Matching and Variation in Adoption

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MATCHING AND VIA:
QUASI-EXPERIMENTAL METHODS IN A
WORLD OF IMPERFECT DATA

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SEE Action Report

- VIA more highly ranked than matched comparison group methods
Presentation Overview

- Background on the program database
- Description of VIA and matched comparison group methods
- Key considerations for each method
- Recommendations
Program Background
MyMeter Overview

Program features include:
- Comparative usage
- Energy challenges
- Property profile
- Bill threshold alerts
- Peak time alerts
- Energy markers
- Outage alerts
Evaluation Methods
True Experiments

- Intervention
- Control
- Reduced energy
- Did not reduce energy
Quasi-Experiments

Intervention Group

Control Group
Variation in Adoption

- Control 1
- Control 2
- Treatment
- Opt in
- Time 1
- Time 2
Matched Comparison Group

Target Population

Opt in

Receive Program

Treatment Group

Treatment and control groups matched on observable characteristics

Control Group

Savings effects of program
Evaluation Approach Considerations

- Enrollment timing
- Enrollment saturation
- Data availability
- Selection bias
- Territory and program-specific conditions
Enrollment Timing

Key Question: Is enrollment spread out across 6 more months or did it happen during a short period of time?
Enrollment Saturation

Key Questions:

**Matching**: Are there enough non-participants to select a comparison group?

**VIA**: Are there enough earlier and later adopters?
Data Availability

Key Questions:

**Matching**: Are sufficient pre- and post- data available for a large pool of customers including non-participants.

**VIA**: Are data available for earlier and later enrollees?
Territory and Program Conditions

Key Questions:

**Matching:** Are there specific customer types in the territory that have unusual energy usage patterns that may be difficult to match?

**VIA:** Can communication about and knowledge of the program be restricted to particular groups of customers at different points in time?
Selection Bias

Key Questions:

**Matching**: Does matching on energy usage control for other differences between participants and comparison customers?

**VIA**: Are customers who enroll later similar to customers who enroll earlier except for knowledge of the program?
Selection Bias


Groups are well-matched in test period

Groups are NOT well-matched in test period
Selection Bias

VIA Method – Assumes no difference in later and earlier adopters

Utility 2 Pre-Enrollment Average Daily kWh

Average daily kWh lower among later enrollees

<table>
<thead>
<tr>
<th>Enrollment Year</th>
<th>Pre-Enrollment Average Daily kWh</th>
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<td>2011</td>
<td>68</td>
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<tr>
<td>2012</td>
<td>61</td>
</tr>
<tr>
<td>2013</td>
<td>57</td>
</tr>
</tbody>
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Savings Estimates

Utility 1: Matched Control Group Pct Savings - 2.3%, VIA Pct Savings - 2.9%
Utility 2: Matched Control Group Pct Savings - 2.8%, VIA Pct Savings - 1.3%
Utility 3: Matched Control Group Pct Savings - 2.6%, VIA Pct Savings - 3.0%
Utility 4: Matched Control Group Pct Savings - 1.8%, VIA Pct Savings - 4.0%
Conclusions

Matched Comparison Group Method is dependent on availability of data:

- **Territory and program-specific conditions**: Is there a large enough pool of similar non-participants from which to draw a comparison group?
- Data availability – Are pre- and post-period data available for participants and matches?
- Enrollment saturation – Is there an adequate pool of non-participants?
- Selection bias – Are there 16 or more months of pre-period data available in order to match on 12 and have a test period?
Conclusions

Variation in Adoption is more likely to be successful if planned for upfront:

- **Territory and program-specific conditions**: Can program marketing be rolled out to customers over time?
- Enrollment timing – Need to have enrollment spaced out over 9 to 12 months
- Enrollment saturation – Are there adequate numbers of earlier and later enrollees?
- Data availability – Are data available for earlier and later enrollees?
- Selection bias – Later enrollees should be similar to earlier enrollees except for knowledge of and enrollment in program
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VIA Model Specification

Average daily energy use for customer $i$ in billing period $t$

- Household effects
- Series of binary variables indicating calendar month of billing period $t$
- Pre-period: Series of binary variables indicating number of months until enrollment for customer $i$ in billing period $t$
- Post-period: Series of binary variables indicating number of months since enrollment for customer $i$ in billing period $t$