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Replication in Economics: A Progress Report

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Outline

- Introduction
- Brief history of data sharing and replication in economics
- Survey of replication policies
- Analysis of a collection of replication studies
- Concluding remarks: The future of replication research

Introduction

- Many empirical results in economics are not reproducible; and/or not generalizable to alternative empirical specifications, econometric procedures, extensions of the data, and other modifications to the original study
- This concern not restricted to economics and social science but the ‘hard science’ too
- Popular media now concerned with replication: The *Economist,* the *New Yorker,* the *Atlantic*, *BBC Radio*, the *Los Angeles Times …* but focus on academic fraud while academic community concerned with production of disproportionate rate of false positives
- Replication not a panacea for the problems facing scientific verifiability but it can provide useful checks on the spread of incorrect results

Brief history of data sharing and replication in economics I

- From the early days of applied economics it has been acknowledged that sharing of data is desirable:
  - “In statistical and other numerical work presented in ECONOMETRICA the original raw data will, as a rule, be published, unless their volume is excessive. This is important in order to stimulate criticism, control, and further studies” (Frisch, 1933:3).
- Despite these early calls, limited practice of replication by economists
- From 1960s onwards the Journal of Human Resources (JHR) included replication as part of their analysis
- Mid-1970s the Journal of Political Economy (JPE) initiated a “Confirmations and Contradictions” section which existed from 1976 to 1999

Brief history of data sharing and replication in economics II

- By the1980s few major economics journals had data sharing or replication policies in place, exception: *Journal of Money, Credit and Banking* (*JMCB*) which requested authors to submit data and code
- Subsequently an increasing number of journals (e.g. AER, JAE, Econometrica) adopted data sharing/archiving or replication policies, either requiring authors to (i) provide data and code upon request or (ii) deposit their data and code in journal-managed data archives upon submission of their article
- However, these requirements were by no means sufficient as in some cases these policies were not strictly enforced

(Dis-)Incentives for replication

- Distorted researcher and publisher incentive systems partially explain lack of replication in economics
- Rewards in academia for innovation, or novelty; since replication seemingly involves repetition it is almost by definition not a rewarding activity
- Discussions of incentives include 3 actors:
  - **Replicators** concerned with the time to undertake replications and publication opportunities
  - **Journal editors** concerned with (per page) citations of replications - lower compared to original papers. Also, reputational effects when controversy between replicators and original authors ensues
  - **Original authors** concerned with costs of compiling data and code into usable forms – benefits small.
- Replication used in “disciplinary” ways: Some replications led to constructive interactions but many conducted more hostile → disincentives
- Replication can undermine the authority that pertains to the expertise and the experts who practice econometrics

Survey of replication policies

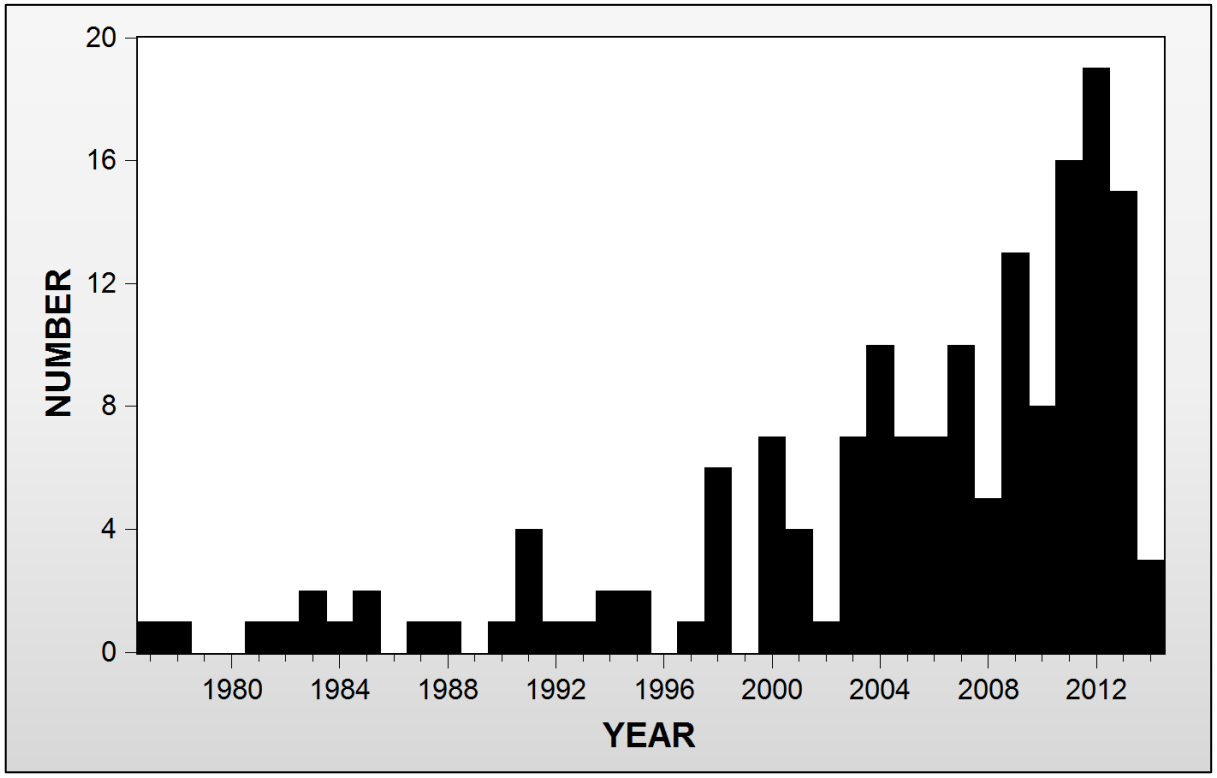
- Surveyed 333 economics journals asking:

  (i) Does the journal regularly publish data and code for its empirical research articles?

  (ii) Does the journal's website explicitly mention that it publishes data and code
- 27 of 333 journals regularly publish data and code for empirical research
- 10 explicitly mention that they publish replications:
  - Econ Journal Watch, Economic Development and Cultural Change, Economics of Education Review, Empirical Economics, Experimental Economics, Explorations in Economic History, International Journal of Forecasting, Jahrbucher Fur Nationalokonomie Und Statistik /Journal of Economics And Statistics, Journal of Applied Econometrics, Review of International Organizations
- The lack of publishing outlets is perhaps the most serious obstacle to researchers interested in undertaking replication research

Analysis of replication studies I

- Analysis of 161 replication studies published between 1977-2014
- Since 2000 publications of replication studies increased in frequency



- JAE most frequent publisher accounting for 1/5, followed by JHR, AER, Econ Journal Watch, JDS and Experimental Economics – they account for 60% of all published replication studies.

Analysis of replication studies II

- ***Summary?*** Was the published article a full study, or did it only summarize the key results from a study?
- ***Exact?*** Did the replication study attempt to exactly reproduce the original findings?
- ***Extension?*** Did the replication study go beyond attempting to reproduce the original results by extending the analysis to different types of subjects, time periods, or test additional hypotheses?
- ***Original Results?*** Did the replication study report the findings of the original study in a way that facilitated comparison of results without having to access the original study?
- ***Negative? Mixed? Positive?*** Did the replication study confirm or disconfirm the original study, or were the results mixed?
- ***Reply?*** Did the journal publish a reply or response from the original authors?

Results

Journals	Summary?	Exact?	Extension?	Original Results?	Negative?	Mixed?	Positive?	Reply?
All (161)	0.050	0.640	0.516	0.584	0.665	0.124	0.211	0.205
JAE (31)	0.194	0.742	0.290	0.323	0.452	0.194	0.355	0.032
Experimental (11)	0.000	0.727	0.818	0.545	0.545	0.182	0.273	0.091
Non-JAE/Non-Experimental (119)	0.017	0.605	0.546	0.655	0.731	0.101	0.168	0.261

NOTE: Numbers in the table are averages of the respective 0-1 dummy variables. The numbers in parentheses in the Journals column indicates the number of replication studies in each journal category.

- **What can we learn from our analysis of replication studies?**
  - Main point: There appears to be a high rate of disconfirmation, approximately two out of every three studies disconfirmed the original findings

Summary

- The importance of making data available to researchers in order to enable replication has long been noted
- Publication of replication studies has been increasing slowly, however, there are few journals that publish replication studies → 6 journals account for approx 60% of all published replication studies
- Only 10 journals have ever published more than 3 replication studies, JAE and JHR are exceptions
- It is quite common to find that major results from empirical research in economics journals cannot be confirmed
- Approx. four out of five replication studies fail to confirm one or more major findings from the original research

Concluding thoughts I

- Many replication initiatives under way:
  - Reproducibility Initiative by the Center for Open Science
  - Berkeley Initiative for Transparency in the Social Sciences (BITSS)
  - Political Science replication initiative led by Gary King
  - “Replication in Economics” project at Goettingen University funded by Institute for New Economic Thinking
- Key forces that have driven the expansion of replication research in recent decades are:
  - the increasing availability of data and code,
  - technological innovations in the allocation of journal space,
  - societal factors that affects “tastes” for replication research – are likely to expand the use of replications in the future.

Concluding thoughts II

- Replication and publication bias:
  - Replication can potentially mitigate publication bias and uncover Type I errors
- Using replications more effectively:
  - Better Integration of replication and meta-regression
  - Meta-regression identifies study characteristics that “explain” why different studies reach different conclusions while replication studies then take these results and examine whether changing the empirical design of a study has the effect predicted by meta-analysis
- Replication is no panacea but a useful tool for assessing the reliability and validity of empirical results and we hope to further this cause.

Thank you!

For more details:
www.replicationnetwork.com

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