INTRODUCTION & MOTIVATION

- Barge transportation more fuel efficient and less polluting than highway and rail transportation, but also the least studied.
- 44% of electricity in the United States comes from burning coal, 10% of coal shipped by barge.
- What factors relating to barge transportation and energy production affect the movement of coal on the Mississippi River?

Data
- Previous months’ coal tonnage through Lock 27
- Total monthly delay hours at Lock 27
- MW hours generated by fuel type
- Monthly retail diesel prices

METHODOLOGY & RESULTS

- Linear regression with Ordinary Least Squares Estimation used to resolve parameter estimates.
- Log-log model used in order to directly ascertain diesel fuel price and energy source elasticities.
- Non-stationary data required a check for autocorrelation.

Null hypothesis:
- No significant autocorrelation present.
- MW hours generated by wind and petroleum have a positive effect on coal tonnage shipped by barge.
  - Reflection of complementary fuel sources
  - Nuclear and natural gas had no effect
- Coal tonnage inelastic with respect to fuel prices, lock delay, and energy source type.
- RMSE for model predictions significantly better than a 3-period moving average of coal tonnage.

MODEL VALIDATION & TRANSFERABILITY

- Predict future Lock 27 coal movements
- Also applied successfully to Lock 25

DISCUSSION & CONCLUSION

- Data can be used by U.S. Army Corps of Engineers to determine best lock maintenance/closure times.
- Planning agencies can see the effects of altering energy generation sources.
- Future research may explore further interactions with other transportation and energy systems.

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