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

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Madhav Regmi, Allen M. Featherstone, Cortney A. Cowley and Mykel R. Taylor

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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.
- 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.

Data

- 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 \( EOS > 0 \), where:
  \[
  EOS = \frac{C(Y) - C(Y_{ce})}{C(Y)}
  \]  
  (1)
- Multiproduct economies of scale exists if \( MPSE > 1 \), where:
  \[
  MPSE = \frac{C(Y)}{\sum Y_i / \sum Y_i^{ce}}
  \]  
  (2)
- Product specific economies of scale exists if \( PSE > 1 \), where:
  \[
  PSE = \frac{C(Y)}{\sum Y_i / \sum Y_i^{ce}}
  \]  
  (3)

Results

Table: Economic Measures

<table>
<thead>
<tr>
<th>Types of Bank</th>
<th>CE</th>
<th>MPSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Banks</td>
<td>0.542</td>
<td>1.002</td>
</tr>
<tr>
<td>Non-Agricultural Banks</td>
<td>0.470</td>
<td>0.999</td>
</tr>
<tr>
<td>Small Banks</td>
<td>0.505</td>
<td>1.016</td>
</tr>
<tr>
<td>Large Banks</td>
<td>0.469</td>
<td>0.975</td>
</tr>
</tbody>
</table>

Economies of Scale and Scope (PSE) at Mean Level of Output and Input Prices [Small vs Large Banks]

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

<table>
<thead>
<tr>
<th>Types of Bank</th>
<th>EOS</th>
<th>PSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>For Small Banks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural loans</td>
<td>0.044</td>
<td>0.978</td>
</tr>
<tr>
<td>Nonagricultural real estate loans</td>
<td>0.138</td>
<td>0.724</td>
</tr>
<tr>
<td>Other nonagricultural loans</td>
<td>0.064</td>
<td>0.678</td>
</tr>
<tr>
<td>Transactions deposits</td>
<td>0.103</td>
<td>0.867</td>
</tr>
<tr>
<td>Nontransactions deposits</td>
<td>0.187</td>
<td>0.803</td>
</tr>
<tr>
<td>Other bank output</td>
<td>0.036</td>
<td>0.894</td>
</tr>
<tr>
<td>For Large Banks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural loans</td>
<td>0.010</td>
<td>0.957</td>
</tr>
<tr>
<td>Nonagricultural real estate loans</td>
<td>0.195</td>
<td>0.650</td>
</tr>
<tr>
<td>Other nonagricultural loans</td>
<td>0.075</td>
<td>0.699</td>
</tr>
<tr>
<td>Transactions deposits</td>
<td>0.060</td>
<td>0.933</td>
</tr>
<tr>
<td>Nontransactions deposits</td>
<td>0.274</td>
<td>0.722</td>
</tr>
<tr>
<td>Other bank output</td>
<td>0.013</td>
<td>0.800</td>
</tr>
</tbody>
</table>

Conclusions

- Both agricultural 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 result in overall cost reduction.

References