ECONOMIC IMPACTS OF INDUSTRIAL PARKS: EVIDENCE FROM VIRGINIA’S TOBACCO REGION MEGASITE PROGRAM

REMI Webinar
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OUTLINE OF PRESENTATION

- Study Background
- Literature: Rationale and economic development effects
- Tobacco Region Megasite Program
- Data and Method
- Economic and Tax Revenue Impact Results
- Summary and Remaining Questions

Acknowledgements: This research was completed with the assistance of contract funding from the Commonwealth of Virginia’s Joint Legislative Audit and Review Commission (JLARC) to evaluate state economic development incentives. The views do not reflect those of JLARC or its staff.
BACKGROUND AND LITERATURE
STATE INDUSTRIAL PARK INVOLVEMENT HAS INCREASED

- Industrial park development is primary/only economic development policy in many rural localities.

- Site certification--North Carolina offered one of the first site readiness programs in 2001 and by 2008, 15 states had such a program (Site Selection 2013). Approximately half of states now operate a program.

- In addition, at least 11 states (including Virginia) have site development programs that provide funding for industrial site development to bring them to higher levels of site readiness.
RATIONAL FOR PUBLIC INVESTMENT

- Imperfect information (reduced search costs)
- Regulatory lags and land assembly cost uncertainty (land ownership and land use fragmentation)
- Quasi public goods (roads, bridges, other infrastructure)
- Reduce environmental externalities by land-use segregation (e.g., congestion, pollution)
- Agglomeration economies (industrial clusters)
LITERATURE REVIEW

- Bartik (2020). *Public infrastructure* and *land development* provide better return on investment than tax incentives.

- Chappel (2014). Establishments located in industrial zones in the San Francisco Bay area were more likely to expand than those located elsewhere. Zones assist growth by providing more "flex" space that aids industrial expansion.

- Kriesel and McNamara (1991). Industrial site quality (as reflected in the estimated price of local industrial parks) is associated with a higher likelihood of attracting a manufacturing plant.

- Luger and Goldstein (1991). Research park success varies. Research park counties grew faster than their matches when the parks were older, university-owned, and provided garbage collection services (a proxy for park provided services).

- Peddle (1984). Communities with industrial parks had more manufacturing firms than those without.
INDUSTRIAL PARK SELECTION

- Peddle (1988) finds that industrial parks are more likely to be built in particular types of places, including newer communities with greater highway, rail, and airport accessibility, higher population and population growth, lower population density, and the availability of public fire protection.

- Peddle (1990). Particular types of firms may be attracted to established industrial parks, such as relatively small businesses (20 to 100 employees), more capital intensive and less energy intensive firms, and light industry.

- Results indicate that population growth, flatter terrain, lower population density, highway access, rail access are positively and statistically significantly associated with the inventory of Virginia industrial site acreage.
VIRGINIA INDUSTRIAL PARK INVESTMENT PROGRAMS

- Several funding programs: Tobacco Region Megasite Program, Virginia Business Readiness Program, GO Virginia, Economic Development Access Program (speculative access roads)

- State government industrial park spending forms approximately 4% of all economic development incentive spending (including grants and tax expenditures exemptions=$2.3 billion) over FY10-FY18 period

- Virginia spending is probably representative of southern region (e.g., megasite locations)

Source: Site Selection Magazine (2016)
Established in 1999 with part of state Tobacco Master Settlement Agreement (MSA) Funds

Assist transition of tobacco growers to other products and promote regional development

Various programs: Education, R&D, industrial incentives, agribusiness, megasites
Nine funded industrial parks in Tobacco Region through Megasites Program

- Nine funded parks
- Only four are actual megasites (1,000 acres or more)
- Parks began opening to business 2013 to present
- Program motivated by automotive megasite study conducted in 2005
  - It concluded that none of the candidate sites were ideal for automotive megasite
# Tobacco Region Megasites vs. National Megasites

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>All U.S. Counties</th>
<th>All U.S. Megasites</th>
<th>Tobacco Region Megasites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topography Scale</td>
<td>8.9</td>
<td>5.6</td>
<td>8.5</td>
</tr>
<tr>
<td>Urban-Rural Scale</td>
<td>5.0</td>
<td>3.2</td>
<td>4.3</td>
</tr>
<tr>
<td>Working age pop&lt;30 miles</td>
<td>--</td>
<td>125,681</td>
<td>35,065</td>
</tr>
<tr>
<td>Working age pop&lt;60 miles</td>
<td>--</td>
<td>573,042</td>
<td>402,058</td>
</tr>
<tr>
<td>Average Acreage</td>
<td>--</td>
<td>2,163</td>
<td>1,865</td>
</tr>
<tr>
<td>% Interstate</td>
<td>45</td>
<td>70</td>
<td>75</td>
</tr>
<tr>
<td>% Rail</td>
<td>81</td>
<td>93</td>
<td>100</td>
</tr>
<tr>
<td>% Commercial Air</td>
<td>81</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>% College Educated</td>
<td>21</td>
<td>22</td>
<td>13</td>
</tr>
<tr>
<td>Number</td>
<td>4,126</td>
<td>190</td>
<td>4</td>
</tr>
</tbody>
</table>
TOBACCO COMMISSION FUNDED OVER HALF OF $180 MILLION PARK COSTS

Economic Development Administration
New Market Tax Credits
U.S. Dept of Interior, OSMRE Abandoned Mine Land (AML)
DATA AND METHOD
REMI PI+ Analysis

- Development Phase
  - Planning
  - A&E
  - Construction

- Occupancy Phase
  - Net direct employment estimate over time

- REMI PI+ is a dynamic, multi-sector regional economic simulation model
Steps in Estimating Opening Economic and Revenue Impacts

- Estimation of park absorption (based on survey results regarding age and location of park). Varies by level of urbanization and year of opening.

- Estimate park employment per acre (based on survey).

- Estimate percentage of park absorption that is state job creation rather than relocation from locality and elsewhere in state (assumed to be 50% loosely based on survey evidence presented in another slide).

- Estimation of “but for” availability of park (Bartik methodology).

- Assignment of park employment to industries (assumed to be manufacturing and warehousing in proportion to state percentages). Assign to firm employment with displacement.
LOCAL DEVELOPER SURVEY

- 67 respondents (out of 133 localities) for 50.1% response rate
- Designed to obtain information on variety of economic incentive topics (e.g., EZ, firm location factor importance, “but for” etc.)
- Block of questions on industrial parks to evaluate Virginia programs
  - Questions on park inventory (acreage) and planned park improvements
  - Question on park occupancy levels and characteristics (e.g., employment)

JLARC Evaluation of Economic Development Incentives – Survey of Local Economic Developers

Title of the Study: Survey of Local Economic Developers (Institutional Review Board Number VU/IRB-SSS85326)

Joint Legislative Audit and Review Commission (JLARC) (http://jlar.virginia.gov/) is a non-partisan research and oversight agency that conducts independent research on behalf of the Virginia General Assembly. During the 2016 General Assembly session, the legislature directed JLARC to evaluate state economic development incentives on an ongoing basis. JLARC contracted with the University of Virginia’s Weldon Cooper Center for Public Service to perform the evaluations.

Purpose of the Survey
This survey is being sent to local economic developers to obtain input on the value of economic development incentives in influencing business decisions. Your responses will contribute to the quality and usefulness of the evaluations and ultimately the findings and recommendations included in JLARC reports.

Economic Development Incentives
For purposes of this survey, economic development incentives include grants, income tax credits, sales and use tax exemptions, property tax abatements, other preferential tax treatments, loans, early and seed stage investments, and other forms of financial or in-kind assistance.
LOCAL DEVELOPER SURVEY LIMITATIONS

- Unfortunately, in haste to get done no questions on park occupant industries (local versus export-base) or park pricing strategies
  - NAICS (2-3 digit) composition not asked
- Some commercial and industrial parks (primarily in economically more prosperous areas) are commercial, market-rate developments. Parks in rural and distressed areas are publicly owned and provide no cost developed land as an economic incentive based on interviews.
INDUSTRIAL PARK ABSORPTION DETERMINANTS

- Used two variables
  - AGE. Years since site(s) available for occupancy (i.e., opening date)
  - URCODE. USDA ERS Rural-urban continuum variable (1=Large metro area county, 9=More remote rural nonmetro county)
  - Also explored private/public ownership variable (private ownership was associated with significantly higher absorption but did not have great confidence in interpretation)

- Fractional probit was used because the dependent variable is measured as a proportion bounded by 0 and 1

- Of the survey 67 respondents, 36% (24 respondents) indicated that they had business/industrial parks of at least 100 contiguous acres. The average park size was 552 acres (compared to an average of 895 acres for the 9 Tobacco Region megasites) of which 205 acres were occupied by businesses for an average absorption rate of 37%. 
### Fractional Probit Regression Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coef</th>
<th>dy/dx</th>
<th>Std. Dev.</th>
<th>z</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE</td>
<td>0.003406</td>
<td>0.15795</td>
<td>0.02031</td>
<td>1.69</td>
<td>0.094</td>
</tr>
<tr>
<td>URCODE</td>
<td>-0.23409</td>
<td>-0.18669</td>
<td>0.09092</td>
<td>-2.42</td>
<td>0.010</td>
</tr>
<tr>
<td>CONSTANT</td>
<td>-0.0218588</td>
<td>0.62416</td>
<td>-0.58</td>
<td>0.565</td>
<td></td>
</tr>
</tbody>
</table>

- **Num Obs**: 23
- **Wald chi2(2)**: 1.27409
- **Prob>chi2**: 0.00000
- **Log pseudolikelihood**: -12.0349
- **Pseudo R2**: 0.1363
ABSORPTION RATE BY URBAN RURAL CODE

- Metro 1M + population
- Metro 250K-1M population
- Metro Less than 250K population
- Nonmetro Urban pop 20,000 +, adjacent to metro
- Nonmetro Urban pop 2,500-19,999, adjacent to metro
- Nonmetro Urban pop 2,500-19,999, not adjacent to metro
TOBACCO REGION MEGASITE ESTIMATED PARK ABSORPTION RATE
Most New Business/Industrial Park Occupants Are Relocation/Expansion of Firms Within Locality or State

“WHAT PERCENTAGE OF FIRMS WOULD YOU ESTIMATE FALL INTO THE FOLLOWING BUSINESS ORIGIN CATEGORIES?”

<table>
<thead>
<tr>
<th>Category</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business startups</td>
<td>7.6</td>
</tr>
<tr>
<td>Relocation or expansion of existing business within locality</td>
<td>39.8</td>
</tr>
<tr>
<td>Relocation or expansion of existing business within state</td>
<td>23.2</td>
</tr>
<tr>
<td>Relocation or new location of business operating outside VA</td>
<td>29.4</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
</tr>
</tbody>
</table>
“BUT FOR”

- Estimated based on Bartik (2018) tax elasticity formula
- Assumed that park land is provided as in-kind incentive to relocating/expanding business (park managers indicated they would do this)
- Assumed that industrial occupant has value-added characteristics per employee same as state distribution for manufacturing and warehousing (REMI data used)
RESULTS
## Development Phase Results

<table>
<thead>
<tr>
<th>Year</th>
<th>Employment</th>
<th>Virginia GDP (Millions)</th>
<th>Megasite development spending (Millions)</th>
<th>Program costs (Millions)</th>
<th>State Tax Revenue (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>139</td>
<td>$14.58</td>
<td>$13.49</td>
<td>$0</td>
<td>$0.50</td>
</tr>
<tr>
<td>2009</td>
<td>40</td>
<td>$5.75</td>
<td>$3.47</td>
<td>$0</td>
<td>$0.18</td>
</tr>
<tr>
<td>2010</td>
<td>111</td>
<td>$12.92</td>
<td>$10.99</td>
<td>$0</td>
<td>$0.41</td>
</tr>
<tr>
<td>2011</td>
<td>414</td>
<td>$48.87</td>
<td>$43.63</td>
<td>$24.96</td>
<td>$1.54</td>
</tr>
<tr>
<td>2012</td>
<td>349</td>
<td>$46.41</td>
<td>$36.74</td>
<td>$27.17</td>
<td>$1.45</td>
</tr>
<tr>
<td>2013</td>
<td>220</td>
<td>$31.81</td>
<td>$22.83</td>
<td>$20.96</td>
<td>$1.08</td>
</tr>
<tr>
<td>2014</td>
<td>200</td>
<td>$28.98</td>
<td>$22.24</td>
<td>$12.79</td>
<td>$0.98</td>
</tr>
<tr>
<td>2015</td>
<td>71</td>
<td>$12.73</td>
<td>$8.21</td>
<td>$6.30</td>
<td>$0.48</td>
</tr>
<tr>
<td>2016</td>
<td>-4</td>
<td>$1.21</td>
<td>$0.17</td>
<td>$0</td>
<td>$0.12</td>
</tr>
<tr>
<td>2017</td>
<td>42</td>
<td>$6.26</td>
<td>$7.21</td>
<td>$0</td>
<td>$0.30</td>
</tr>
<tr>
<td>2018</td>
<td>70</td>
<td>$10.78</td>
<td>$11.43</td>
<td>$4.90</td>
<td>$0.44</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>$7.49</td>
<td></td>
<td></td>
<td>$7.49</td>
</tr>
</tbody>
</table>
# OCCUPANCY PHASE RESULTS

(TOTAL REVENUE GENERATED $28.5 MILLION COMPARED TO MEGASITE PROGRAM INVESTMENT OF $97 MILLION OR 29%)

<table>
<thead>
<tr>
<th>Year</th>
<th>Employment</th>
<th>Attributable to Program</th>
<th>Private Employment</th>
<th>GDP (millions)</th>
<th>State Tax Revenue (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008-18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>1,301</td>
<td>139</td>
<td>248</td>
<td>$33.73</td>
<td>$1.18</td>
</tr>
<tr>
<td>2021</td>
<td>1,377</td>
<td>148</td>
<td>266</td>
<td>$40.84</td>
<td>$1.40</td>
</tr>
<tr>
<td>2022</td>
<td>1,450</td>
<td>155</td>
<td>284</td>
<td>$45.68</td>
<td>$1.61</td>
</tr>
<tr>
<td>2023</td>
<td>1,524</td>
<td>163</td>
<td>299</td>
<td>$50.44</td>
<td>$1.81</td>
</tr>
<tr>
<td>2024</td>
<td>1,602</td>
<td>172</td>
<td>311</td>
<td>$55.13</td>
<td>$2.00</td>
</tr>
<tr>
<td>2025</td>
<td>1,682</td>
<td>180</td>
<td>322</td>
<td>$59.73</td>
<td>$2.19</td>
</tr>
<tr>
<td>2026</td>
<td>1,765</td>
<td>189</td>
<td>333</td>
<td>$64.52</td>
<td>$2.39</td>
</tr>
<tr>
<td>2027</td>
<td>1,850</td>
<td>198</td>
<td>346</td>
<td>$69.65</td>
<td>$2.59</td>
</tr>
<tr>
<td>2028</td>
<td>1,938</td>
<td>208</td>
<td>359</td>
<td>$75.12</td>
<td>$2.81</td>
</tr>
<tr>
<td>2029</td>
<td>2,028</td>
<td>217</td>
<td>374</td>
<td>$81.22</td>
<td>$3.05</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$28.51</td>
</tr>
</tbody>
</table>
RETURN IN REVENUE PER DOLLAR SPENT

- Tobacco Region Megasite Program = 30¢
- Average Virginia economic development incentive = 44¢

Why?
- Slow absorption rate for mainly rural region
- Local and state relocations and expansions are likely significant portion of total occupants
- Not all occupants will be completely export base (I assume that they are in megasite targeted manufacturing and warehousing industries but there is some displacement even then)
- Relatively high development costs because of terrain
- Complete buildout rather than phased buildout in response to demand
## Lessons for Practice

<table>
<thead>
<tr>
<th>Argument</th>
<th>Counterargument</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conduct due diligence (market feasibility and industry targeting studies)</td>
<td>None (except studies appear to never counsel that project not be pursued)</td>
</tr>
<tr>
<td>Increase federal and outside contribution to effort (i.e., leverage)</td>
<td>Longer development timeline</td>
</tr>
<tr>
<td>Create park of suitable scale or phase development rather than all at once approach</td>
<td>Economies of scale in construction are limited</td>
</tr>
<tr>
<td>Collaborate with other localities on larger industrial park development (cost and revenue sharing)</td>
<td>None</td>
</tr>
<tr>
<td>Target appropriate firms (export base and industrial location and expansion rather than local firm relocation)</td>
<td>Longer park absorption</td>
</tr>
</tbody>
</table>
SUMMARY AND REMAINING QUESTIONS
SEVERAL TAKEAWAYS

- Tax revenue impact is lower than many discretionary grant incentives explored to date (poor targeting and lengthy buildout).

- Need for site locational and industrial targeting due diligence (only 2 megasites conducted market feasibility studies; Automotive megasite study was not supportive of feasibility of automotive megasites in the region).

- Limitations of analysis (e.g., development cost based "but for" computations may not reflect full firm value of conveyed business-ready sites or discretionary nature of the incentives)
REMAINING QUESTIONS

- How do market prices of developed industrial land vary from development costs? (If higher “but for” of in-kind contribution is higher)

- How are vacated business sites by local firms that move into industrial parks utilized (are they filtered down to other firms or remain vacant or underutilized in slow growth communities)?

- What are the attributes of public parks and communities related to absorption (e.g., private/public ownership, pricing strategies, amenities, other site availability, development costs, zoning laws)?

- How limited are developable business and industrial sites by region?
  - State industrial park inventory and Costar data

- What role does availability of sites have on firm location decisions?
  - Local economic developers rate business ready site shortage as constraint to development and Virginia as only “average” vs. other states) but other workforce and infrastructure (e.g., telecommunications and highways) are rated as more significant constraints
  - Firm survey found no evidence that site shortage was a factor in location/expansion decisions (though question was not explicit).

- What kinds of firms locate in industrial parks (e.g., export-base industries)
  - Potentially use park boundary files and geocoded confidential QCEW employment data to explore.