# The Estimation of Spillover: EM&V's Orphan Gets a Home

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# Genesis of Paper

- Review of evaluation plans and reports by New York program administrators on behalf of NYDPS revealed common limitations in the estimation of spillover

- NYDPS staff requested contractor team to develop spillover guidelines to enhance practices

- Authors believe the issues observed in NY also common elsewhere in the industry

- Thus paper focuses on aspects of the New York experience thought to be of broader national interest

**2**

# What is Spillover?

- Energy efficiency measures (EEMs) adopted by end-users who were influenced by program, but without direct financial or technical assistance
  - Participant (PSO)
  - Non-participant (NPSO)
- What is the conceptual relationship between spillover, market effects and market transformation?
  - No clear industry consensus on this issue
  - In New York, vast majority of research on out-of-program impacts has focused on spillover rather than market effects
  - New York guidelines, and this paper, therefore focus on spillover
  - However, paper does propose a conceptual framework for the three terms, to which we return later

# Top Seven Problems in Spillover Estimation



## #7. Exclusive reliance on self-reporting

- Limitations of self-reporting have been widely discussed for free-riding, but if anything limitations are greater for spillover

  - Issue is generally less salient to the respondent for spillover than for free riding

  - Self-reporting clearly has a role, but excessive reliance has led to a lack of methodological diversification

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# Top Seven Problems
## in Spillover Estimation

**#6.** Reliance on survey questions regarding program influence that have the potential to lead the respondent

- Launching directly into questions about program influence without first asking about other influences

- Asking about the magnitude of program influence without first asking whether there is any influence at all

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# Top Seven Problems
## in Spillover Estimation

**#5.  Lack of analysis of the specific mechanisms thought to be leading to spillover**

- ☐ Causal claims are almost always more convincing if accompanied by a specific causal mechanism
- ☐ Ideally, program theory should specify causal mechanisms for spillover, and evaluators should test these
- ☐ If not, evaluators can develop and test hypotheses
- ☐ Fairly often, neither of these is done

**6**

# Top Seven Problems in Spillover Estimation

## #4. Supply-side leverage points

- ☐ Leverage point: a case within a sample that has excessive influence on the overall result
- ☐ Spillover studies often rely heavily on interviews with supply-side market actors
- ☐ These interviews tend to have two features that make them susceptible to leverage points
  - ▪ Relatively small sample sizes
  - ▪ industry concentration, resulting in huge disparities in the significance of individual respondents
- ☐ Result can be spillover findings that are dependent on a handful of interviews

# Top Seven Problems in Spillover Estimation

## #3. Unconfirmed assumptions that gross unit savings are the same for NPSO as for in-program savings

- Studies of NPSO typically focus on estimating *number* of spillover measures/projects/adopters in the population
- However, challenging and expensive to directly estimate *gross unit savings* for specific NPSO measures
- Common shortcut is to leverage in-program impact results, assuming that gross unit savings are the same
- Problem: this assumption may lead to upward bias, as small projects less likely to make it into the program than large ones

**8**

# Top Seven Problems in Spillover Estimation



## #2.  Methodological Collisions

- ☐ Efforts at methodological rigor can sometimes backfire, resulting in double counting
  - Study looks at multiple levels of distribution chain, and individual spillover measures may show up at more than one level
  - Study deploys multiple methods, and individual measures show up in more than one method
  - Efforts to sort out the resulting double counting sometimes underadjsut
- ☐ Conversely, evaluation methods focused on in-program effects can penalize the program for spillover
  - Billing analysis compares participants and non-participants, but spillover is present among non-participants

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# Top Seven Problems
## in Spillover Estimation

## #1. Underinvestment in estimation of spillover

- Relative to level of investment in estimating gross savings and/or free riding
- The most important problem, as it tends to drive all the others
- Ideally, level of investment in measuring any one parameter should be roughly proportional to level of uncertainty introduced by that parameter
- Often spillover receives inadequate evaluation funds based on this criterion

*10*

# The New York Spillover Guidelines

- Lay out critical decisions evaluator must make before deciding whether and how to estimate spillover
  - Does the size of expected savings warrant the expenditure?
  - What level(s) in the distribution chain are to be the focus?

- Establish two alternate levels of rigor, standard and enhanced, with applicable level dependent on:
  - Past results
  - Program theory
  - Size of the program; size and complexity of target market
  - National research literature

- Full guidelines available at

http://www3.dps.ny.gov/W/PSCWeb.nsf/96f0fec0b45a3c6485257688006a701a/766a83dce56eca35852576da006d79a7/$FILE/EVALGUIDE.11.12.pdf

# New York Spillover Guidelines: Key Differences Between Standard and Enhanced Tracks

| Methodological Issue | Standard Track | Enhanced Track |
|---|---|---|
| Estimation of gross unit savings for spillover measures | Simplifying assumptions allowable | Must be documented empirically |
| Role of self-reporting | Sole reliance on self-reports acceptable | Self-reports not acceptable as sole method |
| Documentation of causal mechanisms | Recommended but not required | Required |
| Demonstration of program influence on upstream actors | Self-reports generally sufficient | Additional methods required such as econometric techniques, quasi-experimental comparisons |

*12*

# New York Spillover Guidelines: Precision Requirements

- Previously, NY had precision target of 90/10, applicable to gross savings
- Goal of guidelines is to encourage rational allocation of resources between gross savings, FR and SO to minimize overall uncertainty
- Therefore, 90/10 precision target now also applies to <u>total net savings</u>
  - ☐ Not to the NTGR
  - ☐ Not to individual components of the NTGR
  - ☐ Total net savings includes all adjustments for free riding and spillover
- Targeting precision for total net savings in the research planning process requires propagation of error techniques

# Conceptual relationship between spillover, market effects and market transformation

- **Authors propose the following:**
  - ☐ Market effects = spillover savings that reflect meaningful changes in structure and functioning of EE markets
  - ☐ Market transformation = market effects that are substantial and relatively lasting
  - ☐ Thus defined, conceptually, ME are a subset of spillover, and MT a subset of ME

**14**

# Conclusions and Recommendations: Transferability to Other States

- New York PAs tend to be relatively large; other states/PAs might not be able to meet all of these standards due to resource constraints

- However, the following are examples of aspects that may be transferable:

  - Methodological standards must take into account large variations in both the magnitude of spillover and availability of resources

  - Emphasizing the importance of understanding causal mechanisms

  - Recognizing that assuming spillover measures yield same gross savings as in-program measures may lead to upward bias

  - Expanding the focus of precision standards, where these exist, to encompass total net savings

*15*

Questions?

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