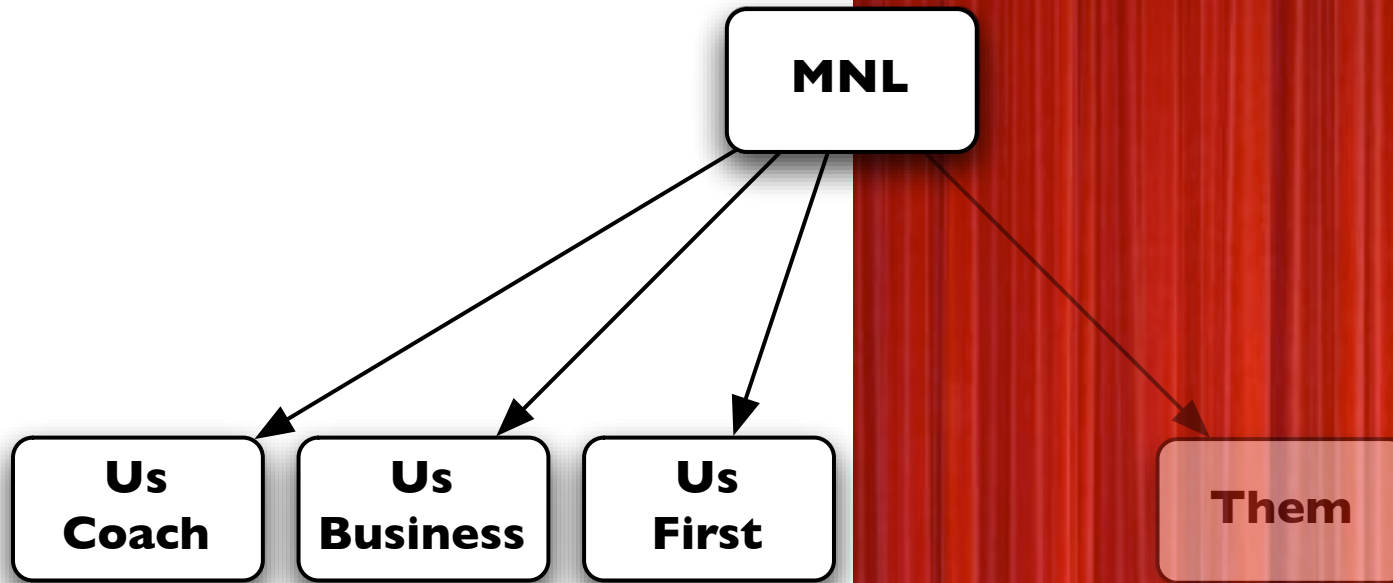
or, Demand Forecasting with Missing Data

Jeffrey Newman

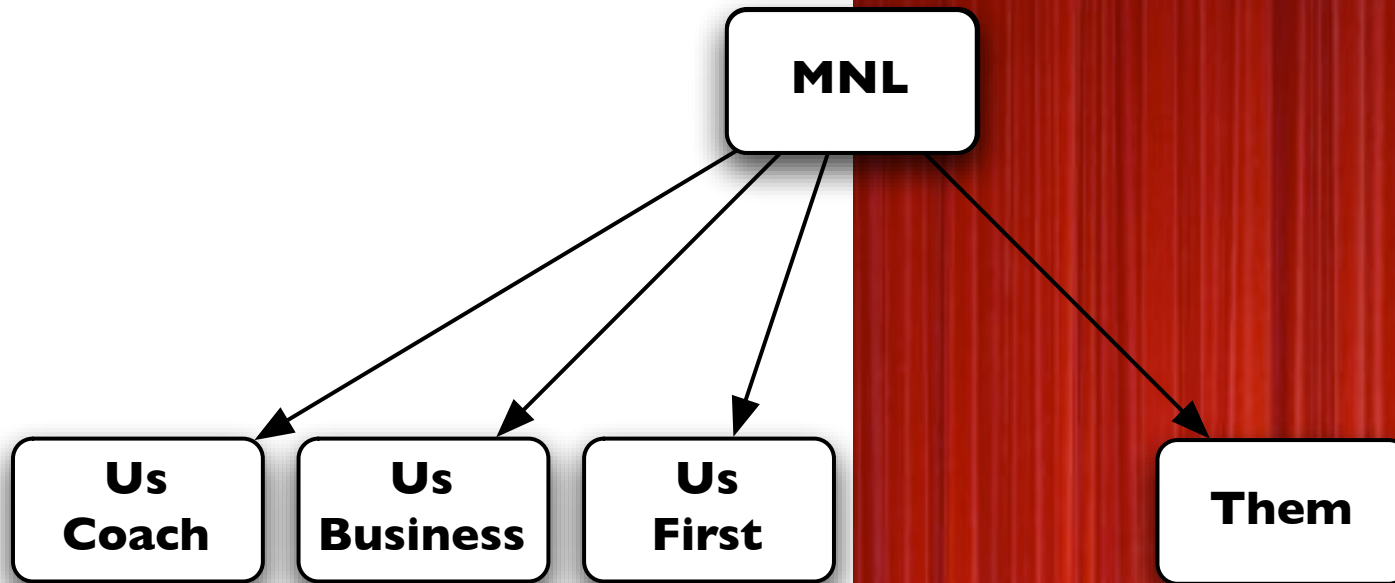








What if **they** have Kryptonite?



It is like a choice-based sample, except the sampling rate on **Them** is zero.

# Talluri & van Ryzin Revenue Management



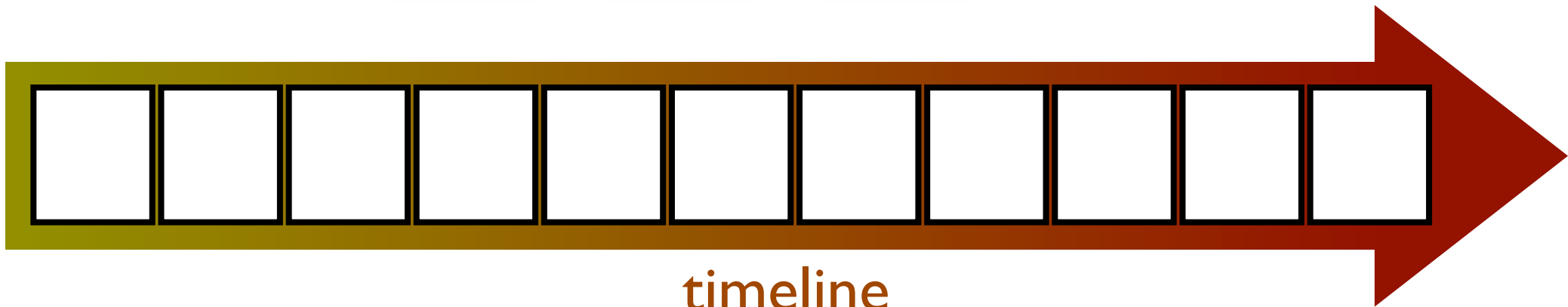
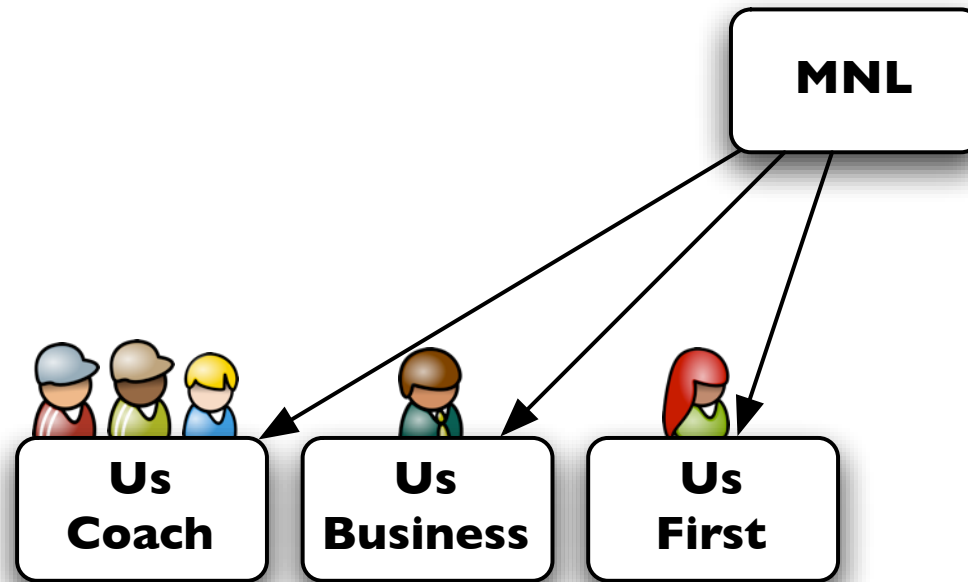
timeline

# Talluri & van Ryzin Revenue Management



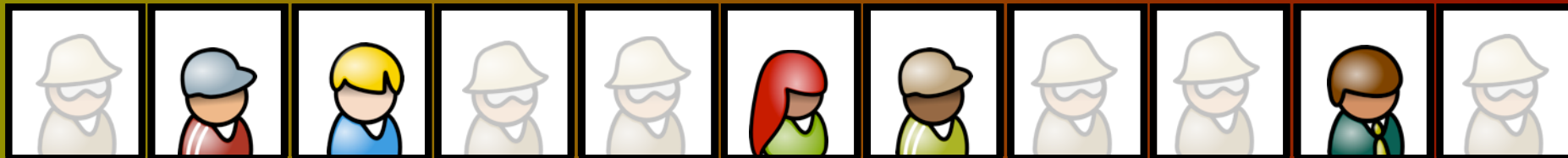


# Talluri & van Ryzin Purchase Windows



# Talluri & van Ryzin Log Likelihood

$$\begin{aligned} \log L = & \sum_{i \in W^+} \left[ \log \lambda + V_i - \log \left[ \sum_{j \in C} \exp V_j + 1 \right] \right] \\ & + |W^-| \alpha \left( \log \lambda - \log \left[ \sum_{j \in C} \exp V_j + 1 \right] \right) \\ & + |W^-| (1 - \alpha) \log [1 - \lambda] \end{aligned}$$



timeline

Expectation for  $\alpha \rightleftharpoons$  Maximization for  $\beta, \lambda$

# Talluri & van Ryzin, Test Data

Case Number	Alternative Availability			Chosen
	Alt A	Alt B	Alt C	
1	1	1	1	A
2	1	1	1	A
3	1	1	0	A
4	1	0	1	A
5	1	0	1	A
6	1	1	1	B
7	1	1	0	B
8	0	1	1	B
9	0	1	1	C
10	1	0	1	C

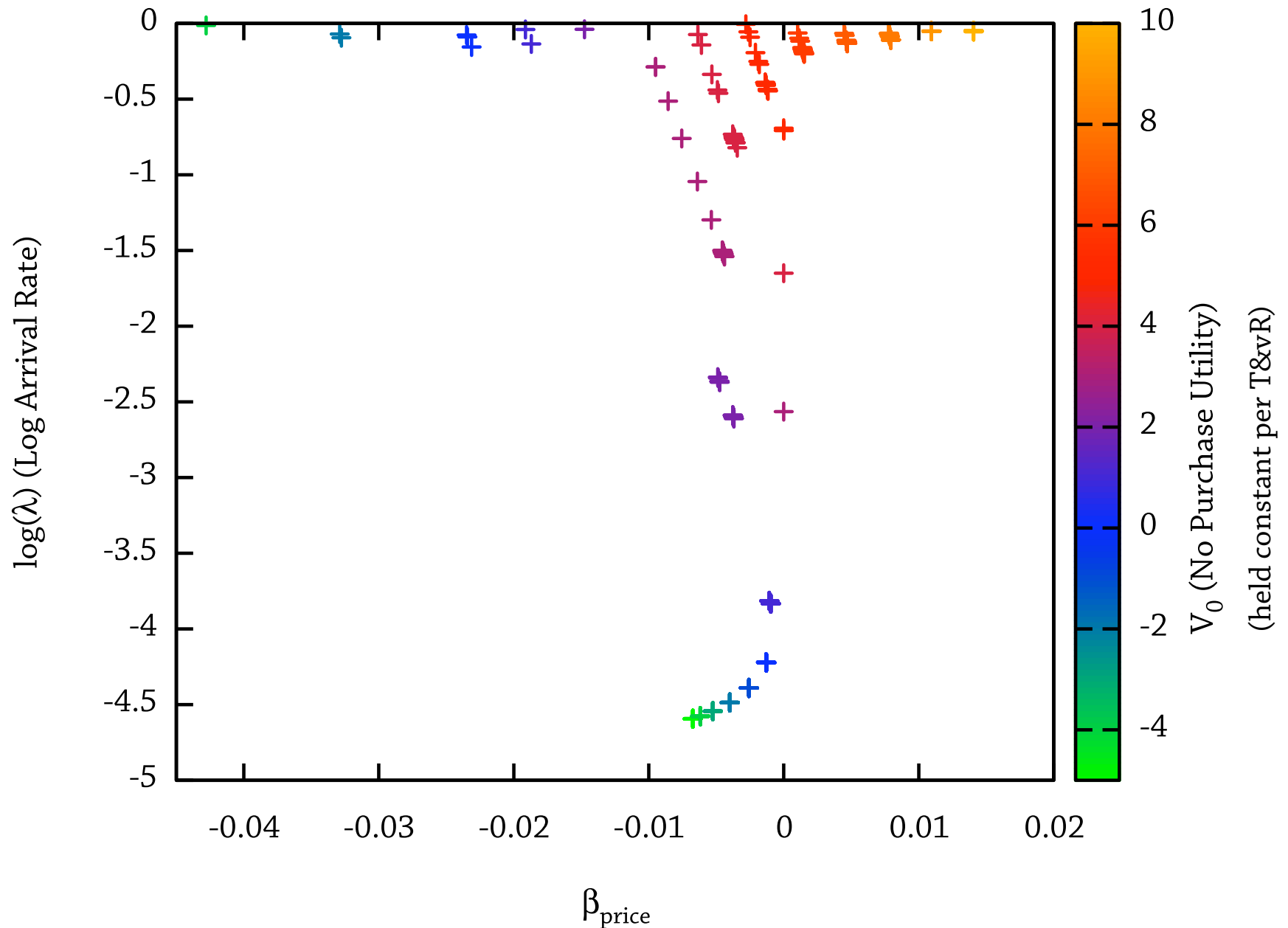
Prices

199

249

347

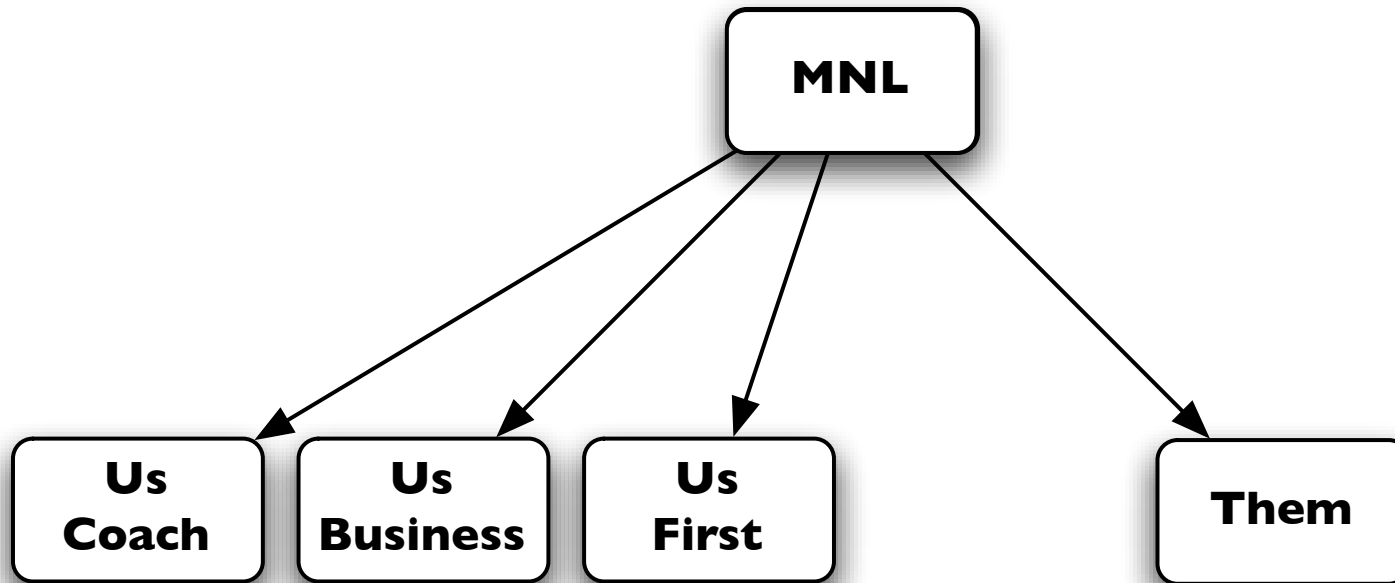
# Talluri & van Ryzin, All Over the Map



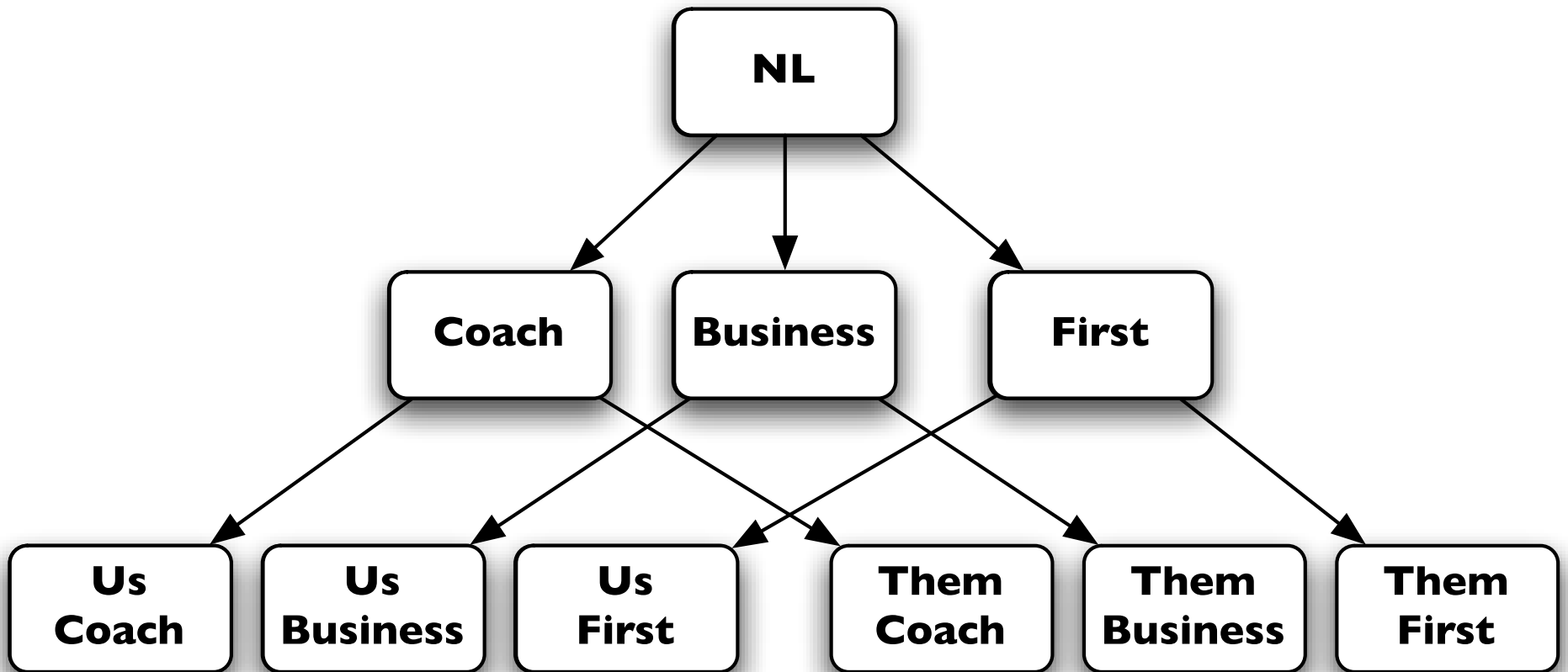
# What to do?

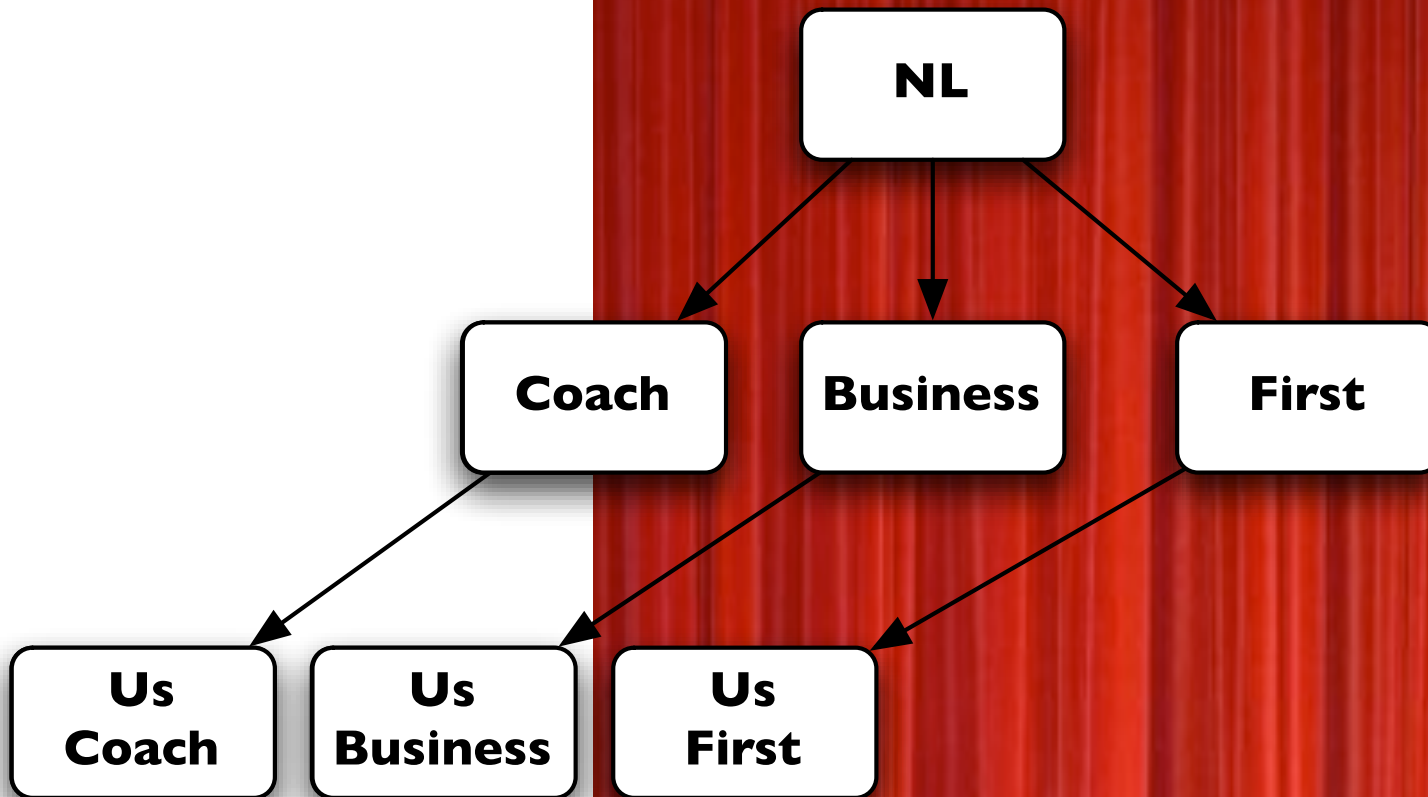
- Problem: there is no information available to tell the difference between their customers and a hole in the wall
- Solution: add some information!
- Aggregate market share data is typically publicly available

# Instead of E-M, M-E

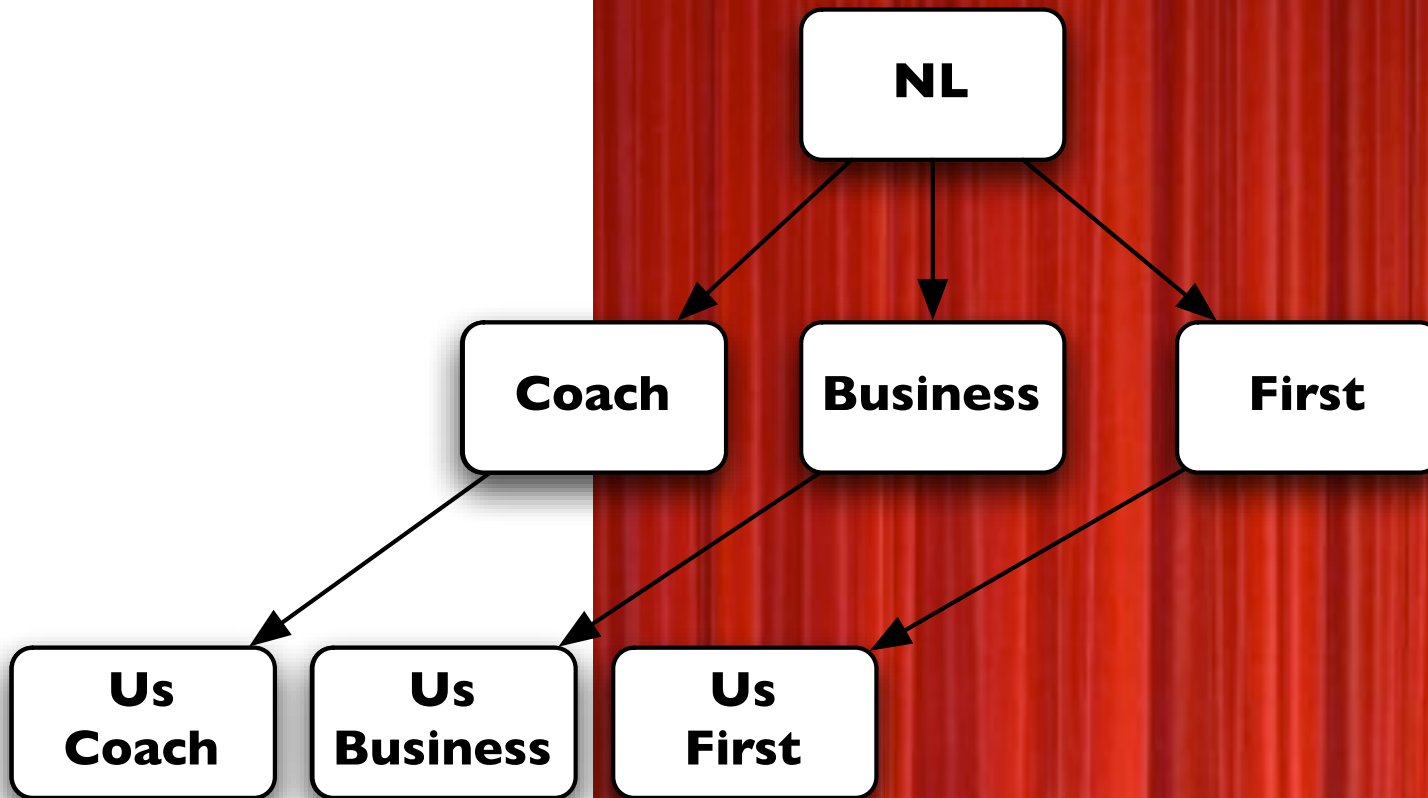


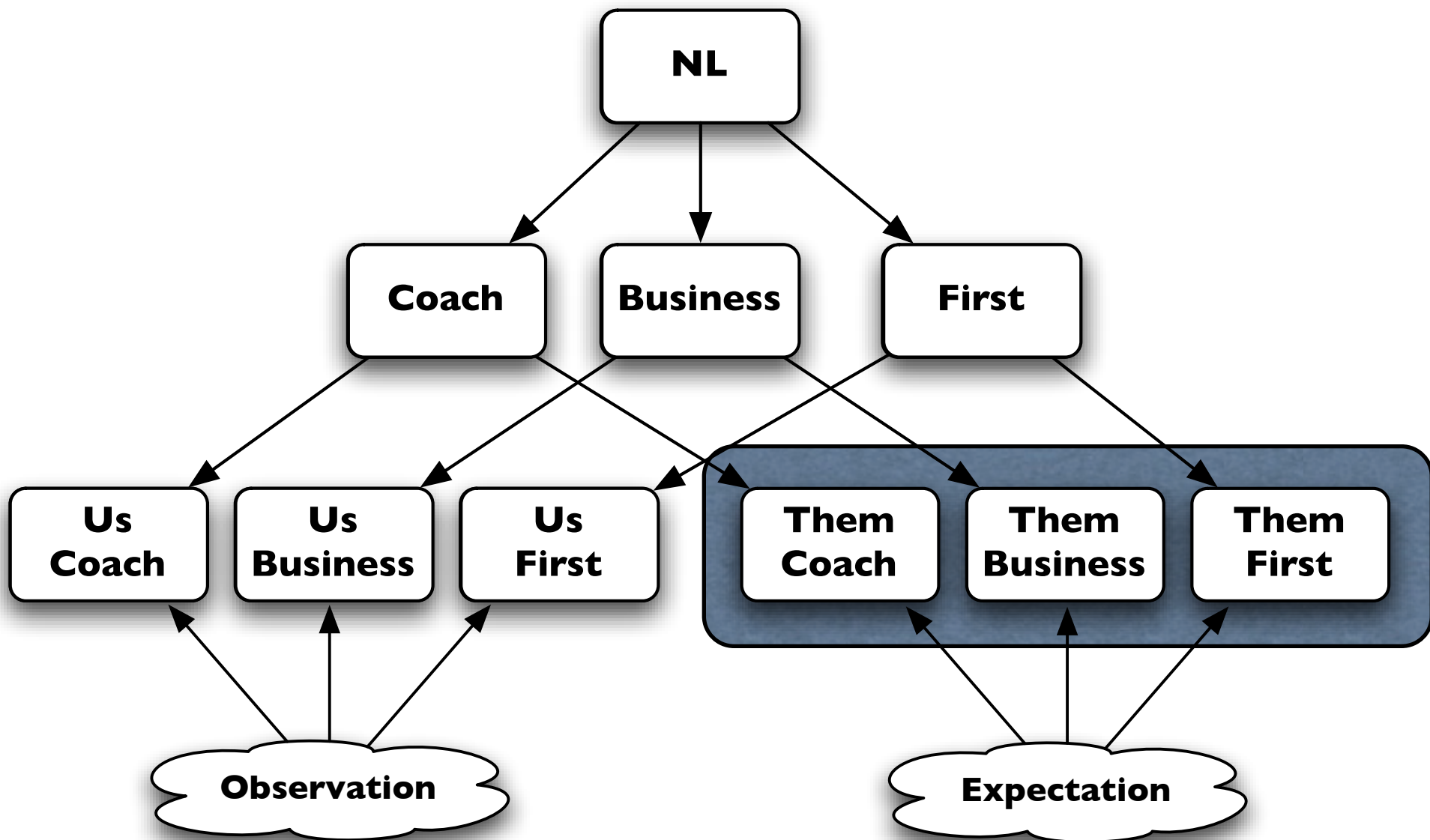
- 1) **Maximization** of our utility parameters
- 2) Holding those fixed, **Expectation** of their utility constant and arrival rate based on overall market share











# To Do

- Connect the GEV sampling adjustment to...
- An aggregate representation of choices in a manner that is not the same as the nesting, and...
- Incorporate the dynamic programming framework for pricing strategy to...
- Maximize revenue.
- Simple!