

# Africa's Slave Trades: Implementing Machine Learning for IV Analysis

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## Abstract

This study utilizes machine learning and IV analysis to examine economic impacts of Africa's slave trades as an extension of Nunn's (2008) "The Long-Term Effects of Africa's Slave Trade". The results show worse economic performance in regions deeply linked to the slave trade.

## Introduction

- Focuses on the economic impacts of Africa's slave trades using Double Lasso and IV analysis.
- Aims to uncover persistent disparities resulting from historical injustices.

## Literature Review

- Tibshiran (1996) introduced the lasso regression model to increase the prediction accuracy through reducing complexity.
- Enhancements of this lasso regression model have been developed, such as Zou's (2006) adaptive lasso method, which uses adaptive weights for each coefficient.
- The lasso method has proven to be not effective for all economics research. For example, the method struggles in a labor economic study by Angrist and Frandsen (2022).

## Methodology

### Replicating Original Study:

- Estimate slave exports using shipping records.
- Examine relationship between slave exports and current economic performance of African countries.
- Use distance from trade routes as an IV in a 2SLS.

### Enhancing with Machine Learning:

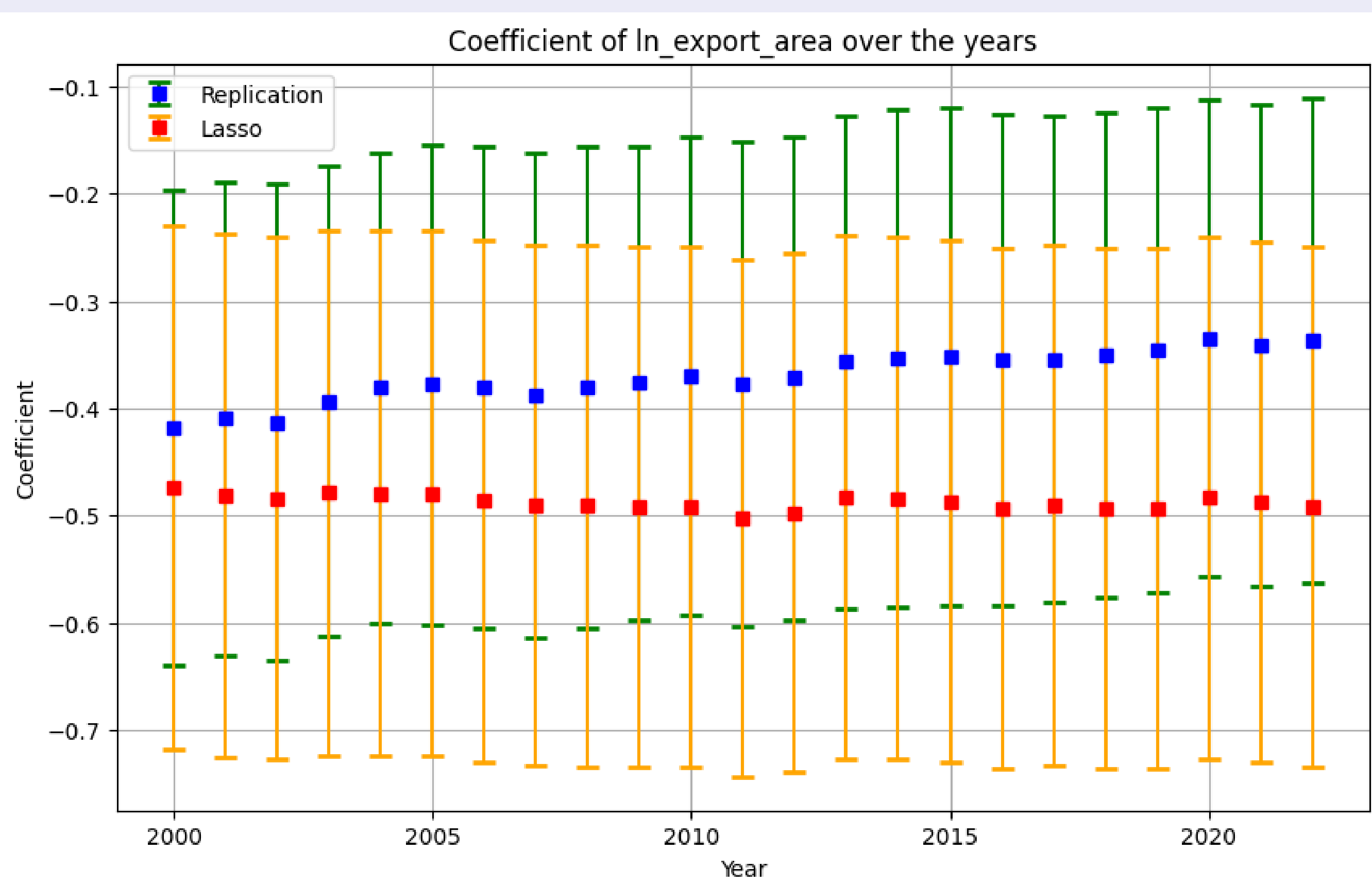
- Select relevant variables using Lasso method.
- Regress IV with features selected using Lasso.
- Regress GDP on predicted values.

## Results Comparison

- Both models were estimated with Python.
- The negative coefficient between export area of slaves and economic outcomes was still significant in the expanded replication.
- The double lasso regressions found a stronger coefficient than both the original study and the expansion of the original.
- The results of the double lasso are not significantly different from the results of the replication.

Table: Regression Results Summary (using GDP with Base Year of 2015)

Independent Variable	Coefficient
Slave Exp.(Nunn Replication; 2000 GDP)	-.418
Slave Exp.(Nunn Replic.; Avg 01-22 GDP)	-.365
Slave Exp.(Double Lasso; 2000 GDP)	-.474
Slave Exp.(Double Lasso; Avg 01-22 GDP)	-.488



## Discussion

- Expanding years studied in the original replication produces more robust and dependable coefficients.
- Specifying more relevant variables in Double Lasso strengthens correlation findings.

## Contributions

- Integrates machine learning with econometric methods for methodological innovation.
- Demonstrates importance of the context of the study and the complexity of the traditional model.

## Conclusions

- Provides insights into the lasting economic legacies of Africa's slave trades.
- Demonstrates the potential value of advanced statistical methods in historical economic analysis.

## References

- Nunn, N. (2008). The Long-Term Effects of Africa's Slave Trades. The Quarterly Journal of Economics Vol. 123, No. 1 (Feb. 2008), 139-176.
- Tibshirani, R. (1996). Regression Shrinkage and Selection via the Lasso. Journal of the Royal Statistical Society. Series B (Methodological), 58(1), 267-288.

## Supplemental Content



Figure: Supplemental Content and Github Link