

# **TIME-VARYING TRANSITION PROBABILITY MATRIX**

## APPLICATION TO BRAND SHARE ANALYSIS

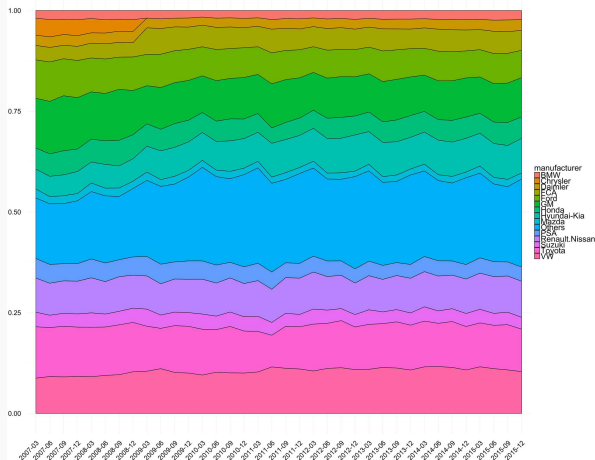
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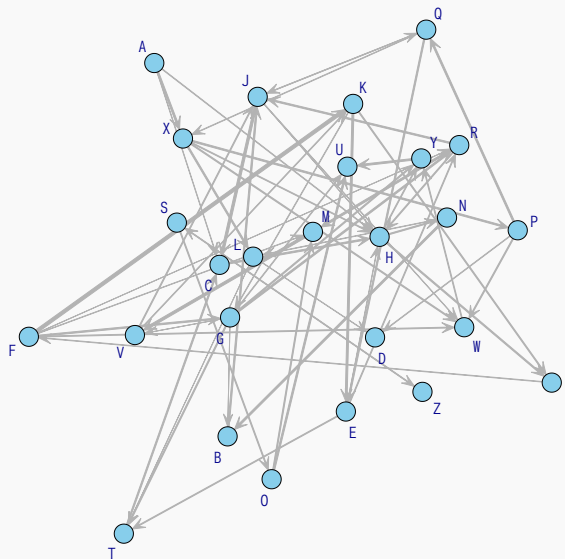
automobile sales data of manufacturers



## Questions

- why sales shares vary?
- what happens in customer preferences?

weighted graph



directed graph

- # of node: 26
- edge exist.: 0.1
- weight:  
uniform on  $[0, 1]$

we presented the followings:

- a model of transitions and stationary distributions
- a simple method for estimating transition matrices from a sequence of stationary distributions
- analysis of consumer transitions for sales share data without detailed recording of consumer transitions

further investigation would be devoted to:

- other objectives and constraints to improve the accuracy of estimation and interpretability
- other probabilistic models for estimating changes in transitions

## REFERENCES

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Chiba, Tomoaki et al. (Jan. 11, 2017). "Time-Varying Transition Probability Matrix Estimation and Its Application to Brand Share Analysis." In: PLoS ONE 12.1, e0169981. DOI: [10.1371/journal.pone.0169981](https://doi.org/10.1371/journal.pone.0169981).