### Effects of Adopting Code Review Bots on Pull Requests to OSS Projects

Mairieli Wessel, Alexander Serebrenik, Igor Wiese, Igor Steinmacher, Marco A. Gerosa

### TSP TU/e UTFPR NAL

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Pull Request Review Process



### Code review bots play a prominent role in the code review process

An interface between human and tools

New voices in the pull request conversation

## As with any new technology adoption, bots may impact group dynamics



# How do pull request activities change after a code review bot is adopted in a project?





## Project Activity Indicators





Time-to-merge/Time-to-close Pull Requests



# Commits of Merged/Non-merged Pull Requests

# Exploratory Case Study



### Exploratory Case Study

Two studied projects



+ 26.1k stars + 3.8k forks + 17k pull requests + 46.4k commits



+ 8.1k stars + 3.4k forks + 8.6k pull requests + 40.9k commits





Decrease after bot adoption



Increase after bot adoption

# Merged Pull Requests



Merged/Non-merged Pull Requests



Time-to-merge/Time-to-close Pull Requests



# Commits of Merged/Non-merged Pull Requests

# Main Study





Open Source Software Projects in our sample

#### Regression Discontinuity Design (RDD)



 $\begin{aligned} y_i &= \alpha + \beta \cdot \text{time}_i + \gamma \cdot \text{intervention}_i + \\ & \delta \cdot \text{time}_a \text{fter}_i \text{intervention}_i + \\ & \eta \cdot \text{controls}_i + \epsilon_i \end{aligned}$ 

#### Regression Discontinuity Design (RDD)



 $y_i = \alpha + \beta \cdot time_i + \gamma \cdot intervention_i + \delta \cdot time_after_intervention_i + \eta \cdot controls_i + \epsilon_i$ 

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#### Some Results: # Merged Pull Requests

	Coefficients	Sum of Squares
Intercept	-0.262***	
TimeSinceFirstPullRequest	0.00004**	4.3
log(TotalPullRequestAuthors)	-0.094***	171.8
log(TotalCommits)	0.042***	484.0
log(OpenedPullRequests)	0.494***	8227.1
log(PullRequestComments)	0.433***	2954.3
log(PullRequestCommits)	0.272***	721.0
time	0.004***	203.2
interventionTrue	0.095***	16.8
time after intervention	0.004**	1.7

### Some Results: # Merged Pull Requests

Control Variables

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#### Control Variables

### Time series predictors

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