Incentivize Replication in Economics – Can Data Journals Help?

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Ralf Toepfer
ZBW Leibniz Information Centre for Economics (Kiel / Hamburg)

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Agenda

• Replication(s) (in economics)
  – The Replication Crisis
  – „Replication“ – a definition
  – Opinions on data sharing and replication
  – Barriers to replication
• Publication opportunities for replication works
  – Scholarly Journals
  – Data Journals
• Summary & Conclusion
Science has lost its way, at a big cost to humanity

Researchers are rewarded for splashy findings, not for double-checking accuracy, building on ideas that aren't even true.

October 27, 2013 | Michael Hiltzik
Reinhart-Rogoff revisited: Coding errors happen – key problem was in not making the data openly available from the start.

The eventual replication of the data from the Reinhart-Rogoff paper on 90% debt/GDP threshold sparked vibrant discussion on the impact of error-ridden research on austerity policies around the world. Velichka Dimitrova argues this controversy highlights the importance of open data of economics datasets. Coding errors happen: the greater research problem was not allowing for other researchers to review and replicate the results through making the data openly available as early as possible.

Another economics scandal made the news last week. Harvard Kennedy School professor Carmen Reinhart and Harvard University professor Kenneth Rogoff argued in their 2010 NBER paper that economic growth slows down when the debt/GDP ratio exceeds the threshold of 93 percent of GDP. These results were also published in one of the most prestigious economics journals—the American Economic Review (AER)—and had a powerful resonance in a period of serious economic and policy turmoil when governments around the world slashed spending in order to decrease the public deficit and stimulate economic growth.

The Grad Student Who Busted Reinhart And Rogoff

Explain how Open They Really Were With Their Data

The weekend, economist Kenneth Rogoff and Carmen Reinhart dropped a bomb in the economic world in the form of a big eyes letter to Paul Krugman, blowing his hair and nearly tree in the debate over recent years.

Researchers, Rogoff and Reinhart were the economists whose work showed that growth for nations dropped off considerably once debt to GDP crossed the 93th threshold. This result was shown through the data of 19 advanced and 19 emerging market economies. The conclusion is that the debt/GDP ratio is a significant indicator of economic growth.

In an age of information, math errors can lead to disaster. NASA's Mars 

Oberon crashed because engineers forgot to convert to metric measurements. JP Morgan Chase's "Zamba Whale" costs were said to be in part because auditors divided by a zero instead of an average. So, did an Excel coding error destroy the economics of the Western world?

The story so far: At the beginning of 2013, two Harvard economists, Carmen Reinhart and Kenneth Rogoff, published a paper, "Growth in a Time of Debt," that purported to identify a critical "threshold," a tipping point, for government indebtedness. Once debt exceeds a certain percent of gross domestic product, they claimed, economic growth dips sharply.
Replication in Economics Research

- Dewald et al. (1986) attempted to replicate 54 papers published in the Journal of Money, Credit and Banking and could replicate only two (2/54)
- McCulloch et al. (2006) tried to replicate 69 articles published in the same journal and could only replicate 14 (14/69)
- McCulloch et al. (2008) attempted to replicate 117 articles published in the Federal Reserve Bank of St. Louis Review and could only replicate 9 (9/117)
- Chang et al. (2015) successfully replicate 29 of 59 papers (49%) from several journals even with help from the authors

What is replication?

- Replication in economics could be using:
  - a) same data and same methods
  - b) same methods but different data
  - c) same data but different methods
  - d) new data and new methods

- Distinction
  - a. „pure“ replication
  - b. „scientific“ replication


Thus if a replication test gives discrepant results, under current usage of the term, this could mean a wide spectrum of things – from signaling a legitimate disagreement over the best method (science), to signaling incompetence and fraud (pseudoscience).“ (Clemens 2015:1)

Data Sharing

„The status quo in empirical research in economics and management is not to share data.“ (Andreoli-Versbach, Mueller-Langer 2014, p.11)

<table>
<thead>
<tr>
<th></th>
<th>Do not share data</th>
<th>Sporadically share data</th>
<th>Share data regularly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responses</td>
<td>394</td>
<td>82</td>
<td>12</td>
</tr>
<tr>
<td>Percent</td>
<td>80.74%</td>
<td>16.8%</td>
<td>2.46%</td>
</tr>
</tbody>
</table>

## Opinions on Data Sharing

On a scale from 1 to 5; 1=„Strongly disagree“ – 5=„Agree completely“

<table>
<thead>
<tr>
<th>Statement</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Researchers should generally publish their data (N=1491)</td>
<td>1,95%</td>
<td>5,9%</td>
<td>16,57%</td>
<td>31,32%</td>
<td>44,27%</td>
</tr>
<tr>
<td>Freely available research data is a great contribution to scientific progress (N=1449)</td>
<td>1,73%</td>
<td>3,8%</td>
<td>11,32%</td>
<td>25,05%</td>
<td>58,11%</td>
</tr>
<tr>
<td>It is common in my discipline / research community to share data (N=1436)</td>
<td>13,86%</td>
<td>23,33%</td>
<td>27,37%</td>
<td>24,44%</td>
<td>11%</td>
</tr>
</tbody>
</table>

Benedikt Fecher, Sascha Friesike, Marcel Hebing, Stephanie Linek, Armin Sauermann: A Reputation Economy: Results from an Empirical Survey on Academic Data Sharing, Berlin and Kiel, February 2015, RatSWD Working Paper 246
Discipline-specific differences

„It is common in my discipline/research community to share data“

<table>
<thead>
<tr>
<th>Discipline (Observations)</th>
<th>Strongly Disagree</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Agree Completely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural science (472)</td>
<td>6,36%</td>
<td>18,64%</td>
<td>26,69%</td>
<td>30,72%</td>
<td>17,58%</td>
</tr>
<tr>
<td>Social Science (425)</td>
<td>19,76%</td>
<td>27,29%</td>
<td>26,59%</td>
<td>19,76%</td>
<td>6,59%</td>
</tr>
<tr>
<td>Human science (168)</td>
<td>10,71%</td>
<td>17,26%</td>
<td>29,76%</td>
<td>30,95%</td>
<td>11,31</td>
</tr>
<tr>
<td>Engineering (119)</td>
<td>10,92%</td>
<td>22,69%</td>
<td>40,34%</td>
<td>18,49%</td>
<td>7,56%</td>
</tr>
<tr>
<td>Humanities (168)</td>
<td>26,19%</td>
<td>29,76%</td>
<td>20,83%</td>
<td>16,07%</td>
<td>7,14%</td>
</tr>
<tr>
<td>Agricultural science (64)</td>
<td>7,81%</td>
<td>28,13%</td>
<td>28,13%</td>
<td>28,13%</td>
<td>7,81%</td>
</tr>
<tr>
<td>Total (1416)</td>
<td>13,70%</td>
<td>23,16%</td>
<td>27,54%</td>
<td>25,58%</td>
<td>11,02%</td>
</tr>
</tbody>
</table>

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Replication studies

Figure 3

Researcher's opinions about replication studies:

- 84% agree that replications are necessary for improving scientific output
- 71% disagree with the statement that replications are not worthwhile
- 58% of the researchers never attempted any replication study

Economists treat replications the way teenagers treat chastity – as an ideal professed but not to be practiced.
Barriers to replication

- Low data sharing rates
- Issues with data documentation

Limited attractiveness to conduct replication studies

“The most important reason why researchers might be reluctant to conduct a replication study is, because it is difficult to successfully accomplish and it carries more risk than potential reward for both the replicator and the originator of the research“
(Park 2004, quote according to Fecher, Fräßdorf & Wagner 2016:4)

doi:10.3152/147154404781776400
What can be done to foster replication?

„By itself, access to data and code might be inadequate to incentivize replication studies: Researchers also need outlets to publish the results of replication efforts.“ (Duvendack et al. 2015:164)

I. Scholarly Journals
II. Data Journals

https://replicationnetwork.com/replication-studies/

http://replication.uni-goettingen.de/wiki/index.php/Main_Page
Publication opportunities I: Scholarly Journals

**TABLE 2. Journals whose websites explicitly mention that they publish replications**

<table>
<thead>
<tr>
<th></th>
<th>Journal</th>
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<tbody>
<tr>
<td>1</td>
<td>Econ Journal Watch</td>
</tr>
<tr>
<td>2</td>
<td>Economic Development and Cultural Change</td>
</tr>
<tr>
<td>3</td>
<td>Economics of Education Review</td>
</tr>
<tr>
<td>4</td>
<td>Empirical Economics</td>
</tr>
<tr>
<td>5</td>
<td>Experimental Economics</td>
</tr>
<tr>
<td>6</td>
<td>Explorations in Economic History</td>
</tr>
<tr>
<td>7</td>
<td>International Journal of Forecasting</td>
</tr>
<tr>
<td>8</td>
<td>Jahrbücher für Nationalökonomie und Statistik/Journal of Economics and Statistics</td>
</tr>
<tr>
<td>9</td>
<td>Journal of Applied Econometrics</td>
</tr>
<tr>
<td>10</td>
<td>Review of International Organizations</td>
</tr>
</tbody>
</table>

Figure 1. Histogram of replication studies by year for our sample of 162 articles

Publication opportunities I: Scholarly Journals

- Journal of Applied Econometrics accounts for about one-fifth (19.1%) of all replication studies
- Six journals accounts for almost 60% (58.7%)
- Only ten journals have ever published more than three replication studies


„There is a structural lack of interest in replication“ (Hamermesh 2007:9)
Publication opportunities II: Data Journals

- **Data Journal**
  - focuses on the dataset rather than the research article
  - data creators get credit for their work
  - dataset must be citable and peer reviewed

- **Data Paper**
  - provide a citable journal publication
  - describe data in a structured human-readable form
  - bring the existence of the data to the attention of the scholarly community

Publication opportunities II: Data Journals

- DFG-funded project „International Journal of Economic Micro Data (IJEMD)"
- Open Access, e-only „Data Journal“
- Three types of articles
  - descriptions (data papers)
  - replication studies
  - research articles
- Program code and descriptions will be published in a data archive
- Authors could be honored in due form of citations and reputation

Enhanced concept of data journals

http://gepris.dfg.de/gepris/projekt/278201669
Summary & Conclusion

- There is a **need for more replications** in economics to **regain trust and credibility**.
- In the current system neither data sharing nor replicating other people's result progresses researchers career.
- Though established scholarly journals have adopted replication policies in recent years, replication activities only slightly increased.
- Therefore, **dedicated publication platforms for replication studies** that offer the possibility to **reward authors** in form of citations and reputation are needed.
- **Data Journals should enhance their scope** and publish not only data papers but also replication studies.
Literature


Thanks for your attention!

Contact:
Ralf Toepfer
ZBW – Leibniz Information Centre for Economics
Neuer Jungfernstieg 21, 20354 Hamburg, Germany

E: r.toepfer@zbw.eu
T: +49(0)40.42834-449

Twitter: @thiaru