DISAGGREGATION OF FREIGHT ANALYSIS FRAMEWORK (FAF) DATA FOR LOCAL FREIGHT PLANNING STUDIES: A CASE STUDY OF FLORIDA.

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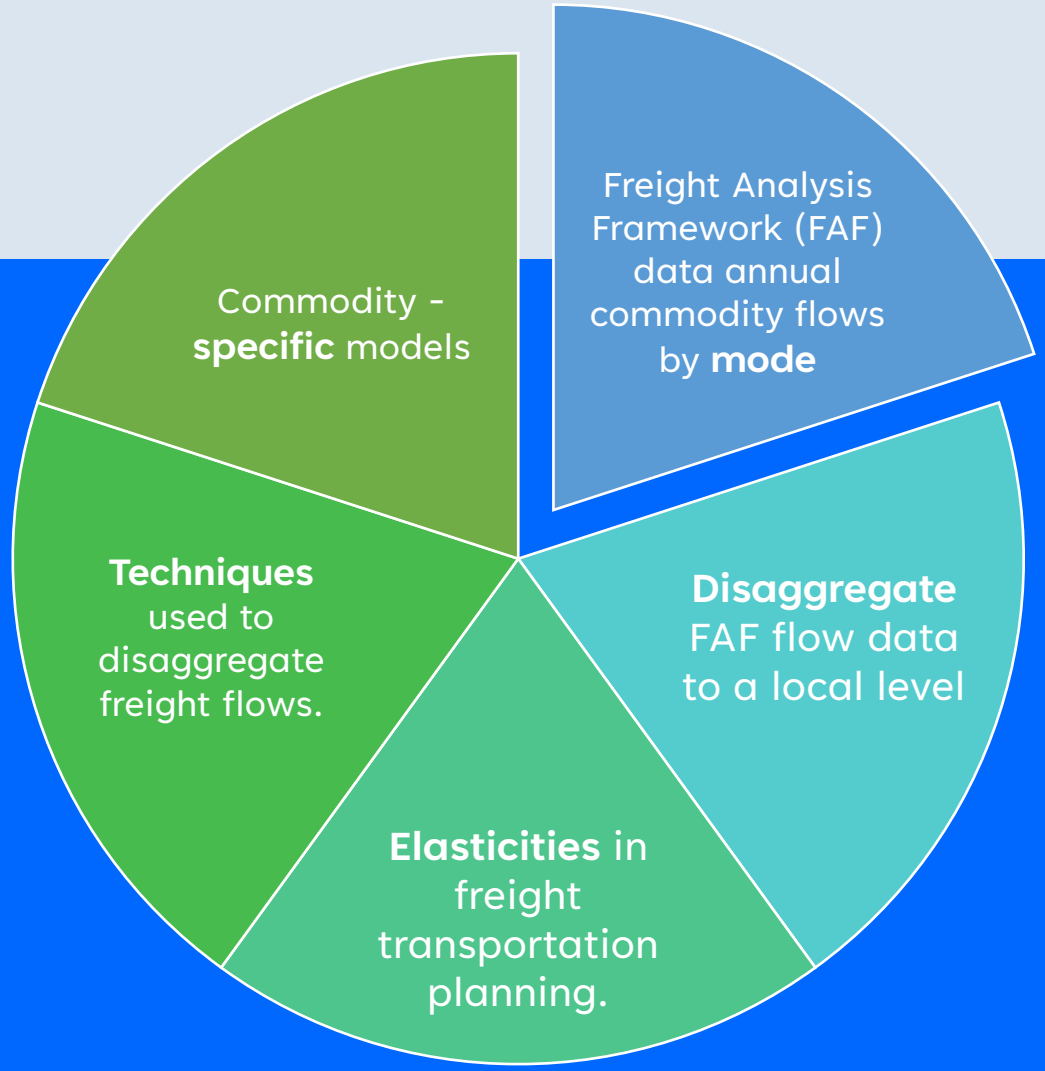
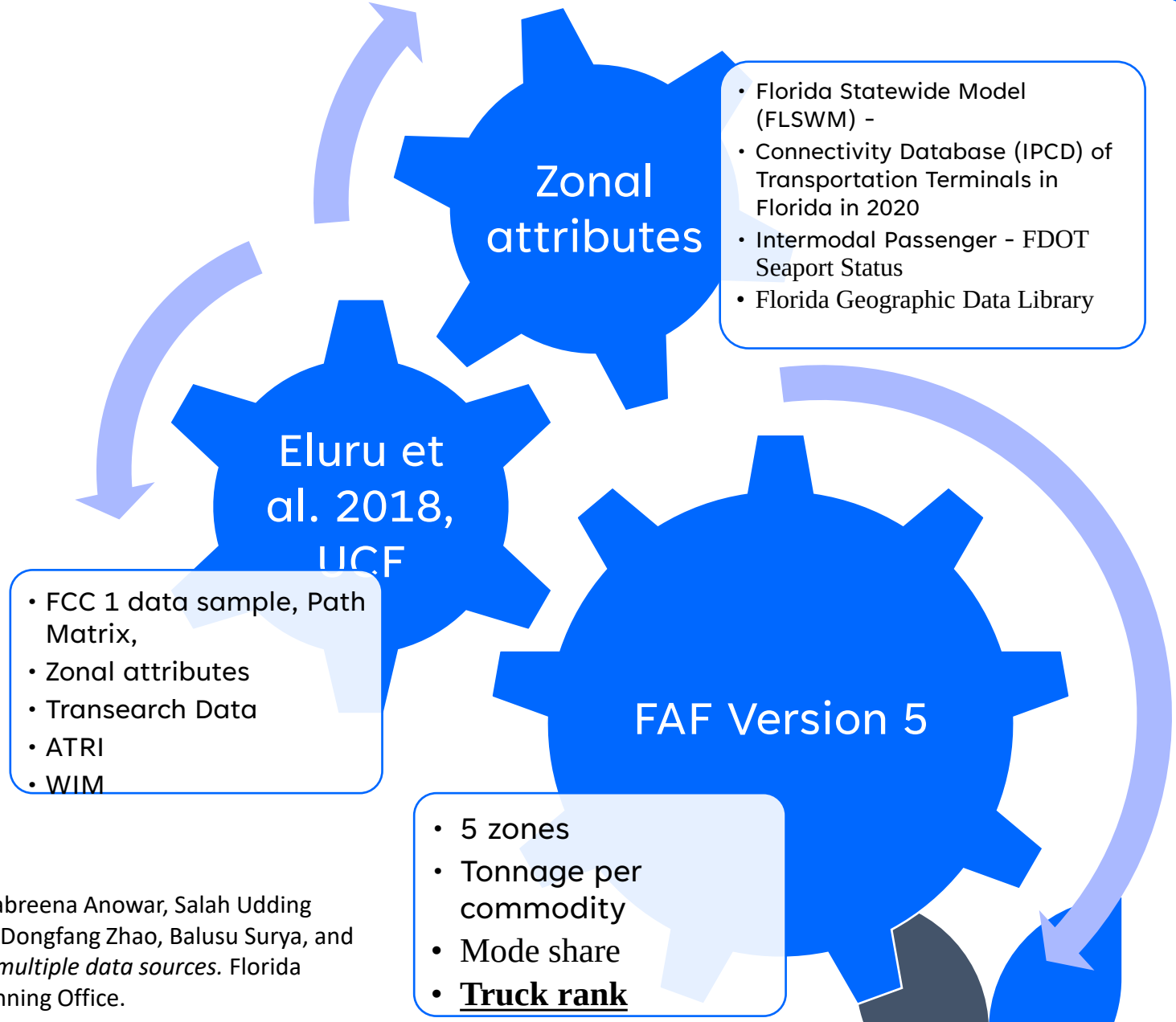
Introduction & Objectives:

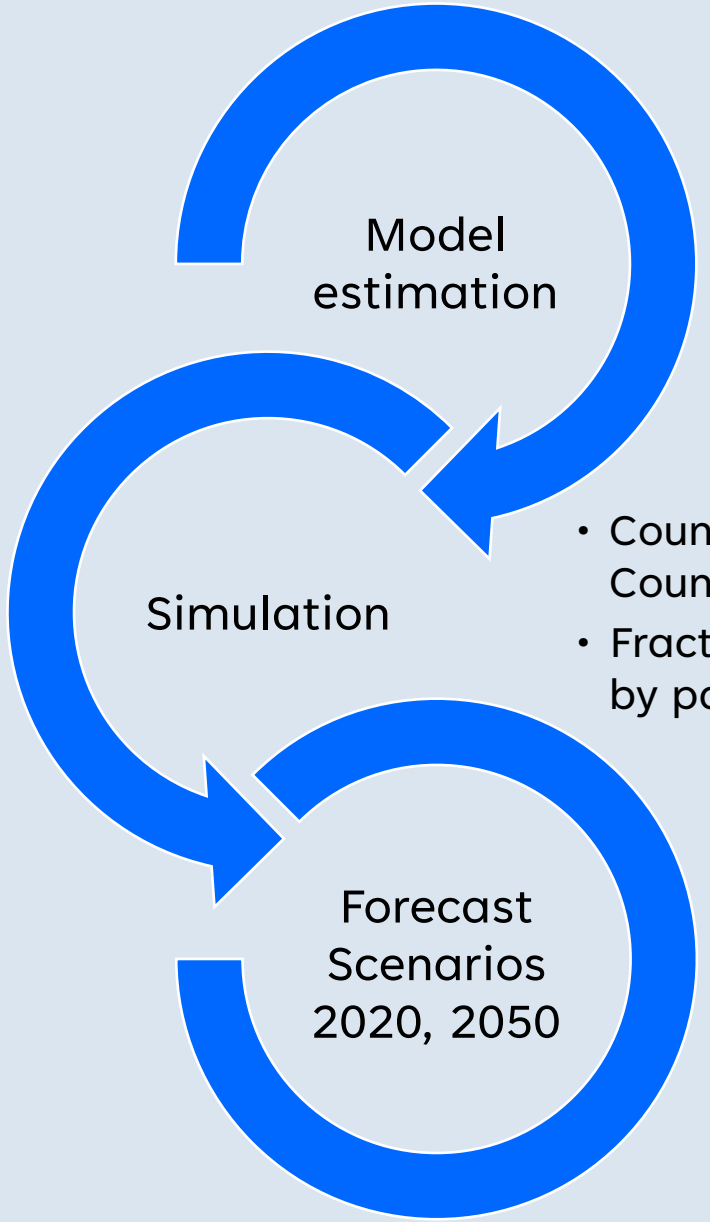


Data



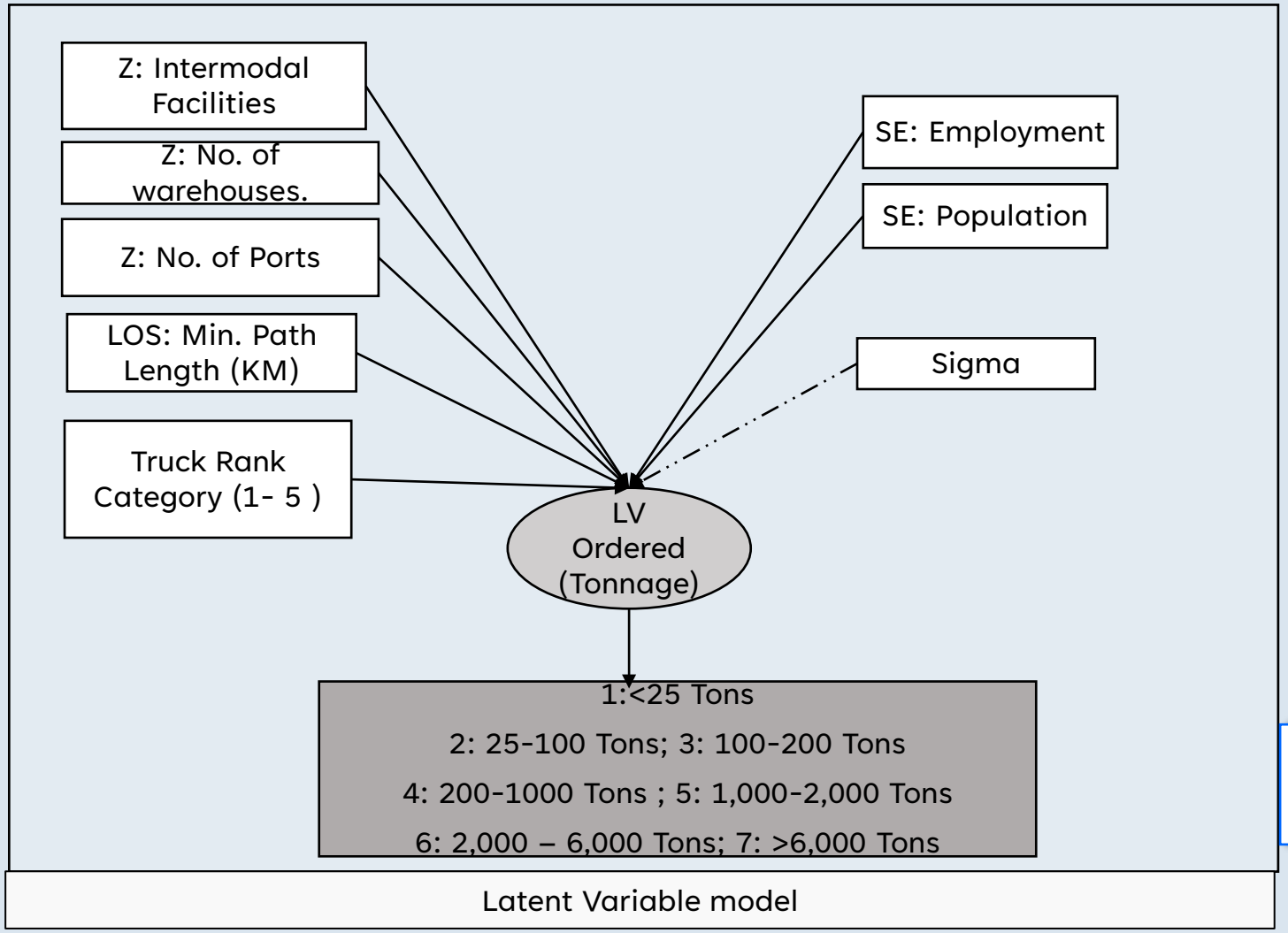
Eluru, Naveen, Xiaopeng Li, Abdul Pinjari, Sabreena Anowar, Salah Udding Momtaz, Nowreen Keya, Bibhaskumar Dey, Dongfang Zhao, Balusu Surya, and Parvathy S., 2018. *Freight data fusion from multiple data sources.* Florida Department of Transportation, Systems Planning Office.

Methods



- Python Biogeme
- County to County
- Fractional split by path
- Mode share based on FAF 5
- Path distribution link assignment
- TAZ GIS Maps

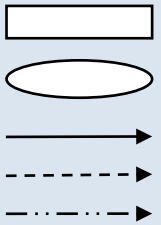
Data and Methods



Fractional Split by Link (Eluru et al. 2018)

Fractional TAZ Split (Eluru et al. 2018)

Notation



Observable variable

Unobservable variable

Structural relationship

Measurement relationship

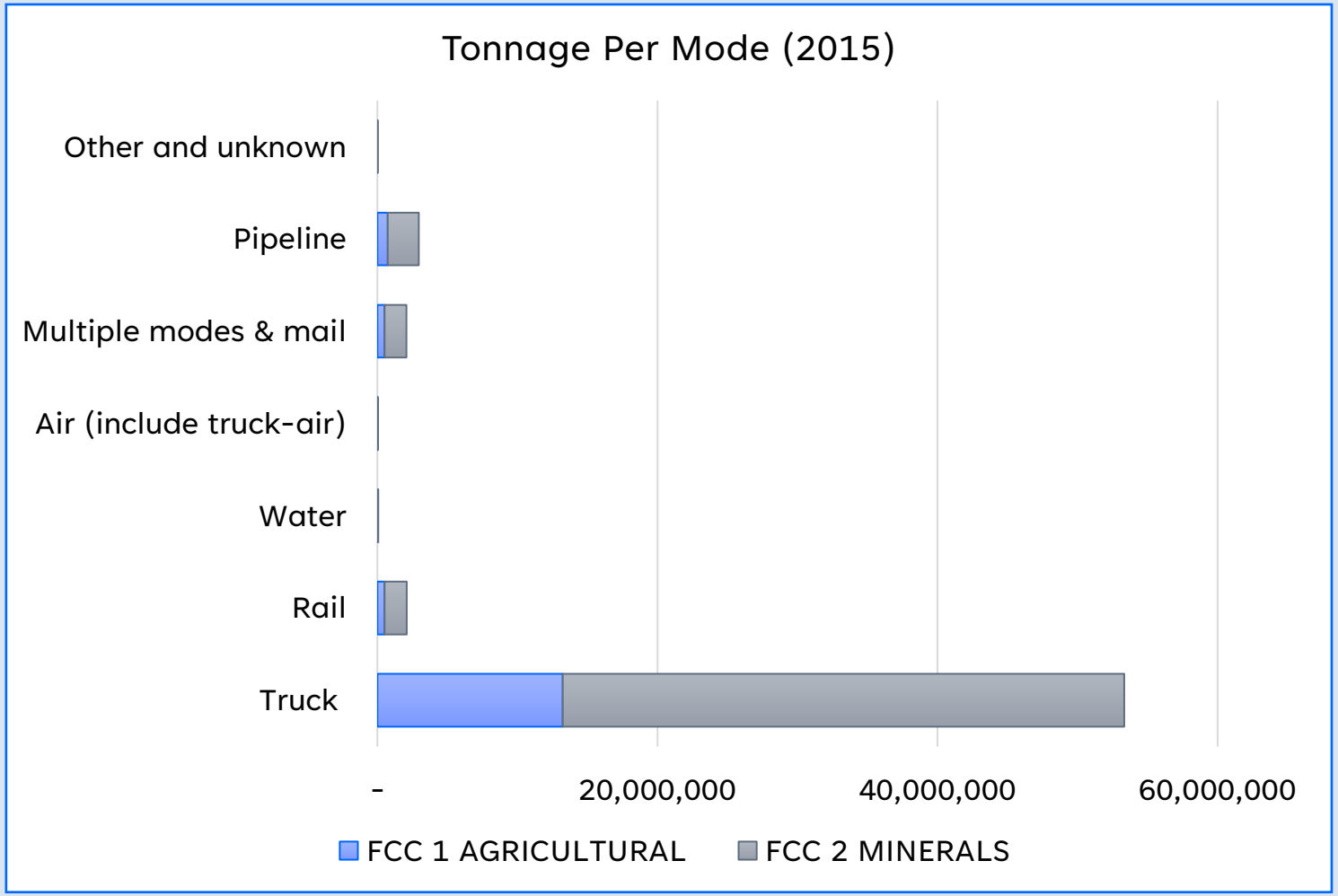
Disturbances

Combine methods and results from a previous project

La Paix, L., Wu, Y., Zang, Y. and Hill, T., 2023. A disaggregated approach of freight mobility per commodity based on public data: case study of Florida. Paper accepted for presentation at the 103rd Annual Meeting Transportation Research Board, January 7-11, Washington D.C.

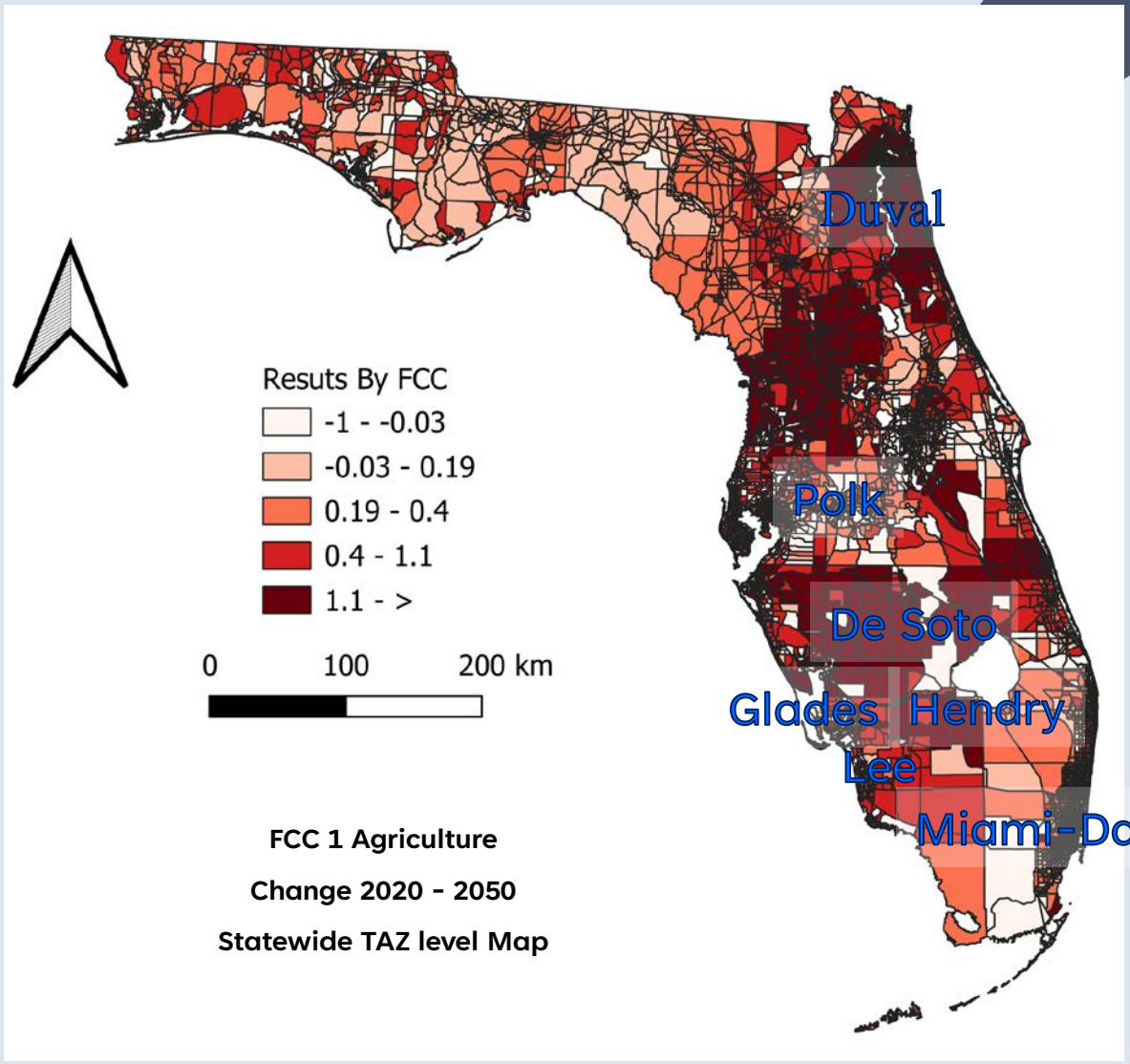
Why is this different?

- Use of **ordered** structure.
- Estimation **tonnage** coefficient separately.
- Use **mode share** from public data source (FAF5).
- **Forecast** based on **simulation** with estimated coefficients.



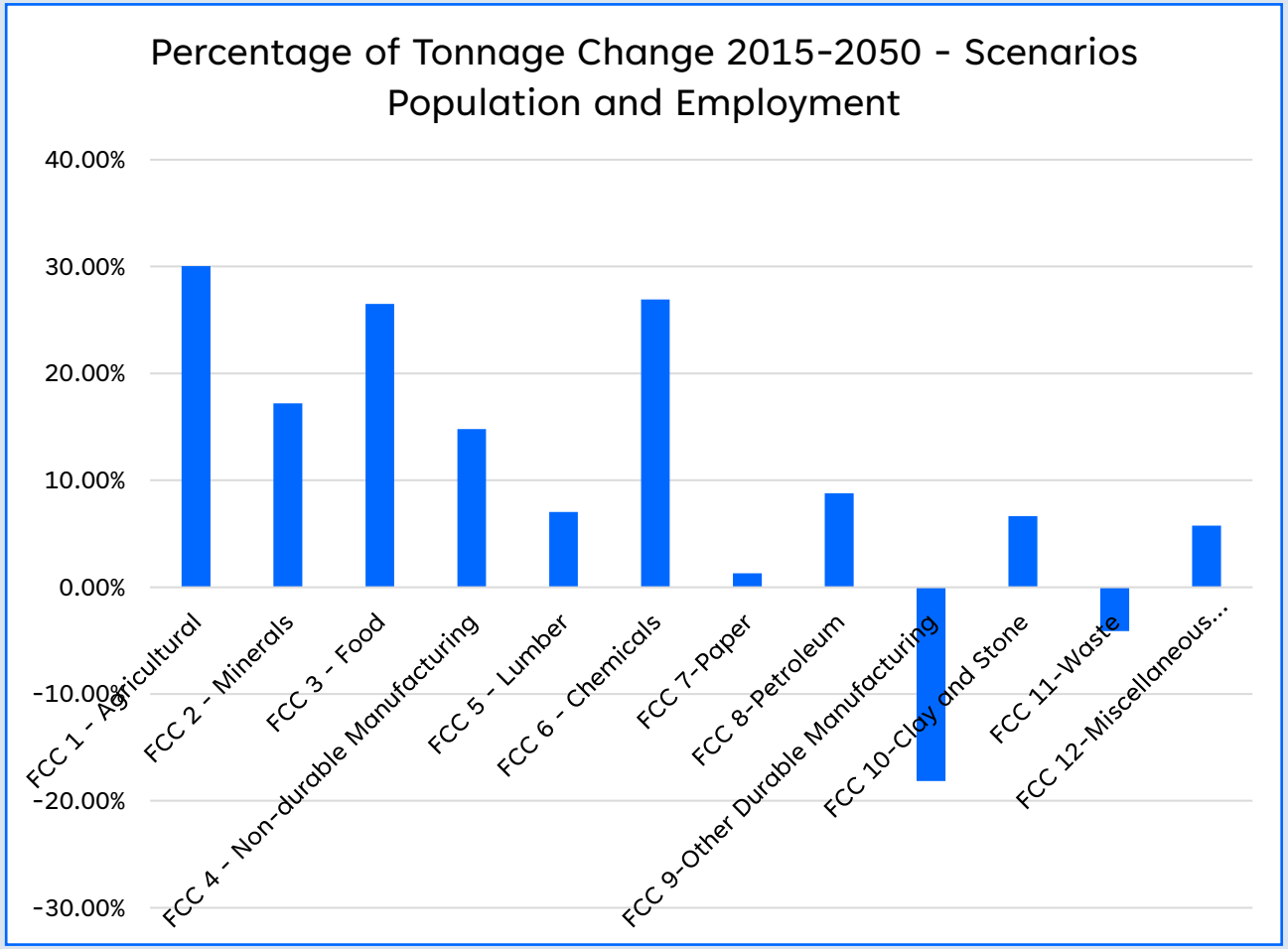
Why is this useful?

- Estimation and forecast at **disaggregated** level.
- Generate **scenario** maps (what if) statewide TAZ level.
- Prepare integrated local transport plans **per zone.**
- Provide the corresponding **supply per zone.**
- Analyze impacts **per commodity.**
- **Visualization**



What did we improve?

- Use of public data to estimate county and **TAZ** level flows **per commodity.**
- Model structure:
  - Introduce **flexibility** to the model estimation.
  - Improve model **robustness**
- Forecast based on **simulation** vs linear projection
- Estimation of **elasticities**



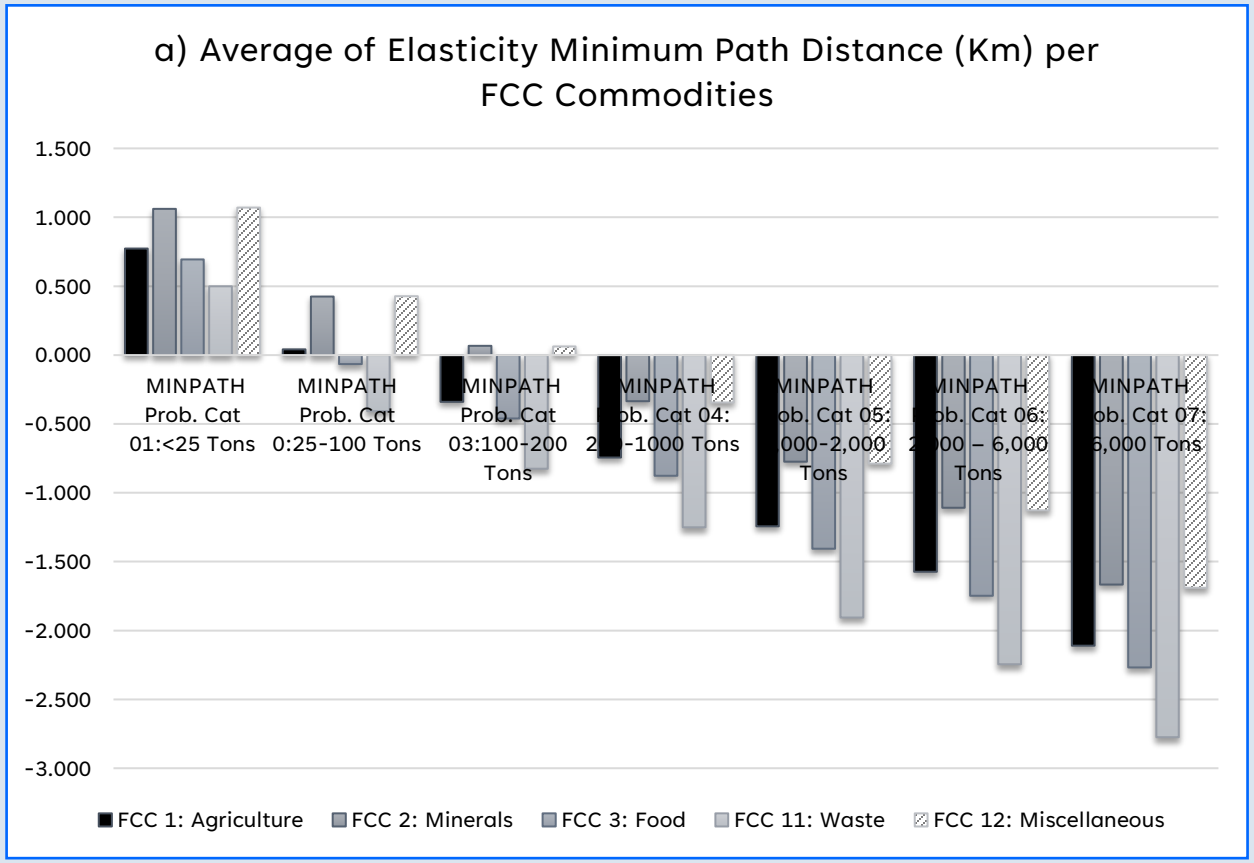
Elasticities: Why is this useful?

- What does an elasticity mean?

- Why distance?
  - Affects modal shift

- Observe the impact of **route distance** over specific categories/commodities tonnage.

- Impacts **are not** linear.



Calculation details available upon request

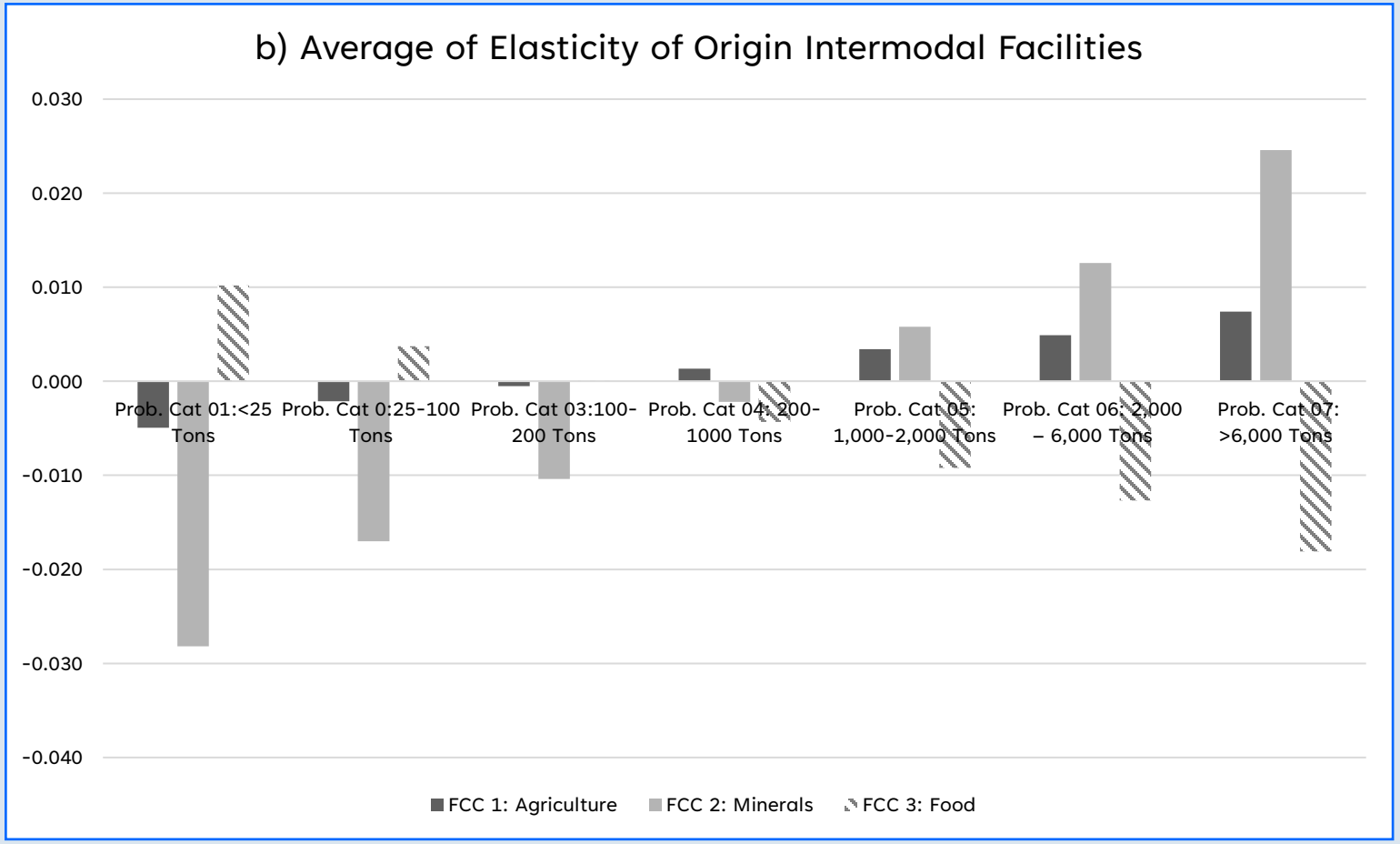
Elasticities: Why is this useful?

- Impacts of the availability of **intermodal** facilities per commodity and **category**.
- Substantial differences among **commodities**.

- How can we implement this to passenger, e.g.?
  - Ordinal
  - Ridership

A further step?

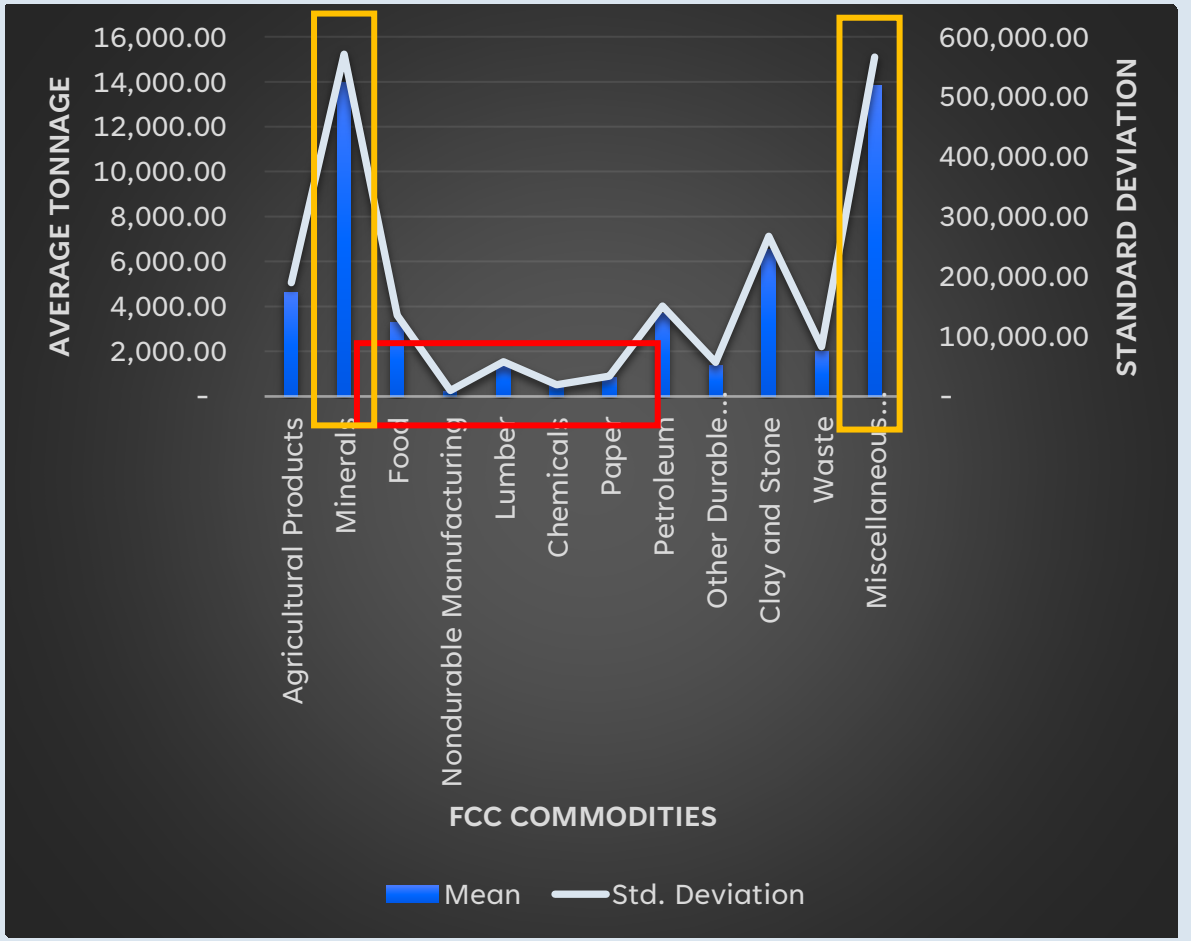
Elasticities map at TAZ level



What can be improved?

- **Simultaneous** estimation of mode-flows choice.
- **Path/route choice** estimation based on observations.
- **Thresholds** per commodity – **different** nature.

Probabilities Categories	Group 1	Group 2	Group 3
Assigned to	FCC 4	FCC 3	FCC 1
	FCC 5	FCC 8	FCC 2
	FCC 6		FCC 9
	FCC 7		FCC 12
	FCC 8		
	FCC 11		



Summary & Challenges

Disaggregate flows and mode share based on public data.

Fusing data and methods across research projects.

Challenge: accurate data publicly available (e.g. GPS) to develop a simultaneous estimation framework.

Need: gather observed route choices.

Thank you

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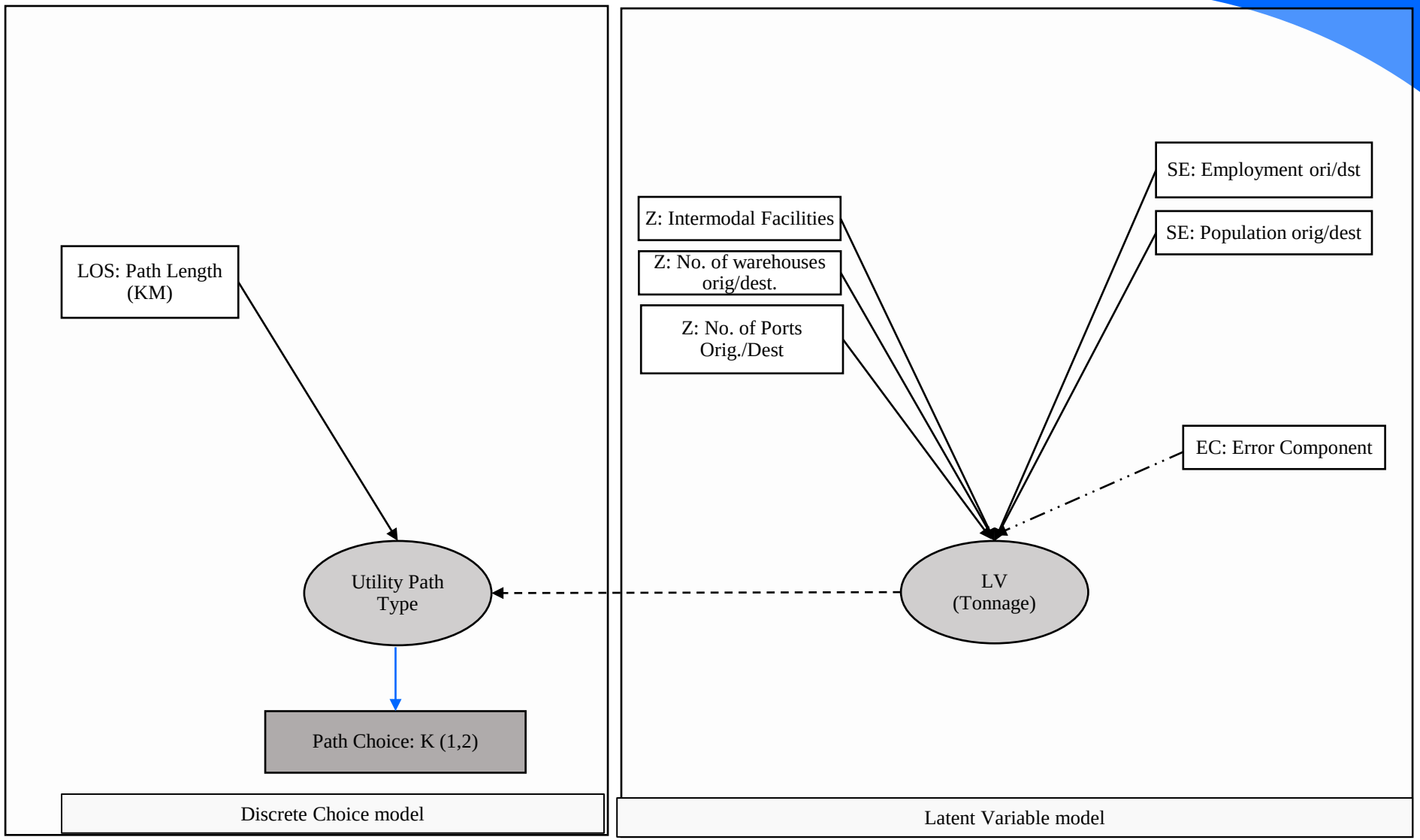
LOS: Path Length (KM)
Utility Path Type
Path Choice: K (1,2)
Discrete Choice model
Z: Intermodal Facilities
Z: No. of warehouses orig/dest.
Z: No. of Ports Orig./Dest
SE: Employment ori/dst
SE: Population orig/dest
EC: Error Component
LV (Tonnage)
Latent Variable model
Notation
Observable variable
Unobservable variable
Structural relationship
Measurement relationship
Disturbances

What can be improved?

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	Continuous Value			
Probabilities Categories	Type A	Type B	Type C	Tyde D
P_tonCat01 - 1:<25 Tons	25	25	25	25
P_tonCat02 25-100 Tons	100	100	100	100
P_tonCat03 100-200 Tons	200	200	200	200
P_tonCat04 200-1000 Tons	1,000	1,000	1,000	1,000
P_tonCat05 1,000-2,000 Tons	2,000	2,000	2,000	2,000
P_tonCat06 2,000 – 6,000 Tons	6,000	6,000	6,000	6,000
P_tonCat07 >6,000 Tons	100,000	300,000	190,000	120,000
Assigned to		FCC 4	FCC 3	FCC 1
		FCC 5	FCC 8	FCC 2
		FCC 6		FCC 9
		FCC 7		FCC 12
		FCC 8		
		FCC 11