JB3 Discussion: Lindsay Berry
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Main contributions of Lindsay's research

1. Random Effects for dynamic count models

2. Scalable inference procedure via decouple/recouple

3. Rich framework for extensions

Research addresses main challenge in modern statistics

Scale models & computation to meet demands of modern data… **without sacrificing our principles**

Reliable quantification of uncertainty

Richly structured models

Borrow strength

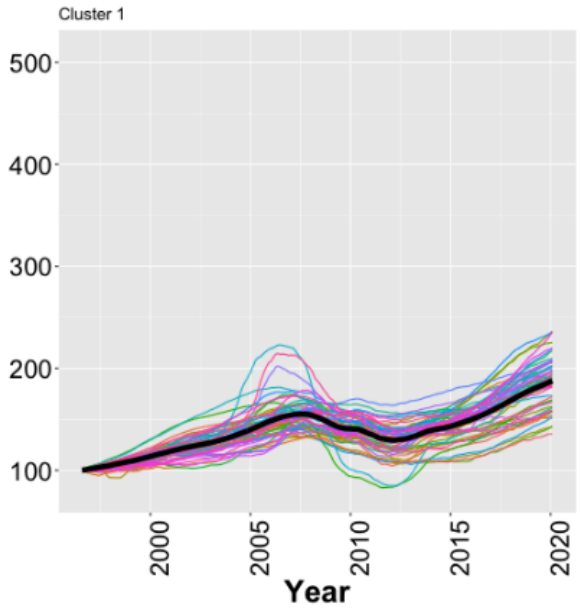
Interpretable

amazon

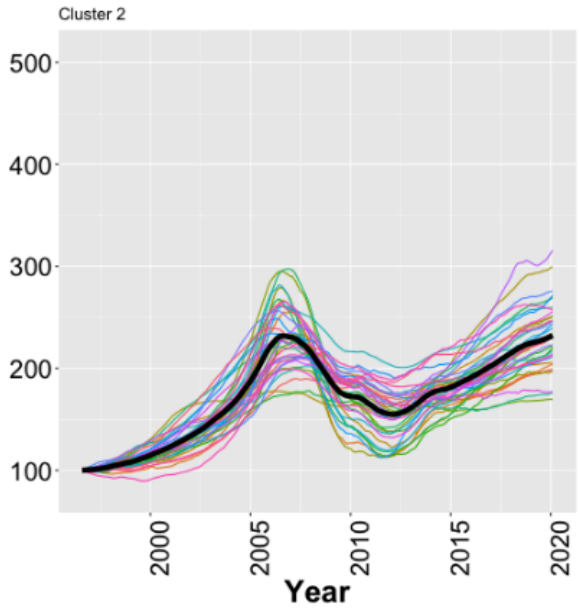
Large collections of time series are pervasive in tech, commerce, and finance

integrated framework for inference, prediction, and decision-making

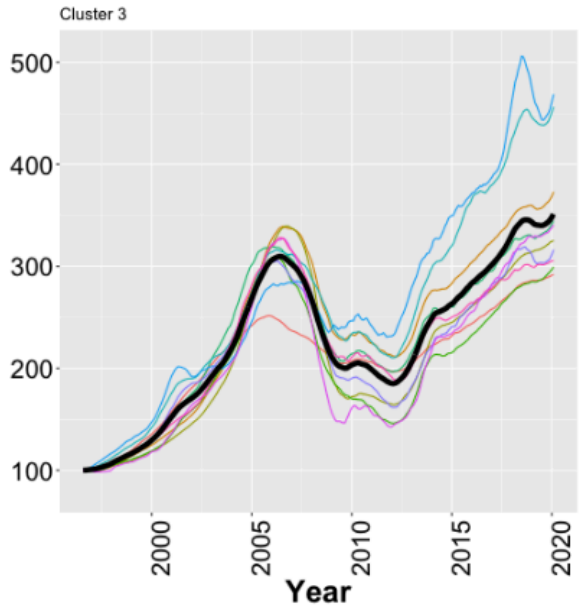
Commercial time series often exhibit latent structure



(a) Cluster 1



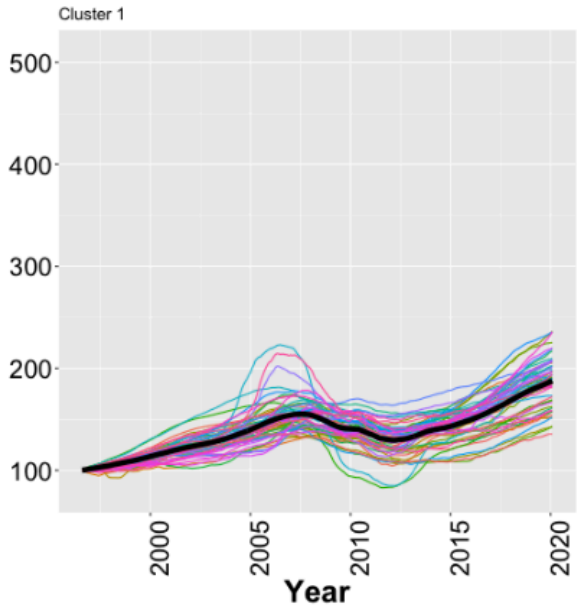
(b) Cluster 2



(c) Cluster 3

Scalable models and procedures for inferring latent structure are important in commercial applications

Commercial time series often exhibit latent structure



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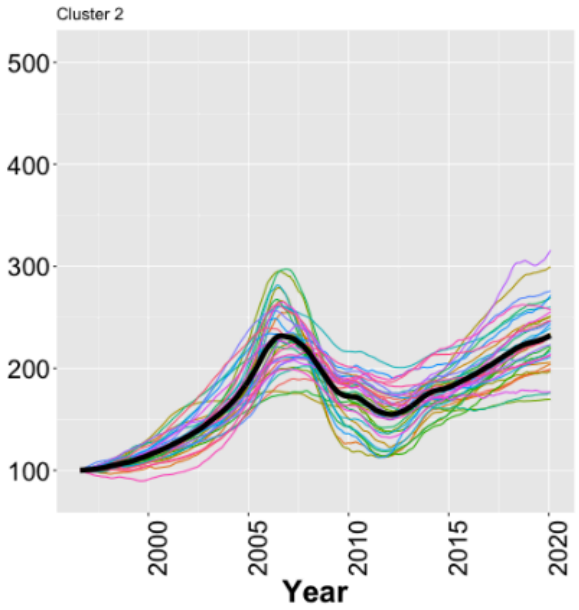
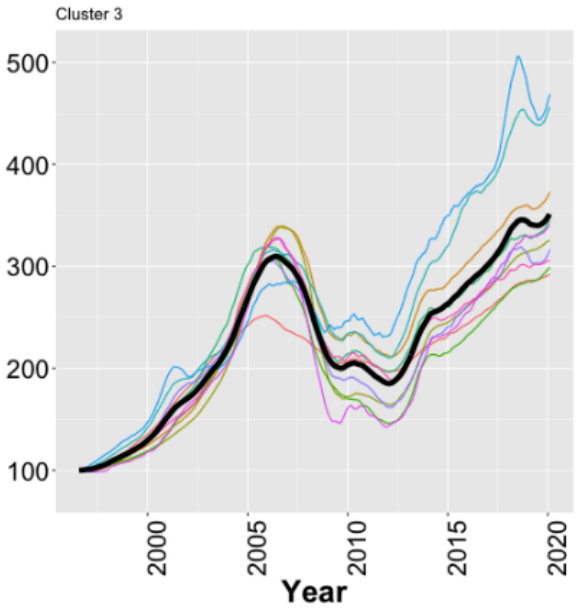


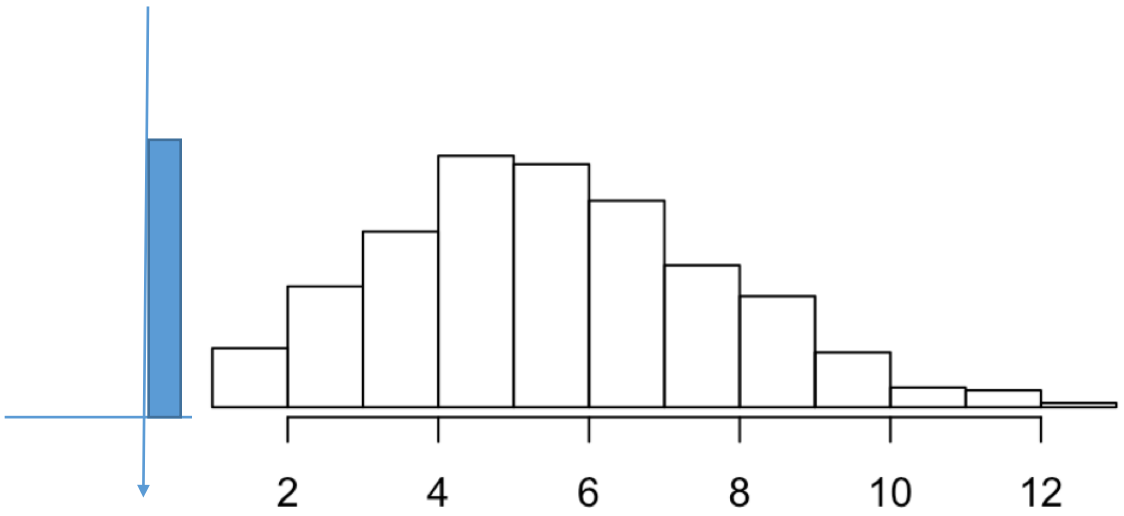
(b) Cluster 2



(c) Cluster 3

Question: How to choose dimension of latent factor as N grows?

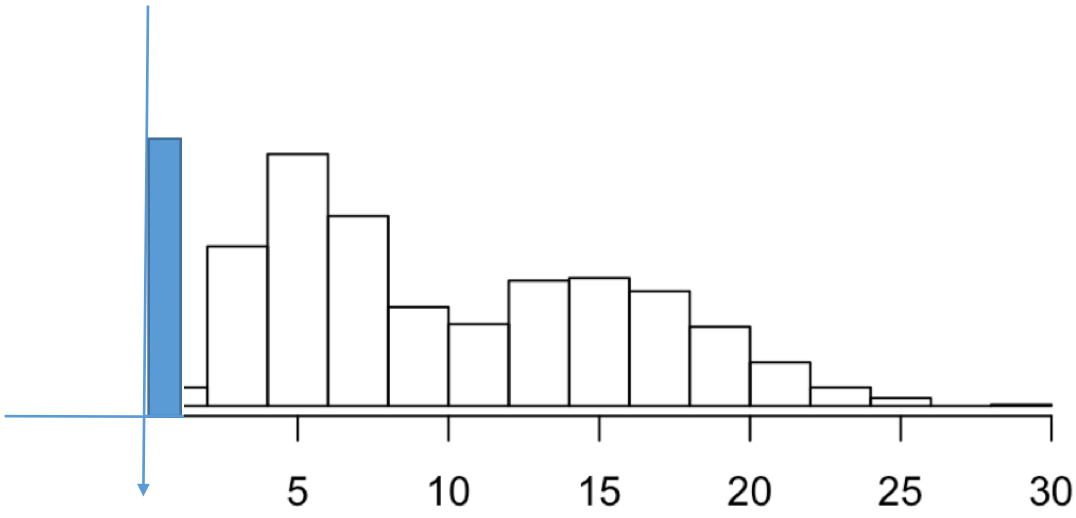
DCMM: Full forecast distributions aid demand planning



Current mixture model includes point mass at zero.

DCMM: Full forecast distributions aid demand planning

Future work: Multimodal forecast distributions may be appropriate for some products



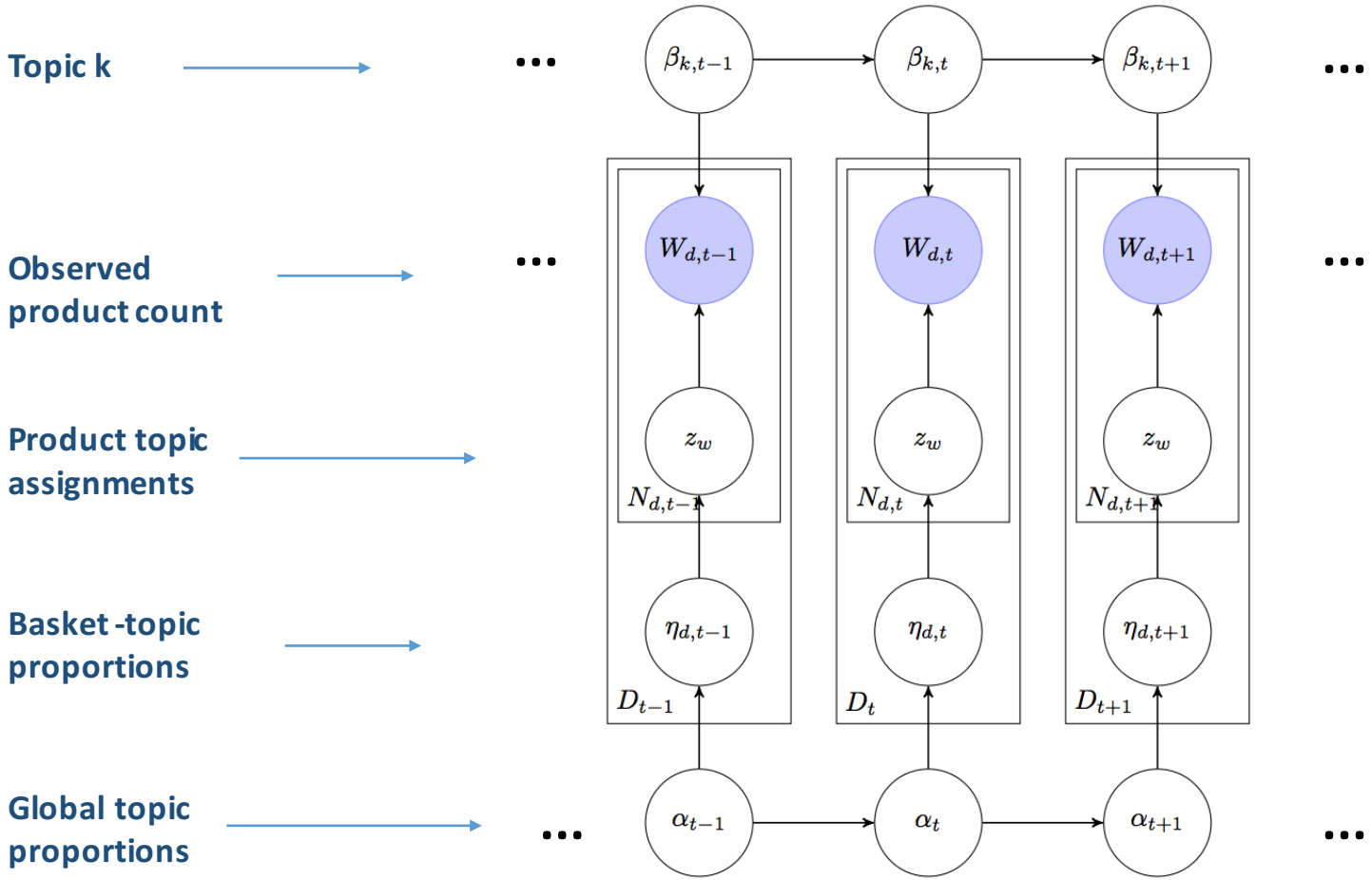
Currently, Intervention to reduce discount factor ρ needed to accommodate abrupt changes in demand

Dynamic Topic Models provide an alternative framework for modeling grocery baskets

Basket of Products / Bag of Words approach:

- Each **basket** a vector of **product counts** (text document)
- Topics are **latent probabilities distributions** over **products**
- Products commonly sold together receive higher probability in a topic (e.g., milk & cookies)
- Topics and **basket-topic proportions** evolve over time.

Dynamic Topic Models for Baskets



Future Direction:

Develop a framework based on **DCMM** for causal inference in retail promotions

Predict the counterfactual.

Estimate promotion effect.