

# Reflections on Empirical Peer Production Research



Community  
Data Science  
Collective

**Aaron Shaw**

aaronshaw@northwestern.edu  
Northwestern University

**Benjamin mako Hill**

makohill@uw.edu  
University of Washington

October 31, 2015

Reflections on Empirical Peer Production Research

2015-10-30

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Thank you.

**Before we start:**

We're really grateful you all could be here.

We're also really grateful that the other organizers invited us to collaborate on planning of workshop.

- ▶ **Reflections** on empirical peer production research
- ▶ Present an **ongoing study** motivated by these reflections
- ▶ Close with **implications, limitations, & challenges**

└ Intro

└ Our talk

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- ▶ Reflections on empirical peer production research
- ▶ Present an ongoing study motivated by these reflections
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Reflections on Empirical Peer Production Research

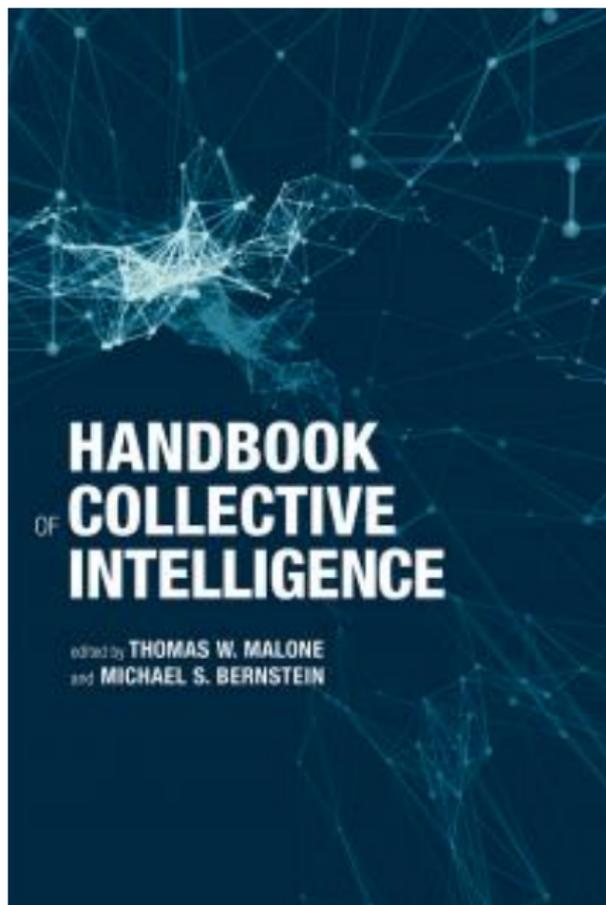
└ Part I: Recent peer production research and challenges

Part I: Reflections

# Part I: Reflections

# Peer Production: A Form of Collective Intelligence

In *Handbook of Collective  
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W. Malone and Michael S.  
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November 2015.



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Reflections on Empirical Peer Production Research

└ Part I: Recent peer production research and challenges

└ CI chapter

Peer Production:  
A Form of Collective  
Intelligence

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Yochai invited us to work with him on a review chapter for a soon-to-be-published MIT Press Handbook on Collective Intelligence edited by Malone and Bernstein.

Our mandate was (among other things) to review recent social scientific research on peer production...

## Three central concerns in empirical peer production research

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└ Part I: Recent peer production research and challenges

└ CI chapter

└ Three central concerns in empirical peer production research

- We found these three central concerns or puzzles driving research across disciplines.
- Not exhaustive.
- We really focus our work on questions of organizational dynamics & performance
- This is where network analyses, orgs research, and info sys work on peer production happens.

## Three central concerns in empirical peer production research

- ▶ **Motivation:** Why do people participate in peer production systems?

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- ▶ **Organization:** How do peer production systems organize effectively?

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└ Org dynamics and effectiveness

└ Organizational Dynamics & Effectiveness in Peer  
Production

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# Organizational Dynamics & Effectiveness in Peer Production

## Early stage vs. Recent work

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- Descriptive and exploratory
- Focused on a small number of **large extraordinary communities** (e.g., Wikipedia, Linux, GNU, Apache)
- Frequently relying on **stylized facts** (i.e., non-hierarchical, Linus' law; etc.)

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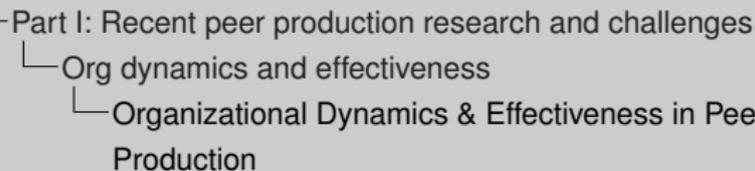
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- └ Part I: Recent peer production research and challenges
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## Early stage vs. **Recent work**

- Deepened connections with literature on communication networks, teams, organizations, social exchange/psychology, information systems, management, complex systems.



- Comparative analyses
- More Inferential
- Testing stylized facts

...much of this work done by people in this room!

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- ▶ **Testing stylized facts**

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**causal identification**

**+**

**observational data**

**+**

**comparative analysis**

# Part II: Example Study

## **The Hidden Costs of Requiring Accounts: Quasi-Experimental Evidence that Transaction Costs Deter Contributions to Communal Public Goods**



# Account Creation: A Barrier to (Good) Contributions?



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Reflections on Empirical Peer Production Research

└ Part II: Example study: Anonedit

└ Account Creation: A Barrier to (Good) Contributions?

This captures a broadly held and widely repeated belief among Wikipedians that, on average, allowing people to contribute without creating accounts is a good decision for the community.

More formally, Yochai drew this conclusion on the basis of transaction cost economics: more barriers equals less action. Radically reduced barriers drives participation. With enough eyeballs...etc.

# Account Creation: A Barrier to (Good) Contributions?

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Mako gave the “Almost Wikipedia” talk at Wikia.

After the talk, Danny Horn came up and expressed skepticism in the claim made about account creation being part of Wikipedia’s success.

Lots of people in communities have voiced this feeling but Danny is a great example of somebody who argued this with some evidence and his argument goes something like this:

# Contrary Opinions!

- ▶ Most vandalism is from “anons” (**True!**)
- ▶ Most high quality contributions come from registered users (**True!**)
- ▶ Good faith contributors will take the few seconds to register. (**Testable!**)



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## Contrary Opinions! (with evidence!)

Danny had analyzed a few Wikia wikis that blocked anonymous editing and found what appeared to be:

- ▶ **A decrease in vandalism**
- ▶ **Stable or increasing contributions**

	Edits	Blocks	Edits/Block
January	7,000	67	104
February	9,300	57	163
March	6,300	78	81
April	6,300	20	315
May	4,700	6	783
June	5,600	14	400
July	9,900	17	582
August	5,300	20	265
September	3,000	16	187
October	3,300	21	157
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Edit/block data from Muppet Wiki during year anonymous editors were blocked.

[Table from Danny Horn]

13 / 35

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# How would accounts support public goods production?

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└ How would accounts support public goods production?

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This is a gross simplification, but it's consistent with theories and findings from HCI, exchange theory, and organizational communication.

Friedman and Resnick also argue that there's a complicated interplay where if the contribution costs exist, but are not high enough you might only chase away under-motivated good-faith contributors, but not the determined vandals...the point is that there are competing theories and evidence!

This is also a **real problem** faced by communities. People in the Wikia who heard we were working on this asked us to present this internally because they were engaged in serious community-wide discussions to turn off IP-editing and require accounts on all wikis.

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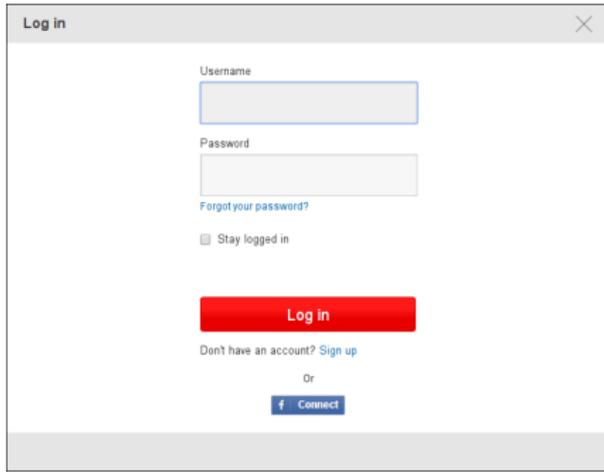
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Danny also explained that more than **100** Wikia wikis had switched to **block anonymous editing**...

Mako promised Danny he would do a more thorough analysis and get back to him...

- ▶ How much damage and vandalism never happens?
- ▶ How much good content is never contributed?

What happens when wikis require account registration (disallow IP-editing)?

- ▶ How much **damage and vandalism** never happens?
- ▶ How much **good content** is never contributed?

Very tricky question to answer because:

- We want a **causal** answer.
- We want to **see what's not happening** as well as what is.

# wikia

- ▶ Hosts 100,000s of publicly editable wikis
- ▶ Many of the largest wikis
- ▶ Use MediaWiki (same as Wikipedia)
- ▶ Founded in 2005 by Jimmy Wales, Angela, etc.
- ▶ Many large & small wikis are focused on fan culture

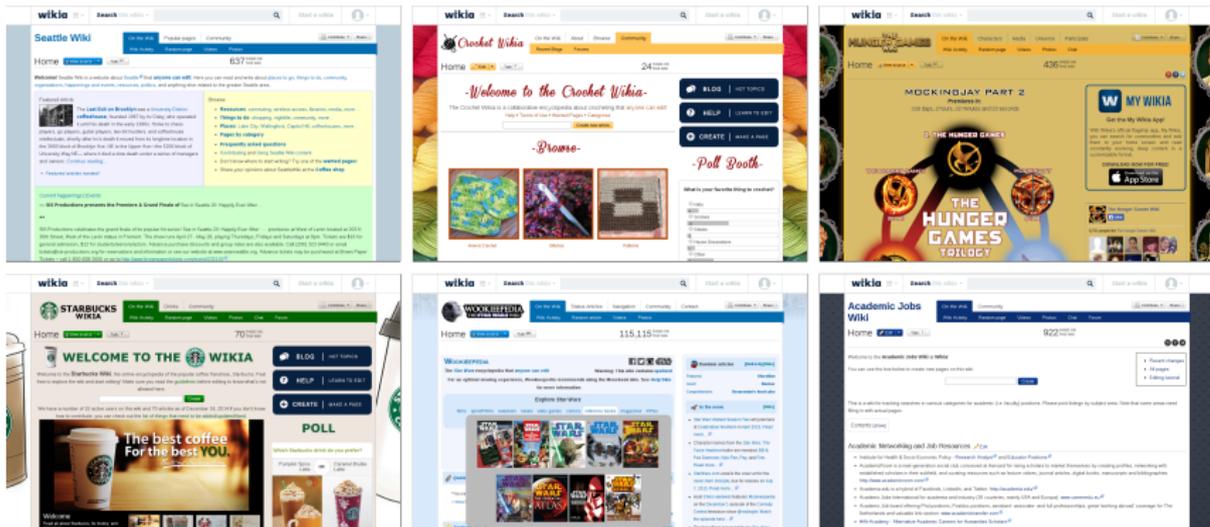
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A screenshot of a login form titled 'Log in'. It features a close button in the top right corner. The form contains two input fields: 'Username' and 'Password'. Below the password field is a link for 'Forgot your password?'. There is a checkbox labeled 'Stay logged in'. A prominent red 'Log in' button is centered below the form. At the bottom, there is a link 'Don't have an account? Sign up' and an 'Or' separator, followed by a blue 'Connect' button with a Facebook icon.

This is what account registration looks like. It takes 30 seconds. It does not require an email address. Very low barrier to entry.

# Analytic Strategy: Panel Regression Discontinuity

- ▶ **136 wikis** blocked contributions from unregistered contributors (one day to the next)

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└ Part II: Example study: Anonedits

└ Analytic Strategy: Panel Regression Discontinuity

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# Analytic Strategy: Panel Regression Discontinuity

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- ▶ **Within-wiki comparison** using regression discontinuity design (RDD) around the cutoff (+/- 3 months)

Reflections on Empirical Peer Production Research

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- ▶ Estimating the effect of the block on measures of damage and quality contributions regardless of who is contributing

In some sense, this is a weaker test than Benkler might argue. It might be that by being freed up from antivandalism work, admins can contribute more. Good contributions might still be deterred but we can at least see the effect.

Our measure of **damage**:

- **Reverted edits** – edits that are completely undone

# Results: Damage

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└ Part II: Example study: Anonedits

└ Results: Damage

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We use software and tools created by WMF's own Aaron Halfaker.

We find the probability that **any** edits will be reverted declines by about 55% (70% week before to about 15% week after).

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(Intercept)	3.52	(0.79)
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Window Week	0.12	(0.07)

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## Two measures of **quality**:

### ▸ **Unreverted edits**

- First we look at edits that are not reverted. Better than just total edits in some ways.
- One measure of quality embraced by Wikipedians.
- Originally developed/validated as WikiTrust (Luca Alfaro) and now implemented/maintained by Aaron Halfaker as part of MediaWiki Utilities Python package.
- Intuition is that tokens that stick longer are probably better.
- We parse seven edits ahead (higher number doesn't matter) and just count the total for every edit. Super skewed, so use log-transformations everywhere.

## Two measures of quality:

- ▶ **Unreverted edits**
- ▶ **Persistent word revisions**  
– a measure of both quality and productivity. i.e., words that stick around longer are better

Revisions	PWR
1: Apples are red.	6
2: Apples are blue.	0
3: Apples are red.	0
4: Apples are tasty and red.	1
5: Apples are tasty and blue.	0

Explanation of PWR. (Aaron Halfaker)

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2015-10-30

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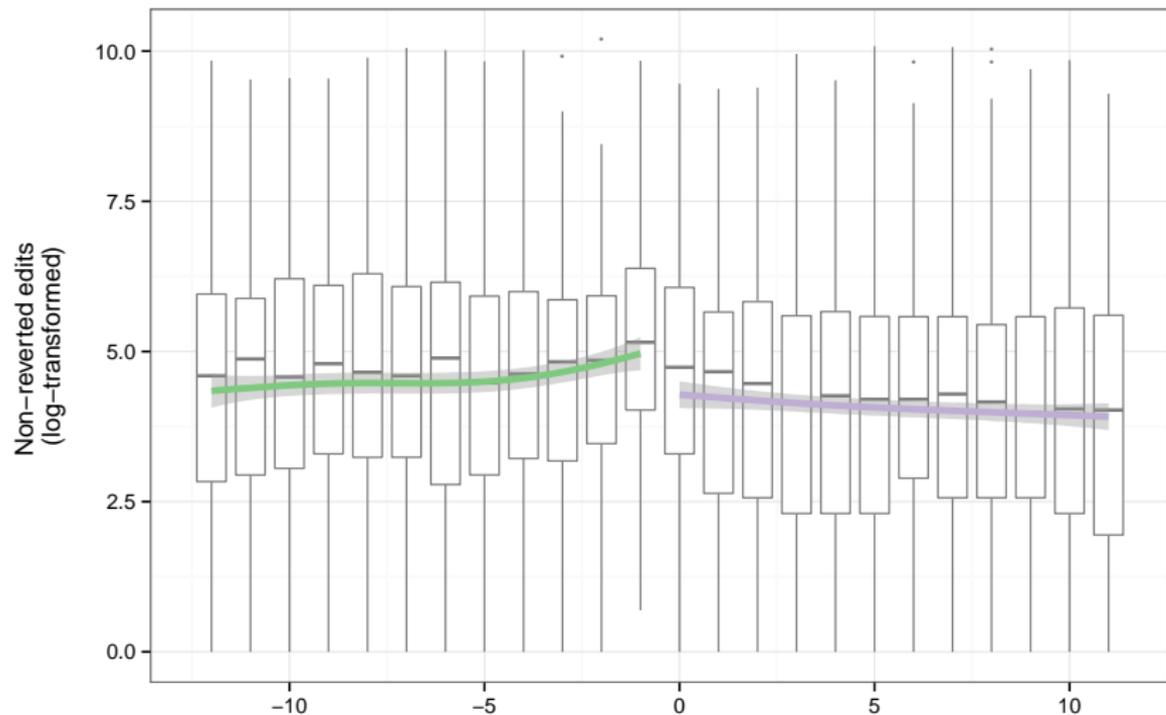
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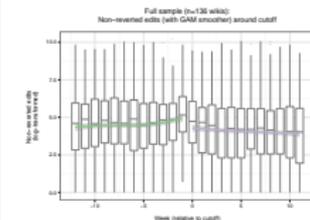
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# Results: Quality – Non-Reverted Edits

Full sample (n=136 wikis):  
Non-reverted edits (with GAM smoother) around cutoff



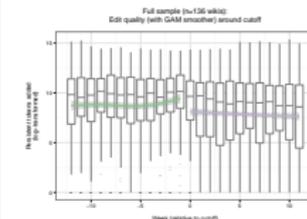
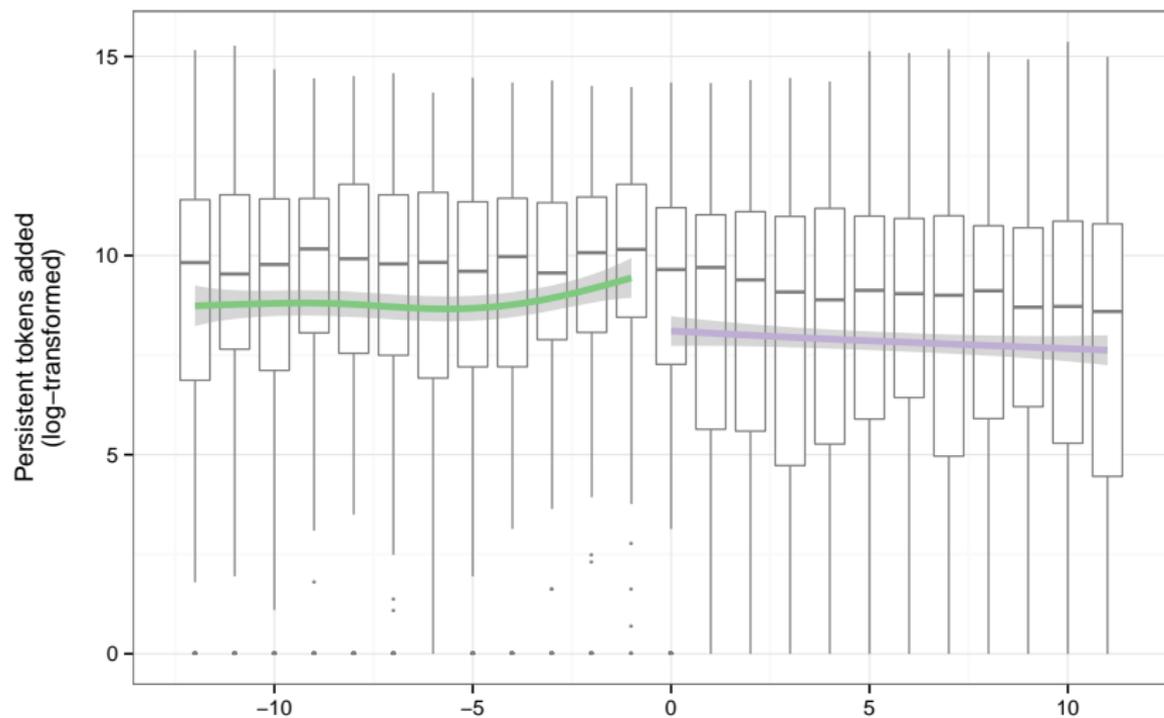
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We predict that this would translate to going from about 118 non-reverted edits in the week before the cutoff to about 85 non-reverted edits in the week after ( 30%).

# Results: Quality – Persistent Word Revisions

Full sample (n=136 wikis):  
Edit quality (with GAM smoother) around cutoff

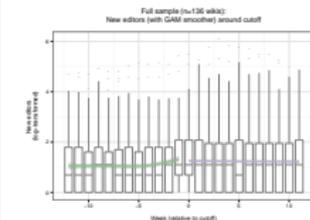
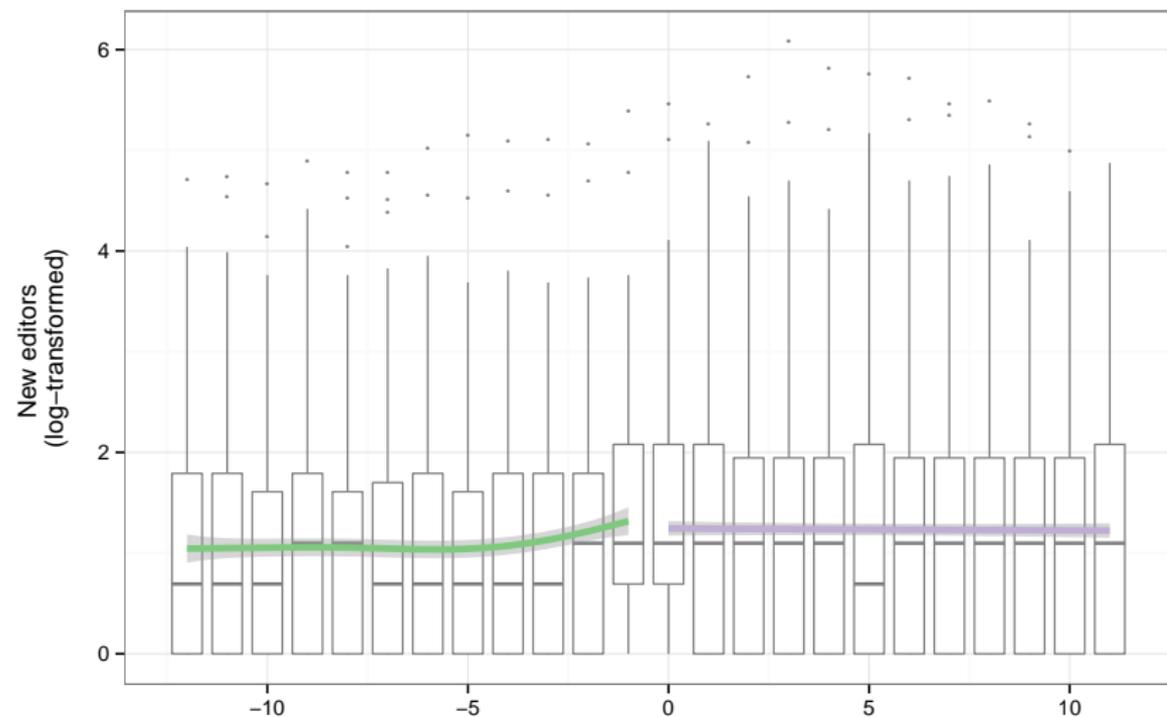


## Summary of findings across all wikis.

- So much more data. Skewed DV with many zeroes. So, we model the discontinuity using a negative binomial specification. Wiki and week fixed effects.
- A large, significant negative effect ( 62% drop) on persistent tokens added. 95% CI puts it between -32% and -91% drop.

# Results: New Editors

Full sample (n=136 wikis):  
New editors (with GAM smoother) around cutoff



New accounts that make at least one edit.

No meaningful change. Before the cutoff, we predict about 1.3 new editors per week; after the cutoff about 1.8 new editors.

Every editor matters, but it's clear that this is not the kind of increase that we would see if people who had formerly been making IP edits all registered accounts. Mostly, they just go away.

# Results are Robust!

Results are robust to:

- ▶ Multiple model specifications
- ▶ Dropping influential observations
- ▶ Different analytic windows
- ▶ Dropping contributions from administrators
- ▶ Limiting analysis only to newer contributors
- ▶ “Placebo” tests show no effect at other time points

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Reflections on Empirical Peer Production Research

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## Requiring accounts deters contributions:

- ▶ **55% decrease** in probability of any reverts (damage).
- ▶ **30% decrease** in non-reverted edits (quality).
- ▶ **60% decrease** in persistent word revisions (quality).

## Few people make the effort to register new accounts:

- ▶ New editors per week **increases by .5 editors**.

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Results are within the range of previous (unpublished) experimental evidence from Wikipedia.

# Takeaways

- ▶ Support for transaction cost approach.

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- ▶ But also evidence that barriers can enhance the signal and may (on balance) increase quality.

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Identify networks of core contributors and test for effects on their participation.

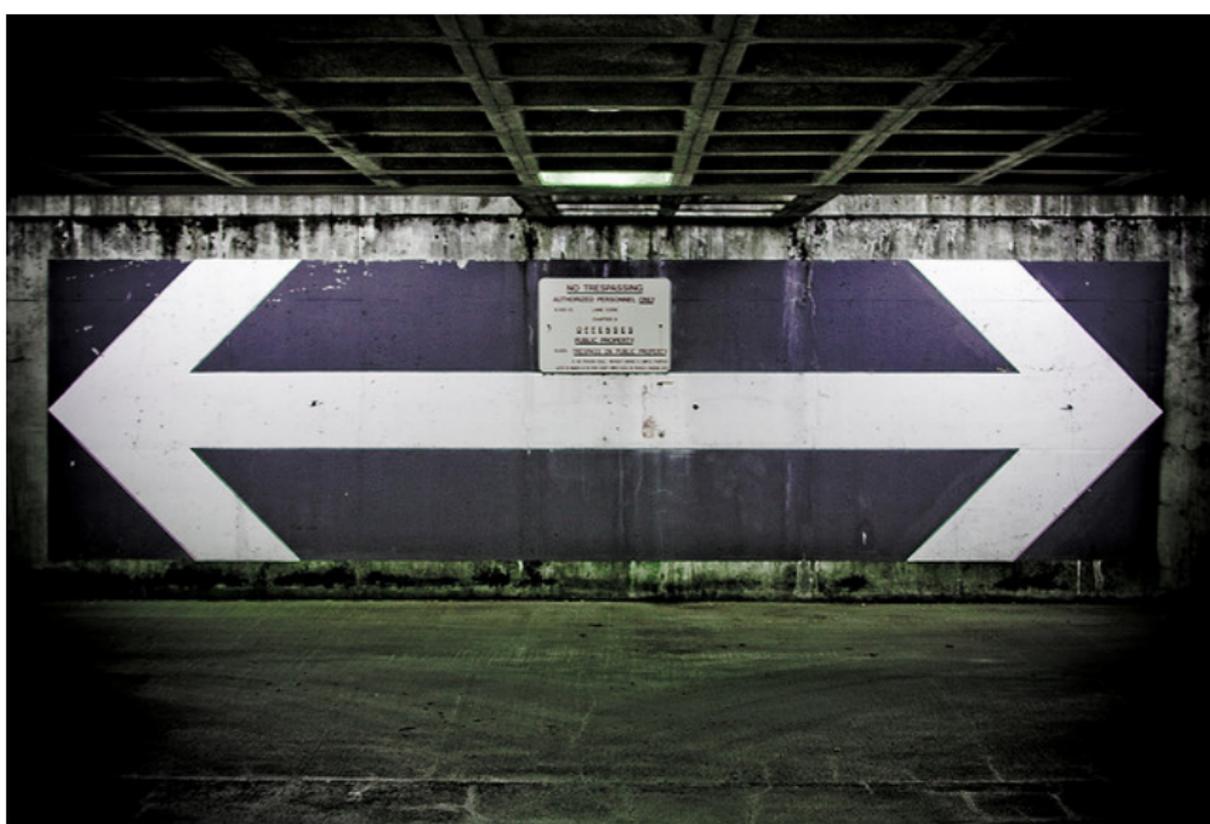
- ▶ Qualities/quantities of contribution.
- ▶ Survival (in terms of editing activity).

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## Further analysis:

Identify networks of core contributors and test for effects on their participation.

- ▶ Qualities/quantities of contribution.
- ▶ Survival (in terms of editing activity).



# A worthwhile trade-off?

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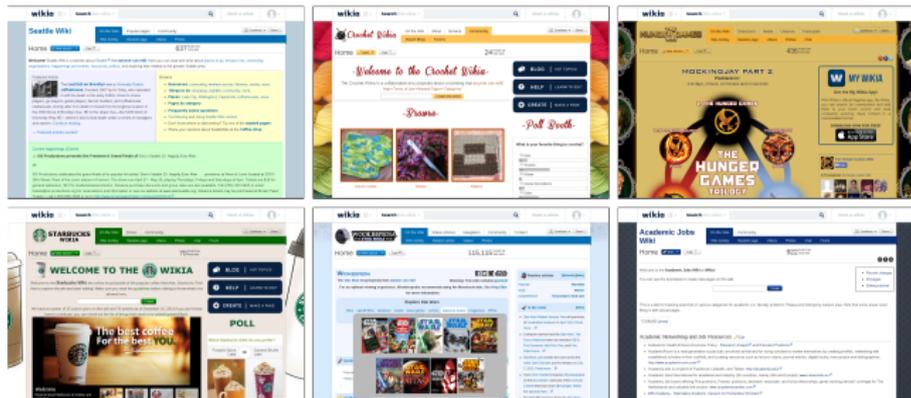


A worthwhile trade-off?

It depends on a number of tradeoffs:

- Do you have a principled objection to requiring accounts?
- How costly is removing tokens? If most reverts are done by bots, it might be extremely low which would tip the scale.

# Advantages of observational population-level comparison



- ▶ Enormous **between-wiki variation** on our measures
- ▶ Increased **precision** that comes from using larger datasets
- ▶ Enhanced **internal validity** from causal identification using observational data

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- ▶ Coarse measures  $\neq$  participant experiences

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└─ Implications and Challenges for Future Work

└─ Limitations

Limitations



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- good quasi-experiments are hard to find
- randomly assigning groups or organizations is still relatively rare
- most platforms are still controlled by firms who aren't interested in sharing data widely
- Using data that is uniquely both broad and deep to dig into content of contributions and context of organizational-level effects in terms of individual experiences.



Thank you!

makohill@uw.edu

aaronshaw@northwestern.edu

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