

Economies of Scale and Scope in U.S. Agricultural Banks

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Introduction

- Agricultural banks: banks with at least 25 percent of agricultural loans in their loan portfolio.
- Small banks: banks with less than 250 million dollars in total assets.
- Both of these banks play a crucial role in agricultural lending.
- Major agricultural banks operate in the multiproduct framework.
- Only a few past studies are focused in the economic measures of U.S. agricultural banks.

Objectives

- To measure the overall economic performance of agricultural banks.
- To compare the economic measures across different types of banks.

Data

- Quarterly Reports of Condition of Commercial Banks (Call Report) dataset for the year 2016.
- Final estimation sample includes only the commercial banks.
- Following (Featherstone and Moss, 1994): six outputs and four inputs.

Table: Descriptive Statistics of Sample Commercial Banks (5,031 Observations)

Variables	Mean
Outputs	
Agricultural loans (\$000)	32751.2
Nonagricultural real estate loans (\$000)	711479.1
Other nonagricultural loans (\$000)	808134.7
Transactions deposits (\$000)	366613.7
Nontransactions deposits (\$000)	1395348.0
Other bank output (\$000)	43064.0
Inputs	
Total assets (\$000)	2741501.0
Total deposits (\$000)	2043714.0
Number of employees	376.8
Fixed assets (\$000)	9089.5
Input prices	
Other expenses/total assets	0.006
Interest paid/total loans	0.080
Average salary (\$000)	46.32
Occupancy expense/fixed asset	0.34

Economic Measures

- Economic measures are obtained through non-parametric estimation of cost frontier in the multiproduct framework.
- Using translog to estimate the bank cost functions can lead to the "erroneous estimates of returns to scale" (Wheelock and Wilson, 2017).

- Economies of scope exists if $EOS_i > 0$, where:

$$EOS_k = \frac{C(Y_k) + C(Y_{n-k}) - C(Y)}{C(Y)} \quad (1)$$

- Multiproduct economies of scale exists if $MPSE > 1$, where:

$$MPSE = \frac{C(Y)}{\sum_k Y_k \left[\frac{\partial C(Y)}{\partial Y_k} \right]} \quad (2)$$

- Product specific economies of scale exists if $PSE_k > 1$, where:

$$PSE_k = \frac{AIC_k}{\frac{\partial C(Y)}{\partial Y_k}} \quad (3)$$

Results

Table: Cost Efficiency (CE) and Multi-Product Scale Economies (MPSE) at Mean Level of Output and Input Prices

Types of Bank	CE	MPSE
Agricultural Banks	0.542	1.002
Non-Agricultural Banks	0.470	0.999
Small Banks	0.505	1.016
Large Banks	0.469	0.976

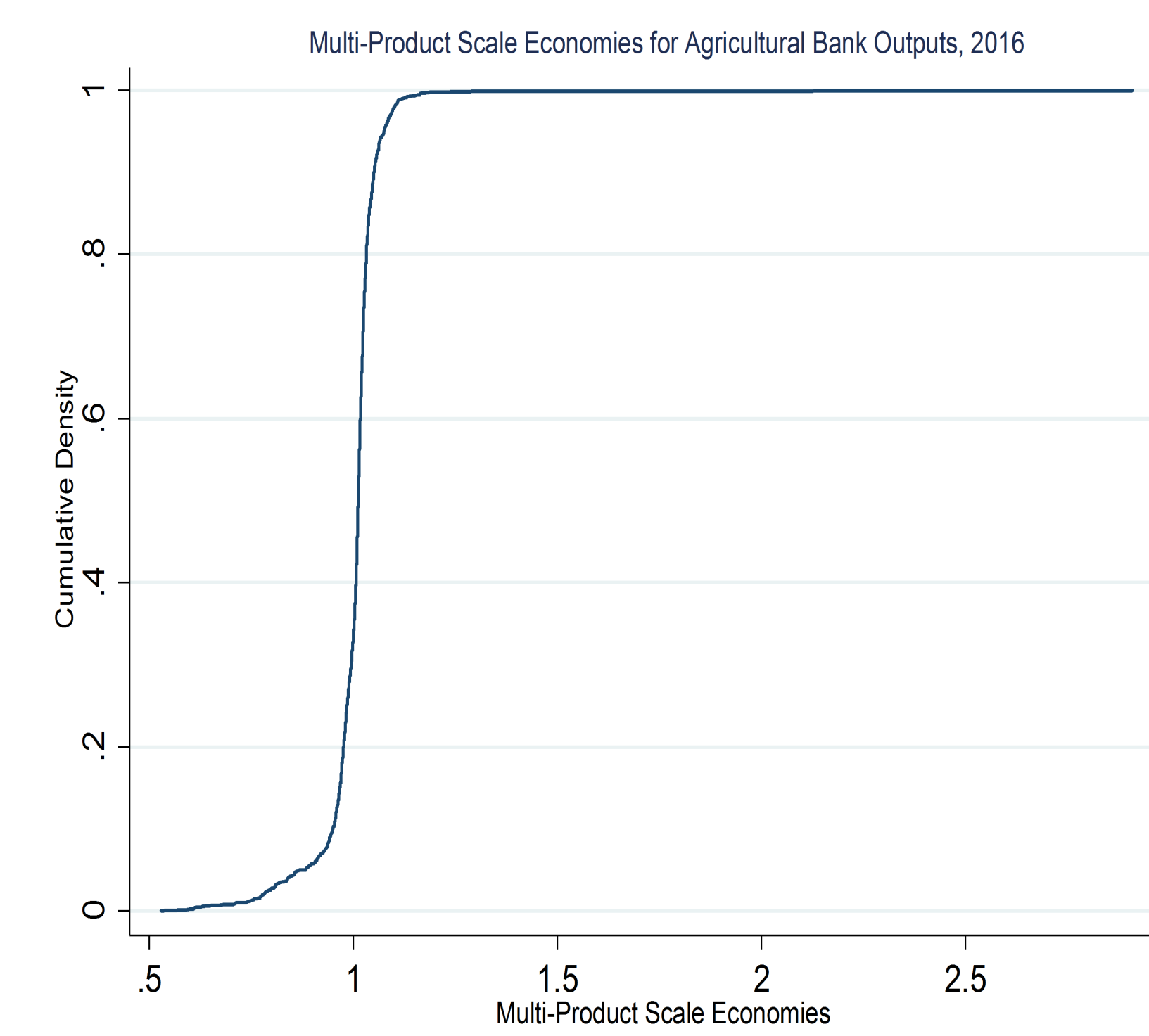
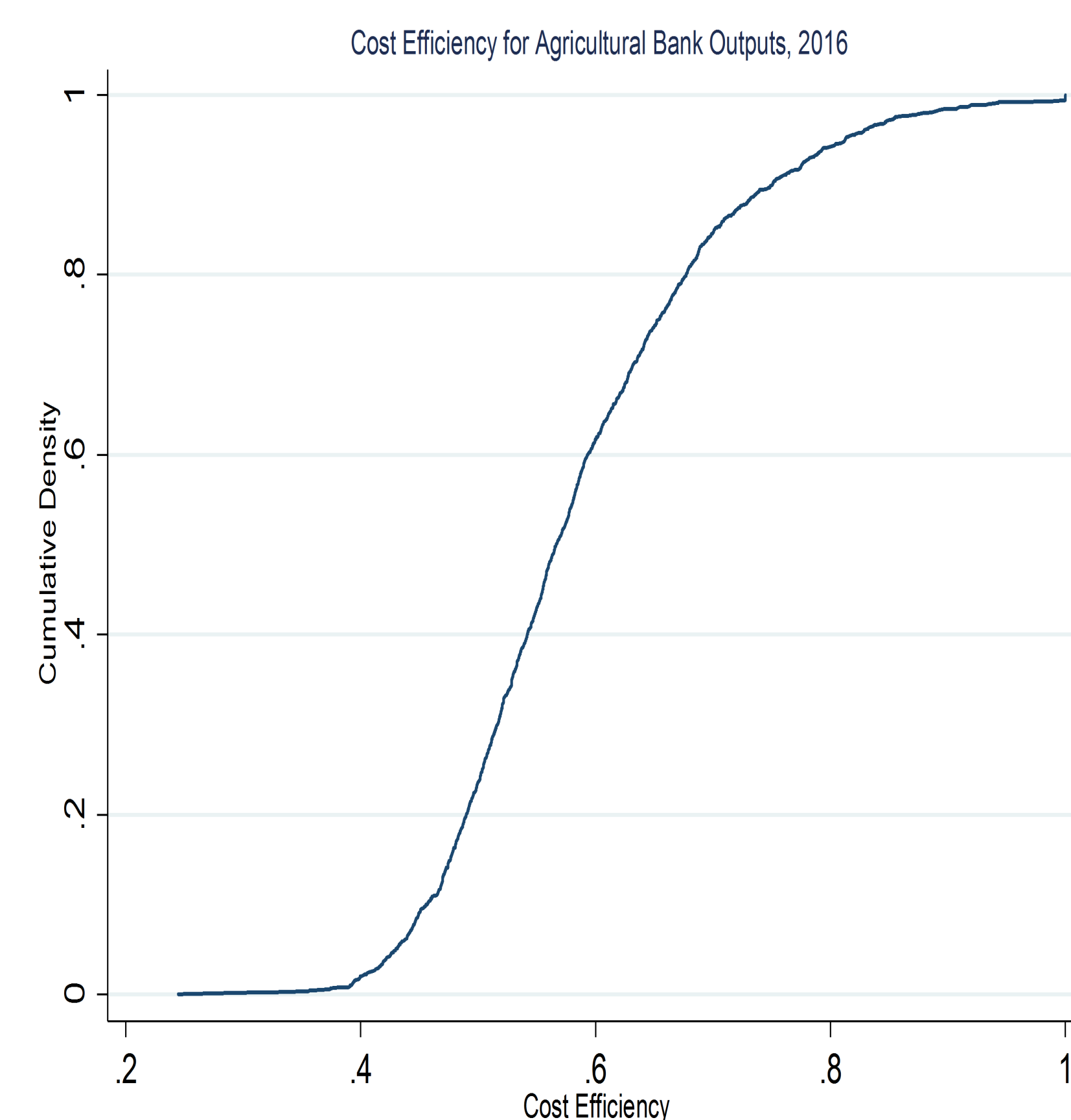


Table: Economies of Scope (EOS) and Product-Specific Economies of Scale (PSE) at Mean Level of Output and Input Prices [Small vs Large Banks]

Output	EOS	PSE
<i>For Small Banks</i>		
Agricultural loans	0.044	0.978
Nonagricultural real estate loans	0.138	0.724
Other nonagricultural loans	0.064	0.678
Transactions deposits	0.103	0.887
Nontransactions deposits	0.187	0.803
Other bank output	0.036	0.894
<i>For Large Banks</i>		
Agricultural loans	0.010	0.957
Nonagricultural real estate loans	0.195	0.650
Other nonagricultural loans	0.075	0.699
Transactions deposits	0.060	0.933
Nontransactions deposits	0.274	0.722
Other bank output	0.013	0.800

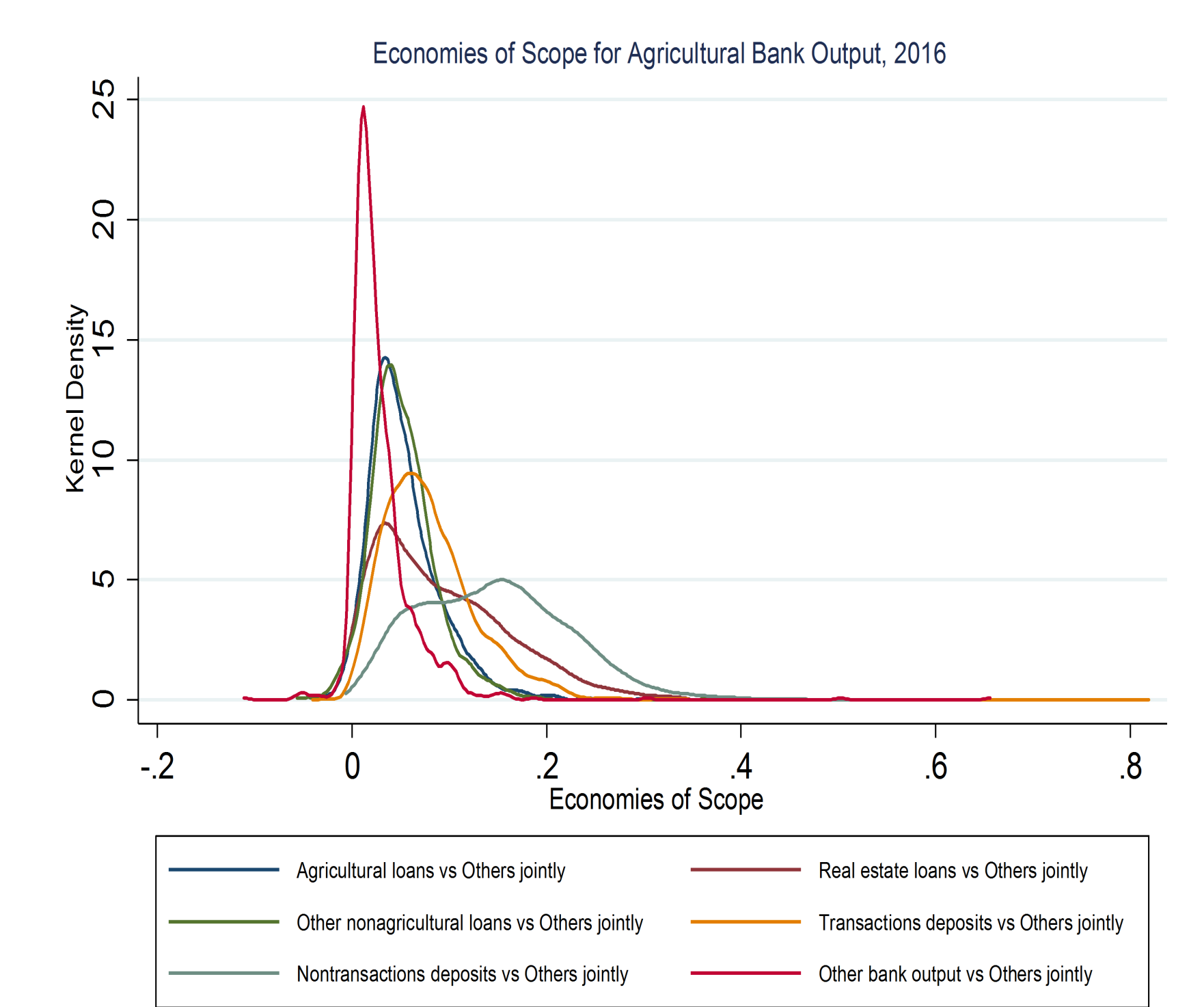
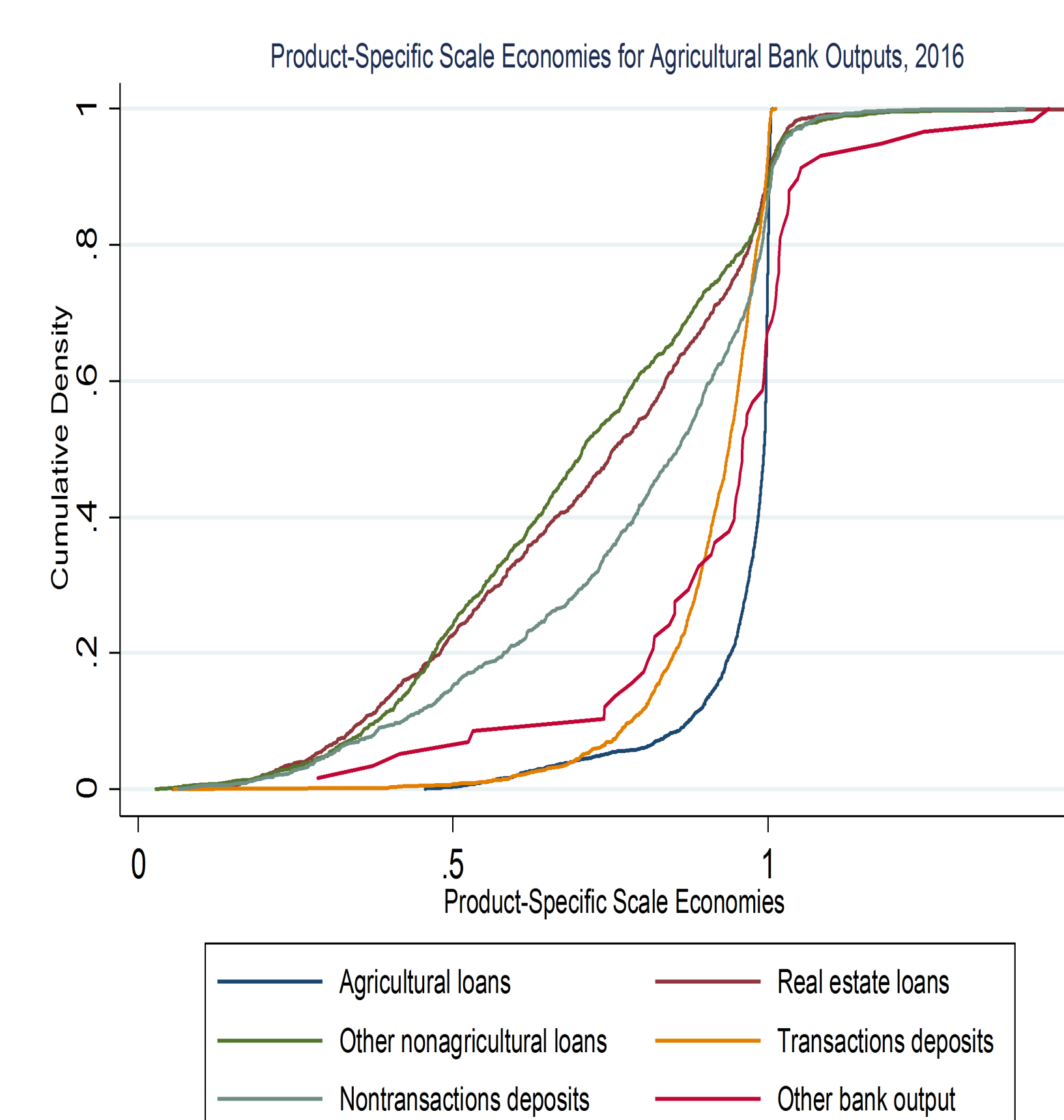


Table: Economies of Scope (EOS) and Product-Specific Economies of Scale (PSE) at Mean Level of Output and Input Prices [Ag vs Non-Ag Banks]

Output	EOS	PSE
<i>For Agricultural Banks</i>		
Agricultural loans	0.054	0.955
Nonagricultural real estate loans	0.093	0.719
Other nonagricultural loans	0.053	0.702
Transactions deposits	0.081	0.908
Nontransactions deposits	0.147	0.785
Other bank output	0.029	0.924
<i>For Non-Agricultural Banks</i>		
Agricultural loans	0.020	0.977
Nonagricultural real estate loans	0.188	0.684
Other non-agricultural loans	0.074	0.681
Transactions deposits	0.087	0.905
Nontransactions deposits	0.252	0.768
Other bank output	0.027	0.863

Conclusions

- Both agricultural banks and small banks are operating under constant returns to scale at the mean levels of output.
- These banks can save cost by reducing their outputs except the agricultural loans.
- Product diversification can also results in overall cost reduction.

References

- Featherstone, A.M. and Moss, C.B., 1994. Measuring economies of scale and scope in agricultural banking. *American Journal of Agricultural Economics*, 76(3), pp.655-661.
- Wheelock, D.C. and Wilson, P.W., 2017. The evolution of scale economies in US banking. *Journal of Applied Econometrics*.