

How can We Increase Pro-Social Behavior?  
An Experiment with Referees at the *Journal of Public Economics*

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# Introduction

- Specific question: how can we improve the speed/quality of peer review?
- Broader question: what policies best motivate pro-social behavior?
  - Economic incentives (e.g., corrective subsidies)
    - Could have negative effects by crowding out intrinsic motivation
  - Social incentives (e.g., public recognition)
    - Effective in situations where economic incentives are not?
- Considerable lab evidence on these questions; much less field evidence

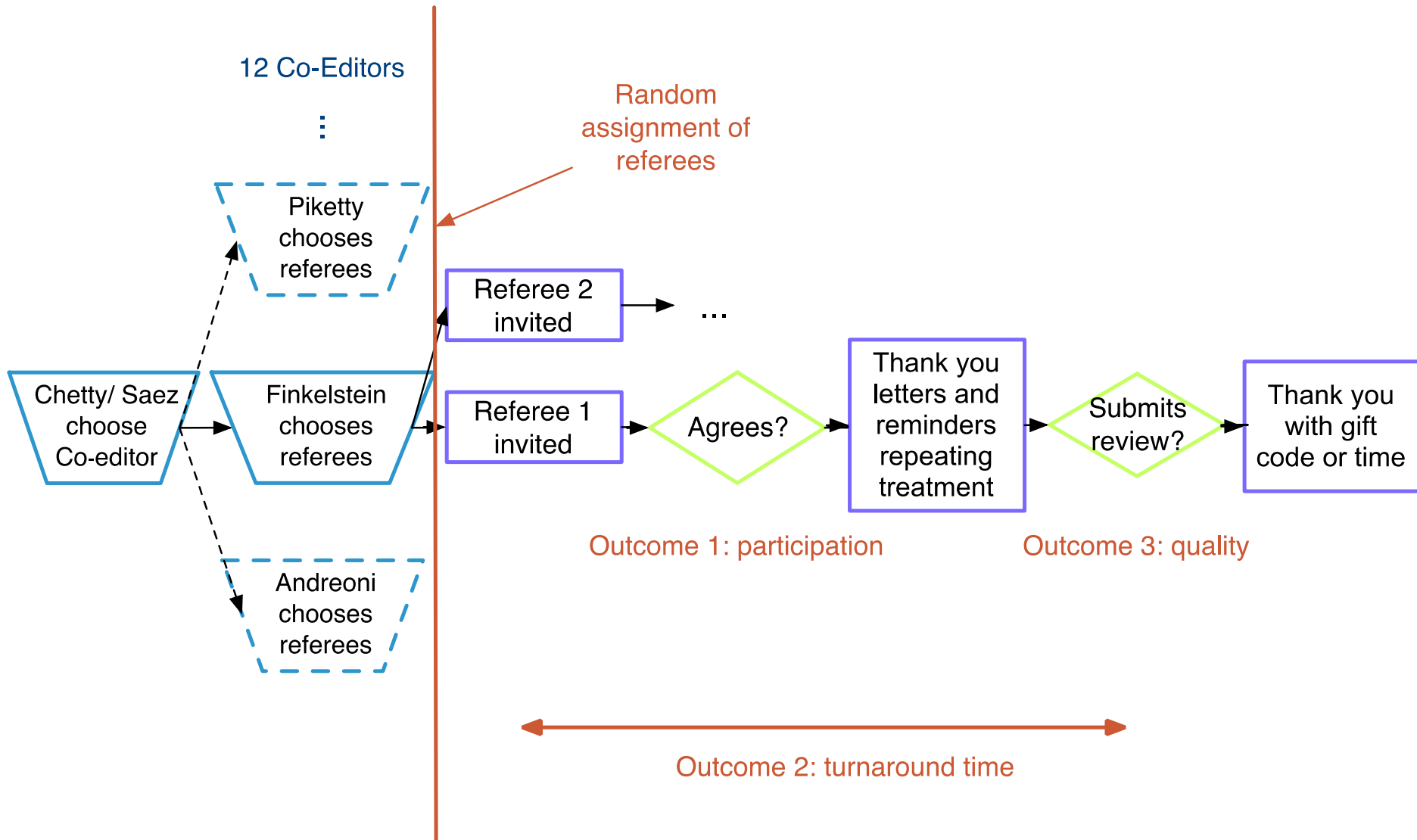
# Field Experiment: Referee Behavior

- Peer review is a canonical example of pro-social behavior
  - Small private reward from submitting a high-quality report quickly
  - Potentially large gains to author and society
- Experiment analyzing impacts of economic and social incentives on peer review process
  - 3,000 referee invitations for the *Journal of Public Economics*
  - Run for 20 months from Feb. 15, 2010 to Oct. 26, 2011

# Experimental Design

- Referees randomized to one of four groups in invitation emails
  1. *6 week* – 6 week deadline [control group]
  2. *Social* – 6 week deadline + referee turnaround time posted on journal's website at end of year
  3. *4 week* – 4 week deadline
  4. *Cash* – 4 week deadline + \$100 for meeting deadline
- Assignments stable over time: referees never switch groups
- Cash payments ended on May 9, 2011 → study post-cash effects

# Experiment Timeline



# 1. 6 Week (Control Group) E-mail Invitation

Ref. No.: JPUBE-D-10-00356

Title: Commodity Price Shocks and Taxation

Editor: Kai Konrad

Author(s): Jim Smith, Ph. D.

Dear László Sándor,

You are invited to review the above-mentioned manuscript for publication in the Journal of Public Economics. The manuscript's abstract is at the end of this email.

If you accept this invitation, I would be very grateful if you would return your review on or before **July 21, 2010** (6 weeks from now).

Please choose one of the following options to proceed:

- 1) If you are willing to review this manuscript, please click: [Agree to Review](#)
- 2) If you are not able to review this manuscript, please click: [Decline to Review](#)
- 3) If you would like to view the manuscript before making a decision, please click: [View Manuscript](#).

Your username is: LSandor. Click [here](#) to retrieve your password.

Yours sincerely,

Liz Anderson  
Senior Editorial Assistant  
Journal of Public Economics

**ABSTRACT:** We examine the effects that international commodity price shocks have on external debt using panel data for a world sample of 93 countries spanning the period 1970-2007. Our main finding is that positive commodity price shocks lead to a significant reduction in the level of external debt in democracies, but to no significant reduction in the level of external debt in autocracies. To explain this result, we show that positive commodity price shocks lead to a statistically significant and quantitatively large increase in total government expenditures in autocracies. In democracies on the other hand government expenditures did not increase significantly.

To assist you in the reviewing process, I am delighted to offer you full access to Scopus (the largest abstract and citation database of research information) for 30 days. With Scopus you can search for related articles, references and papers by the same author. You may also use Scopus for your own purposes at any time during the 30-day period. If you already use Scopus at your institute, having this 30 day full access means that you will also be able to access Scopus from home. Access instructions will follow once you have accepted this invitation to review.

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## 1. 6 Week (Control Group) E-mail Invitation

If you accept this invitation, I would be very grateful if you would return your review on or before **July 18, 2010** (6 weeks from now).



## 2. Social Treatment E-mail Invitation

If you accept this invitation, I would be very grateful if you would return your review on or before **July 18, 2010** (6 weeks from now). In the interest of improving transparency and efficiency in the review process, Elsevier will **publish referee times by referee name**, as currently done by the Journal of Financial Economics at [this website](#). The referee times for reports received in 2010 will be posted on the Journal of Public Economics website in January 2011. Note that referee anonymity will be preserved as authors only know the total time from submission to decision (and not individual referee's times).

***JFE* Ad Hoc Referees**

**The data below covers the period January 1, 2008 through December 31, 2008;  
it reflects the activity of the 338 individuals assisting us during that interval.**

	<b>Referee</b>		<b>Manuscript(s)</b>	
	<b>Name</b>	<b>Affiliation</b>	<b>Reviewed</b>	<b>Avg Days</b>
1	Acharya, Viral V.	New York University	1	28
2	Aggarwal, Reena	Georgetown University	2	29
3	Ait-Sahalia, Yacine	Princeton University	2	30
4	Albuquerque, Rui	Boston University	3	31
5	Almeida, Heitor	New York University	1	28
6	Amihud, Yakov	New York University	2	10
7	Andersen, Torben	Northwestern University	2	28
8	Ang, Andrew	Columbia University	5	20
9	Asquith, Paul	Massachusetts Institute of Technology	1	0
10	Avramov, Doron	University of Maryland	1	32
11	Back, Kerry	Texas A&M University	2	74
12	Bailey, Warren B.	Cornell University	3	15
13	Baker, Malcolm	Harvard University	3	32
14	Balduzzi, Pierluigi	Boston College	1	14
15	Barber, Brad	University of California-Davis	4	31
16	Barberis, Nicholas C.	Yale University	3	114
17	Barinov, Alexander	University of Georgia	2	8
18	Basak, Suleyman	London Business School	1	24
19	Bates, David R.	University of Iowa	1	28
20	Beber, Alessandro	University of Amsterdam	2	30
...				

### 3. Four Week Deadline Treatment E-mail Invitation

If you accept this invitation, I would be very grateful if you would return your review on or before **July 4, 2010** (4 weeks from now).

## 4. Cash Treatment E-mail Invitation

If you accept this invitation, I would be very grateful if you would return your review on or before **July 4, 2010** (4 weeks from now). As a token of appreciation for timely reviews, you will receive a **\$100 Amazon.com® Gift Card\*** if you submit your report on or before the due date. The Journal of Public Economics will automatically email you a gift card code within a day after we get your report (no paperwork required).

## Reminder E-mail One Week Before Due Date

Ref. No.: JPUBE-D-10-00356

Title: Commodity Price Shocks and Taxation

Editor: Kai Konrad

Author(s): Jim Smith, Ph. D.

Journal of Public Economics

Dear László Sándor,

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You may submit your comments online in our editorial system by clicking [here](#). Please login as a Reviewer using the username and password I sent you in my first email.

You may access the manuscript by selecting the "Pending Assignments" link on your Main Menu page. To submit your comments, please click on the "Submit Reviewer Recommendation" link.

With kind regards,

Liz Anderson

Senior Editorial Assistant

Journal of Public Economics

**Table 1: Summary Statistics**

Variable	Mean	Std. Dev.	Median
<u>Invitation to Referee (N = 2,423)</u>			
Agreed to do review	66.2%	47.3	
<u>Refereeing Statistics conditional on agreement (N = 1605)</u>			
Reviews censored (not submitted)	6.3%	24.3%	
Review time conditional on submitting review (days)	44.9	28.6	41.0
New referee (no historical data)	32.7%	46.9%	
<u>Referee Characteristics (N = 1,157)</u>			
Agreed to do 1 job during experiment	74.9%	43.4%	
Agreed to do 2 jobs during experiment	16.4%	37.1%	
Agreed to do 3+ jobs during experiment	8.6%	28.1%	
Tenured	54.6%	49.8%	
Academic	92.4%	26.5%	
American	52.5%	50.0%	
Female	12.3%	32.9%	

**Table 2a: Randomization Tests Full Sample of All Invited Referees**

Variable	6 week	Social	4 Week	Cash	p value
	(1)	(2)	(3)	(4)	(5)
Has pre-experiment data	58.2%	63.6%	66.0%	66.6%	0.07
Prior agreement rate	73.8%	70.3%	77.4%	73.8%	0.17
Prior median turnaround time	54.1	57.1	55.2	58.6	0.24
Tenured	60.2%	68.4%	59.8%	65.9%	0.07
Academic	90.2%	93.4%	93.0%	93.4%	0.51
American	53.4%	58.6%	53.8%	51.2%	0.30
Female	12.2%	8.3%	13.4%	11.8%	0.20
Observations	639	568	626	590	

**Table 2b: Randomization Tests Sample of Referees who Accepted Invitations**

Variable	6 week (1)	Social (2)	4 Week (3)	Cash (4)	p value (5)
Has pre-experiment data	64.1%	65.1%	71.6%	68.2%	0.25
Prior agreement rate	82.5%	79.2%	87.3%	81.5%	0.03
Prior median turnaround time	52.1	57.1	53.8	57.0	0.19
Tenured	50.8%	59.9%	50.9%	59.4%	0.09
Academic	91.0%	96.2%	91.8%	93.0%	0.09
American	56.5%	57.9%	55.9%	51.1%	0.51
Female	14.1%	9.9%	16.1%	12.6%	0.30
Observations	432	347	401	425	



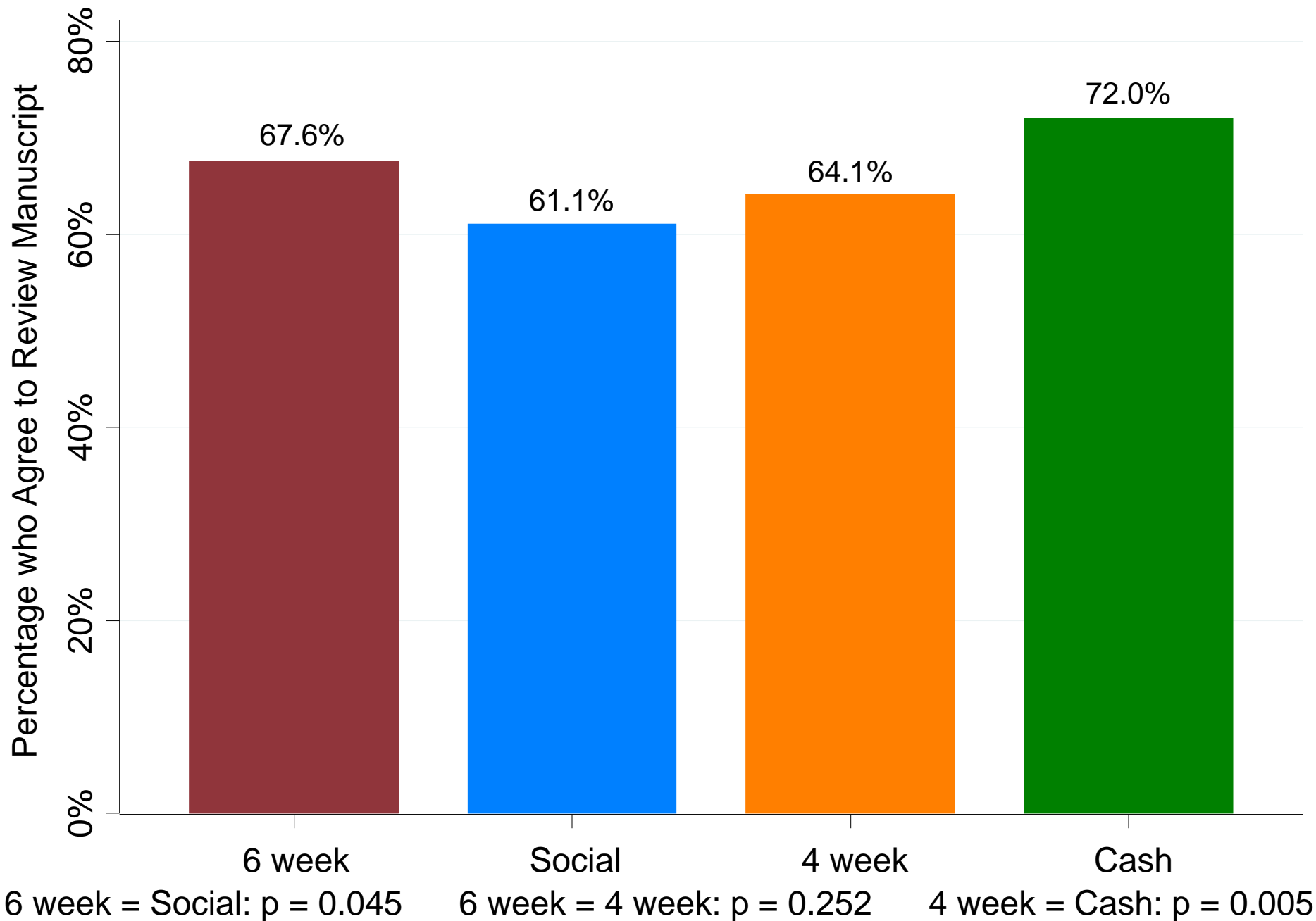
# Experimental Analysis

1. Participation
2. Turnaround Times
3. Review Quality
4. Spillover Effects on Other Journals

# Outcome 1: Participation

- Test if treatments affect the fraction of referees who accept invitation to write reports

## Fraction of Accepted Referee Invitations by Treatment Group



# Selection: Anecdotal Evidence

## *Selection out of social*

“I was surprised to receive an email stating the journal is posting referee times by names. I don't like Elsevier's way of showing its appreciation for free labor, particularly given how much it charges for its journals. I would like to withdraw my agreement to referee this paper. Sorry about that. I would have been happy to send in a report on time under a different policy.”

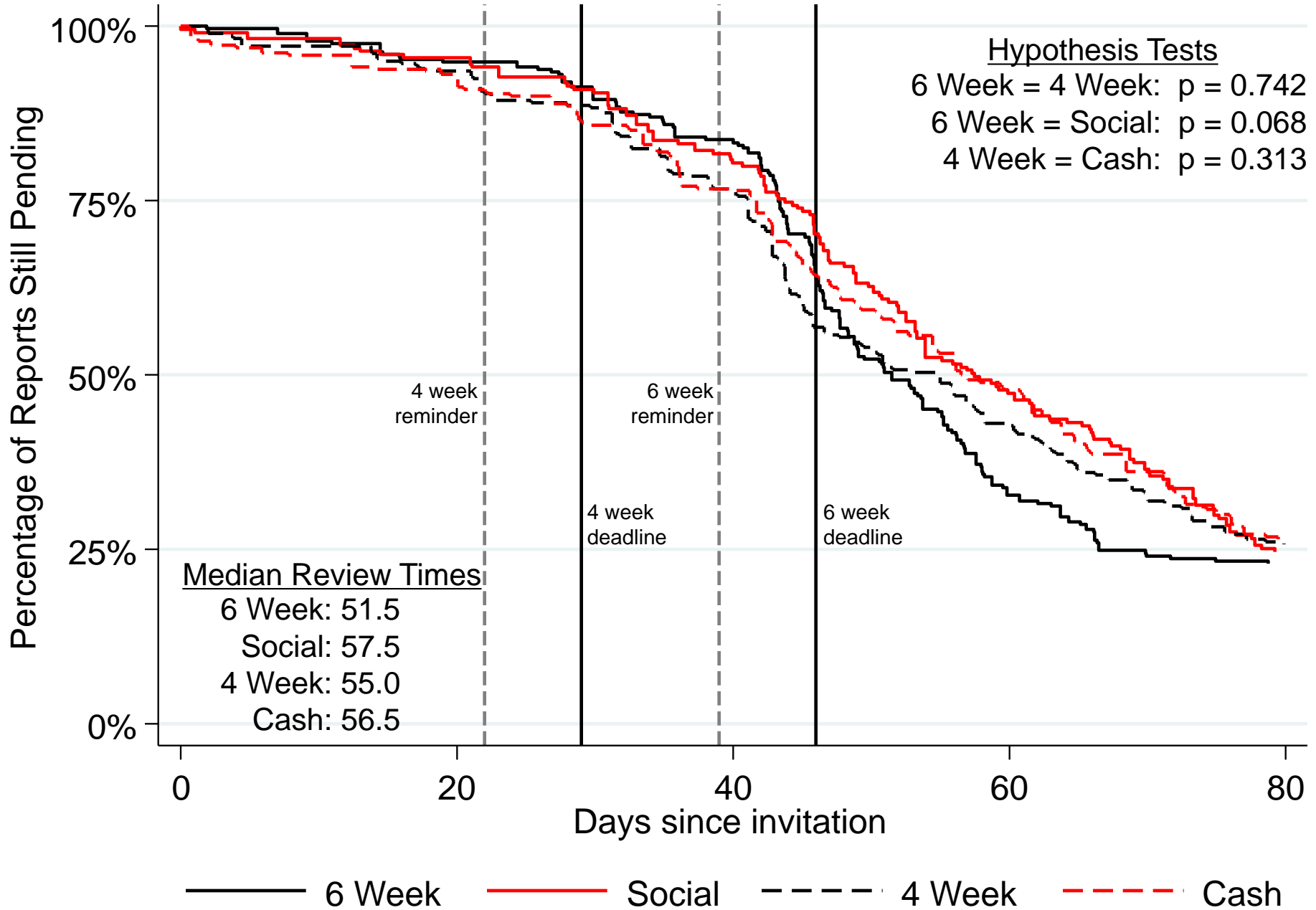
## *Selection into cash*

“I am sorry to have to decline this “invitation” to work for free.... For me, this practice has become too discouraging. Can't Elsevier offer a better reward for the time they ask to devote to this screening?”

# Outcome 2: Turnaround Time

- Now analyze impacts of treatments on time taken to submit report
- Treatment effects may be biased by selection into agreement to referee
  - Ex: faster referees may accept cash invitation
- To test for such selection, analyze pre-experiment turnaround among referees who agree to participate

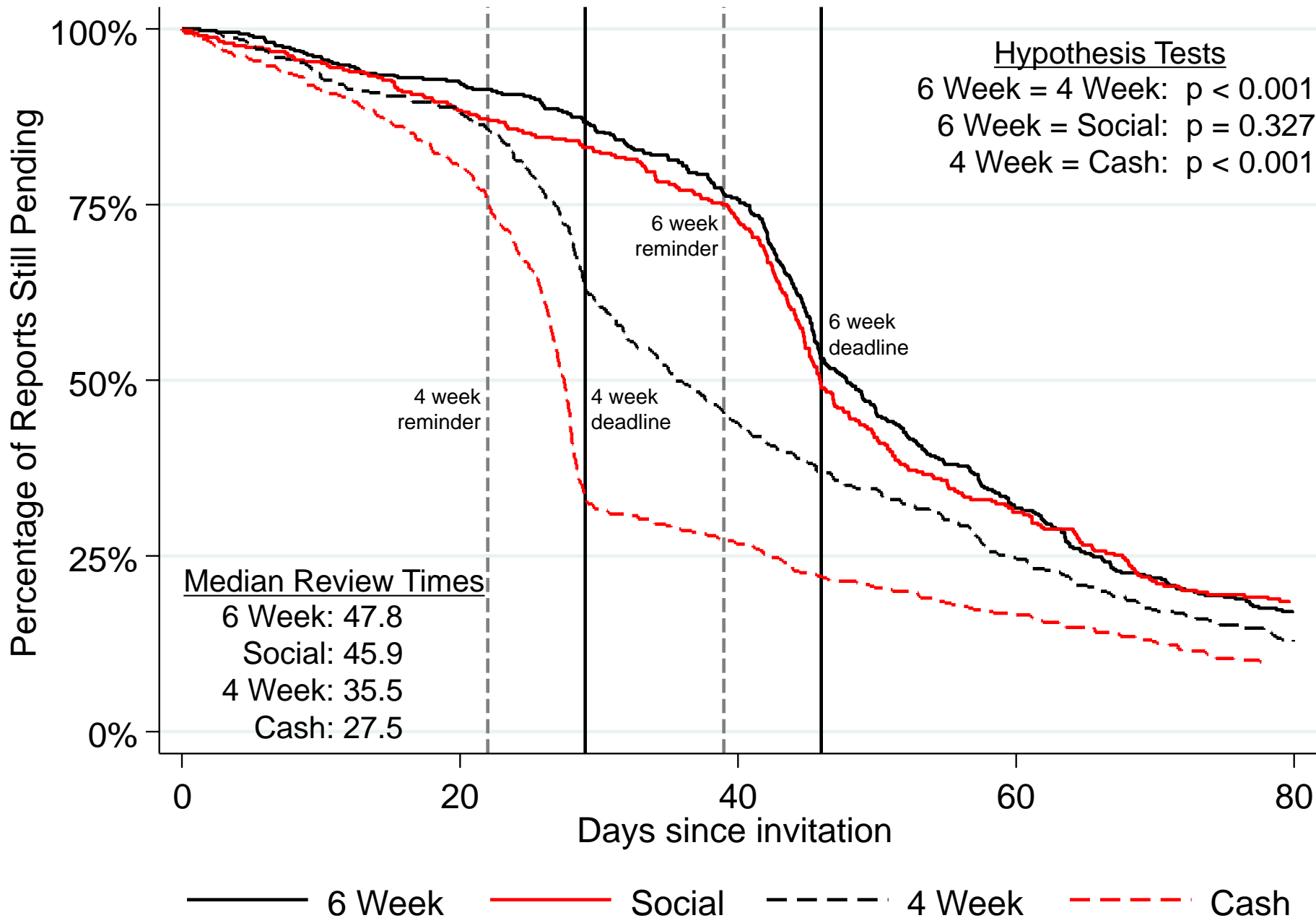
# Pre-Experiment Review Times for Referees who Accept During Experiment



# Outcome 2: Turnaround Time

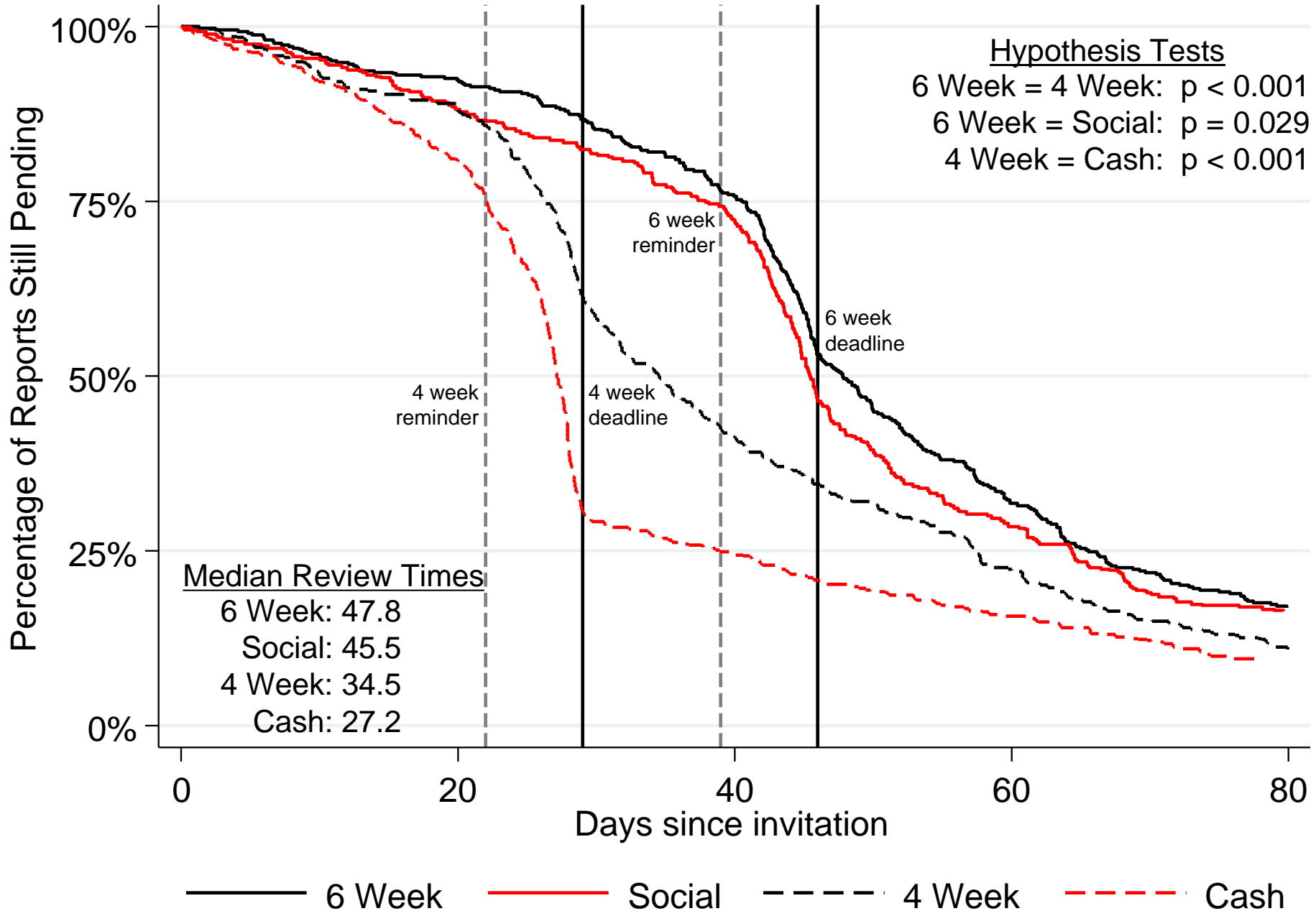
- Now analyze impacts of treatments on time taken to submit report
- Treatment effects may be biased by selection into agreement to referee
  - Ex: faster referees may accept cash invitation
- To test for such selection, analyze pre-experiment turnaround among referees who agree to participate
- Account for any selection by reweighting using pre-experiment turnaround times [Dinardo, Fortin, Lemieux 1996]
- Most results also robust to use of non-parametric trimming bounds instead [Lee 2009]

# Review Times by Treatment Group During Experiment





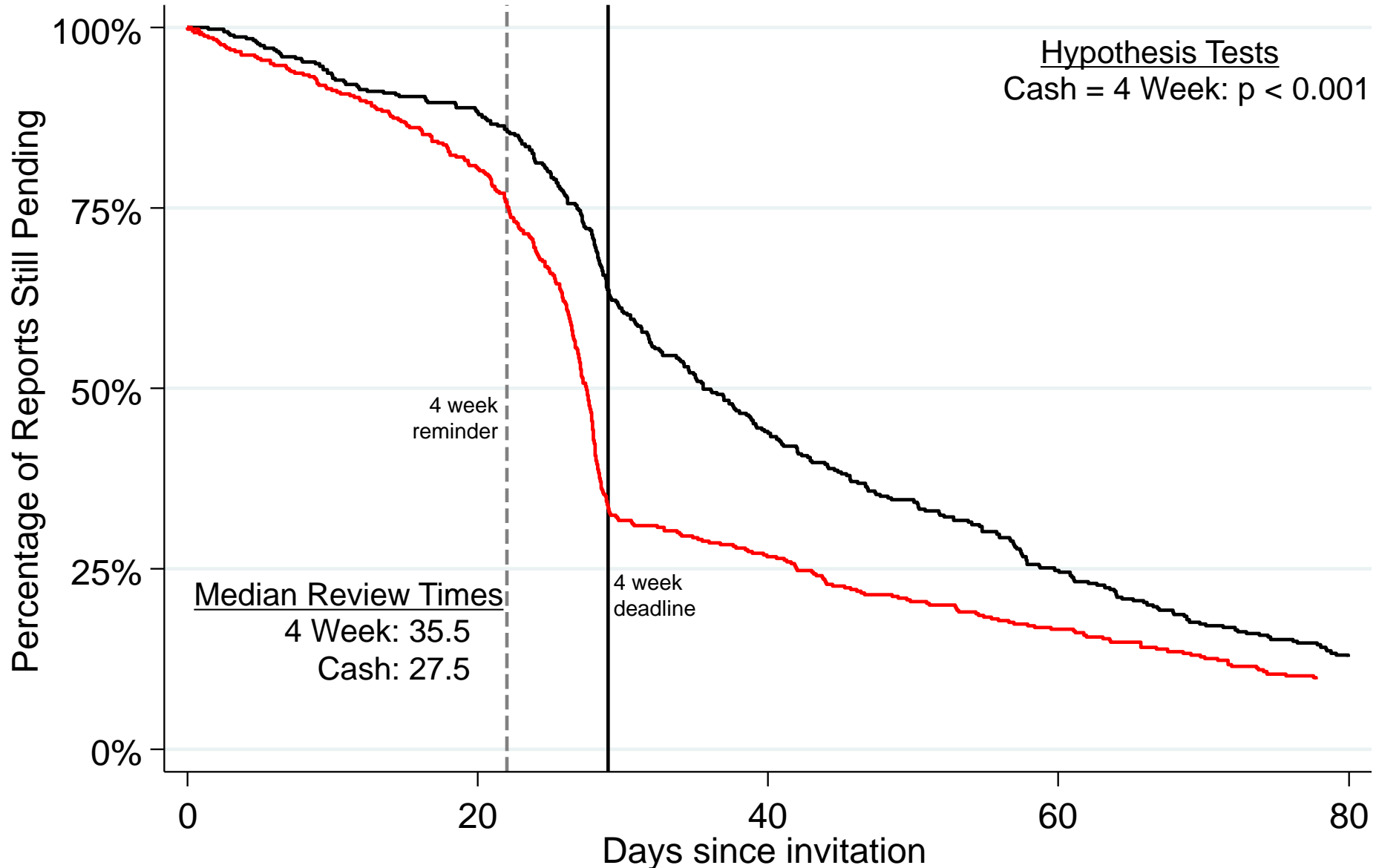
# Review Times by Treatment Group: Reweighted Estimates



# Crowd-out of Intrinsic Motivation

- Do cash incentives crowd-out intrinsic motivation?
  - Social psychology literature predicts that cash rewards can have negative long-run effects [e.g., Deci 1971, Benabou and Tirole 2003]
  - Existing evidence based primarily on lab experiments [Deci et al. 1999, Kamenica 2012]
- We ended cash treatment six months before other treatments to test this hypothesis
  - Do cash-treated referees become slower than four-week group after they stop receiving cash payments?

# Review Times Before vs. After End of Cash Reward



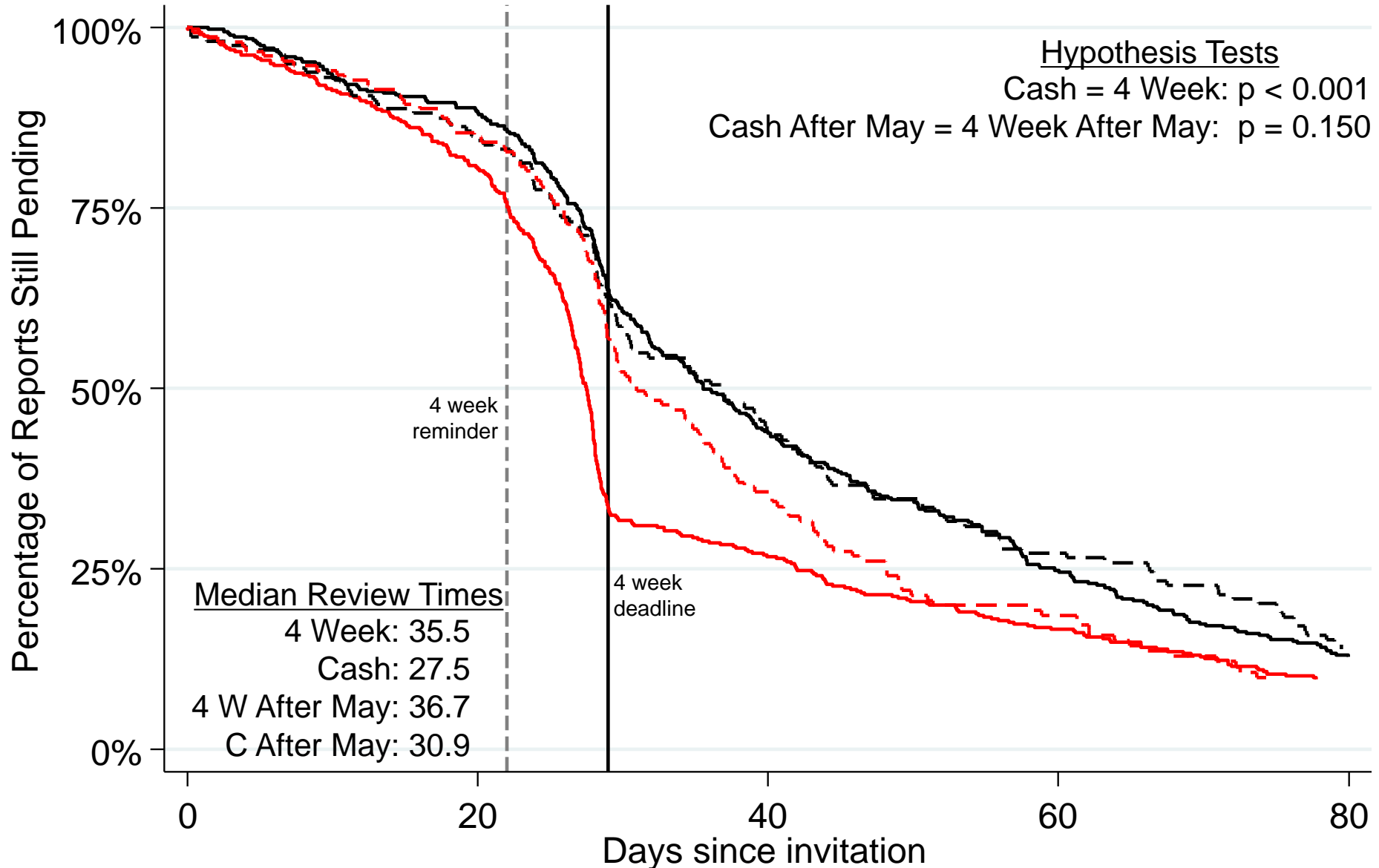
— 4 Week (before May 9)

— Cash (before May 9)

- - - 4 Week (after May 9)

- - - Post-Cash (after May 9)

# Review Times Before vs. After End of Cash Reward

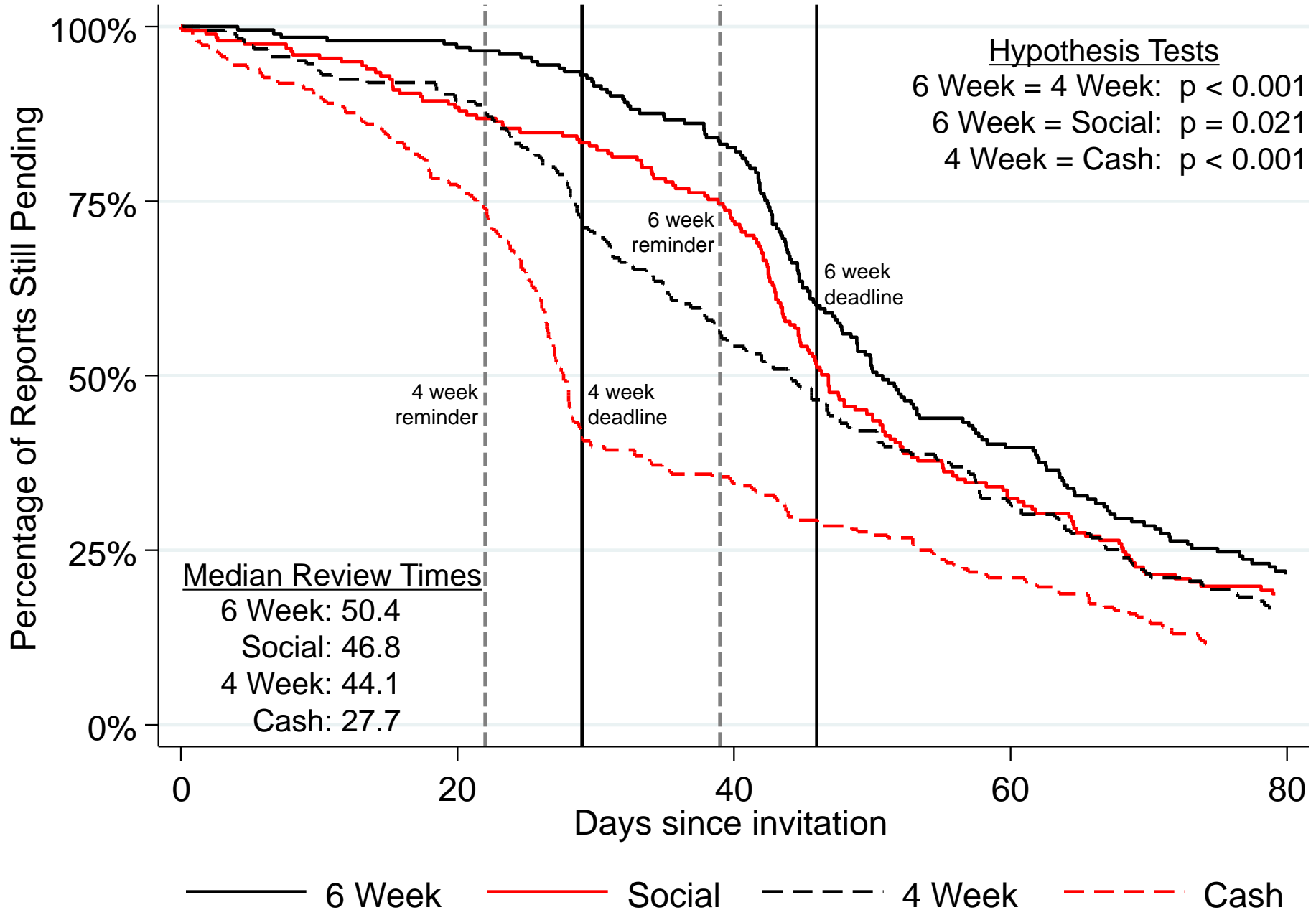


— 4 Week (before May 9)      — Cash (before May 9)  
- - - 4 Week (after May 9)      - - - Post-Cash (after May 9)

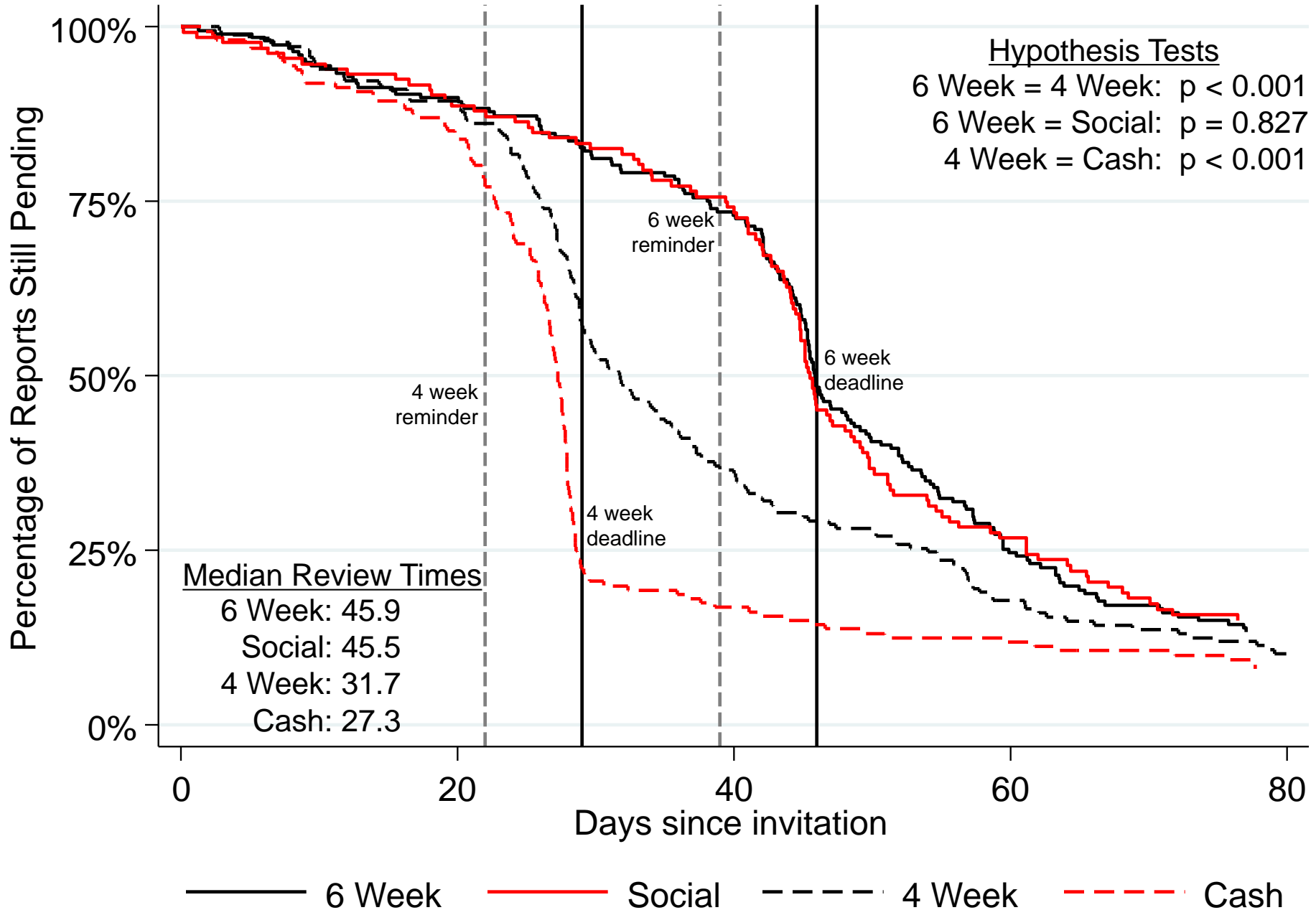
# Heterogeneity in Treatment Effects

- We collected referee characteristics from CV's posted online
  - Academic position, tenure, employer rank, gender, country
- Do treatment effects vary by observable characteristics?
- Strongest difference: tenured vs. untenured

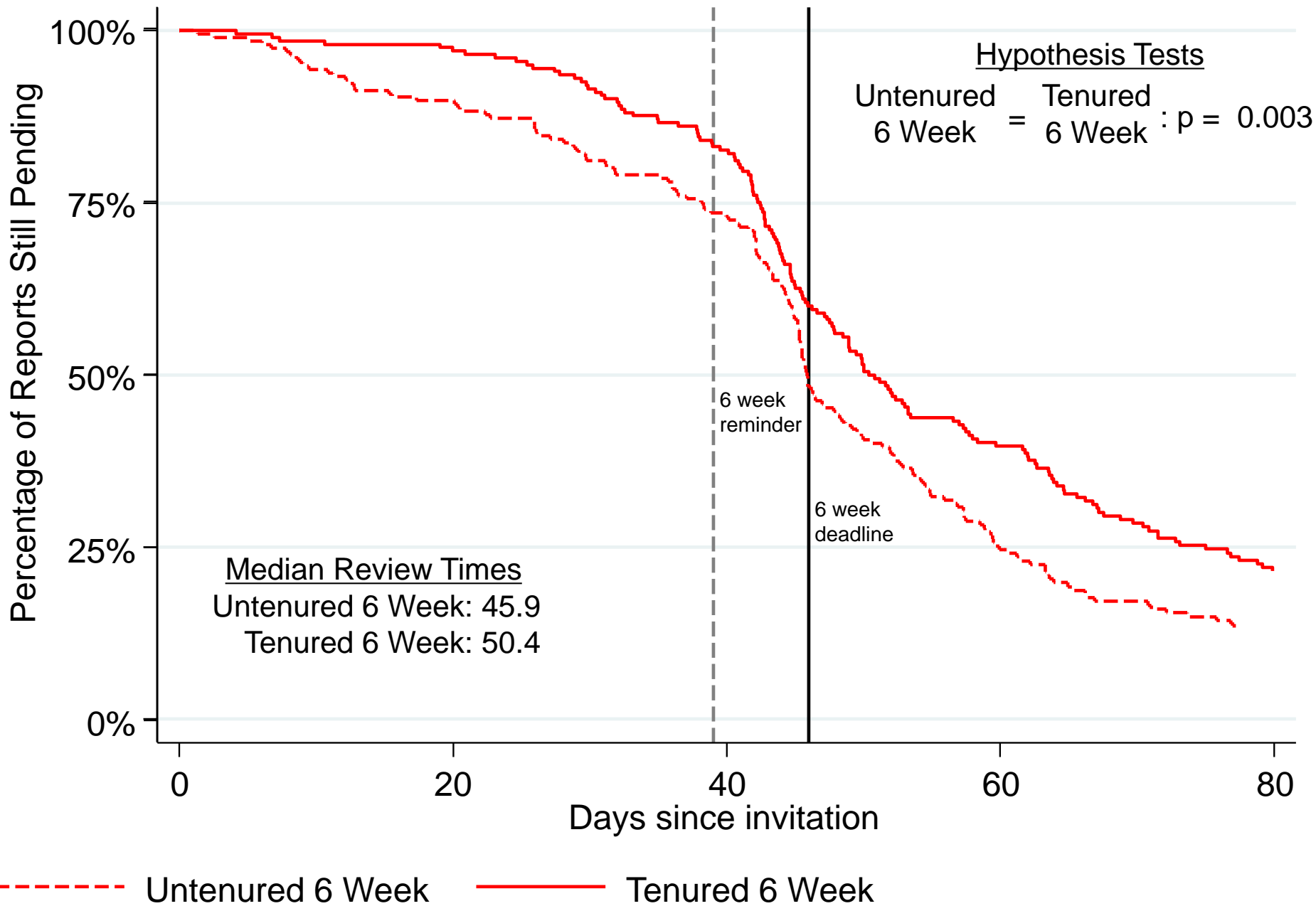
# Turnaround Times by Treatment Group: Tenured Referees



# Turnaround Times by Treatment Group: Untenured Referees

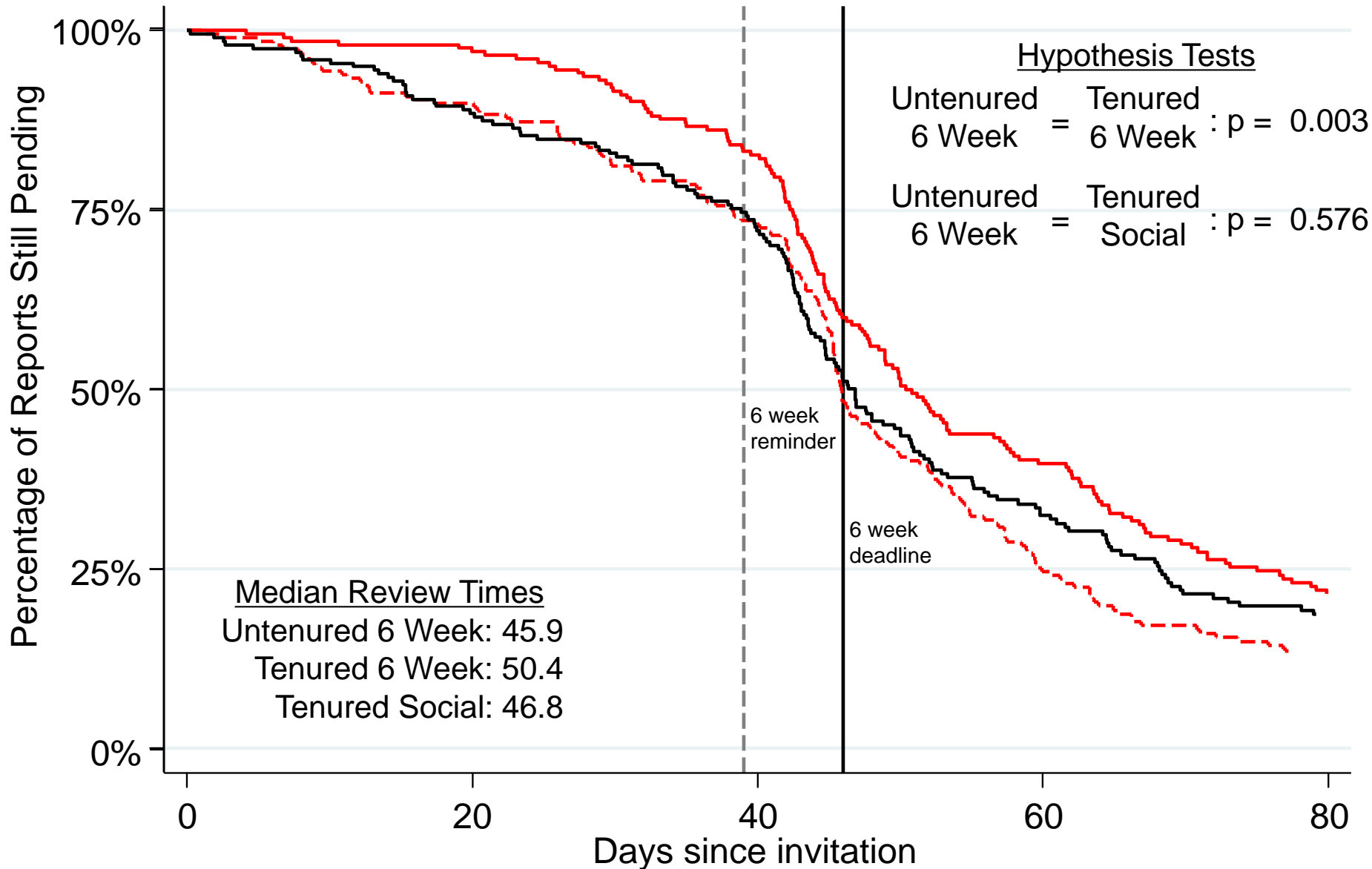


# Turnaround Times: Tenured vs. Untenured Referees





# Turnaround Times: Tenured vs. Untenured Referees

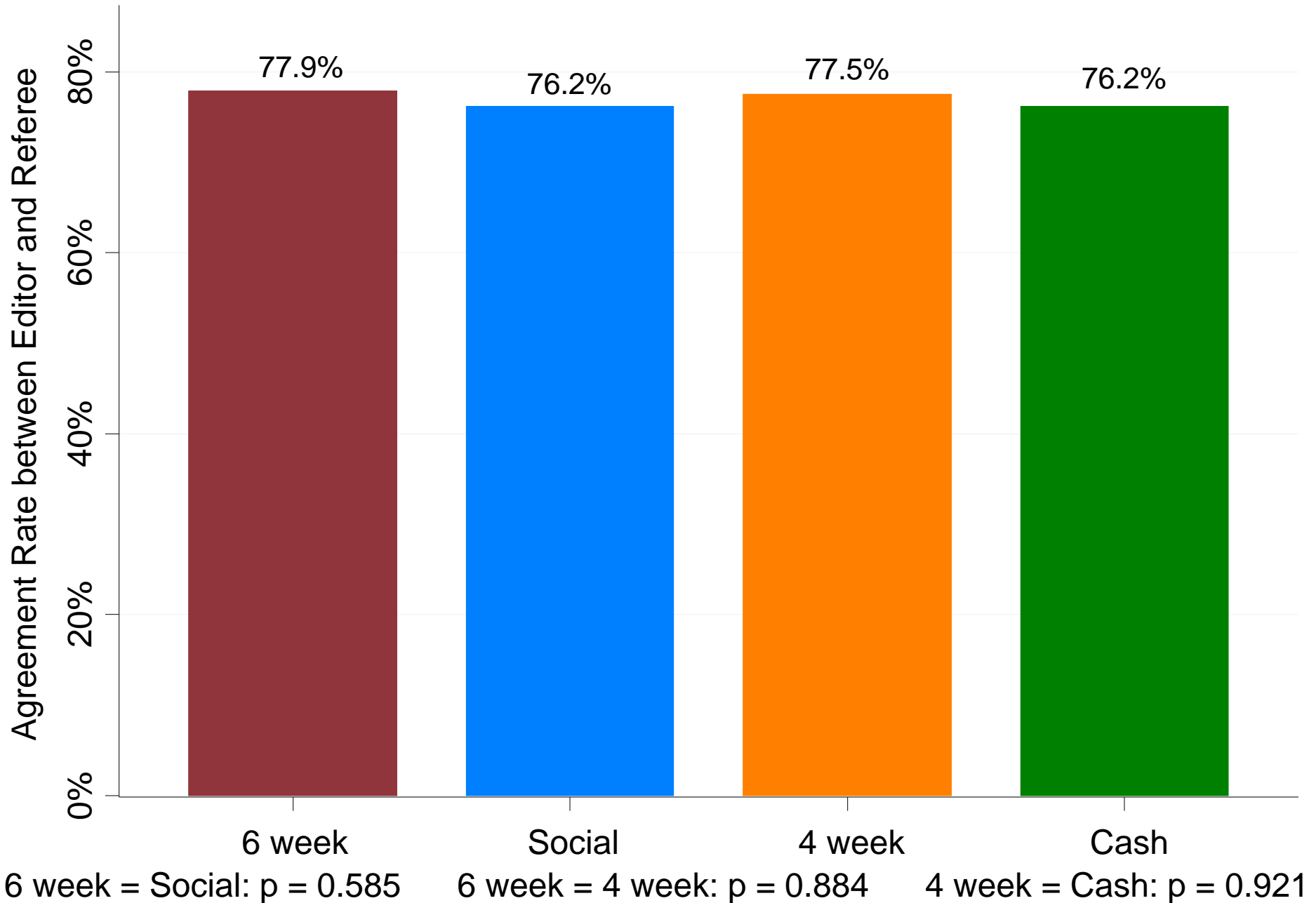


--- Untenured 6 Week      — Tenured 6 Week      — Tenured social

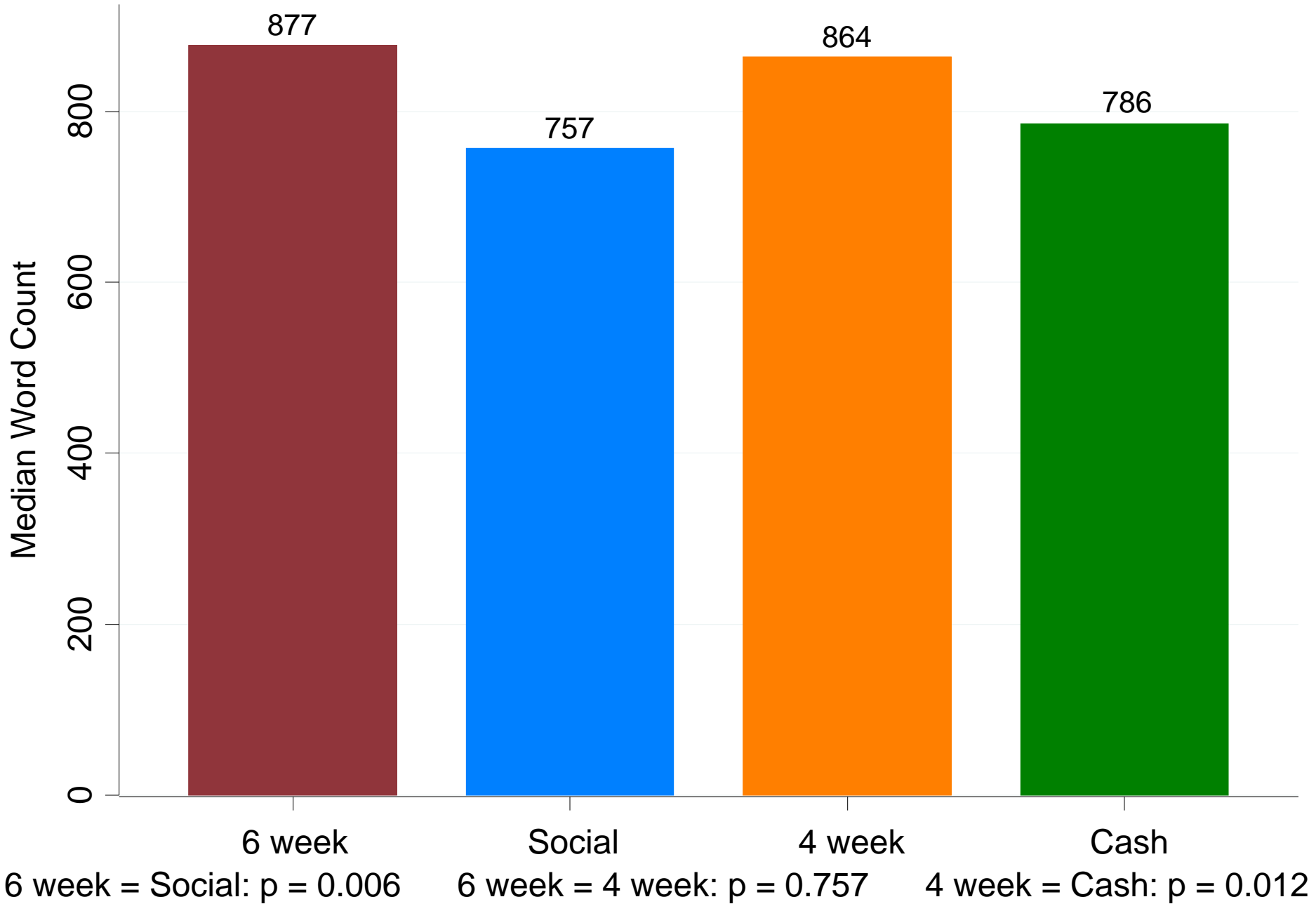
# Outcome 3: Review Quality

- Do referees who submit reports more quickly because of treatments write lower quality reports?
- Multi-tasking problem in contracts [Holmstrom and Milgrom 1991]
- Two proxies for quality:
  1. Does editor agree with referee recommendation (accept, revise, or reject)?
  2. Length of report to author and letter to editor

# Does Editor Follow Referee's Recommendation to Accept, Revise, or Reject?



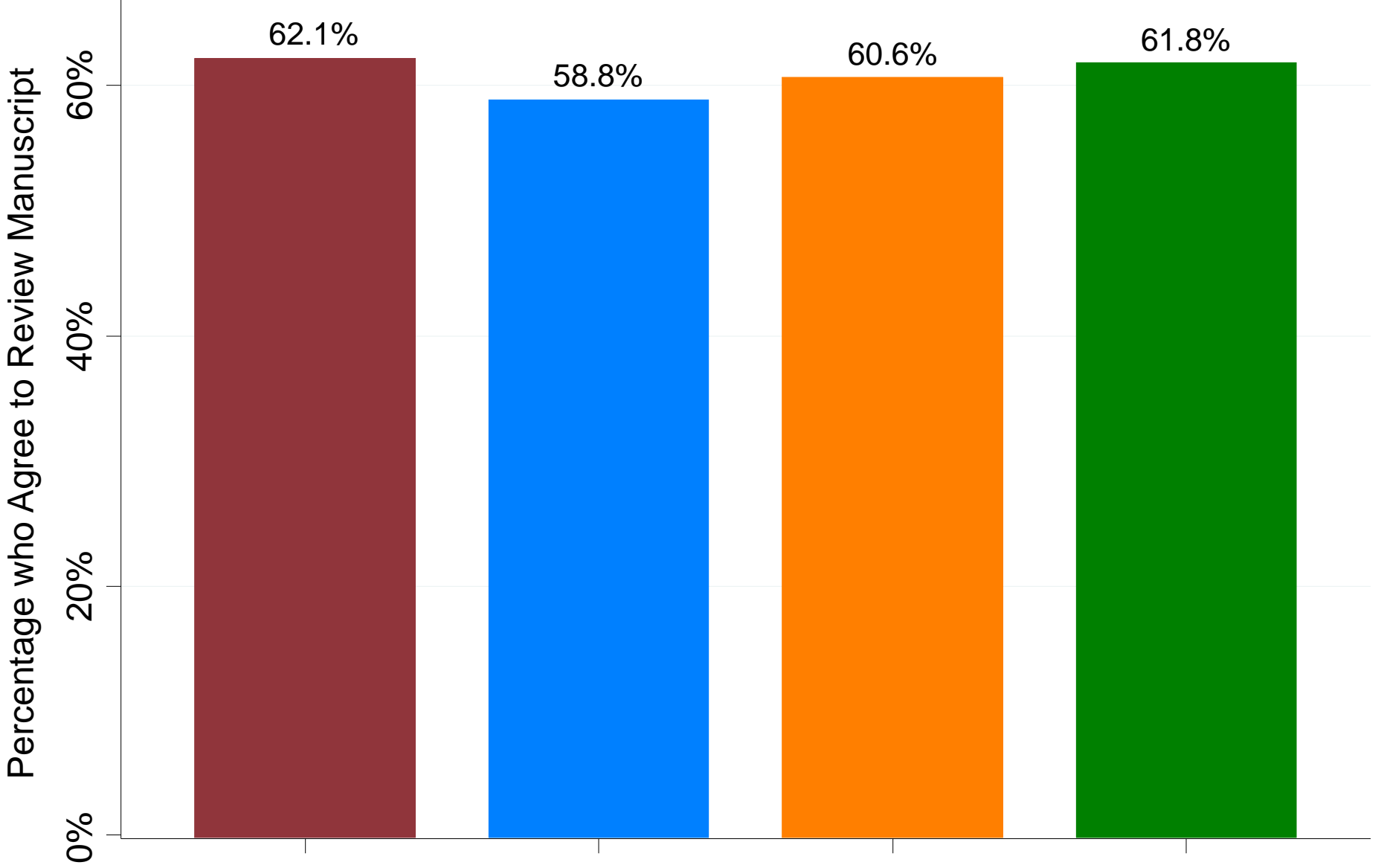
# Median Number of Words in Referee Report



# Outcome 4: Externalities on Other Journals

- General equilibrium concern: does speeding up referee times at one journal affect referee times at other journals?
- Test using data from 20 other Elsevier journals in related subfields during experimental period
  - Ex: Journal of Health Economics, Journal of Development Economics, Journal of Environmental Economics and Management
  - Does performance at these journals vary based on treatment group assignment at the *Journal of Public Economics*?

# Reviewer Acceptance Rate at Other Elsevier Journals

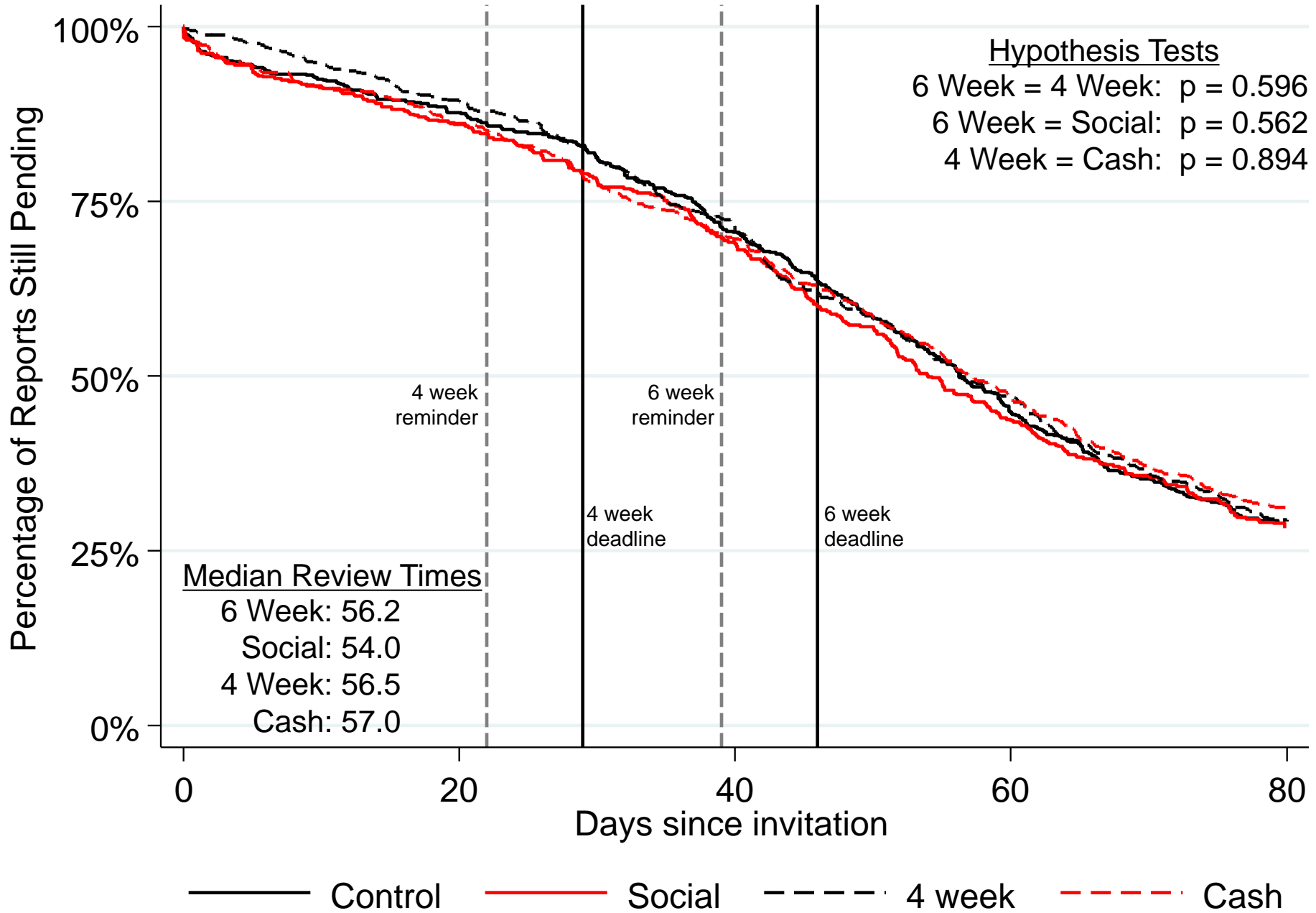


6 week = Social:  $p = 0.344$

6 week = 4 week:  $p = 0.654$

4 week = Cash:  $p = 0.774$

# Spillover Effects: Review Times at Other Journals



# Conclusions: Journal Policies

1. Short deadlines are extremely effective at increasing speed
  - Little adverse effect on participation rates, quality of report, or other journals
2. Cash incentives can generate significant improvements with salient reminders shortly before deadline
  - Paying cash without highlighting incentive amounts to an infra-marginal transfer
3. Even light social incentive implemented here has significant benefits
  - Stronger social treatments such as personalized letter from editor likely to have powerful effects on behavior



# Broader Conclusions

1. Attention matters: reminders and deadlines have significant impacts
2. Cash incentives motivate pro-social behavior and do not appear to have adverse effects on intrinsic motivation
3. Manipulating social prices may be valuable especially when traditional policies are ineffective [Luttmer and Singhal 2013]