Beyond Public vs. Private: Is There A Third Option to Improve the Economic Competitiveness of US Ports?

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Problem Statement and Motivation

- Most of the major US ports are managed by various types of mixed public and private partnerships, whereas all of the Panama canal ports are privatized.
- One key question unanswered in the literature is the effect of various types of privatization on port competitiveness.
- This research fulfills the gap in the literature by providing a quantitative measure of the impact of the various types of privatization on port competitiveness.

Technical Approach

- Determine the quantitative measure of port competitiveness.
- Determine the quantitative measure of private sector involvement in US ports' operations.
- Perform an empirical analysis to quantify the effect of various types of privatization and other determinants on port competitiveness.
- Panel data for 11 major US ports and 4 Panama canal ports used for the empirical study.

Empirical model specification

- \( Y_{it} = f(X_{it}, \beta) + \nu_{it} + \mu_{it}, \) where
- \( Y_{it} \) is the measure of port competitiveness,
- \( \mu_{it} \) is the time invariant unobservable individual effect \( \sim N(0, \sigma^2) \),
- \( \nu_{it} \) is the random disturbance,
- \( X_{it} \) are the set of dependent variables and \( \beta \)'s are their coefficients to be estimated.

Quantifying Privatization of selected US Ports

- Figure 1: Sample data collection for the study
- Figure 2: Ratio of privately owned port assets to total assets
- Figure 3: Ratio of publicly owned port assets to total assets
- Figure 4: Ratio of public-private owned port assets to total assets

Table: Measure of port competitiveness

<table>
<thead>
<tr>
<th>US Container Ports</th>
<th>Average TEU</th>
<th>TEU Ranking</th>
<th>Opr. Revenue (mean)</th>
<th>Opr. Income (mean)</th>
<th>Inc. Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port of Los Angeles (CA)</td>
<td>6,042,464</td>
<td>1</td>
<td>$329,380</td>
<td>$110,796</td>
<td>3</td>
</tr>
<tr>
<td>Port of Long Beach (CA)</td>
<td>5,166,581</td>
<td>2</td>
<td>277,550</td>
<td>142,896</td>
<td>2</td>
</tr>
<tr>
<td>Port Authority of NY &amp; NJ</td>
<td>3,928,789</td>
<td>3</td>
<td>2,173,376</td>
<td>307,277</td>
<td>1</td>
</tr>
<tr>
<td>Port of Virginia (VA)</td>
<td>1,971,166</td>
<td>4</td>
<td>153,494</td>
<td>-1,880</td>
<td>10</td>
</tr>
<tr>
<td>Port of Oakland (CA)</td>
<td>1,707,165</td>
<td>5</td>
<td>172,923</td>
<td>76,975</td>
<td>5</td>
</tr>
<tr>
<td>Port of Seattle (WA)</td>
<td>1,571,330</td>
<td>6</td>
<td>263,957</td>
<td>97,486</td>
<td>4</td>
</tr>
<tr>
<td>Port of Houston (TX)</td>
<td>1,414,614</td>
<td>7</td>
<td>142,418</td>
<td>12,002</td>
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<tr>
<td>Port of Tacoma (WA)</td>
<td>1,340,600</td>
<td>8</td>
<td>80,663</td>
<td>15,813</td>
<td>8</td>
</tr>
<tr>
<td>Port of Miami (FL)</td>
<td>900,890</td>
<td>9</td>
<td>82,329</td>
<td>15,607</td>
<td>7</td>
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<tr>
<td>Port of Jacksonville (FL)</td>
<td>777,786</td>
<td>10</td>
<td>35,112</td>
<td>-3,318</td>
<td>11</td>
</tr>
<tr>
<td>Port of Everglades (FL)</td>
<td>687,648</td>
<td>11</td>
<td>97,849</td>
<td>35,786</td>
<td>6</td>
</tr>
<tr>
<td>Panama Container Ports</td>
<td>Average TEU</td>
<td>Ranking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MIT</td>
<td>1,349,384</td>
<td>1</td>
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<td></td>
</tr>
<tr>
<td>Balboa</td>
<td>1,281,550</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CCT</td>
<td>446,930</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cristobal</td>
<td>231,464</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*TEU: Twenty Foot Equivalence Unit

Macroeconomic conditions, physical characteristics, railroad access, accessibility to market and competition between ports are important factors for explaining competitiveness of ports.

- Pure Private and Pure Public do not lead to most competitive ports. The combination provides more desirable results. This is because a pure public does not get the efficiency and effectiveness gains of private sector operations.
- Pure private does not have access to public funding that could make operations more efficient and effective.
- Around 50-50 split provides most optimal results.

- The optimal public ownership (from Model 1) is calculated to be 43%, optimal private ownership is 39% (from Model 2) and optimal private ownership is 52% (from Model 3).

Key findings

Observation: 166
N: 15
R²: 0.707

Dep var: ln(TEU)

In(global TEUs) | Model 1 | Model 2
--- | --- | ---
0.163 (0.072)** | 0.191 (0.81)**
Quaylength | -0.010 (0.001)** | -0.001 (4.67 E-04)**
Railroad access | 0.284 (-0.126)** | 0.047 (0.136)
In(popeso) | 1.511 (0.177)** | 1.645 (0.201)**
Distance | -1.79 E-04 (2.78 E-04) | 0.001 (2.58 E-04)**
Public | 16.70 (2.625)** | 0.008 (2.55 E-04)**
Public² | -19.438 (3.14)** |
Mixed | 2.429 (0.255)** | 2.813 (0.352)**
Private | 3.101 (1.282)** |
Private² | -3.921 (1.291)** |
Constant | -10.066 (3.498)** | -18.403 (3.631)**
Observations | 122 | 122
N | 11 | 11
R² | 0.823 | 0.781

Estimation result for US & Panama ports

Dep var: ln(TEU)

In(global TEUs) | Model 1 | Model 2
--- | --- | ---
0.448 (0.147)** |
Maxerth | -9.98E-05 (5.09E-05)** |
In(pop) | 0.541 (0.154)** |
Distance | -0.003 (5.74E-04)** |
Mixed | 1.71 (2.02)** | 3.421 (0.758)**
Private | -3.310 (0.693)** |
Private² | -3.421 (0.758)** |
Constant | 13.087 (3.69)** |
Observation | 166 |