Assessing Intrastate Equity of Transportation Funding
The Case of Southwest Florida

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Transportation Research Forum
Outline

• Equity Concepts
  • Motivation
• Equity Measures
  • Applications
  • Results
• Conclusions
Equity Concepts

• Vertical equity
• Horizontal equity
• Geographic equity
  – Interstate equity in distributing funds from the highway account of the federal Highway Trust Fund
Motivation

• Confusion on perspectives
  – Fund recipients
  – Funding agencies

• Confusion on equity measures
  – Collection-based
  – Norm-based

• Sources of Confusion
  – Literature
  – Practice in Florida
Equity Measures

- **Collection-Based**
  - Compares actual distributions to collections
  - Use these
    - When need objectivity in defining equity
    - When comparing distributions with collections

- **Norm-Based**
  - Compares actual distributions to what should be distributed
  - Use these
    - When need flexibility in defining equity
    - When assessing if distribution is done according to existing laws and policies
Equity Measures
Norm-Based

\[ \text{Norm-Based} = \frac{D_i}{N_i} \]

Typically, \( N_i = D \sum_k \left( w_i^k F_i^k \right) \), \( \sum_k w_i^k = 1 \), \( \sum_i F_i^k = 1 \)

- It is subjective to select:
  - What values for the weights
  - How many factors
  - What factors
Equity Measures
Collection-Based

Based on Gross Collections = \[ \frac{D_i}{C_i} \]

Based on Net Collections = \[ \frac{D_i}{C_i \left(\frac{C_n}{C}\right)} \]

Based on Gross Shares = \[ \frac{D_i}{C_i} = \frac{D_i}{D} \times \frac{D}{C} = \frac{D_i}{C_i \left(\frac{C_i}{C}\right)} = \frac{D_i}{C_i \left(\frac{D}{C}\right)} \]

Based on Net Shares = \[ \frac{D_i}{C_i} = \frac{D_i}{C_i} \times \frac{C_n}{C} = \frac{D_i}{C_i \left(\frac{C_n}{C}\right)} = \frac{D_i}{D} \times \frac{D}{C^n} = \frac{D_i}{C_i \left(\frac{C_n}{C}\right)} = \frac{D_i}{D} \times \frac{D}{C^n} \]

In a long period

Always

Similar in a Long Period

Equal
Application
The Region: Southwest Florida

- Individual counties want to know their relative distributions and collections
- Assess intrastate equity for individual counties as fund recipients
Application

• Modes: All
• Time frame: FY1995 – FY2004
• Base analysis: Equity measure based on gross shares
• Sensitivity analysis:
  – Equity measure based on gross collections
  – Equity measure based on net collections
## Application
### Revenue Sources

<table>
<thead>
<tr>
<th>Taxes/Fees</th>
<th>Grouping</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal Highway Excise Taxes</td>
<td>Federal Highway Excise Taxes (36.14%)</td>
<td></td>
</tr>
<tr>
<td>Fuel Sales Taxes</td>
<td></td>
<td>State Controlled (79.28%)</td>
</tr>
<tr>
<td>SCETS Tax</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alternative Fuel Fee</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel Use Tax and Fee</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aviation Fuel Tax</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor Vehicle License Fee</td>
<td></td>
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<tr>
<td>Initial Registration Fee</td>
<td></td>
<td></td>
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<tr>
<td>Motor Vehicle Title Fee</td>
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<td></td>
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<tr>
<td>Rental Car Surcharge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State Other Taxes/Fees</td>
<td>State Other Taxes/Fees (46.95%)</td>
<td></td>
</tr>
<tr>
<td>Fuel Excise Taxes</td>
<td>State Fuel Excise Taxes (6.91%)</td>
<td>Local Controlled (20.72%)</td>
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<tr>
<td>Ninth-cent Fuel Tax</td>
<td>Local Fuel Taxes (13.81%)</td>
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<tr>
<td>Local Option Fuel Taxes</td>
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</tbody>
</table>
# Application

## Determining Gross Collections

<table>
<thead>
<tr>
<th>Approaches</th>
<th>Taxes</th>
<th>Percent</th>
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<tbody>
<tr>
<td>Exclusion</td>
<td>Alternative Fuel Fee</td>
<td>0.01%</td>
</tr>
<tr>
<td>Actual Data</td>
<td>Motor Vehicle Fees</td>
<td>13.97%</td>
</tr>
<tr>
<td>Direct Estimation</td>
<td>Federal Highway Fuel Excise Tax&lt;br&gt;State Highway Fuel Sales Tax&lt;br&gt;SCETS Tax&lt;br&gt;State Fuel Excise Taxes&lt;br&gt;Local Fuel Taxes</td>
<td>78.37%</td>
</tr>
<tr>
<td>Apportionment</td>
<td>Federal Highway Non-Fuel Excise Taxes&lt;br&gt;State Off-Highway Fuel Sales Tax&lt;br&gt;State Fuel Use Tax and Fee&lt;br&gt;State Aviation Fuel Tax&lt;br&gt;State Rental Car Surcharge</td>
<td>7.85%</td>
</tr>
</tbody>
</table>
# Application

## Net Collections

<table>
<thead>
<tr>
<th>Adjustments</th>
<th>Federal Highway Excise Taxes</th>
<th>State Other Taxes/Fees</th>
<th>State Fuel Excise Taxes</th>
<th>Local Fuel Taxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diversions of Gross Collections</td>
<td>-24%</td>
<td>-14%</td>
<td>-6%</td>
<td>-7%</td>
</tr>
<tr>
<td>Non-Transportation Sources</td>
<td></td>
<td></td>
<td></td>
<td>+5%</td>
</tr>
<tr>
<td>Diversions of STTF Proceeds</td>
<td></td>
<td></td>
<td>-3%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>-24%</td>
<td>-12%</td>
<td>-6%</td>
<td>-7%</td>
</tr>
</tbody>
</table>
Application
Determining Distributions

- FDOT’s Work Program Administration database
- Excluding projects not funded by transportation taxes/fees
  - Non-reimbursable local participation
  - Toll funded projects
  - FRA, FAA, FEMA
  - Toll Facilities Revolving Trust Fund
  - Reimbursable emergency repair funds
  - Etc.
Results
Rate of Return

Based on Gross Shares
Based on Gross Collections
Based on Net Collections

Greater Population
Results

Required Changes to Achieve 100% Rate of Return

Percent of Base Distributions

Cents per Gallon

% Base Distributions

Changes in Tax Rates (Right)

Lower Rate of Return
Conclusions

• Collection-based equity measures are objective
• Collection-based measures should be used if fund recipients want to know their distributions relative to their collections
• Norm-based equity measures are subjective in many ways
• Norm-based measures are often used by funding agencies to justify funding practices
Conclusions

• Rates of return based on gross shares vary dramatically across counties, ranging from 56% to 535%.

• The highest rates of return are with the least populous inland counties.

• To achieve a 100% rate of return:
  – Requires an increase in distributions ranging from 7% to 77%, or
  – Requires an increase in local fuel tax rates ranging from 2.3 cents to 18.6 cents per gallon