Implementing Machine Learning for IV Analysis

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Abstract

This study uses machine learning and instrumental variable analysis to assess the economic impacts of Africa's slave trades through historical shipping records and modern economic data. The Double Lasso Regression reveals that regions heavily involved in the slave trade have poorer economic performance today, highlighting the lasting economic damage. This research demonstrates the effectiveness of advanced analytics in tracing the persistent economic disadvantages caused by the slave trades in Africa.

Methodology

Replicating Original Study:

- Estimate number of slaves exported using shipping records.
- Examine relationship between slave exports and current economic performance of African countries.
- Use the distance from trade routes as an instrumental variable and performed Two-Stage Least Squares.

Enhancing with Machine Learning:

- Use the Lasso selection method to determine the most relevant variables for the regression.
- Regress the instrumental variable with the features selected using lasso.
- Regress GDP on the predicted values, including the features selected using lasso in the model.

Results Comparison

- The year 2000 used in the original study was the least significant year
- The negative correlation between export area of slaves and economic outcomes was more significant in the expanded replication
- The double lasso regressions found a stronger correlation than both the original study and the expansion of the original.

Table: Regression Results Summary

Independent Variable	Coefficient
Original correlation(2000)	-.286
Double Lasso correlation (2000)	-.556
Expanded Correlation Avg (01 - 22)	-.365

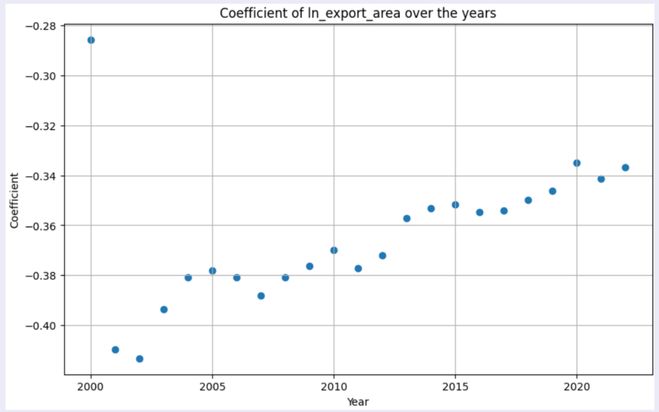

Figure: Average Correlations between Export Volume and Economic Outcomes

Discussion

- Specifying more relevant variables in the double lasso regression led to a stronger correlation being found than in the original paper
- Expanding the years studied of the original replication also produced more statistically significant correlations than the original

Conclusions

Employing the Double Lasso Regression, our study confirms a significant negative correlation between historical slave trade exposure and current economic conditions. The findings stress the need to recognize how historical injustices like the slave trades contribute to ongoing economic disparities in Africa, showcasing the value of sophisticated statistical methods in historical economic analysis.

Supplemental Content