Timber Mills Closures and Procurement Zones Characteristics: Is there a Link?

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U.S. Forest Products Economic Importance
World's Major Industrial Roundwood Producers, 2007

- Russia, 10%
- Brazil, 6%
- China, 6%
- Canada, 11%
- USA, 23%
- Other, 44%

Source: FAO, 2009

U.S. Forest Products Economic Importance

- GDP
- Employment

Contribution to GDP, 2007

Source: Bureau of Economic Analysis, 2009
**U.S. Forest Products Economic Importance**

- **Employment**

  Number employees, 2007

  ![Bar chart showing employment](image)

  Source: Bureau of Economic Analysis, 2009

**RPA Regions and Subregions**

![Map showing RPA regions](image)


**Total Volume Roundwood Harvested by Region 1976-2006**

- 51% of the saw logs
- 67% of the plywood & veneer
- 75% of the pulpwood
- 51% of the composite panel

![Bar chart showing volume](image)

Source: USDA Forest Service RPA 2007
Volume of Timber on Timberland by Region, 2007

Source: USDA Forest Service RPA 2007

Timber mills in the South 1980-2005

Source: USDA Forest Service RPA 2007

Factors affecting Sustainable Timber Supply to existing Mills

- Procurement zone characteristics
  - Land ownership
  - Urban expansion
  - Forest characteristics
  - Policies and regulations
  - Income levels
  - Distance to mills
- Increased demand products & services
  - New industry (biofuels)
  - Ecosystem services

Purpose: Gain better understanding of relationship between procurement zone characteristics and changes in mill capacity (closures and openings)
Objectives:

1. Assess how timber management (e.g., planting, thinning, timber stand improvement, harvest intensity) within the primary wood processing plants procurement zone affects the supply of timber products.

2. Estimate the expected level of production of primary wood processing plants under various market scenarios.

3. Determine the effect of new primary wood processing plants on existing plants that share the same procurement zone.

Objectives...continued

4. Quantify the relative impact of factors such as proximity to urban areas, tract size, land ownership, and existing plant production levels on the likelihood of opening a new, or closing an existing, primary wood processing plant within an FIA survey unit.

5. Determine if the combined production levels of primary wood processing plants within an FIA survey unit affects timberland management, stand structure, and species composition.

Methods

- **Time series cross sectional data (1986, 5 states)**

- **Variables**
  - Forest characteristics (FIA)
  - Land ownership (FIA, Census)
  - Income per capita (US Census)
  - Population density (US Census)
  - Timber tract size (FIA)
  - Management laws & regulations (Pubs, State)
  - Incentives for forest mgmt. (Pubs, State)
  - Distance to mills (calculated ArcGIS tools)
  - Stumpage prices (TMS)
  - Market conditions (BEA, BLS)
  - Mill capacity (TPO)
  - Mill type (TPO)
  - Volume timber drawn (TPO)

- **Pricing data**

- **Production data**
Considerations...

- Possible models
  - Regression (1-3)
  - System D=S (2)
  - Multinomial / binomial logit (4&5)

- Lagged information
  - Management
  - Forest inventory

- Estimation by
  - Species type
  - Product type

Considered Models:

1. Procured volume based on forest management

\[ M_{Vol_p} = f(P, F, W_i, M) \]

Where,
- \( M_{Vol_p} \) = Volume of product \( p \) from county \( i \)
- \( P \) = Stumpage price
- \( F \) = Forest characteristics county \( i \)
- \( W_i \) = Procurement zone influence of county \( i \)
- \( M \) = Forest management activity

2. Mill demand function

\[ Vol_m = f(D, C_m, C_i, P, T) \]

Where,
- \( Vol_m \) = Volume drawn by mill \( m \) from county \( i \)
- \( D \) = Distance to county \( i \)
- \( C_m \) = Capacity of mill \( m \)
- \( C_i \) = Capacity of other mills drawing timber from county \( i \)
- \( P \) = Stumpage price
- \( T \) = Wood products prices

3. Likelihood of Mill capacity change

\[ P(Y_i = j) = \frac{\exp(X_i \beta_j)}{1 + \sum_j \exp(X_i \beta_j)} \]

Based on probability of \( Y_i \) Using maximum likelihood estimation

Where,
- \( Y_i \) = Mill status
- \( X_i \) = Vector of variables

4. Timberland management

Type of management as a function of:

\[ Vol_p = \text{Total volume by type of product} \]
- \( P \) = Stumpage price
- \( r \) = Rate of investment return
- \( F \) = Forest characteristics
- \( O \) = Land ownership type
- \( 4P \) = Incentive programs
References


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