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the International Initiative for Impact Evaluation (3ie)

# MAKING DATA REUSABLE LESSONS FROM REPLICATIONS OF IMPACT EVALUATIONS

Wednesday 9<sup>th</sup> October 2019

12:45 – 14:00 GMT

[Room 3a, 3rd Floor, Student Central, Malet Street, WC1E 7HY, London](#)

A 50 minute lecture followed by a 25 minute Q&A session

**If you are following online and have questions**

**please email [cedil@lshtm.ac.uk](mailto:cedil@lshtm.ac.uk)**

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International Initiative for Impact Evaluation

# Making data reusable: lessons from replications of impact evaluations

**Marie Gaarder**, Director of Evaluation Office and Global Director for Innovation and Country Engagement, 3ie

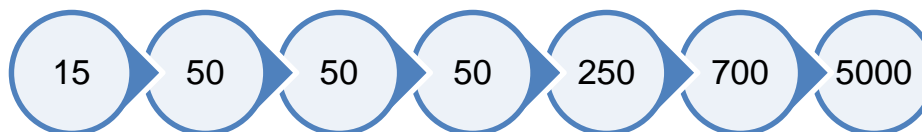
**Sayak Khatua**, Research Associate, 3ie

CEDIL, October 2019

# Who we are & what we do

**3ie** is a member-based international NGO promoting evidence-informed development policies and programmes.

- **Grant maker, producer and standard setter** for policy-relevant impact evaluations, systematic reviews, evidence gap maps, evidence syntheses and replication studies focussed on low- and middle-income countries
- **Convener** of forums to build a culture of evaluation, capacity to undertake impact evaluations and reviews and commitment to evidence-informed decision-making
- **Producer** of knowledge products for policymakers, programme managers, researchers, civil society, the media and donors
- **Champion** of Global Public Evidence Goods



# Research Transparency at 3ie

## Highlights from the Policy

- **Preregister** studies in the appropriate registry
- Develop a **pre-analysis plan** before starting the study;
- Ensure all materials supporting research findings are available on the 3ie **Dataverse** (de-identified) for purposes of replicating the results (PBR) and reusing these data.
- Provide a comprehensive and **transparent description** of study context, design, analysis methods
- Adhere to **appropriate citation** of any data, program code and other methods;
- Provide **unrestricted access** to and **reuse of all published research** funded, in whole or in part, by 3ie.



The screenshot shows the 3ie website header with the logo and navigation links: About us, Events, Blogs, Media, Newsletter, Resources. Below the header are dropdown menus for 'Our expertise', 'Evidence hub', 'Our work', and 'Funding'. The main content area features a section titled 'Research transparency' with a large blue diagonal banner that reads 'Policy was implemented in April, 2018'. The text in the section states: '3ie has always been strongly committed to research transparency and open access to data. We are proud to be a leader in the growing movement to improve global standards for research transparency. By research transparency, 3ie refers to posting research preregistrations, developing pre-analysis plans, creating replication files, reporting adequate sample sizes, ensuring complete citations and publishing open research.' To the right of the text is a photograph of a woman in a red patterned sari looking at a document, with several men in the background. The photo is credited to '© David Eschbacher'.

3ie produces research – whether in-house or through grants or contracts – that clearly and precisely documents the data and methods used in the analysis and the materials used to conduct the study. 3ie's [Research Transparency Policy](#) articulates our commitment to research transparency and aligns our policy with the transparency policies of our key funders.

### Guidelines for 3ie-supported researchers

Our research transparency policy requires 3ie researchers to take the following actions:

- Preregister their studies in the appropriate registry. For instance, impact evaluations must be registered in RIDIE.
- Develop a pre-analysis plan before starting the study.



Reproducibility?  
That sounds like  
something for  
nerds!



It can save lives!



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# Reproducibility and replication

- **Push button replication:** press “go” on the statistical code
- **Pure:** replicate original results using original data and methods as described in publication or code audit
- **Measurement and estimation analysis:** sensitivity of original approach to pre-specified research methods- reanalysis
- **Theory of change analysis:** sensitivity of original approach to pre-specified alternative hypothesis along the causal chain

## Other types of replication-informed research

- **External/ field replication:** Using interventions/methodologies from the original study in another location under the same settings as the original study
- **Systematic Reviews** answers a defined research question by collecting and summarizing all empirical evidence that fits pre-specified eligibility criteria.
- **Meta-analysis** is the use of statistical methods to summarize the results of these studies.

If I run the  
same code on  
the same data,  
I should get  
the published  
results right?



Seems like  
science 101!



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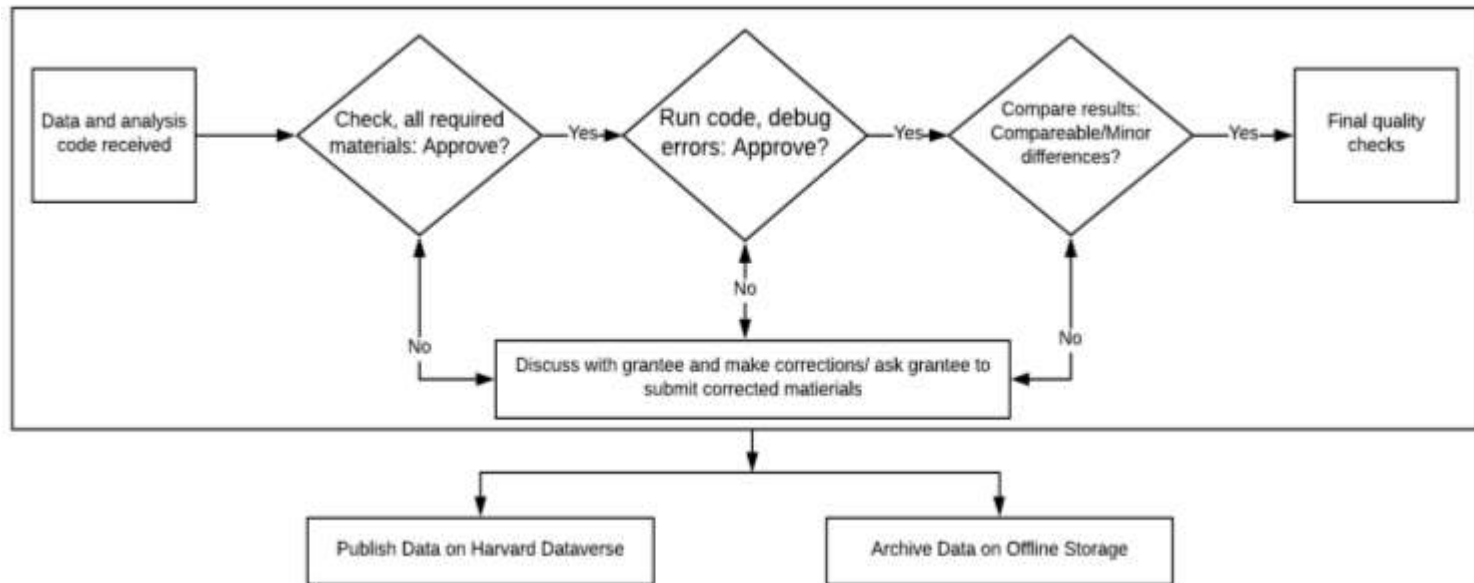
# Findings from our latest replication paper





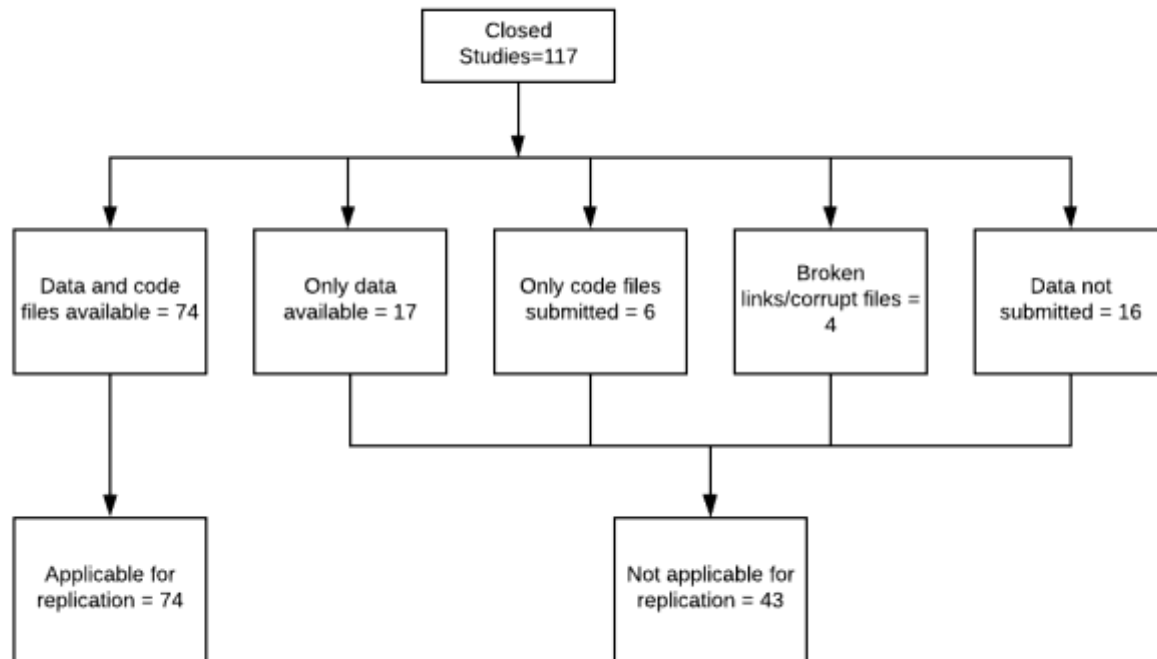
# Findings from our latest replication paper

## Push Button Replication process



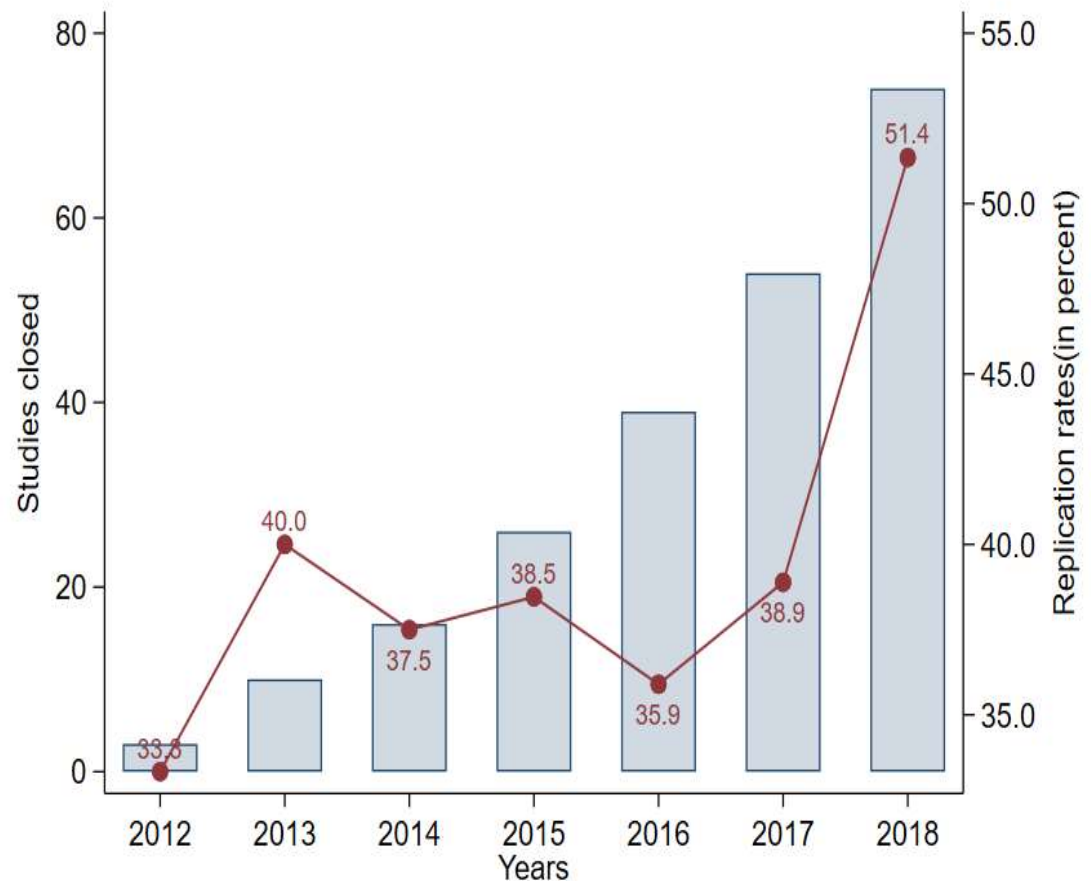
# Findings from our latest replication paper

## Our Sample



# Findings from our latest replication paper

- Between 2013 and 2017, the replication rate consistently stayed well **below 40%**
- In 2018, we note a dramatic increase to **50%**
- In 2019, till date we have pushed this figure to about **61%**(With an annual replication rate of **100% for 2019**)

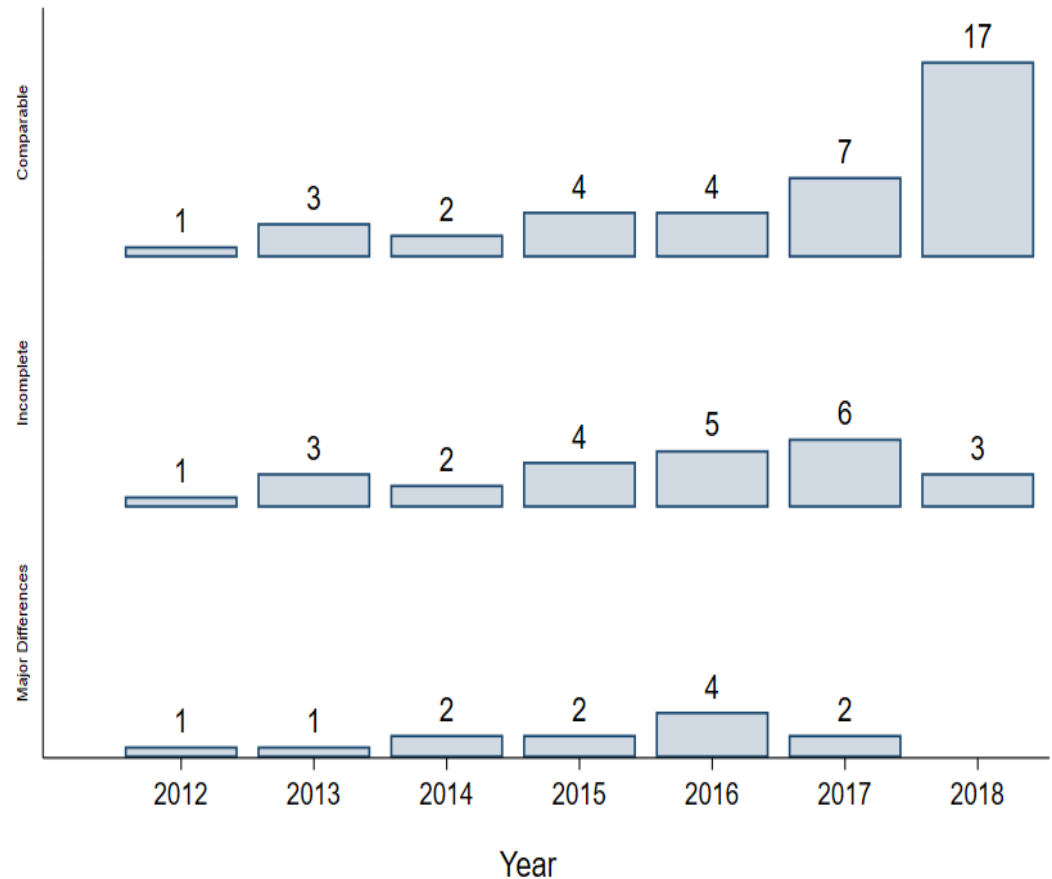


Source: Author's Calculation.

\*The graph shows the closed studies with data and code files available

# Findings from our latest replication paper

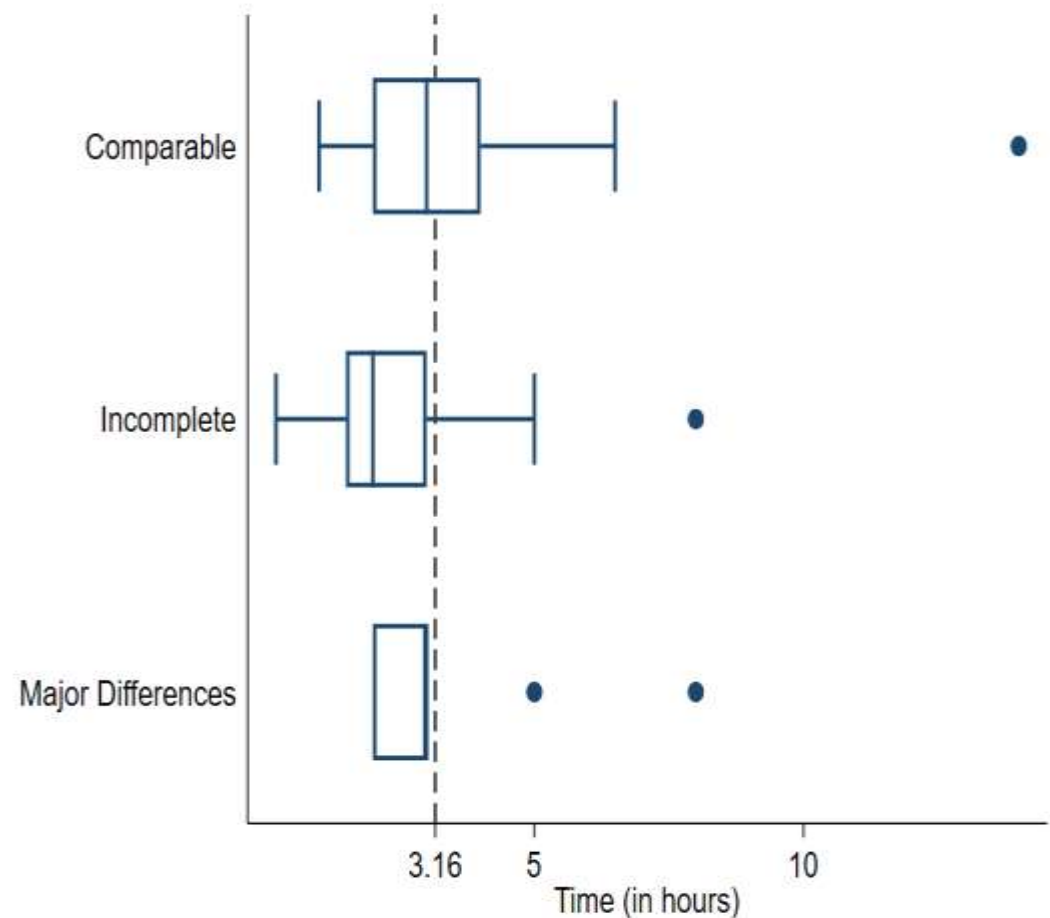
- The number of comparable studies in 2018 is **17** which is much higher (about **140%** increase) than the previous years



Source: Author's Calculation.

# Findings from our latest replication paper

- It took about 3 hours to complete the replication for one study (across multiple rounds)
- The time taken for comparable studies ranged from 2 to 6 hours



Source: Author's Calculation.

# Challenges

- *Educating in-house staff on the importance of the verification process*
- *Reaching out to researchers from older studies to access correct replication materials*
- *Opposition from researchers to make data open, citing retrospective nature of the policy*
- *Access to government or proprietary data for verification purposes only*
- *Ownership of data: Data funded using public money is public property*
- *Data Privacy*

# Findings from our latest replication paper

## Lessons Learnt

- *Open data is an ongoing process*
- *Policy articulation and enforcement can serve as important steps to re-inforce commitment to transparency*
- *Open data begins with informed consent*
- *Conduct replications soon after a project is complete*
- *Build internal capacity to manage replications*

# Thank you



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# Validity of assumptions - tips

## Tips for exercises to validate assumptions

- Test balance for additional, relevant variables
- Test balance at applicable units of analysis or for analyzed subsets of the data
- Use outside data to explore equivalence of groups or clusters used in the study
- Run placebo tests, especially for natural experiment designs
- Explore assumptions visually, especially distributions or across time
- Identify important untested assumptions for chosen estimation methods and test using accepted methods

# Data transformations - tips

## Tips for data transformation exercises

- Employ alternative imputation methods for missing values to test robustness
- Use an alternative outlier drop rule to test robustness
- Explore the impact on the results of any dropped observations
- Decompose constructed variables to understand the implications of the composition and weights
- Consider different constructions supported by theory or qualitative analysis
- Use alternate data for key variables to test robustness

# Estimation methods - tips

## Tips for checking estimation methods

- Run additional robustness tests for key parameter or specification choices in the estimation strategy
- Explore estimation strategies from other disciplines with applicable approaches, especially in cases where the other disciplines sometimes analyze similar questions
- Apply newly available techniques for an estimation strategy
- Check for the correct application of estimation strategies given the set-up of the study

# Heterogeneous impacts - tips

## Tips for heterogeneous impacts exercises

- Identify theoretically or clinically relevant subgroups and check whether heterogeneous impacts are tested for these subgroups
- Test for heterogeneous impacts for relevant subgroups
- Search for variation in treatment effects using machine learning methods