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A Comment on "Information and Spillovers from Targeting Policy in Peru's Anchoveta Fishery"

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A comment on “Information and Spillovers from Targeting Policy in Peru’s Anchoveta Fishery”*

Marta Bernardi

Sarah Zeller

Rebecca Rotich

July 5, 2024

Abstract

The study provides empirical evidence that a targeted policy can backfire because information signals affect non-targeted units. Specifically, the analysis of the policy aimed at regulating the harvesting of juvenile fish in Peru’s Anchovy Fishery, by temporarily closing areas with high juvenile catch percentages, reveals an unintended increase of 48% in the overall seasonal juvenile catch percentage. This appears to be due to substantial spatial and temporal spillovers generated by the policy that reduces search costs for fishers. The study combines administrative micro-data used by the regulator to generate closures with biologically richer data from fishing firms. All results are easily computationally reproducible within a 5-hour time frame, except for the synthetic controls robustness check, which takes a considerable amount of time (appr. 64 hours) but works. We stress the robustness and reproducibility of the study by testing whether the analysis is robust to the use of different types of standard errors, and the findings appear unaffected. Overall, the full analysis and graphic outputs of the paper are reproducible using the publicly available complementary data and code from the AEJ website despite minor code interpretability challenges.

KEYWORDS: information spillovers, targeted policies, place-based policies, fisheries, Peru

JEL CODES: Q28, O13, Q56, D83, Q22

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1 Introduction

In our report prepared for the Institute for Replication (I4R) [Brodeur et al. \(2024\)](#), we utilized the publicly available replication package of the paper *"Information and Spillovers from Targeting Policy in Peru's Anchoveta Fishery"*. [Englander \(2023\)](#) investigates the effect of targeted policy interventions on the Peruvian anchoveta fishery, specifically examining the consequences of area closures aimed at reducing the catch of juvenile fish. The author studied a policy implemented in Peru that temporarily closed fishing areas with high juvenile catch percentages, intending to preserve juvenile fish populations. The primary data sources include administrative microdata used by the Peruvian regulator to determine closures and biologically rich data provided by fishing firms, covering the period from 2018 to 2020.

The main scientific claim of the original study is that the targeted closures, contrary to expectations, led to an unintended 48% increase in the overall seasonal juvenile catch percentage. This was attributed to the reduction in search costs for fishers, which resulted in significant spatial and temporal spillovers. According to the authors, this outcome highlights a critical flaw in the policy's design, which inadvertently increased juvenile catches by signaling where mature fish could be found (page 5).

To reach this conclusion, the paper employed a difference-in-differences approach to estimate the causal impact of the policy. The main results presented an estimated increase of 48% in juvenile catch (standard error: 10%), demonstrating a statistically significant policy impact. The robustness of the findings was tested through the use of simple standard errors instead of the delta method ones.

In our replication, we utilized the publicly available replication package, which included both raw and analysis data along with the necessary code. The package can be accessed at [this link](#). We did not contact the authors, as the data and code provided were sufficient for our purposes. The programs and data used in our replication can be found at the AEJ Policy website.

Our reproduction of the study's results was largely successful. We were able to computationally reproduce the primary findings, including Tables 2, 3, and 4, using the provided raw data and code. However, we encountered some minor issues during the replication process, such as challenges with installing packages using

`renv::restore()` and a misnamed script file that required renaming to execute correctly.

For robustness reproduction, we conducted a check to verify the original study's findings. We examined the impact of replacing the delta method standard errors with simple standard errors in Figure 9. Our results closely matched those of the original study, suggesting that the delta method may provide slightly more conservative standard errors.

In summary, our replication confirms the reproducibility of the findings of the original study's conclusions regarding the unintended consequences of targeted closures in the Peruvian anchoveta fishery. Implementing a robustness check and addressing minor computational issues, we verified that the main point estimate remains robust.

2 Computational Reproducibility

We used the replication package [here](#). The cleaning codes, raw and analysis data were provided in the replication package.

We successfully computationally reproduced all the main results (*i.e.*, Tables 2, 3 and 4) from the raw data. See Table [A1](#) for details.

There were two minor issues when rerunning the code. The first was in installing the packages correctly with `renv`. The provided command `renv::restore()` did not work; using `renv::hydrate()` did. The second was that one script that was sourced was not called by the correct name. After correcting the name by adding '6. ' to the file's name, the script ran correctly.

However, the standard errors and sometimes estimates don't match the original paper exactly, although very closely. Sign and significance do not change. Consider Panel 1 from Table [1](#), which is the original Table 1 from the paper, and Panel 2 from the same table, which shows our computational reproduction. While very closely related, they vary a bit. In columns 1 and 3, the results are exactly the same. In column 2, the original result is 0.002 (SE: 0.167) while it's 0.004 (SE: 0.167) in our reproduction. In column 4, the original result on the paper is -0.099 (SE: 0.145) while it's -0.098 (SE: 0.145) in our reproduction; in column 5, the original result is

-0.029 (SE: 0.170) while it's -0.026 (SE: 0.170) in our reproduction.

3 Robustness Reproduction

3.1 Replication without delta-method standard errors

When reproducing Figure 9 which contains the main results, substituting the delta methods employed by the authors to compute standard errors that are interpretable in terms of percentage changes, with simple standard errors we find similar results. If anything, the delta standard errors seem to nudge towards a more conservative interpretation. The original Figure 9 and the Figure 9 without the delta method errors can be found in [5.1](#).

3.2 Replication using `set.seed()`

The author samples multiple times, especially when imputing the size. However, so far, the seed has not always been set. We add the line `set.seed(20200422)` to match the seeds the author sets in other scripts: `Scripts/make_data/2. impute_size_be.R` and `Scripts/other_empirics/appendix_C_robustness_length_distribution_imputation.R`.

Again, we have very similar results that only marginally change when compared to the original results. Consider Table [1](#) as a representative example; the other tables and figures are impacted similarly, in that the sign and significance do not change, and that the magnitude is not severely impacted. Column 1 and 3 are exactly the same as in the original results. For column 2, the original result is 0.002 (SE: 0.167) while it's 0.004 (SE: 0.167) in our reproduction. For column 4, the original result is -0.099 (SE: 0.145) while it's -0.098 (SE: 0.145) in our reproduction. In column 5, the original result is -0.029 (SE: 0.170) while it's -0.026 (SE: 0.170) in our reproduction.

Table 1. Test for difference in pre-period juvenile catch

Original					
	(1)	(2)	(3)	(4)	(5)
Treatment fraction	0.271 (0.143) [0.05]	0.002 (0.167) [0.99]	-0.055 (0.147) [0.70]	-0.099 (0.145) [0.49]	-0.029 (0.170) [0.86]
Fixed effects		X			X
Length distribution			X	X	X
Other controls				X	X
Reproduction					
	(1)	(2)	(3)	(4)	(5)
Treatment fraction	0.271 (0.143) [0.05]	0.004 (0.167) [0.98]	-0.055 (0.147) [0.70]	-0.098 (0.145) [0.49]	-0.026 (0.170) [0.87]
Fixed effects		X			X
Length distribution			X	X	X
Other controls				X	X
After setting the seed					
	(1)	(2)	(3)	(4)	(5)
Treatment fraction	0.271 (0.143) [0.05]	0.004 (0.167) [0.98]	-0.055 (0.147) [0.70]	-0.098 (0.145) [0.49]	-0.026 (0.170) [0.87]
Fixed effects		X			X
Length distribution			X	X	X
Other controls				X	X

Notes: All regressions have 35,113 observations. Dependent variable is the inverse hyperbolic sine of millions of juveniles caught. All regressions estimate treatment effects for all 37 treatment bins, but only the coefficient on treatment fraction for the inside, day-before bin is displayed in this table. Standard errors clustered at level of two-week-of-sample by two-degree grid cell. P-values are shown in square brackets.

4 Conclusion

We found a good degree of consistency in the replicability of the study – with a replication package not clear in terms of variable definitions (i.e., no codebook or dictionary) and code structure (i.e., no self-explanatory comments). At the same time, if it was not for the missed seed setting, we would have been most likely able to get the exact same numbers as the authors; without the seed setting, we were always able to get similar estimates.

In **Table 1**, which tests for differences in pre-period juvenile catch, the results for Columns 1 and 3 are identical between the paper and our reproduction, while Columns 2, 4, and 5 show slight differences in results but not in standard errors (SE).

After setting the seed, all tables confirmed that there were no significant changes compared to the pre-seeding results. Overall, the reproduction validates the original paper’s findings, demonstrating robustness across various analyses with only minor discrepancies.

References

- Brodeur, A., Cook, N., Heyes, A., McShane, B. B., Stoye, J. and Thoenig, M.: 2024, Mass Reproducibility and Replicability: A New Hope, *I4R Discussion Paper* **107**.
- Englander, G.: 2023, Information and spillovers from targeting policy in peru's anchoveta fishery, *American Economic Journal: Economic Policy* **15**(4), 390–427.
URL: <https://www.aeaweb.org/articles?id=10.1257/pol.20210812>

5 APPENDIX

5.1 Appendix Figures

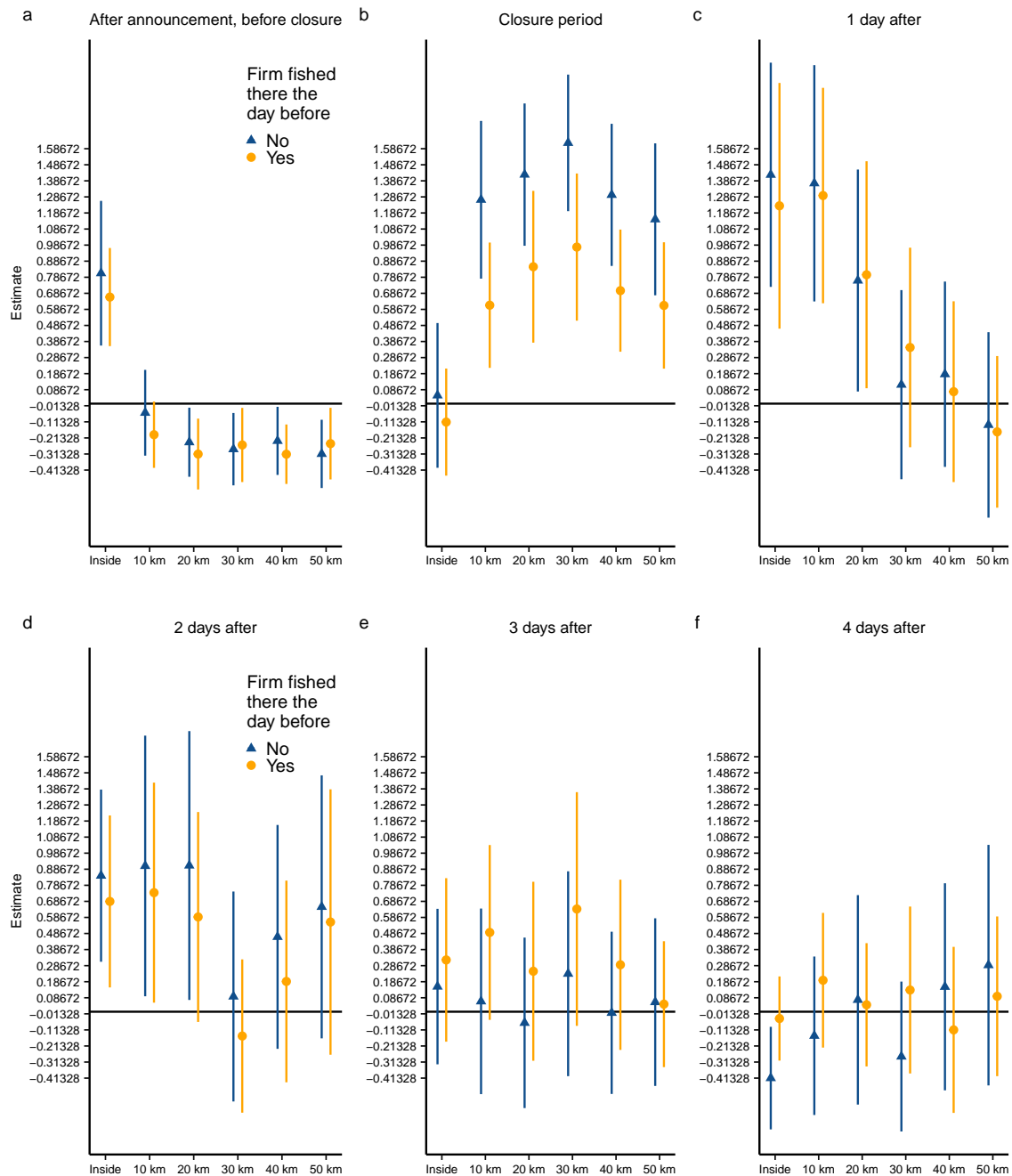


Figure A1. Figure 9 without delta errors

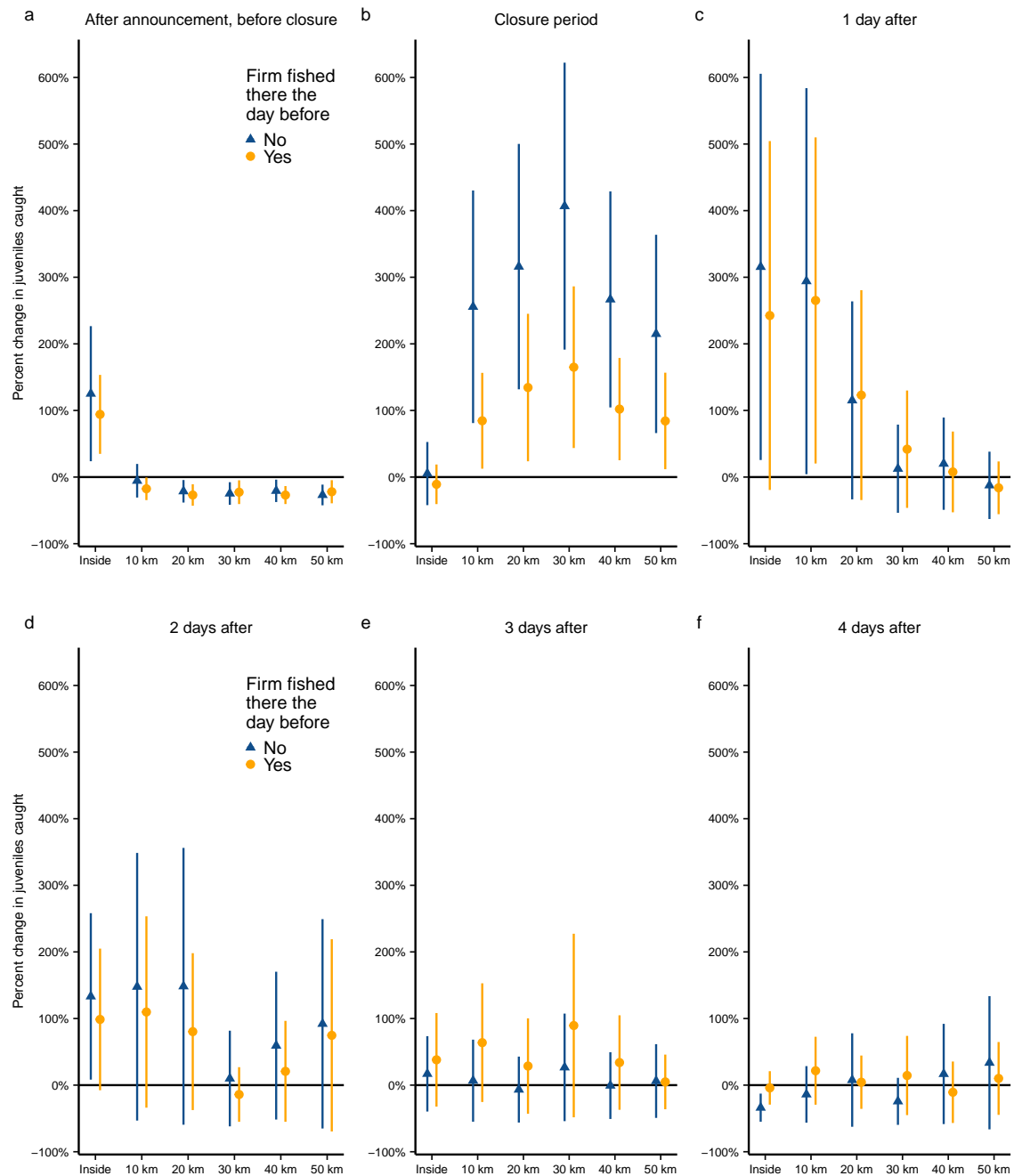


Figure A2. Original Figure 9

5.2 Appendix Tables

Table A1. Replication Package Contents and Reproducibility

Replication Package Item	Fully	Partial	No
Raw data provided	✓		
Analysis data provided	✓		
Cleaning code provided	✓		
Analysis code provided	✓		
Reproducible from raw data		✓	
Reproducible from analysis data	✓		

Table A1. *Notes:* This table summarizes the replication package contents contained in [Englander \(2023\)](#).