Does rice exports cause economic growth in leading rice-producing states in the U.S.?

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Introduction

❑ The structure of the U.S. Agricultural sector have been changed over the decade. For example, corns have been used as energy with the adaption of bio-energy policy in the U.S.

❑ Recently, the relative importance of value-added has grown compared to productivity issues. The expansion of the organic and non-GMO market represents this phenomenon.

❑ However, the rice sector has not changed a lot compared to other agricultural sectors in the U.S.

❑ In turn, leading rice-producing states such as Arkansas, Louisiana, and Mississippi do not follow the agricultural structure change.

❑ Furthermore, these states are heavily depending on the agricultural sector compared to other states.

❑ In these circumstances, the export-led growth hypothesis focusing on agricultural products and rice is expected to not working at cases of leading rice-producing states in the U.S.

❑ Utilizing the autoregressive distributed lag (ARDL) model using quarterly data (exports and GDP) from BEA and U.S. Census, this study investigates the Agricultural export-led growth hypothesis focusing on leading rice-producing states in the U.S.

❑ In this study, we expect that the Agricultural export-led growth hypothesis is not satisfied in the case of leading rice-producing states in the U.S.
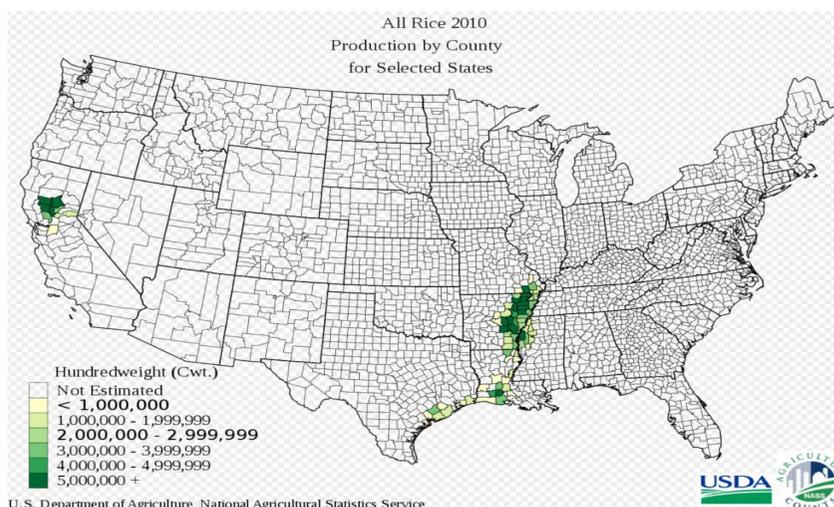

Figure 1. All Rice 2010 Production by Country for Selected States

Sources: U.S. Department of Agriculture, National Agriculture Statistics Service

Data

❑ The primary source of data used in this study is quarterly time-series data from 2005 to 2020.

❑ Rice exports, Agricultural exports, and non-agricultural exports data are obtained from USA Trade Online provided by the U.S. Census Bureau.

❑ Real GDP is obtained from the Bureau of Economic Analysis.

Table 1. Descriptive Summary Statistics

Variable	Unit	Mean	Std. Dev.	Min	Max
Ag Exports	log	19.720	1.812	17.043	22.924
Rice Exports	log	17.532	1.436	15.030	19.402
Non-Ag Exports	log	21.652	0.820	20.284	23.310
GDP	log	11.829	0.385	11.440	12.431

Methodology

❑ Autoregressive Distributed Lag (ARDL) model is specified as follows:

$$y_t = c_0 + c_1 t + \sum_{i=1}^{p} \emptyset_i y_{t-i} + \sum_{i=0}^{q} \beta_i' x_{t-i} + u_t$$

where

t: $\max(p, q)$

y_t: a vector of ln(GDP)

x_t: a vector of ln(Export without Agricultural Export), ln(Agricultural Export without Rice Export), ln(Rice Export)

u_t: the error term

❑ ARDL can be rewritten by reparametrizing in the conditional EC form:

$$\Delta y_t = c_0 + c_1 t - \alpha(y_{t-1} - \theta x_{t-1}) + \sum_{i=1}^{p-1} \psi_{y_i} \Delta y_i + w' \Delta x_t + \sum_{i=1}^{q-1} \psi_{x_i} \Delta x_i + u_t$$

where α $(= 1 - \sum_{j=1}^{p} \emptyset_j)$ is the speed of adjustment coefficient, and θ $(= \frac{\sum_{j=0}^{q} \beta_j}{\alpha})$ is the long-run coefficient.

Empirical Results

Table 2. The Long-Run Coefficients Estimating Results

Variable	Coef.	Std. Err.	P-Value
Louisiana			
Ag Exports	-0.0216	0.0169	0.206
Rice Exports	0.0130	0.0230	0.574
Non-Ag Exports	-0.0657	0.0348	0.064*
Constant	4.4215	1.2604	0.001
Mississippi			
Ag Exports	-0.0392	0.0217	0.078*
Rice Exports	-0.0132	0.0251	0.603
Non-Ag Exports	0.0472	0.0282	0.101
Constant	4.5174	1.6410	0.008

❑ Notes: *, **, *** indicate 10%, 5%, and 1% significance level, respectively. We do not report Arkansas in the results table above according to the results of Bounds test.

Summary and Conclusions

❑ This study finds that the Agricultural export-led growth hypothesis is not satisfied in cases of rice production leading states: Arkansas, Louisiana, and Mississippi.

❑ To be specific, there is no long-run relationship between exports and GDP in Arkansas. In Louisiana and Mississippi, there are long-run relationships between exports and GDP. However, only non-ag exports of Louisiana have a significant effect on GDP in the long-run.

❑ This study will contribute to the previous literature agricultural export-led growth hypothesis test in developed countries.

❑ One of the limitations in this study is that we could not incorporate the population due to the data limitation to calculate the GDP per capita as many previous studies employed GDP per capita to test the Agricultural export-led growth hypothesis.

❑ Future research might also need to figure out the policy method for reconstructing Agricultural export-led growth in rice leading states. It is expected to be important since those states are heavily depending on agricultural sectors, especially on rice production.