A Short Comparative Interrupted Time-Series Analysis of the Impacts of Jobs-Plus

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Introduction

What is short comparative interrupted time-series (CITS) analysis?

- It compares deviations from trends for a treatment and comparison group
- It is an extension of difference-in-differences analysis

When might we use such an analysis?

- For a retrospective study of a policy change (e.g. raising or lowering speed limits or drinking ages)
- For a small-N study of a place-based initiative (e.g. a community employment, crime or health intervention)
- To study the impacts of environmental, economic or social disruptions (e.g. storms, earthquakes, plant closings or wars)
- For a longitudinal comparison-group study of a social program (e.g. federal employment and training programs)
Some Benefits of Short CITS Analysis

- What you see is what you get!
- You can use it prospectively or retrospectively.
- You can use it with administrative data.
  - Aggregate level
  - Individual level
- You can use it when a conventional RCT is not feasible.
A Hypothetical “Killer” Application of Short CITS: Measuring the Impact of an Oprah Book Endorsement

![Graph showing the impact of an Oprah endorsement on annual sales of two books, Anna Karenina (Endorsed) and War and Peace (Not Endorsed).]
Conditions for a Successful Short CITS Analysis

- An outcome that is measured consistently over time
- A baseline trend that is sufficiently long, frequent and stable
- Impacts that are sufficiently pronounced and immediate
- A follow-up period that is long enough to account for program implementation but short enough to avoid other major changes
- A comparison group with the same data (matching can help but is not always necessary)
- Covariates can be used to account for sample composition that changes markedly over time
Estimating Intervention Effects

- The basic estimator is a treatment- and comparison-group difference in deviations from their baseline trends.

- Baseline trends can be simple means or linear and (infrequently) non-linear functions of time.

- Serial correlation can sometimes be accounted for.

- Multi-level data can be accommodated.

- Matching can be used to choose a comparison group.

- Covariate adjustments can be made, if needed.
Origins of the Jobs-Plus Community Revitalization Initiative for Public Housing Families

Jobs-Plus was an MDRC demonstration project designed to build mixed-income communities “from within”

- Response to growing concentration of joblessness, underemployment, welfare receipt, and poverty in public housing and surrounding neighborhoods

Public and private Jobs-Plus sponsors

- US Dept. of Housing and Urban Development (HUD)
- The Rockefeller Foundation
- Other public and private funders
The Jobs-Plus Program Model

Three intervention components focused on selected public housing developments:

Employment and training services
   Convenient on-site “job centers”

New rent rules to “make work pay”
   Rents rise less than usual as earnings grow

Community support for work
   Neighbor-to-neighbor outreach; sharing work leads, babysitting for working mothers, etc.

“Saturation-level” outreach
   Aimed at all working-age residents
The Jobs-Plus Sites

- **The local public housing authorities (PHAs) involved**
  - 50 PHAs invited
  - 42 PHAs applied
  - 7 PHAs selected
  - 6 PHAs began participation
    - 3 PHAs had stronger implementation (LA, Dayton and St. Paul)
    - 1 PHA had stronger implementation but could not continue (Seattle)
    - 2 PHAs had very weak implementation (Baltimore and Chattanooga)

- **Selection of treatment and comparison developments**
  - 2 or 3 candidate developments per site
  - Random assignment to Jobs-Plus of one candidate development per site
  - Remaining candidate developments formed the comparison group for each site
The Jobs-Plus Short CITS Analysis

Time series
- Baseline: 4 – 6 years before 1998 launch
- Follow-up: 6 – 8 years after 1998 launch

Outcome measures
- Quarterly earnings and employment rates
- Quarterly welfare receipt and receipt rates

Analytic perspectives
- People (1998 cohort members)
- Place (local public housing developments)

Substantive focus
- Implementation
- Impacts

Findings reported
- Overall, by site implementation level, and by site
- For sample subgroups
Pooled Average Quarterly Earnings for the 1998 Cohort At the Three Stronger Implementation Sites

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Jobs-Plus Group</th>
<th>Comparison Group</th>
<th>Difference due to Jobs-Plus</th>
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<tbody>
<tr>
<td>Q1 1992</td>
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<tr>
<td>Q1 2003</td>
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Difference due to Jobs-Plus = +$1,141/year or +14%
Pooled Difference in Average Quarterly Earnings for the 1998 Cohort at the Three Stronger Implementation Sites
Jobs-Plus Quarterly Impact Estimation Model

Model of Quarterly Mean T/C Earnings Differences

\[ \Delta \bar{Y}_t = \Delta \bar{a} + \sum_m \Delta b_m F_{mt} + \Delta \bar{e}_t \]

and

\[ \Delta \bar{e}_t = \rho \Delta \bar{e}_{t-1} + \Delta \bar{\nu}_t \]

where

\[ \Delta \bar{Y}_t \] is the difference in mean earnings for the treatment and comparison groups in quarter t,

\[ F_{mt} \] = one if quarter t is follow-up quarter m and zero otherwise,

\[ \Delta \bar{e}_t \] and \[ \Delta \bar{e}_{t-1} \] = error terms with a first-order autoregressive structure,

\[ \Delta \bar{\nu}_t \] = a random error term that is independently and identically distributed.
Additional Impact Estimation Steps

- **Estimate annual impacts**: by summing quarterly impact estimates.
- **Estimate standard errors of annual impact estimates**: based on estimated standard errors and covariances of the quarterly impact estimates.
- **Adjust p-values for the multiplicity of annual impact estimates**: using a layered Bonferroni approach.
## Jobs-Plus Earnings Impacts for the 1998 Cohort from the Three Stronger Implementation Sites

<table>
<thead>
<tr>
<th>Follow-Up Period</th>
<th>Observed Outcome with Jobs-Plus</th>
<th>Estimated Effect of Jobs-Plus</th>
<th>Estimated Outcome Without Jobs-Plus</th>
<th>Estimated Change in Outcome Due to Jobs-Plus</th>
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<tr>
<td>1998</td>
<td>6,089</td>
<td>173</td>
<td>5,916</td>
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<td>2000-2003</td>
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Selected References

Original Sources


Recent Sources:

Selected References (continued)

Recent Sources (continued)


Personal Sources


Selected References
(continued)

**Personal Sources (continued)**

**Jobs-Plus Long-Term Follow-up Source**