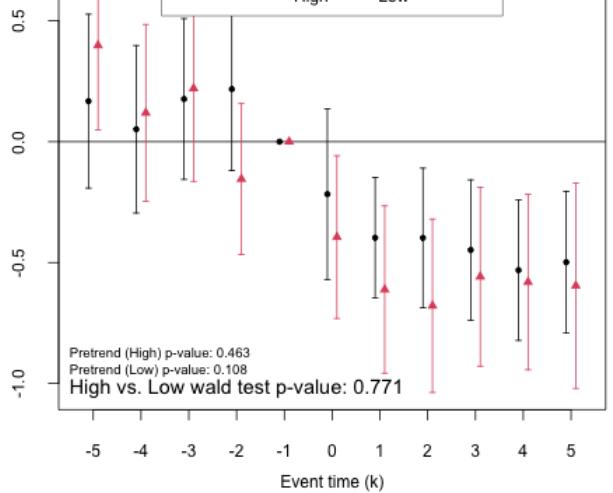


major_minor_release_count rolling5

Sample: num-qualified=1

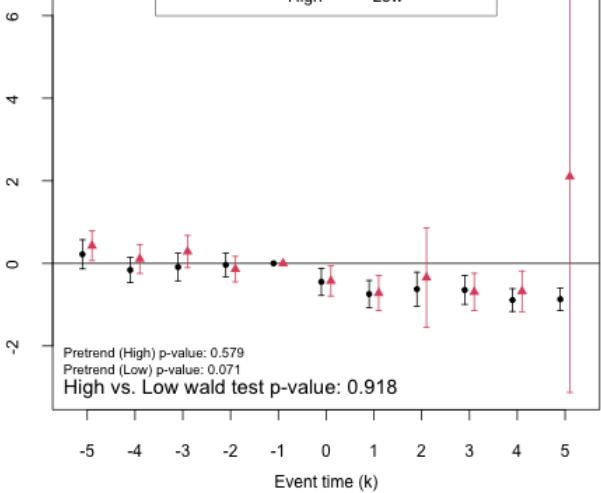
knowledge_redundancy -> broad_expertise
 activity_diversity_count -> avg_unique_types
 ● High ▲ Low



overall_new_release_count rolling5

Sample: num-qualified=1

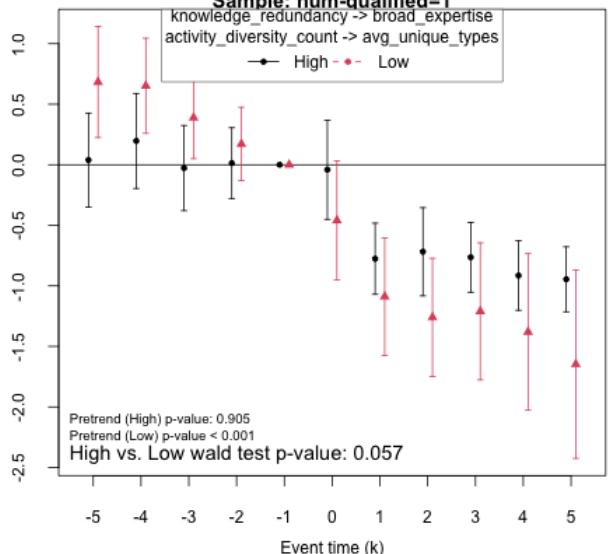
knowledge_redundancy -> broad_expertise
 activity_diversity_count -> avg_unique_types
 ● High ▲ Low



pull_request_merged rolling5

Sample: num-qualified=1

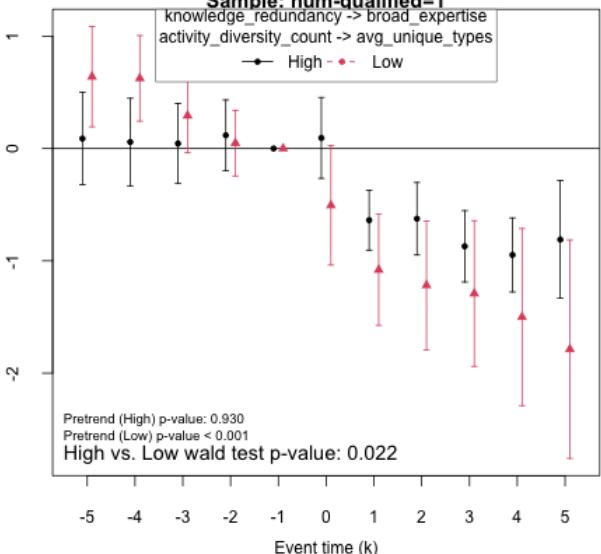
knowledge_redundancy -> broad_expertise
 activity_diversity_count -> avg_unique_types
 ● High ▲ Low



pull_request_opened rolling5

Sample: num-qualified=1

knowledge_redundancy -> broad_expertise
 activity_diversity_count -> avg_unique_types
 ● High ▲ Low

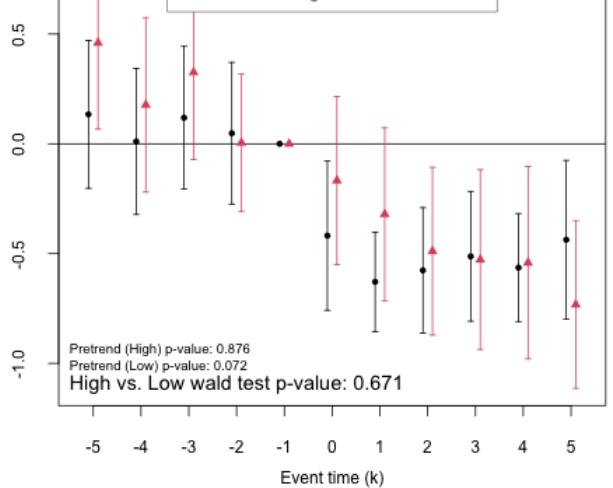


major_minor_release_count rolling5

Sample: num-qualified=1

knowledge_redundancy -> broad_expertise
discussion_content -> cos_sim_diff_actor

● High ▲ Low

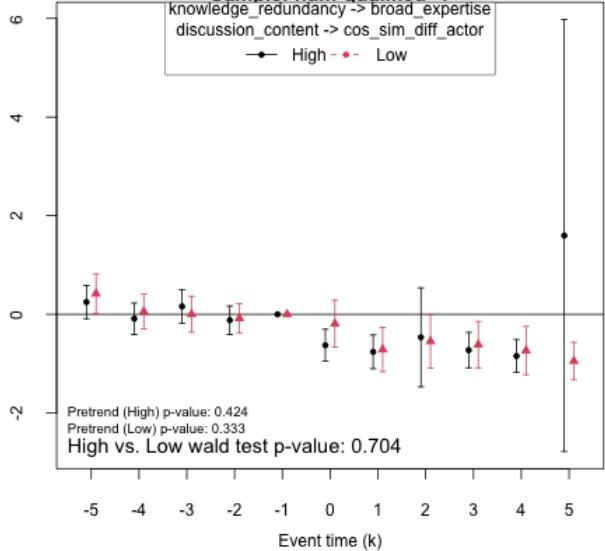


overall_new_release_count rolling5

Sample: num-qualified=1

knowledge_redundancy -> broad_expertise
discussion_content -> cos_sim_diff_actor

● High ▲ Low

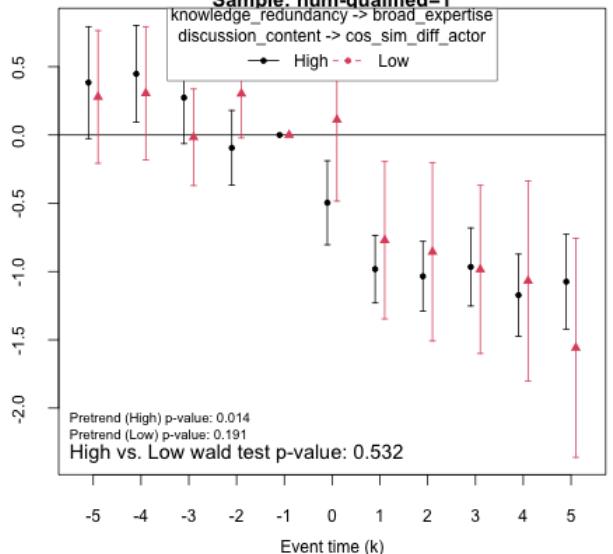


pull_request_merged rolling5

Sample: num-qualified=1

knowledge_redundancy -> broad_expertise
discussion_content -> cos_sim_diff_actor

● High ▲ Low

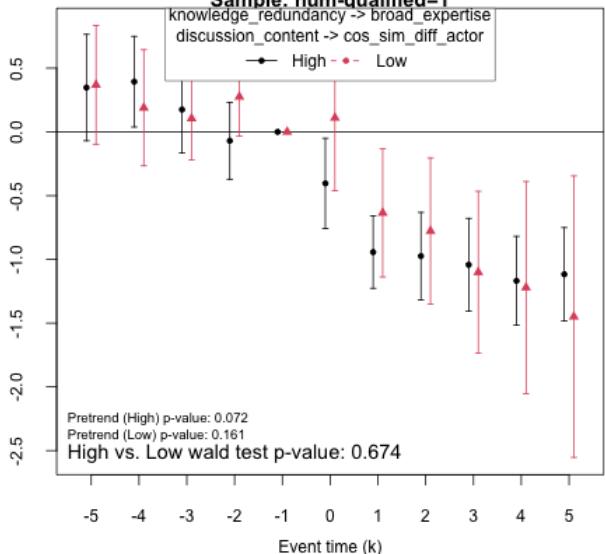


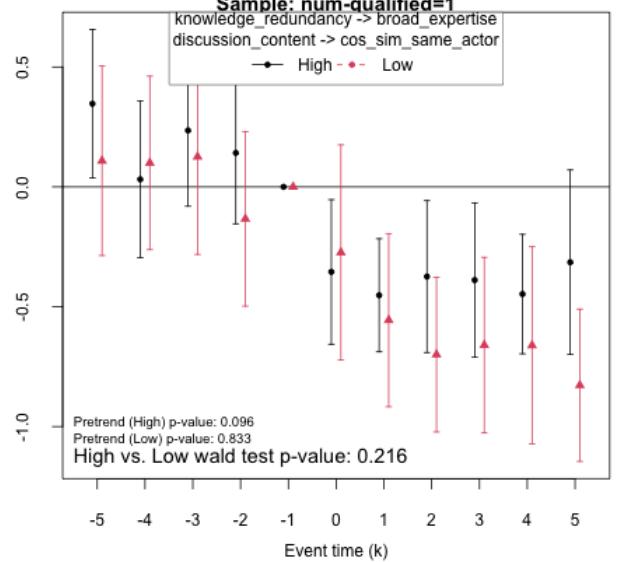
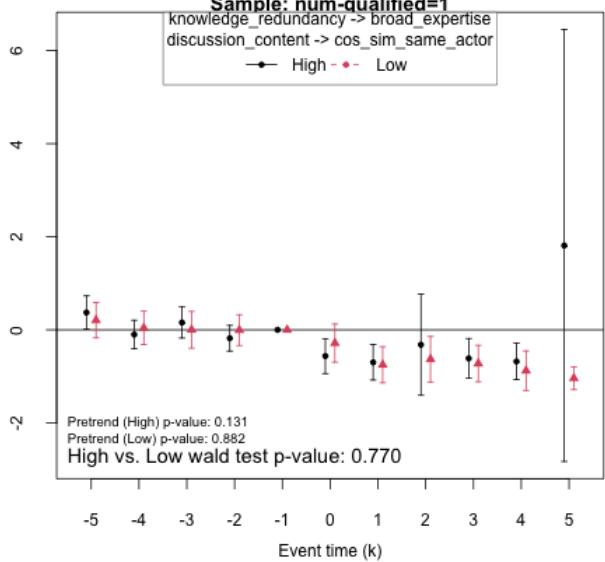
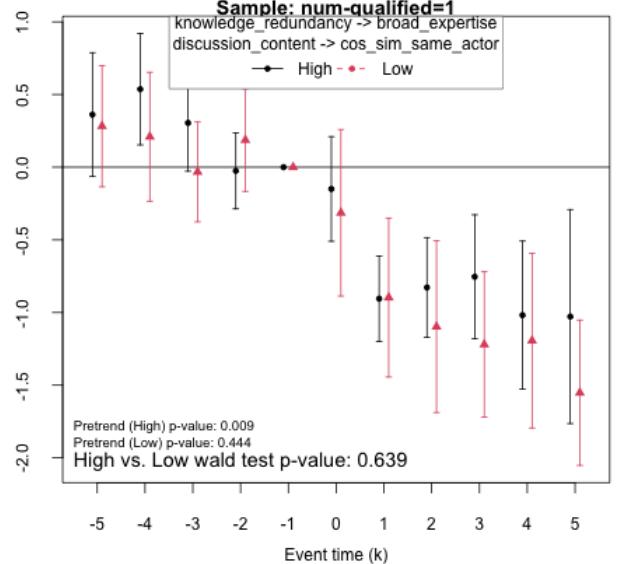
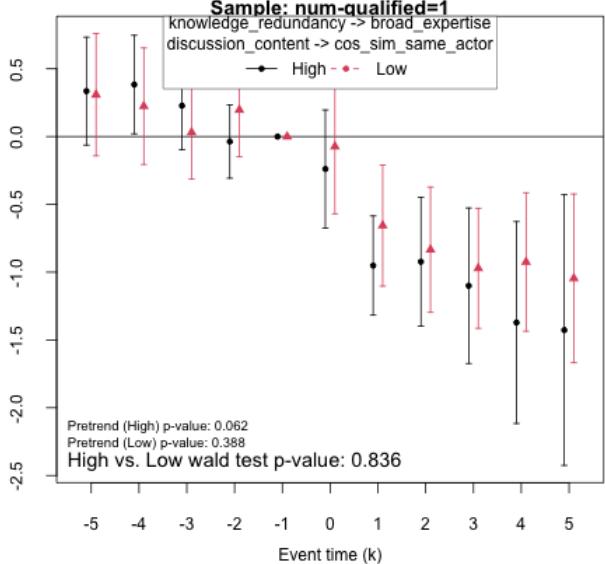
pull_request_opened rolling5

Sample: num-qualified=1

knowledge_redundancy -> broad_expertise
discussion_content -> cos_sim_diff_actor

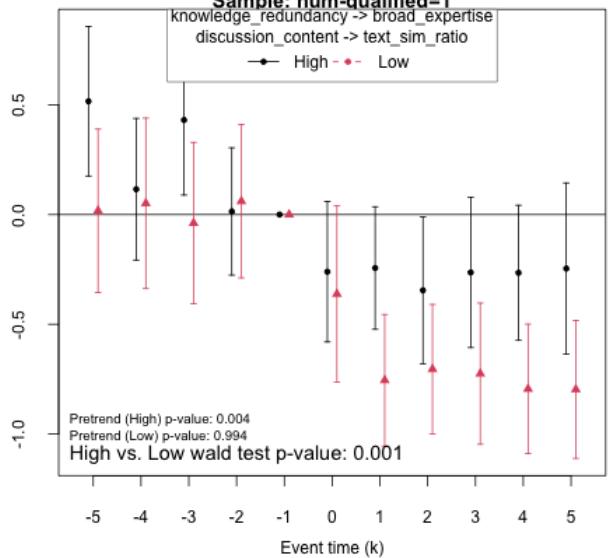
● High ▲ Low



major_minor_release_count rolling5**Sample: num-qualified=1****overall_new_release_count rolling5****Sample: num-qualified=1****pull_request_merged rolling5****Sample: num-qualified=1****pull_request_opened rolling5****Sample: num-qualified=1**

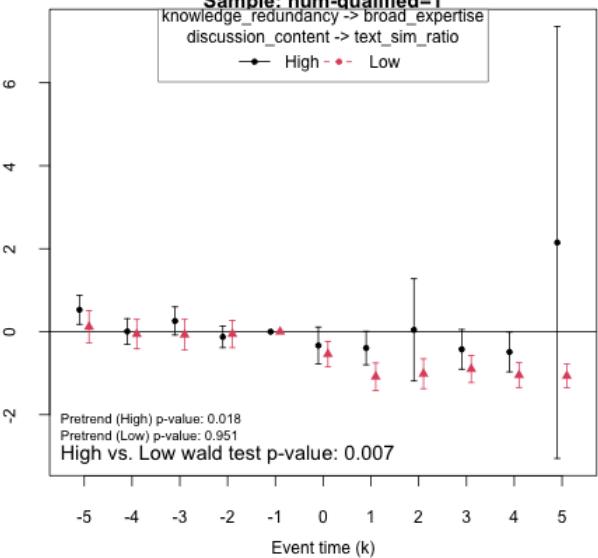
major_minor_release_count rolling5

Sample: num-qualified=1



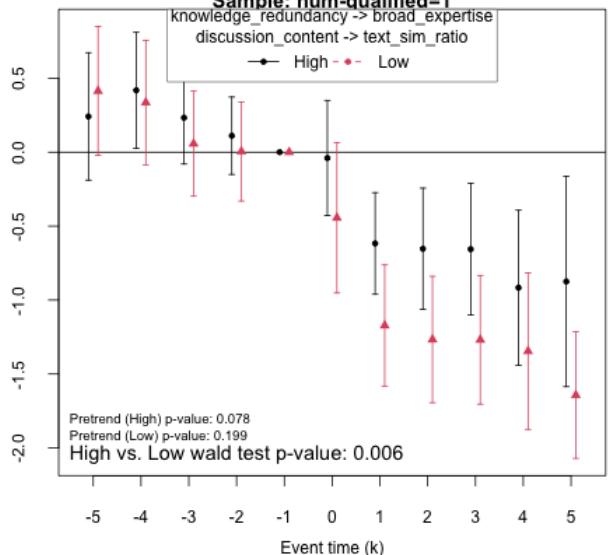
overall_new_release_count rolling5

Sample: num-qualified=1



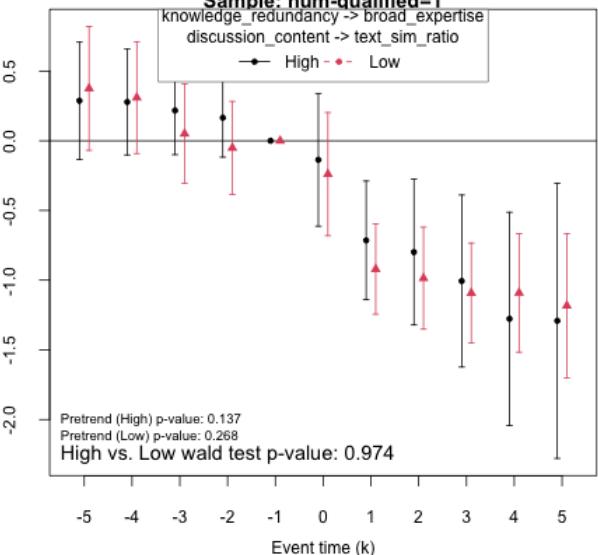
pull_request_merged rolling5

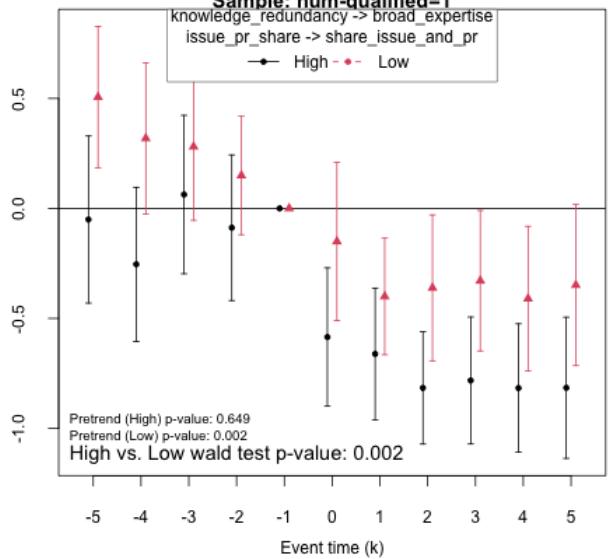
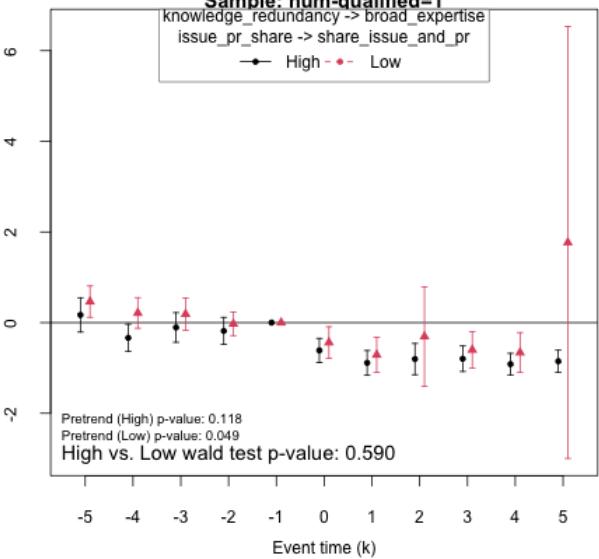
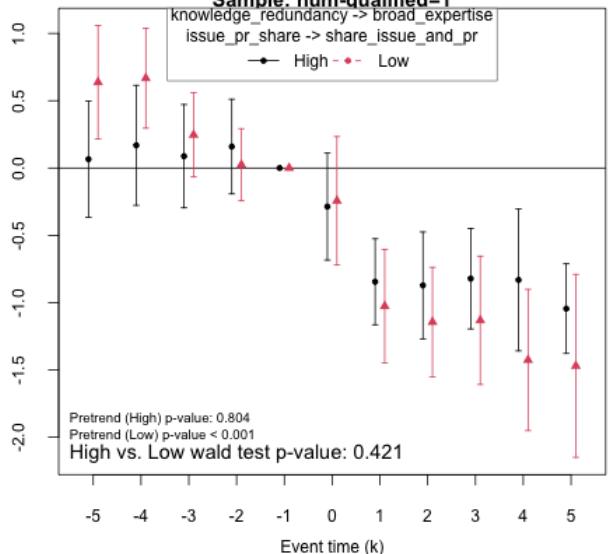
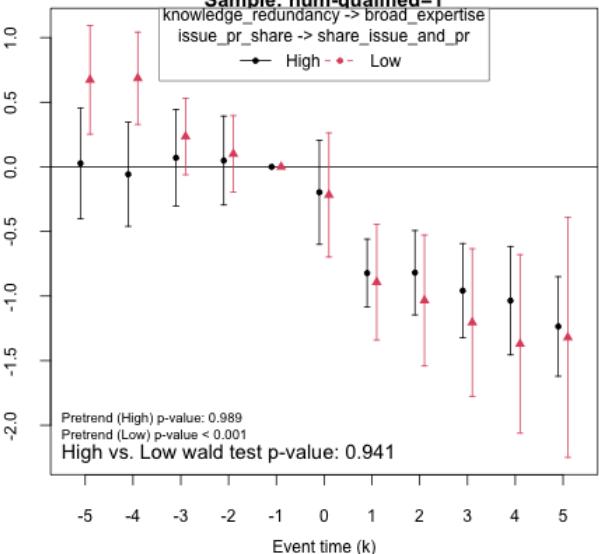
Sample: num-qualified=1

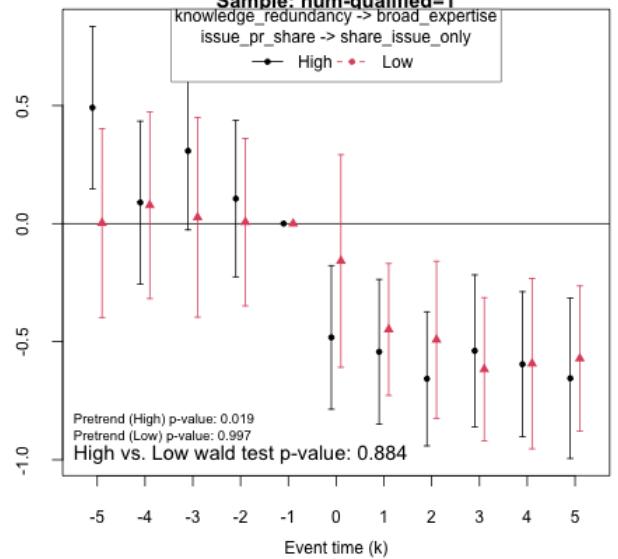
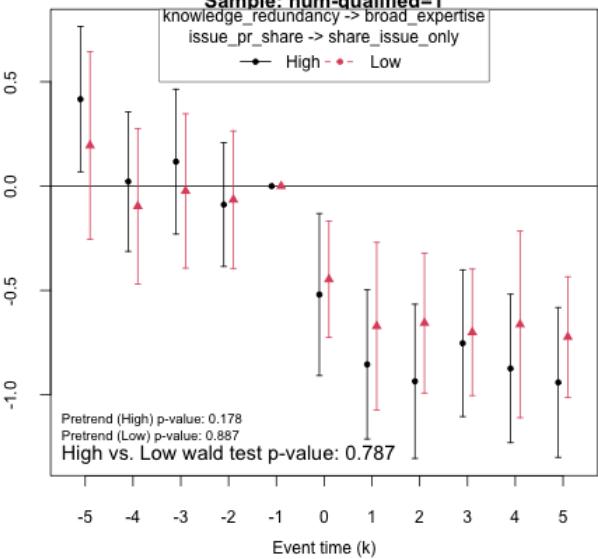
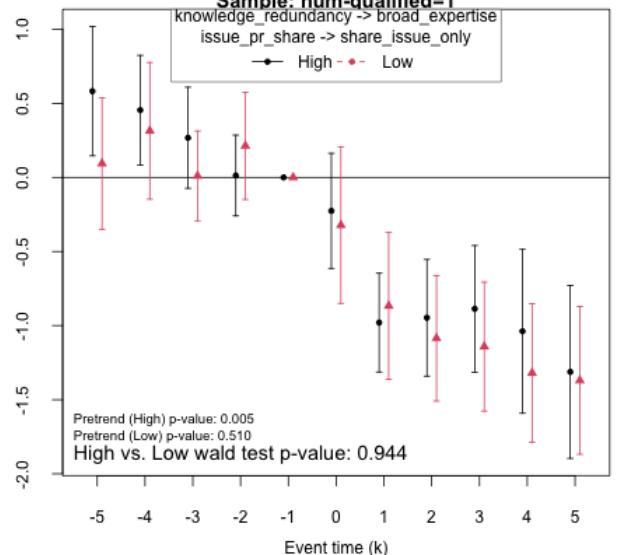
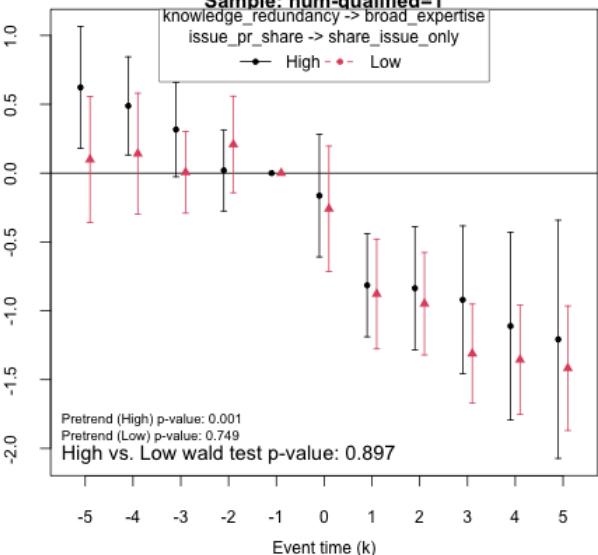


pull_request_opened rolling5

Sample: num-qualified=1

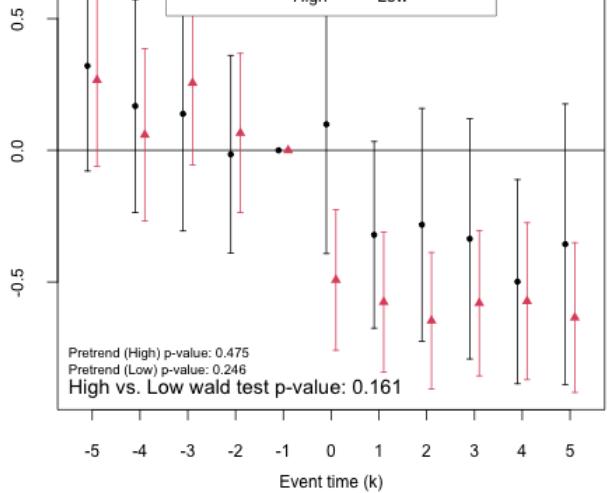


major_minor_release_count rolling5**Sample: num-qualified=1****overall_new_release_count rolling5****Sample: num-qualified=1****pull_request_merged rolling5****Sample: num-qualified=1****pull_request_opened rolling5****Sample: num-qualified=1**

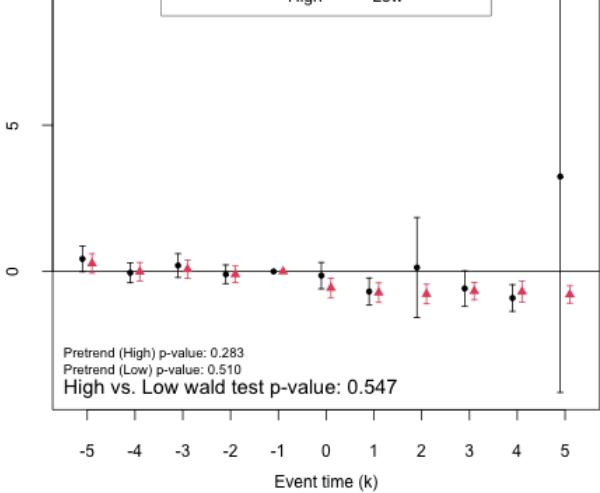
major_minor_release_count rolling5**Sample: num-qualified=1****overall_new_release_count rolling5****Sample: num-qualified=1****pull_request_merged rolling5****Sample: num-qualified=1****pull_request_opened rolling5****Sample: num-qualified=1**

major_minor_release_count rolling5**Sample: num-qualified=1**

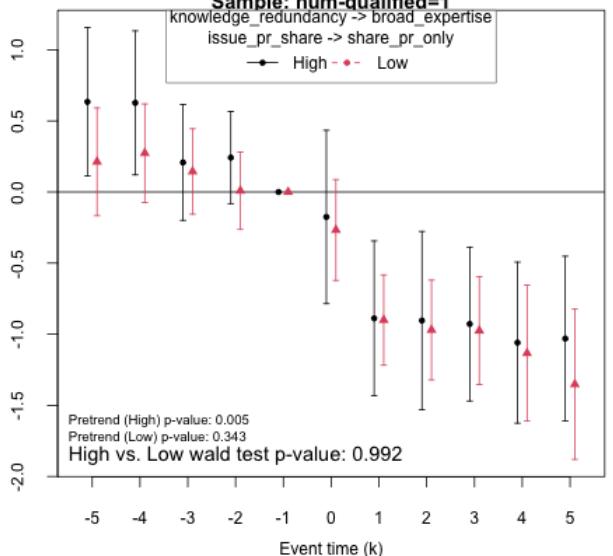
knowledge_redundancy -> broad_expertise
 issue_pr_share -> share_pr_only
 ● High ▲ Low

**overall_new_release_count rolling5****Sample: num-qualified=1**

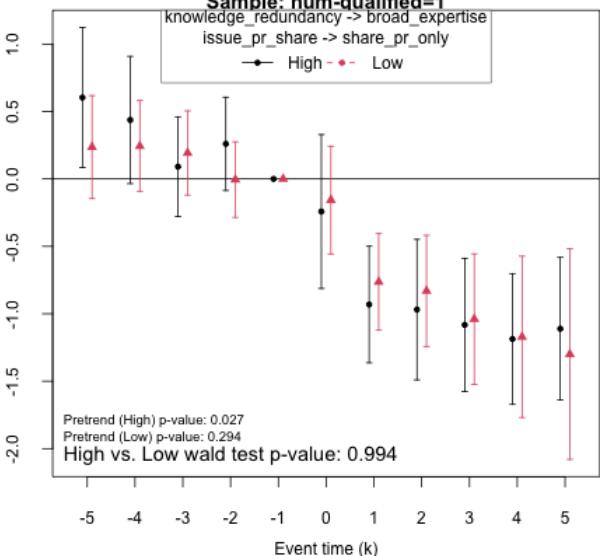
knowledge_redundancy -> broad_expertise
 issue_pr_share -> share_pr_only
 ● High ▲ Low

**pull_request_merged rolling5****Sample: num-qualified=1**

knowledge_redundancy -> broad_expertise
 issue_pr_share -> share_pr_only
 ● High ▲ Low

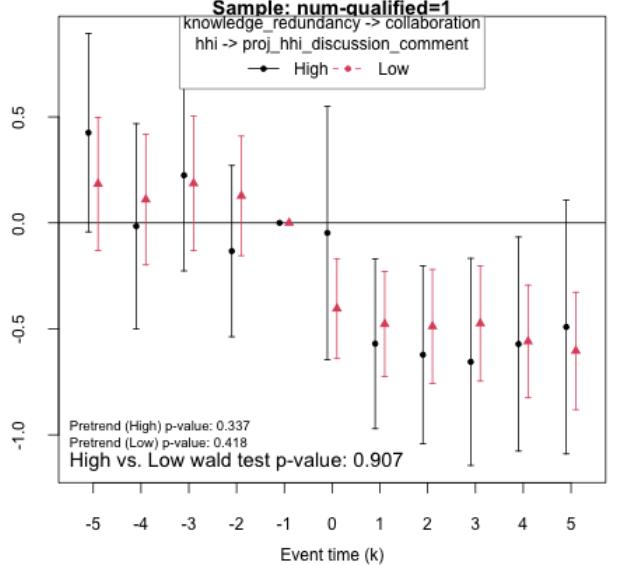
**pull_request_opened rolling5****Sample: num-qualified=1**

knowledge_redundancy -> broad_expertise
 issue_pr_share -> share_pr_only
 ● High ▲ Low

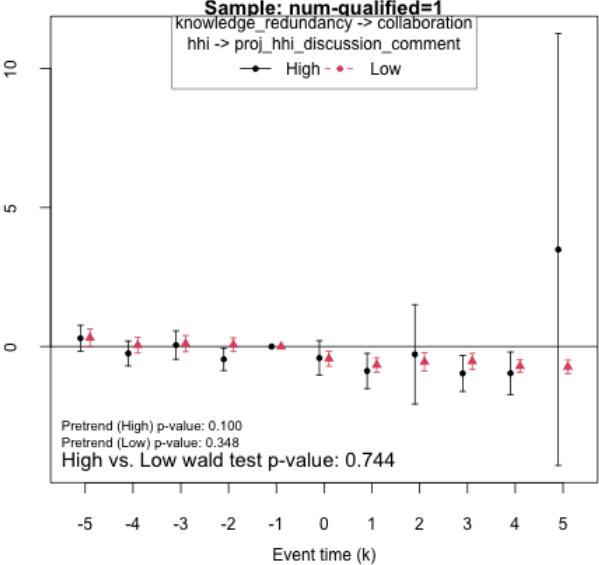
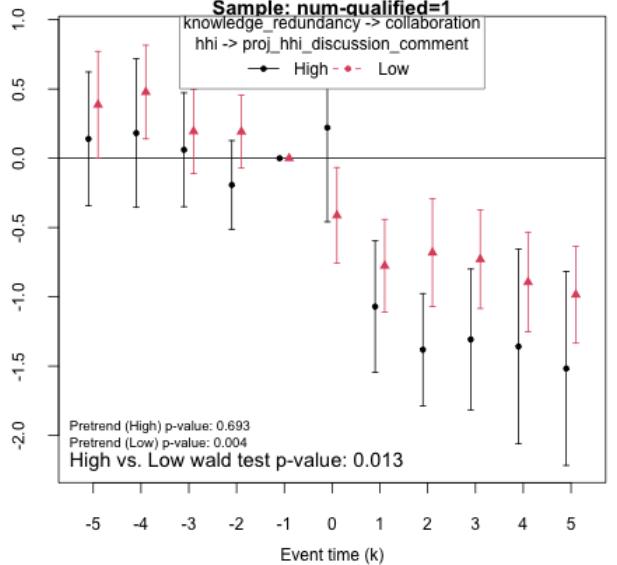
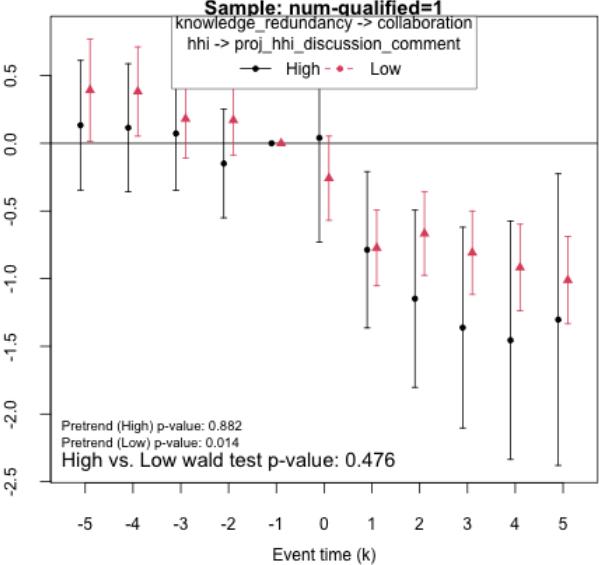


major_minor_release_count rolling5

knowledge_redundancy -> collaboration

hh_i -> proj_hh_i_discussion_comment
● High ▲ Low**overall_new_release_count rolling5**

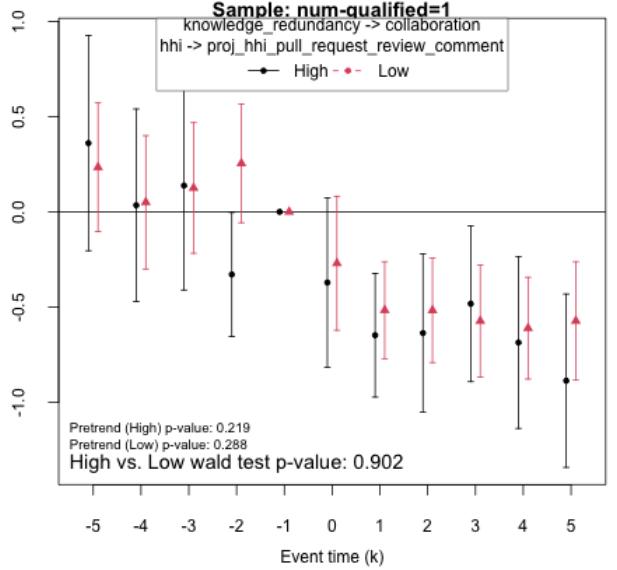
knowledge_redundancy -> collaboration

hh_i -> proj_hh_i_discussion_comment
● High ▲ Low**pull_request_merged rolling5**knowledge_redundancy -> collaboration
hh_i -> proj_hh_i_discussion_comment
● High ▲ Low**pull_request_opened rolling5**knowledge_redundancy -> collaboration
hh_i -> proj_hh_i_discussion_comment
● High ▲ Low

major_minor_release_count rolling5

Sample: num-qualified=1

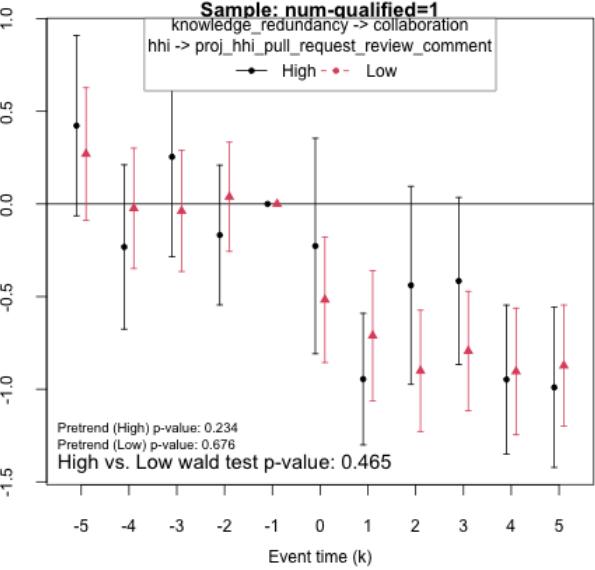
knowledge_redundancy -> collaboration
hh1 -> proj_hh1_pull_request_review_comment
● High ▲ Low



overall_new_release_count rolling5

Sample: num-qualified=1

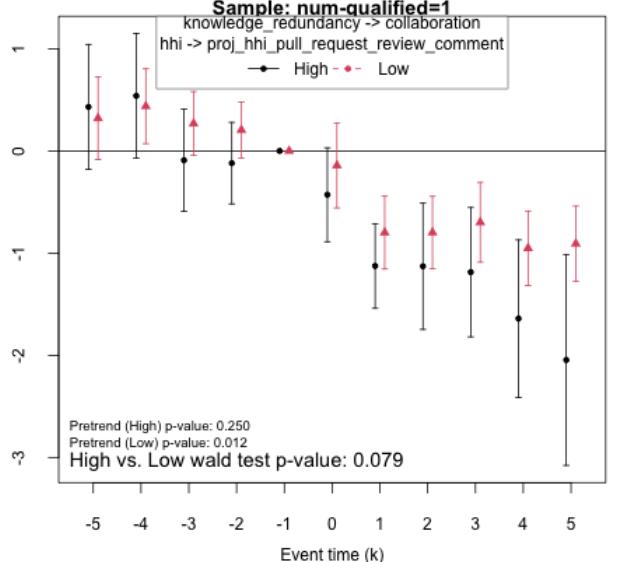
knowledge_redundancy -> collaboration
hh1 -> proj_hh1_pull_request_review_comment
● High ▲ Low



pull_request_merged rolling5

Sample: num-qualified=1

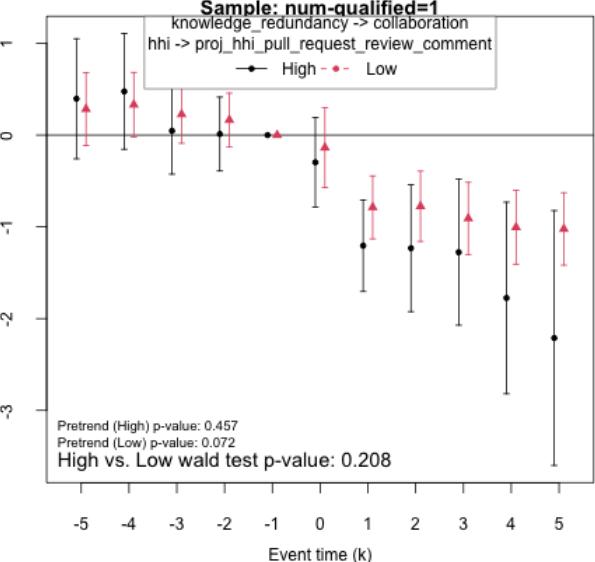
knowledge_redundancy -> collaboration
hh1 -> proj_hh1_pull_request_review_comment
● High ▲ Low



pull_request_opened rolling5

Sample: num-qualified=1

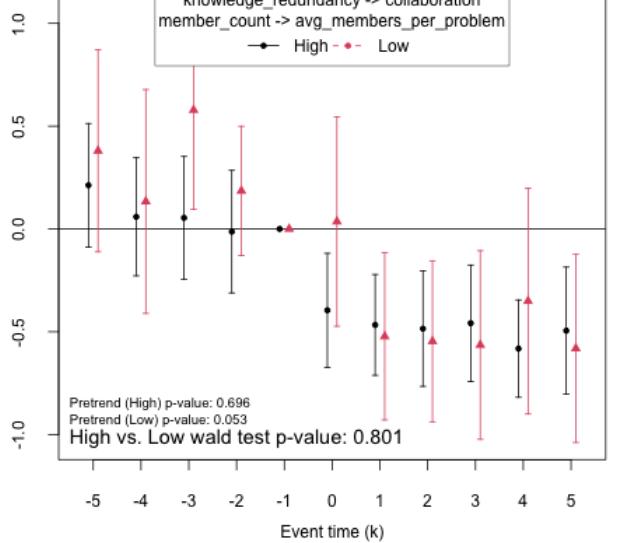
knowledge_redundancy -> collaboration
hh1 -> proj_hh1_pull_request_review_comment
● High ▲ Low



major_minor_release_count rolling5

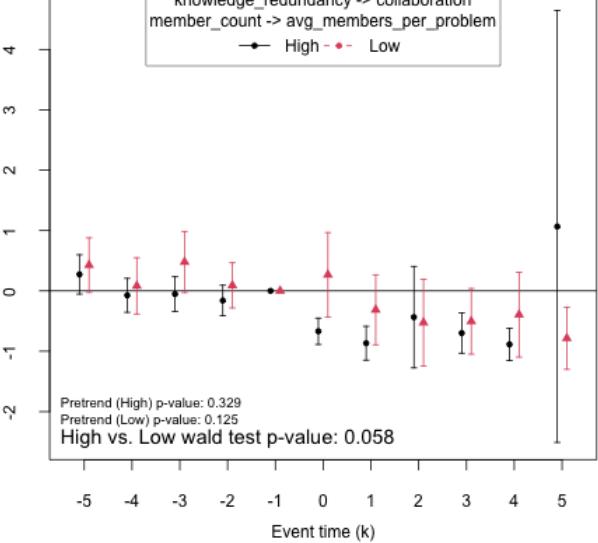
Sample: num-qualified=1

knowledge_redundancy -> collaboration
 member_count -> avg_members_per_problem
 ● High ▲ Low

**overall_new_release_count rolling5**

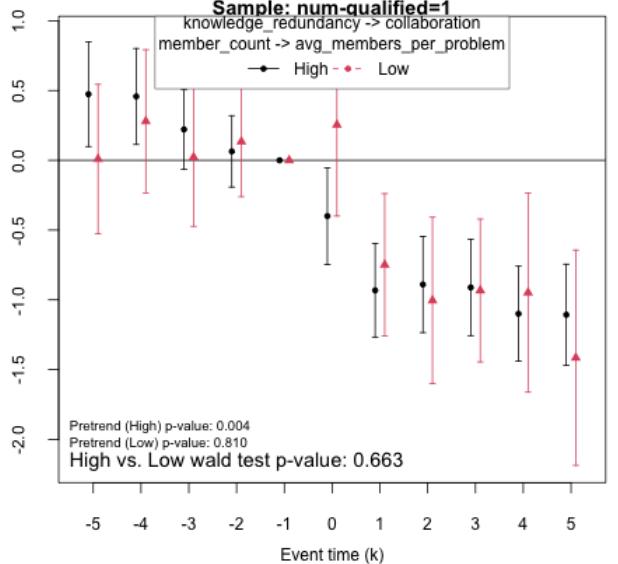
Sample: num-qualified=1

knowledge_redundancy -> collaboration
 member_count -> avg_members_per_problem
 ● High ▲ Low

**pull_request_merged rolling5**

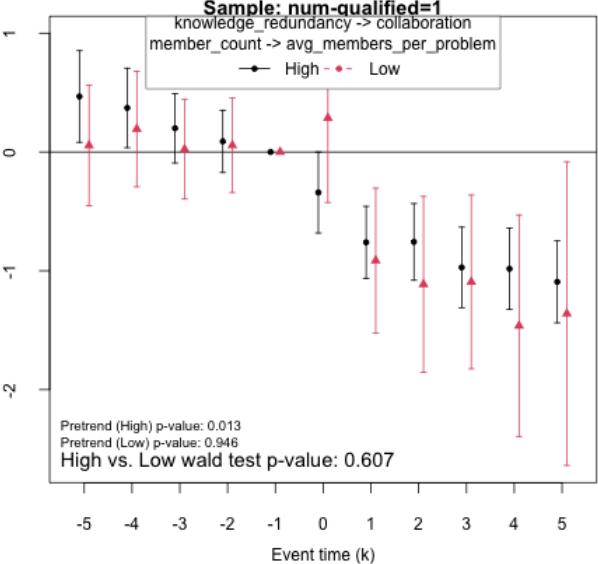
Sample: num-qualified=1

knowledge_redundancy -> collaboration
 member_count -> avg_members_per_problem
 ● High ▲ Low

**pull_request_opened rolling5**

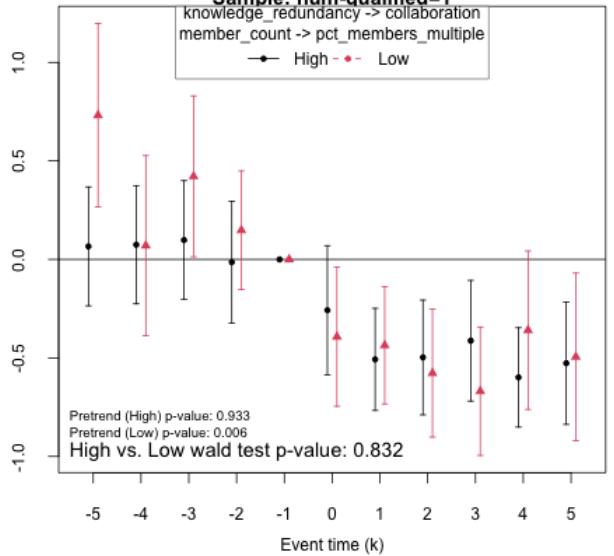
Sample: num-qualified=1

knowledge_redundancy -> collaboration
 member_count -> avg_members_per_problem
 ● High ▲ Low

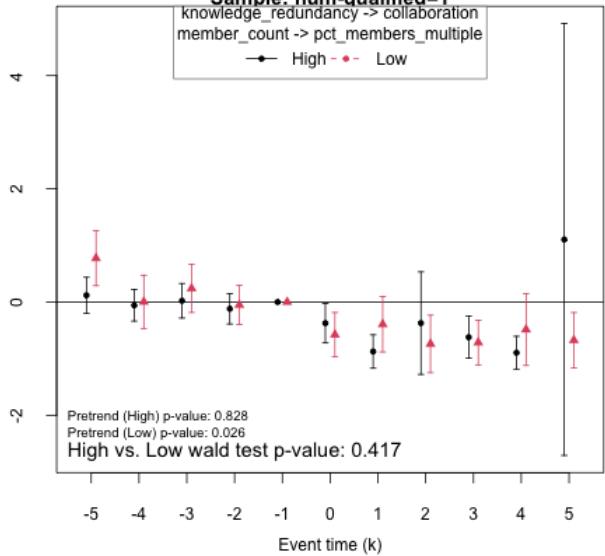


major_minor_release_count rolling5

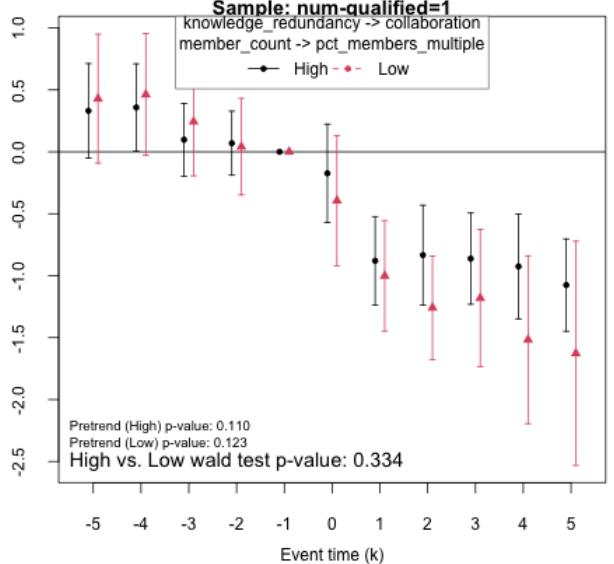
Sample: num-qualified=1
knowledge_redundancy -> collaboration
member_count -> pct_members_multiple
● High ▲ Low

**overall_new_release_count rolling5**

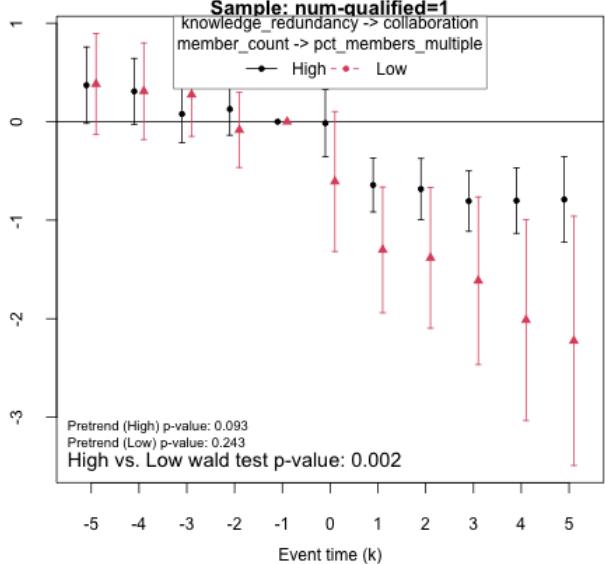
Sample: num-qualified=1
knowledge_redundancy -> collaboration
member_count -> pct_members_multiple
● High ▲ Low

**pull_request_merged rolling5**

Sample: num-qualified=1
knowledge_redundancy -> collaboration
member_count -> pct_members_multiple
● High ▲ Low

**pull_request_opened rolling5**

Sample: num-qualified=1
knowledge_redundancy -> collaboration
member_count -> pct_members_multiple
● High ▲ Low

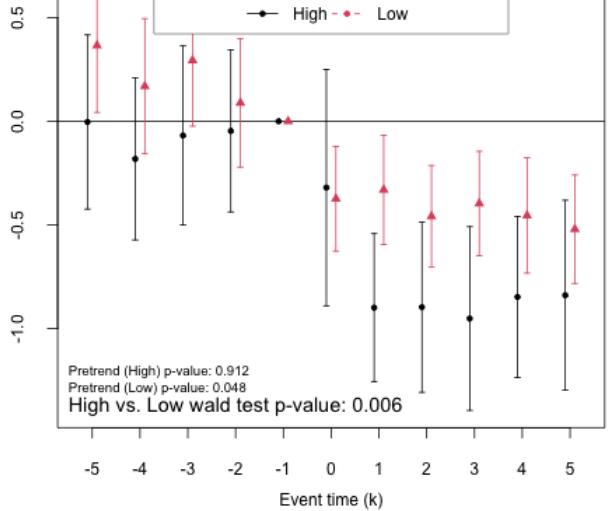


major_minor_release_count rolling5

Sample: num-qualified=1

knowledge_redundancy -> collaboration
 problem_hhi -> proj_prob_hhi_issue_comment

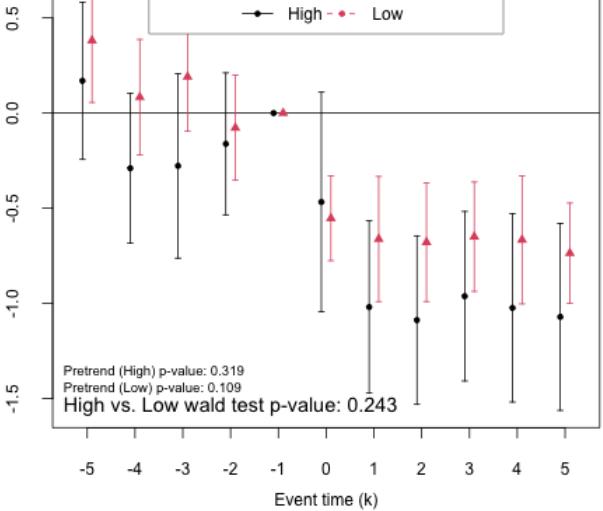
- High
- Low

**overall_new_release_count rolling5**

Sample: num-qualified=1

knowledge_redundancy -> collaboration
 problem_hhi -> proj_prob_hhi_issue_comment

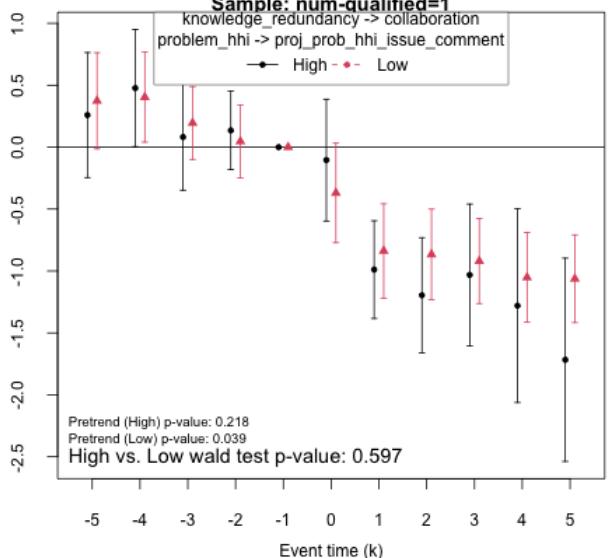
- High
- Low

**pull_request_merged rolling5**

Sample: num-qualified=1

knowledge_redundancy -> collaboration
 problem_hhi -> proj_prob_hhi_issue_comment

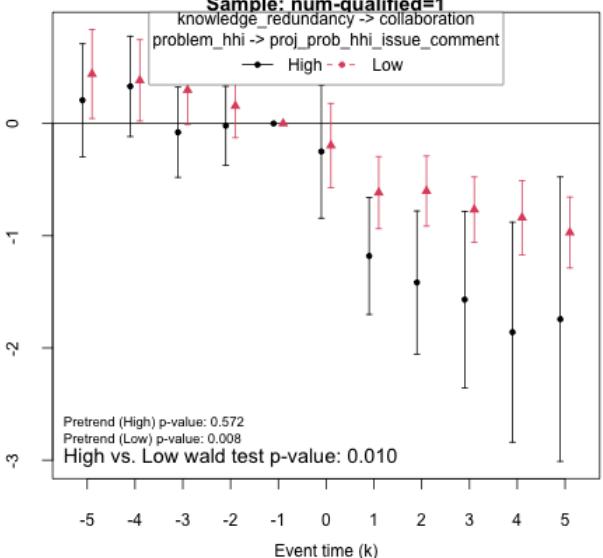
- High
- Low

**pull_request_opened rolling5**

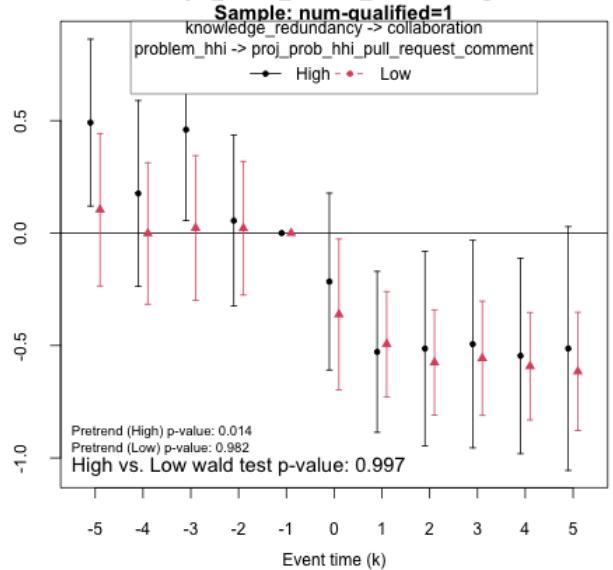
Sample: num-qualified=1

knowledge_redundancy -> collaboration
 problem_hhi -> proj_prob_hhi_issue_comment

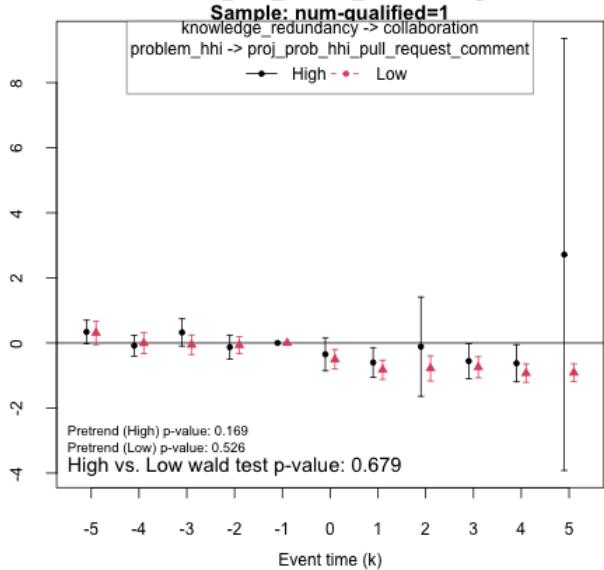
- High
- Low



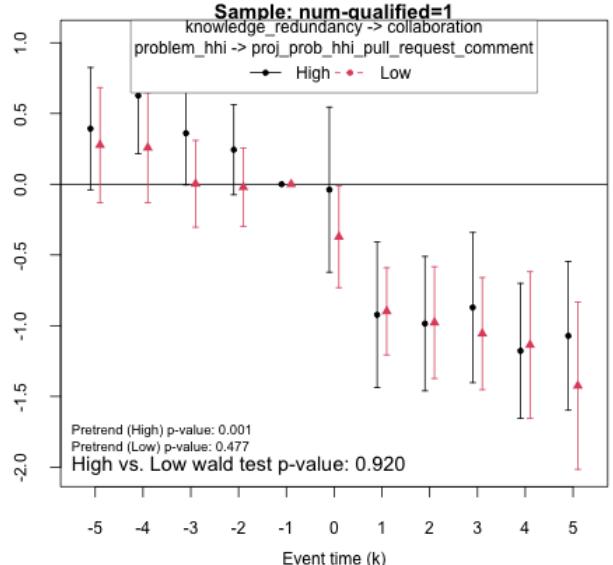
major_minor_release_count rolling5



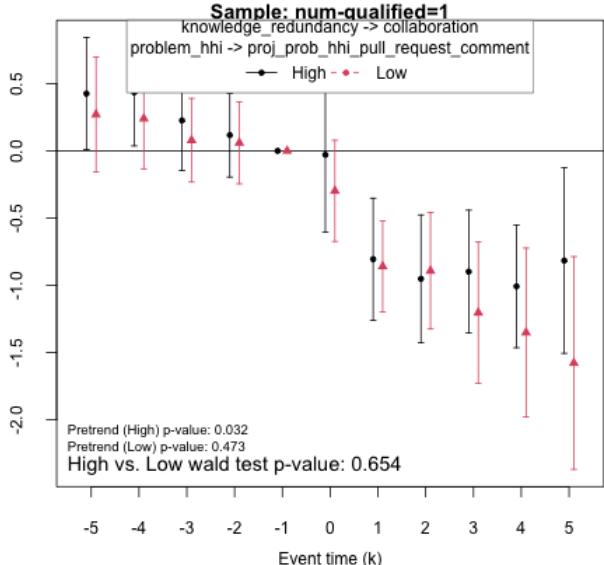
overall_new_release_count rolling5



pull_request_merged rolling5



pull_request_opened rolling5

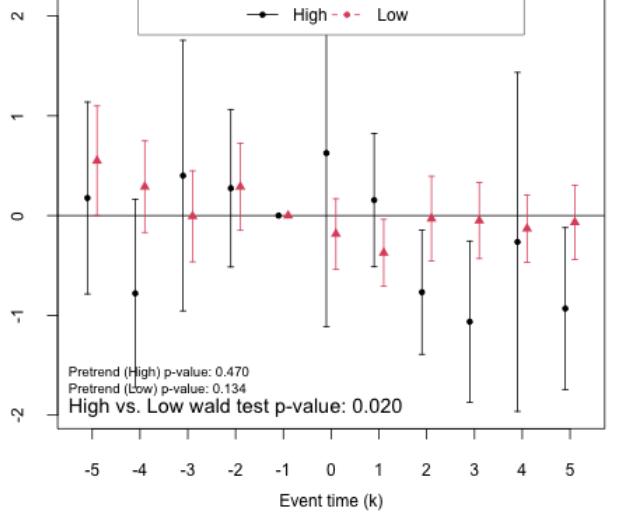


major_minor_release_count rolling5

knowledge_redundancy->collaboration

problem_hhi->proj_prob_hhi_pull_request_review

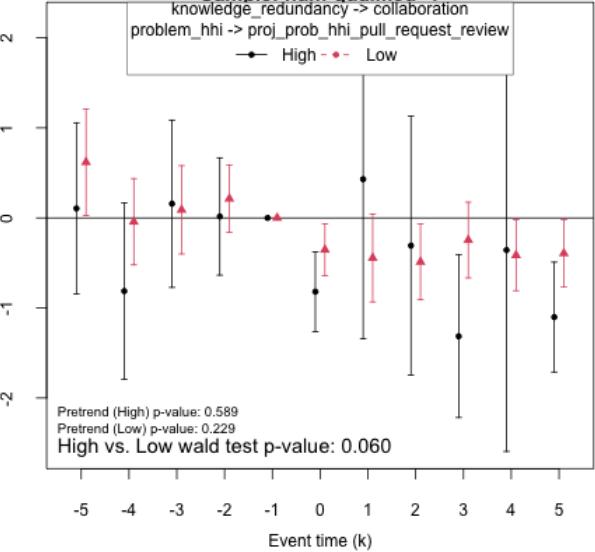
● High -● Low

**overall_new_release_count rolling5**

knowledge_redundancy->collaboration

problem_hhi->proj_prob_hhi_pull_request_review

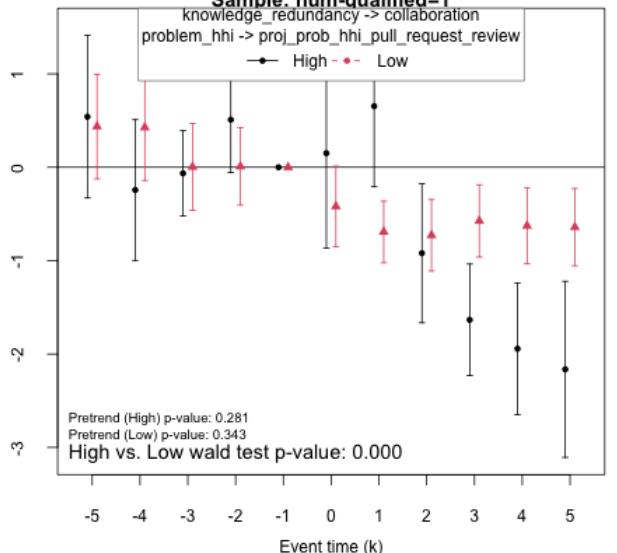
● High -● Low

**pull_request_merged rolling5**

knowledge_redundancy->collaboration

problem_hhi->proj_prob_hhi_pull_request_review

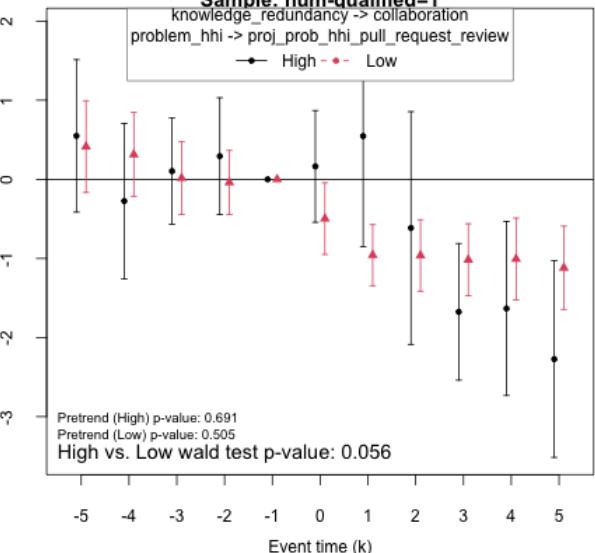
● High -● Low

**pull_request_opened rolling5**

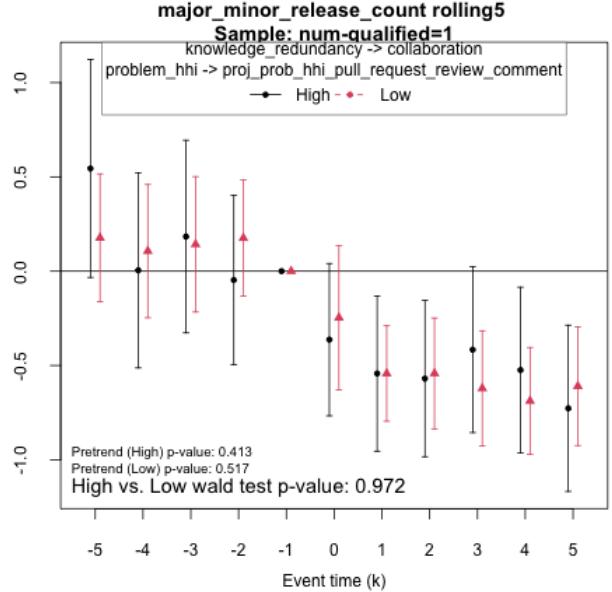
knowledge_redundancy->collaboration

problem_hhi->proj_prob_hhi_pull_request_review

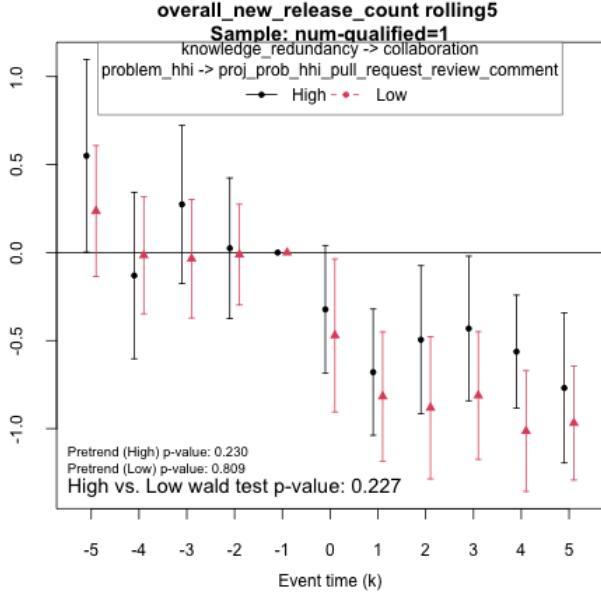
● High -● Low



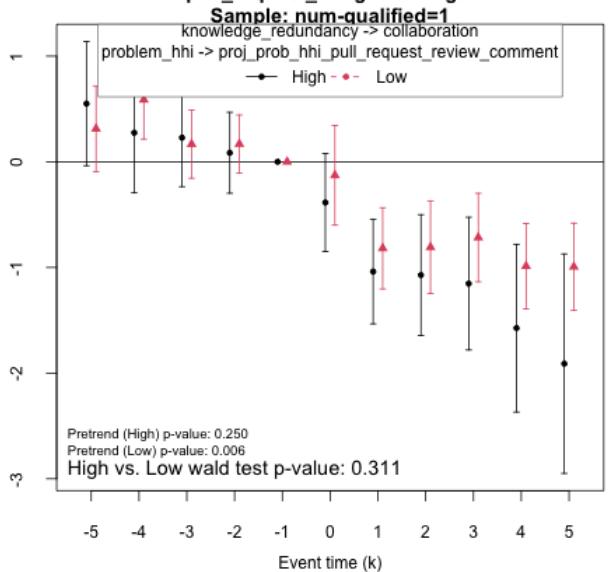
major_minor_release_count rolling5



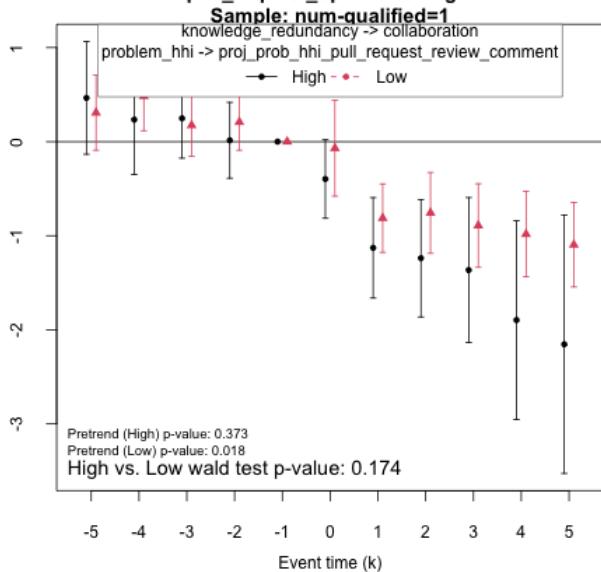
overall_new_release_count rolling5



pull_request_merged rolling5

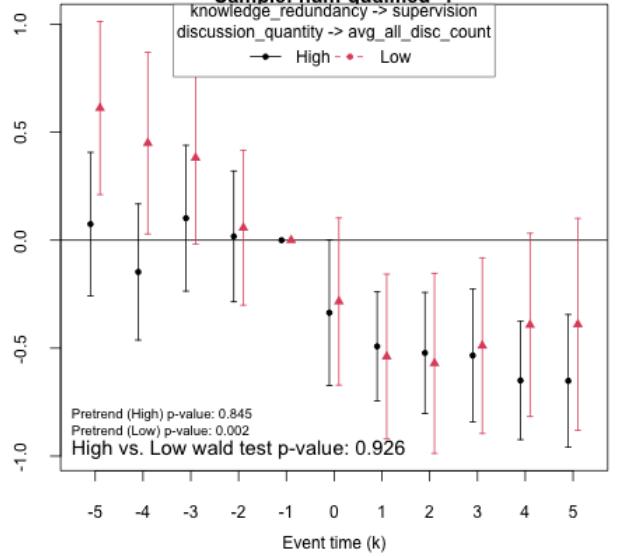


pull_request_opened rolling5

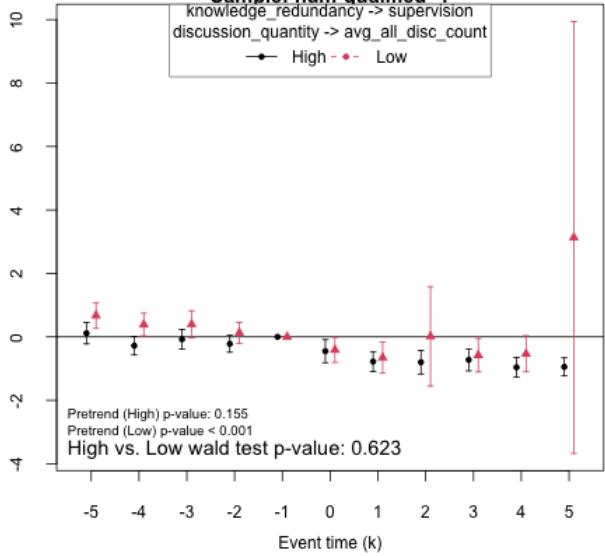


major_minor_release_count rolling5

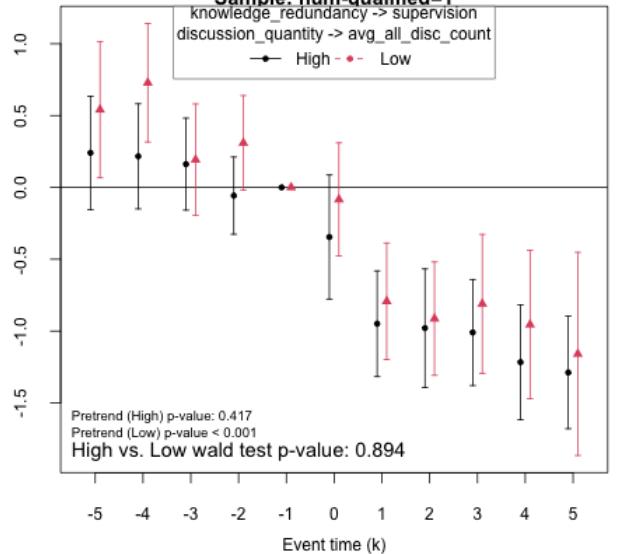
Sample: num-qualified=1
knowledge_redundancy -> supervision
discussion_quantity -> avg_all_disc_count
● High ▲ Low

**overall_new_release_count rolling5**

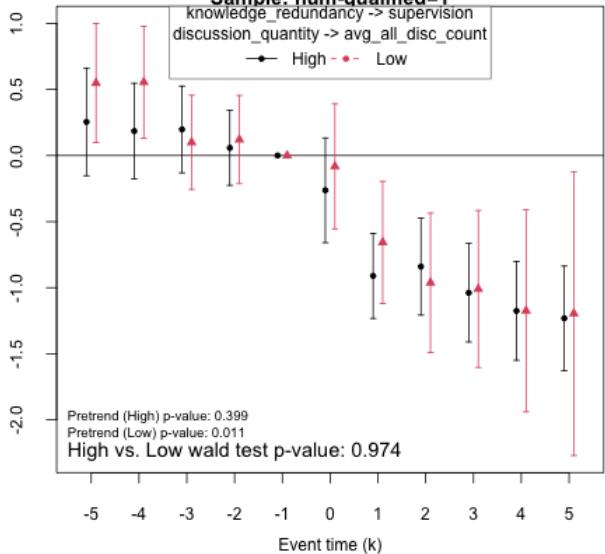
Sample: num-qualified=1
knowledge_redundancy -> supervision
discussion_quantity -> avg_all_disc_count
● High ▲ Low

**pull_request_merged rolling5**

Sample: num-qualified=1
knowledge_redundancy -> supervision
discussion_quantity -> avg_all_disc_count
● High ▲ Low

**pull_request_opened rolling5**

Sample: num-qualified=1
knowledge_redundancy -> supervision
discussion_quantity -> avg_all_disc_count
● High ▲ Low



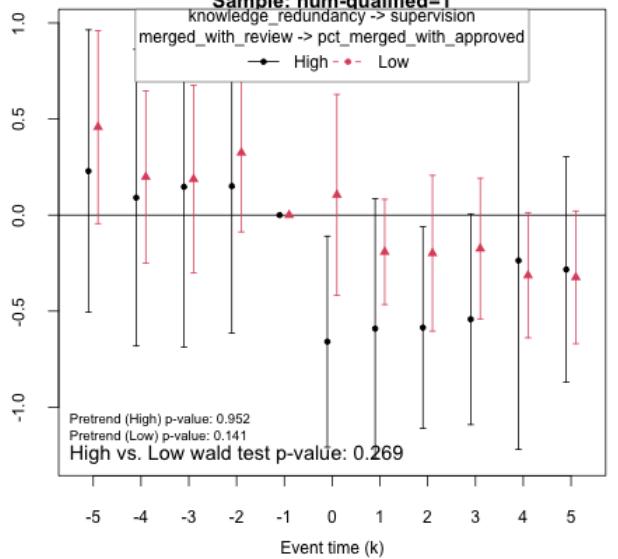
major_minor_release_count rolling5

Sample: num-qualified=1

knowledge_redundancy-> supervision

merged_with_review -> pct_merged_with_approved

● High ▲ Low



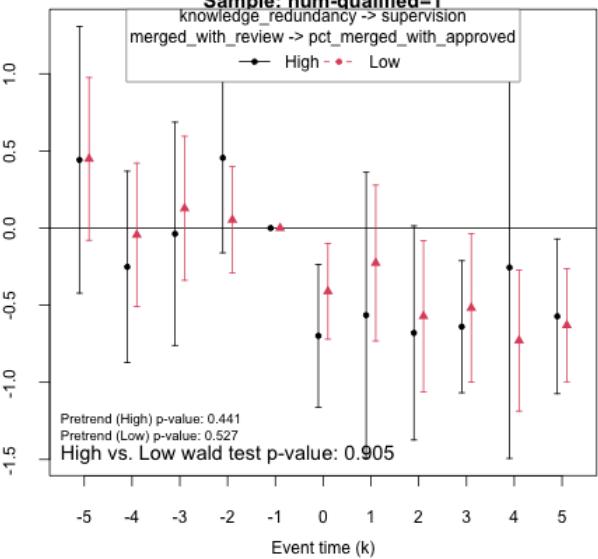
overall_new_release_count rolling5

Sample: num-qualified=1

knowledge_redundancy-> supervision

merged_with_review -> pct_merged_with_approved

● High ▲ Low



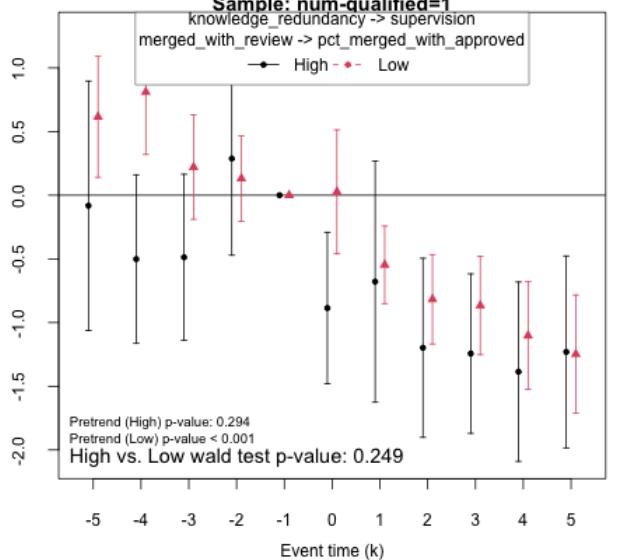
pull_request_merged rolling5

Sample: num-qualified=1

knowledge_redundancy-> supervision

merged_with_review -> pct_merged_with_approved

● High ▲ Low



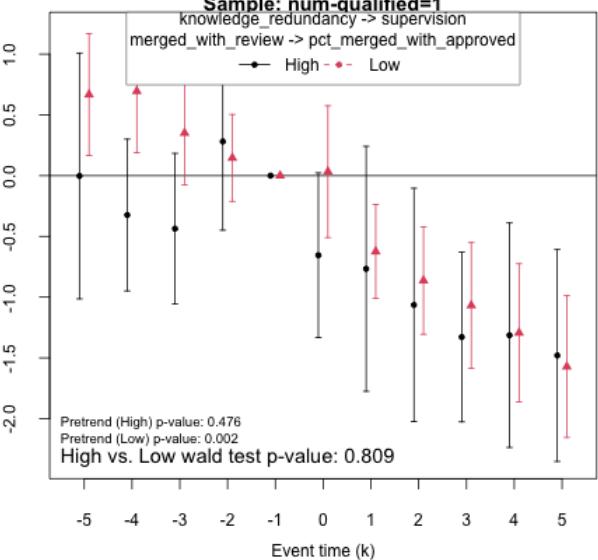
pull_request_opened rolling5

Sample: num-qualified=1

knowledge_redundancy-> supervision

merged_with_review -> pct_merged_with_approved

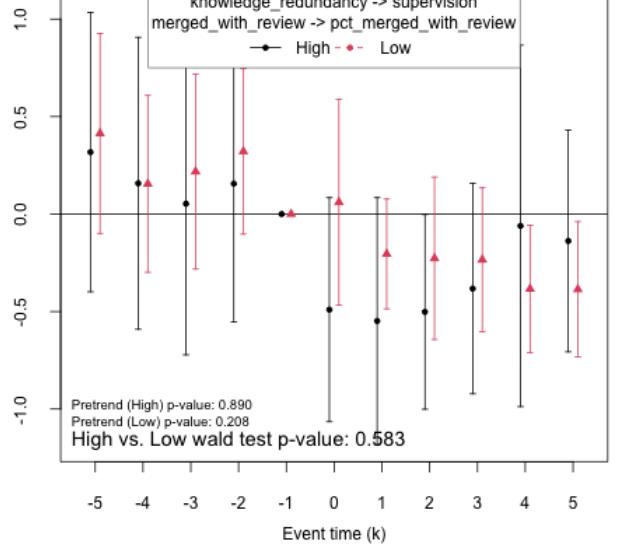
● High ▲ Low



major_minor_release_count rolling5

Sample: num-qualified=1

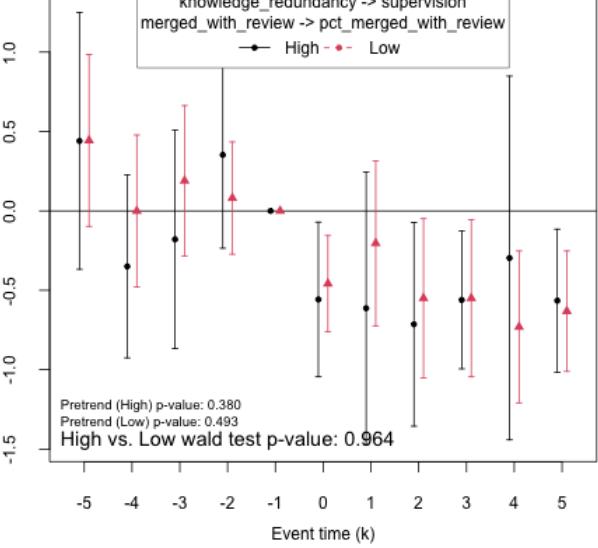
knowledge_redundancy-> supervision
merged_with_review -> pct_merged_with_review
● High ▲ Low



overall_new_release_count rolling5

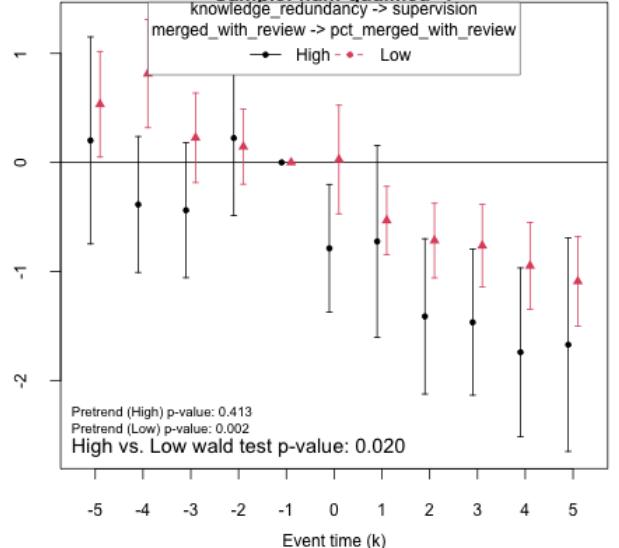
Sample: num-qualified=1

knowledge_redundancy-> supervision
merged_with_review -> pct_merged_with_review
● High ▲ Low



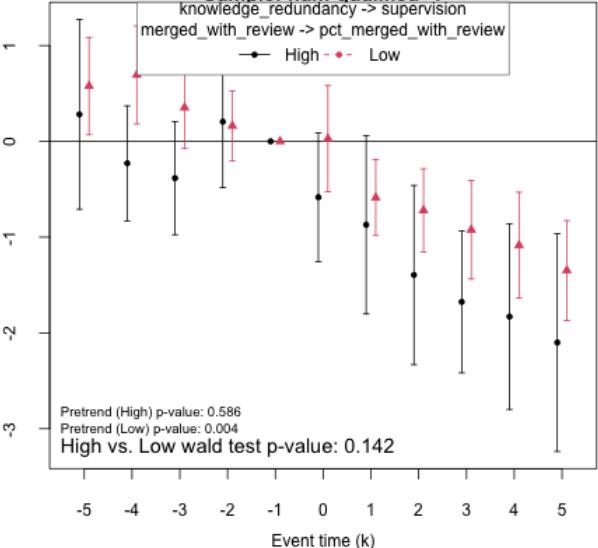
pull_request_merged rolling5

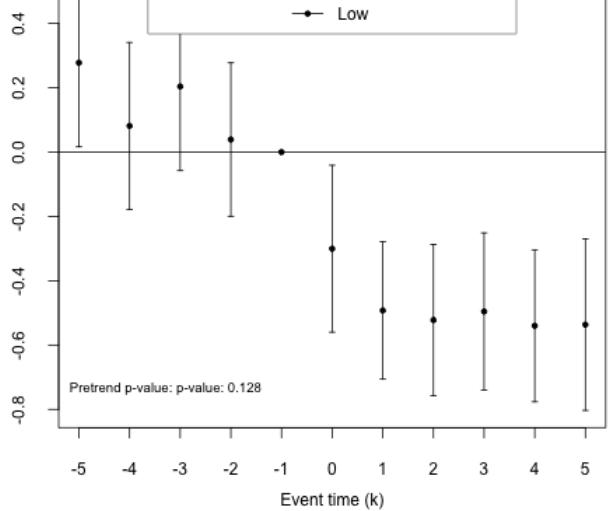
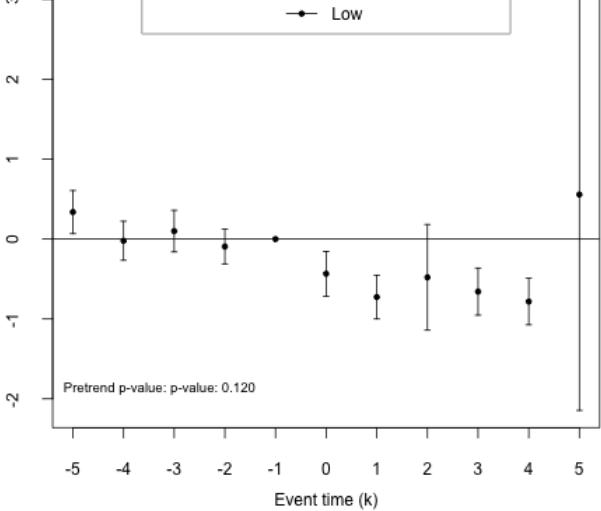
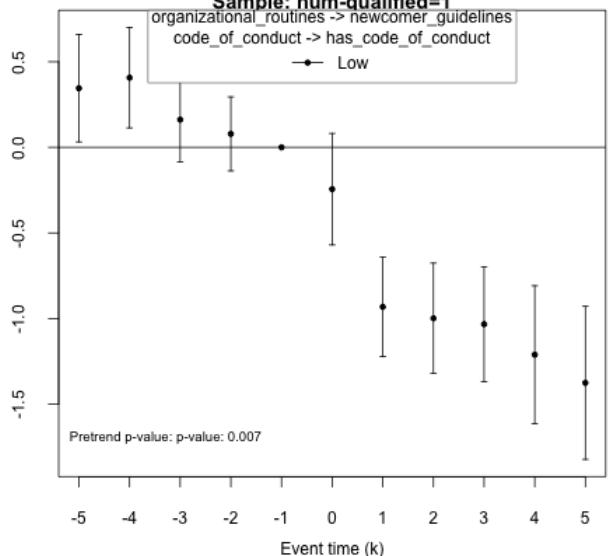
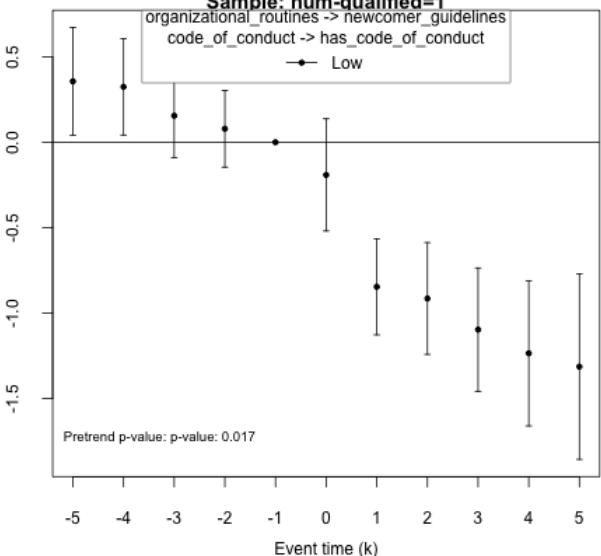
knowledge_redundancy-> supervision
merged_with_review -> pct_merged_with_review
● High ▲ Low



pull_request_opened rolling5

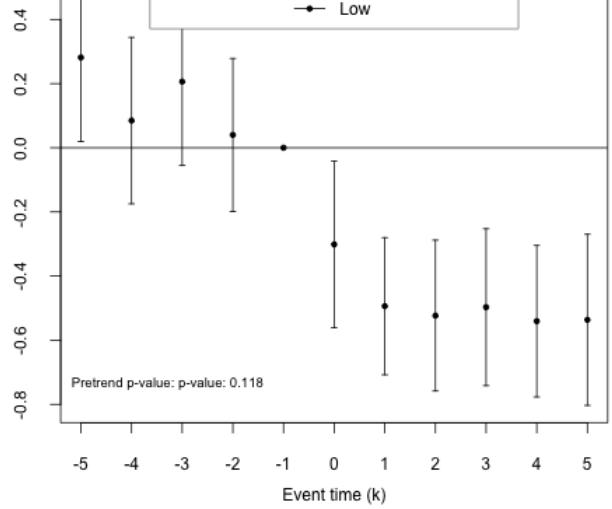
knowledge_redundancy-> supervision
merged_with_review -> pct_merged_with_review
● High ▲ Low



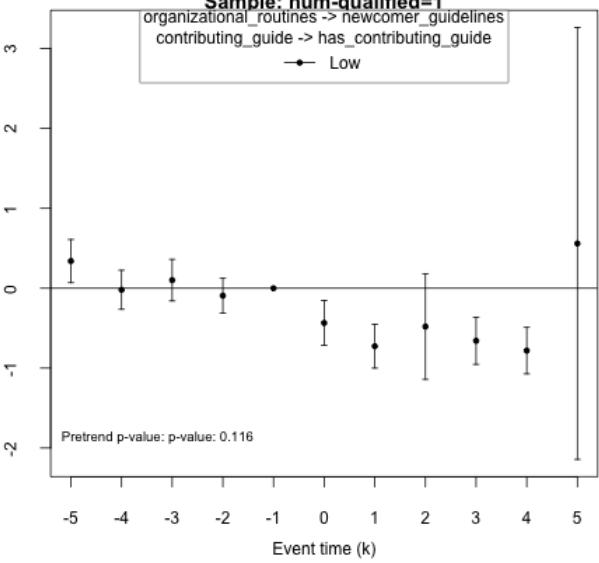
major_minor_release_count rolling5**Sample: num-qualified=1**organizational_routines -> newcomer_guidelines
code_of_conduct -> has_code_of_conduct**overall_new_release_count rolling5****Sample: num-qualified=1**organizational_routines -> newcomer_guidelines
code_of_conduct -> has_code_of_conduct**pull_request_merged rolling5****Sample: num-qualified=1**organizational_routines -> newcomer_guidelines
code_of_conduct -> has_code_of_conduct**pull_request_opened rolling5****Sample: num-qualified=1**organizational_routines -> newcomer_guidelines
code_of_conduct -> has_code_of_conduct

major_minor_release_count rolling5**Sample: num-qualified=1**organizational_routines -> newcomer_guidelines
contributing_guide -> has_contributing_guide

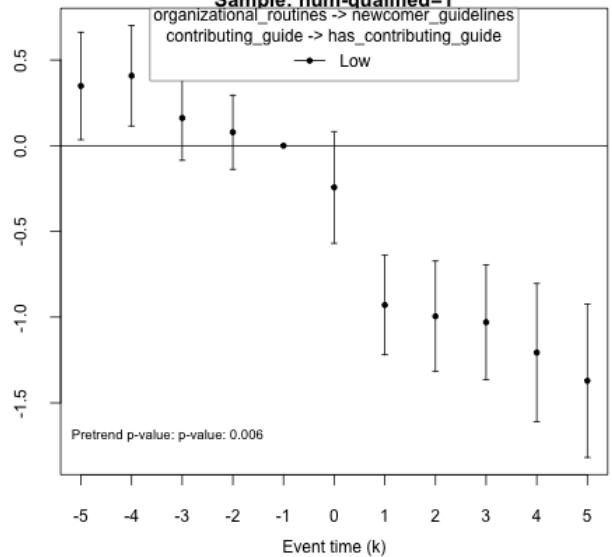
● Low

**overall_new_release_count rolling5****Sample: num-qualified=1**organizational_routines -> newcomer_guidelines
contributing_guide -> has_contributing_guide

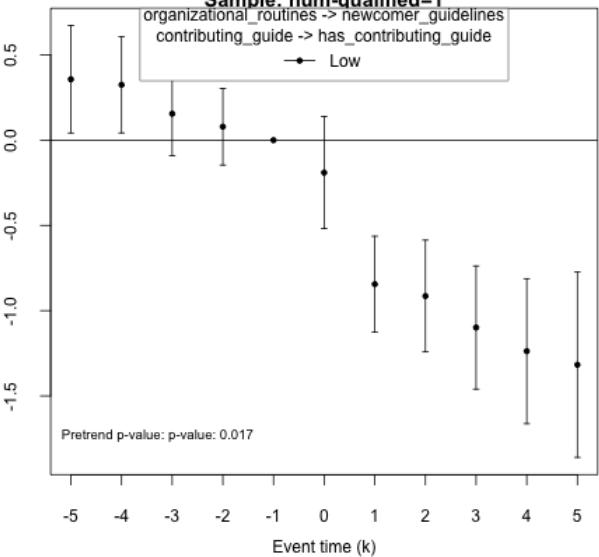
● Low

**pull_request_merged rolling5****Sample: num-qualified=1**organizational_routines -> newcomer_guidelines
contributing_guide -> has_contributing_guide

● Low

**pull_request_opened rolling5****Sample: num-qualified=1**organizational_routines -> newcomer_guidelines
contributing_guide -> has_contributing_guide

● Low

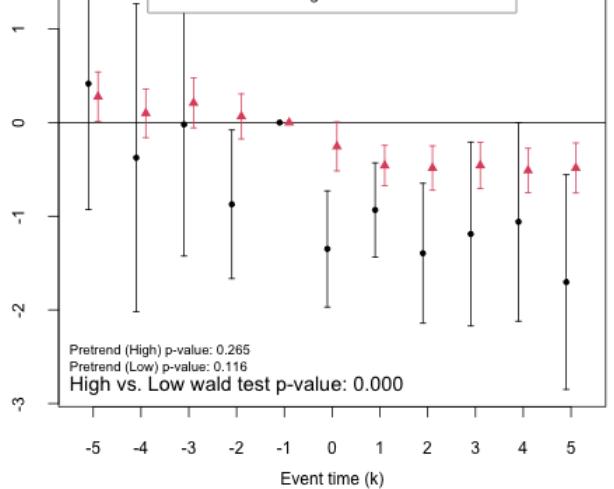


major_minor_release_count rolling5

Sample: num-qualified=1

organizational_routines \rightarrow newcomer_guidelines
 $\text{good_first_issue} \rightarrow \text{has_good_first_issue}$

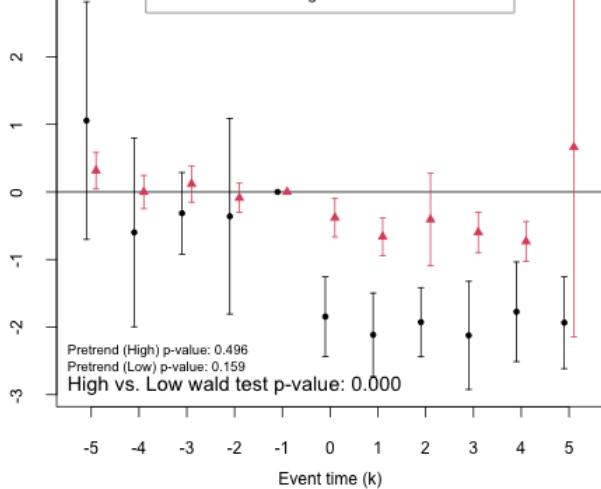
● High - ● Low

**overall_new_release_count rolling5**

Sample: num-qualified=1

organizational_routines \rightarrow newcomer_guidelines
 $\text{good_first_issue} \rightarrow \text{has_good_first_issue}$

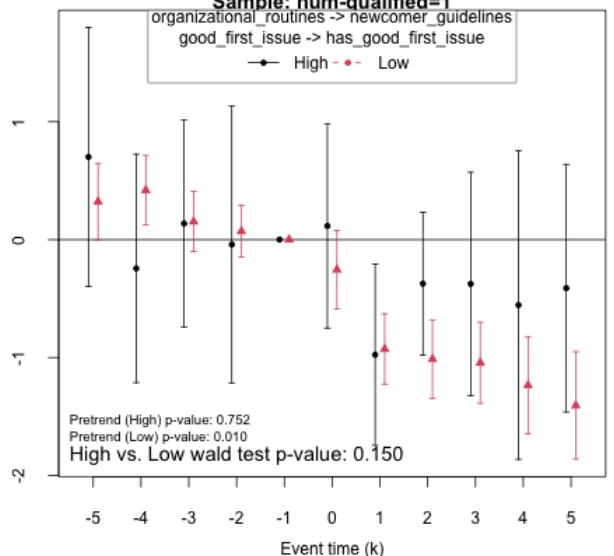
● High - ● Low

**pull_request_merged rolling5**

Sample: num-qualified=1

organizational_routines \rightarrow newcomer_guidelines
 $\text{good_first_issue} \rightarrow \text{has_good_first_issue}$

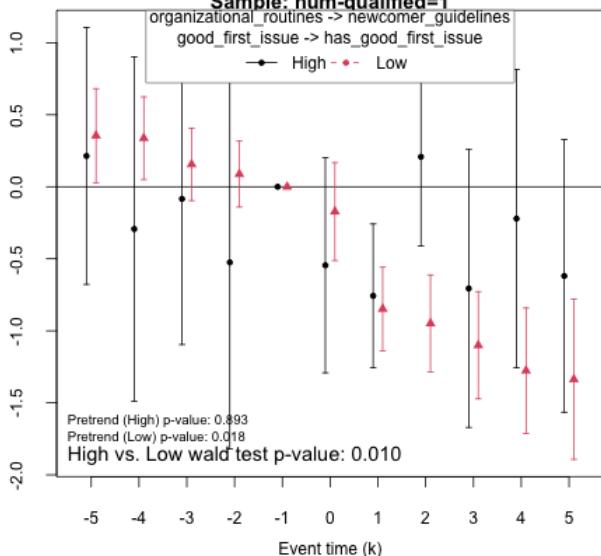
● High - ● Low

**pull_request_opened rolling5**

Sample: num-qualified=1

organizational_routines \rightarrow newcomer_guidelines
 $\text{good_first_issue} \rightarrow \text{has_good_first_issue}$

● High - ● Low

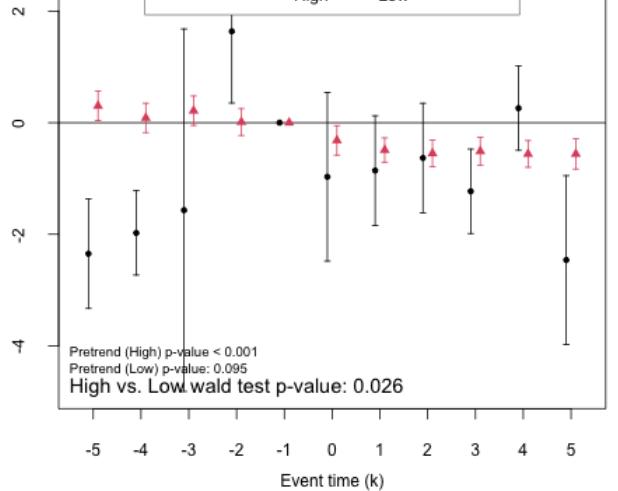


major_minor_release_count rolling5

Sample: num-qualified=1

organizational_routines -> organized_assignment
 codeowners_file -> has_codeowners

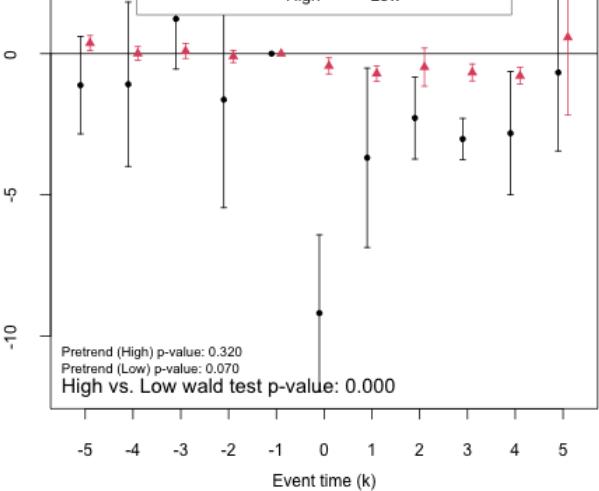
- High ● Low

**overall_new_release_count rolling5**

Sample: num-qualified=1

organizational_routines -> organized_assignment
 codeowners_file -> has_codeowners

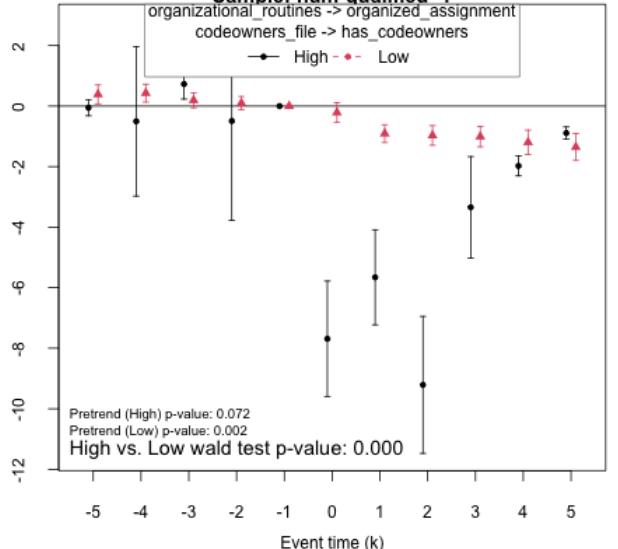
- High ● Low

**pull_request_merged rolling5**

Sample: num-qualified=1

organizational_routines -> organized_assignment
 codeowners_file -> has_codeowners

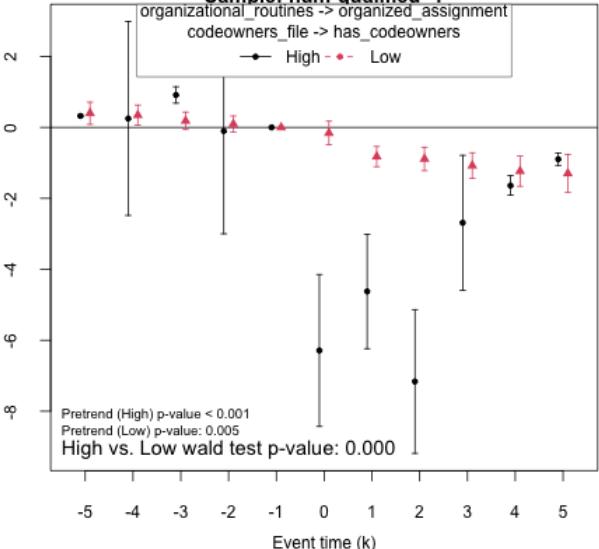
- High ● Low

**pull_request_opened rolling5**

Sample: num-qualified=1

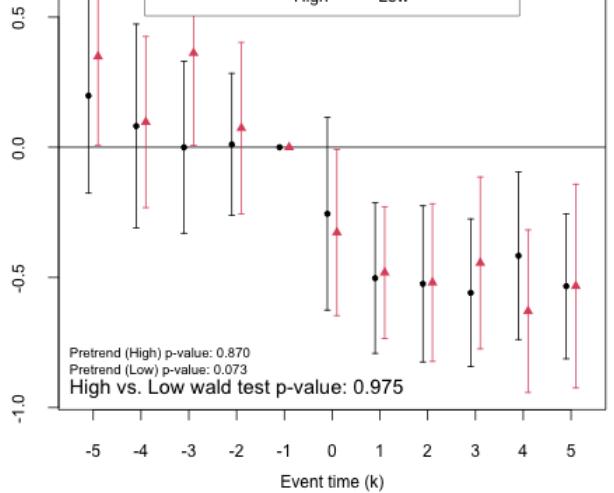
organizational_routines -> organized_assignment
 codeowners_file -> has_codeowners

- High ● Low

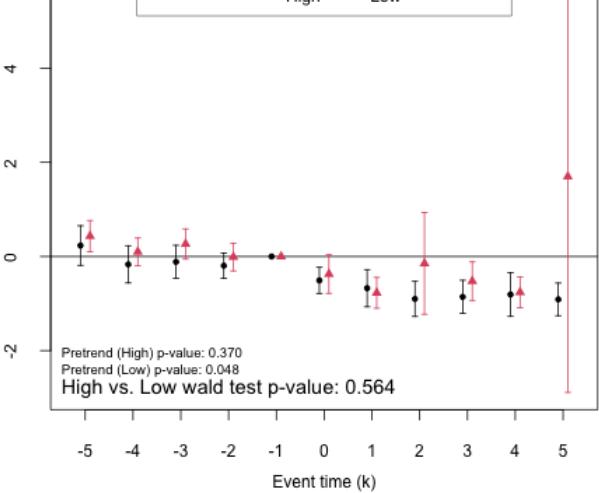


major_minor_release_count rolling5**Sample: num-qualified=1**organizational_routines -> organized_assignment
discussion_assignees -> mean_has_assignee

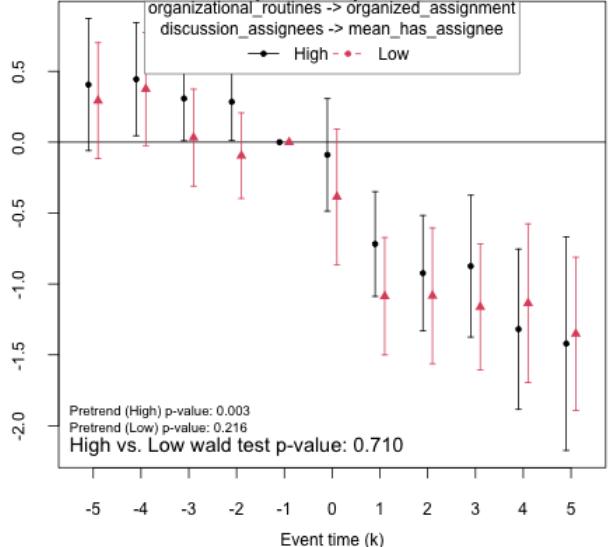
● High ▲ Low

**overall_new_release_count rolling5****Sample: num-qualified=1**organizational_routines -> organized_assignment
discussion_assignees -> mean_has_assignee

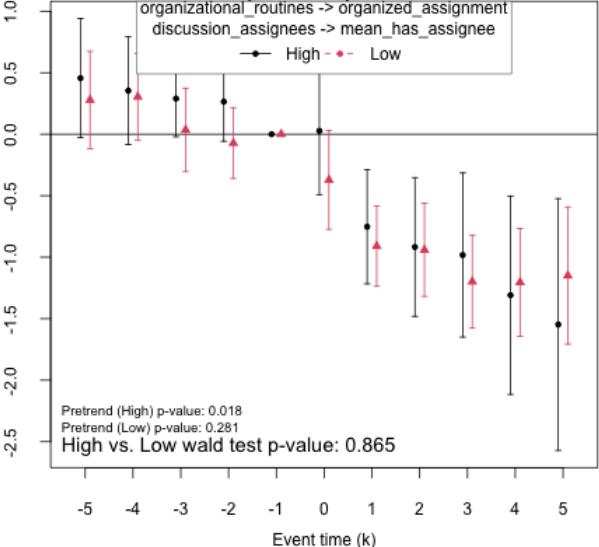
● High ▲ Low

**pull_request_merged rolling5****Sample: num-qualified=1**organizational_routines -> organized_assignment
discussion_assignees -> mean_has_assignee

● High ▲ Low

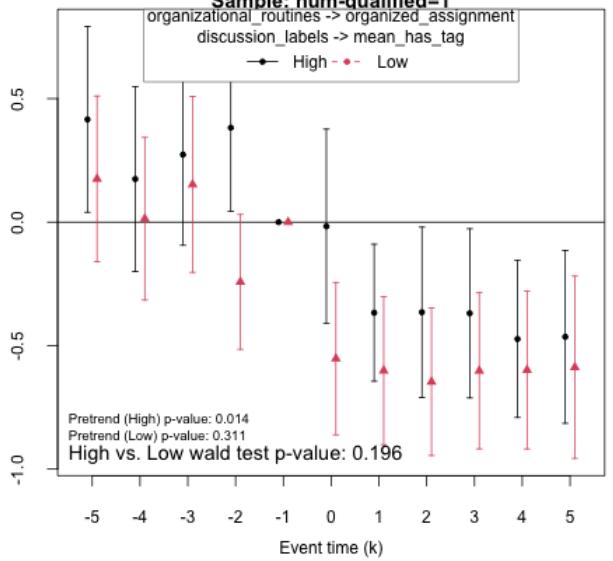
**pull_request_opened rolling5****Sample: num-qualified=1**organizational_routines -> organized_assignment
discussion_assignees -> mean_has_assignee

● High ▲ Low

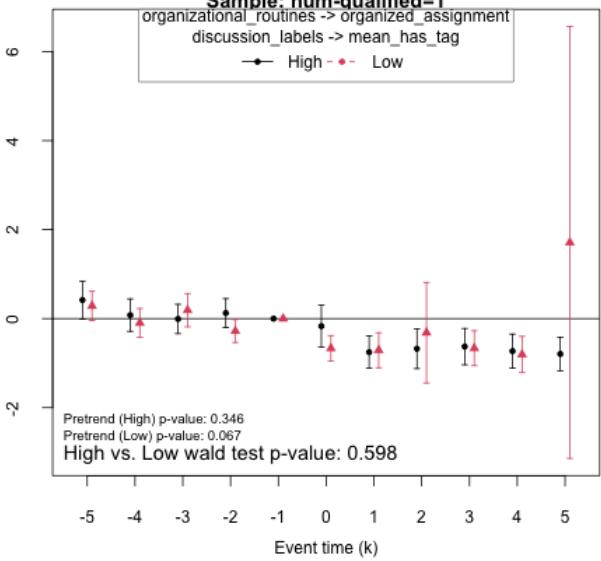


major_minor_release_count rolling5

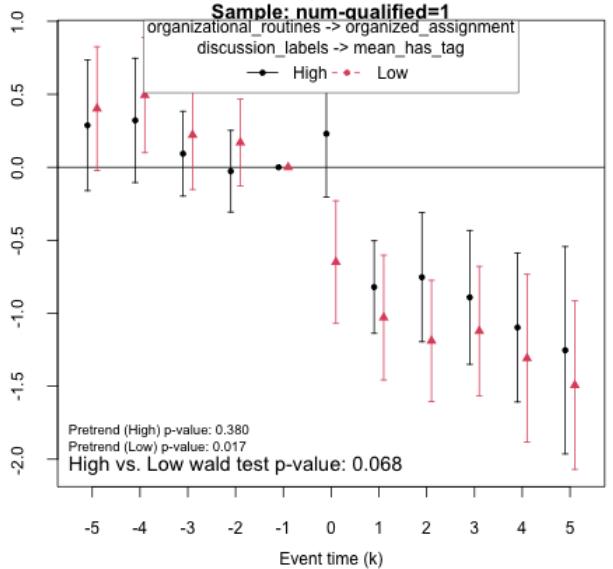
Sample: num-qualified=1

**overall_new_release_count rolling5**

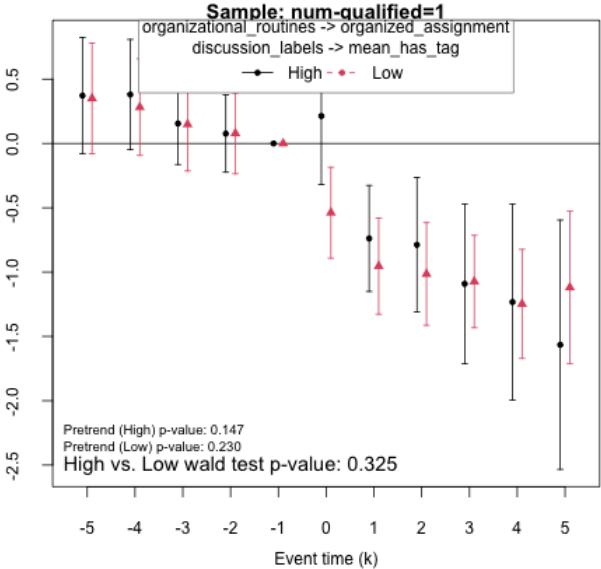
Sample: num-qualified=1

**pull_request_merged rolling5**

Sample: num-qualified=1

**pull_request_opened rolling5**

Sample: num-qualified=1



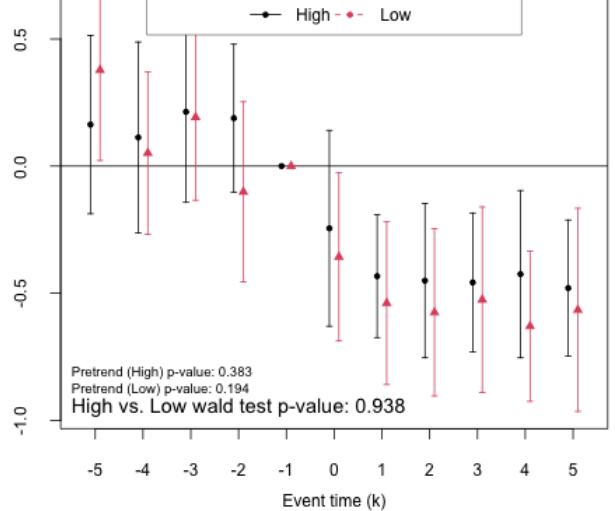
major_minor_release_count rolling5

Sample: num-qualified=1

organizational_routines -> organized_assignment

pr_reviewers -> mean_has_reviewer

● High ▲ Low

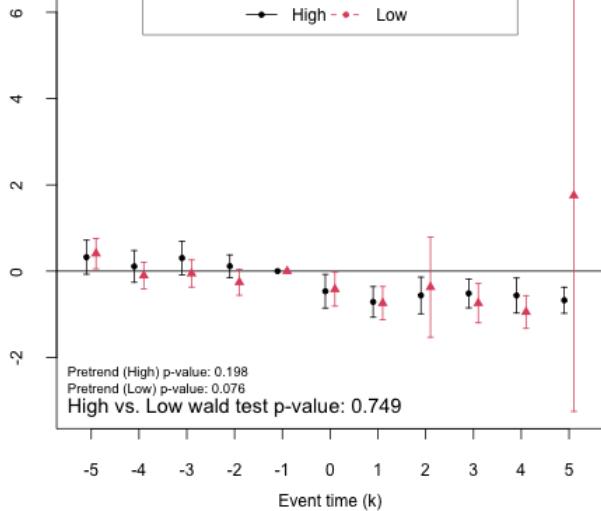
**overall_new_release_count rolling5**

Sample: num-qualified=1

organizational_routines -> organized_assignment

pr_reviewers -> mean_has_reviewer

● High ▲ Low

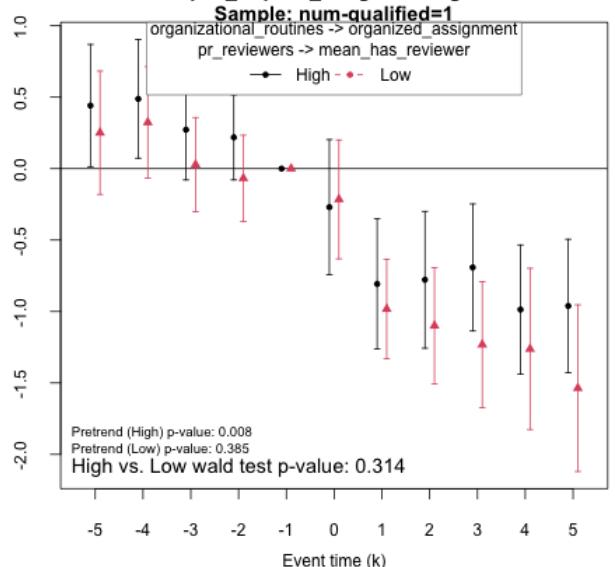
**pull_request_merged rolling5**

Sample: num-qualified=1

organizational_routines -> organized_assignment

pr_reviewers -> mean_has_reviewer

● High ▲ Low

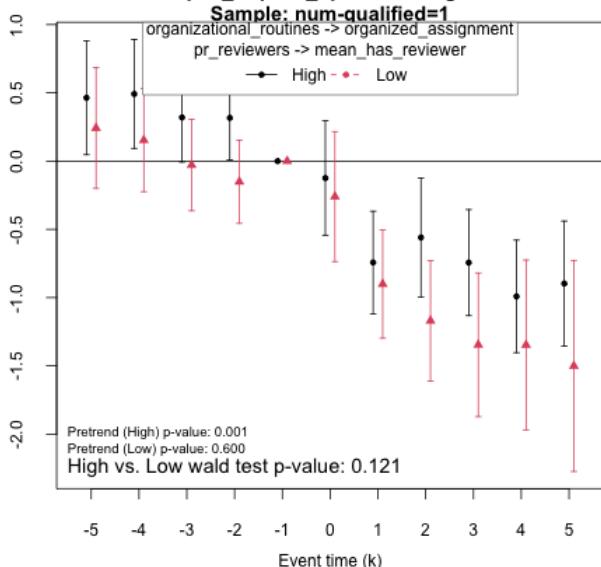
**pull_request_opened rolling5**

Sample: num-qualified=1

organizational_routines -> organized_assignment

pr_reviewers -> mean_has_reviewer

● High ▲ Low



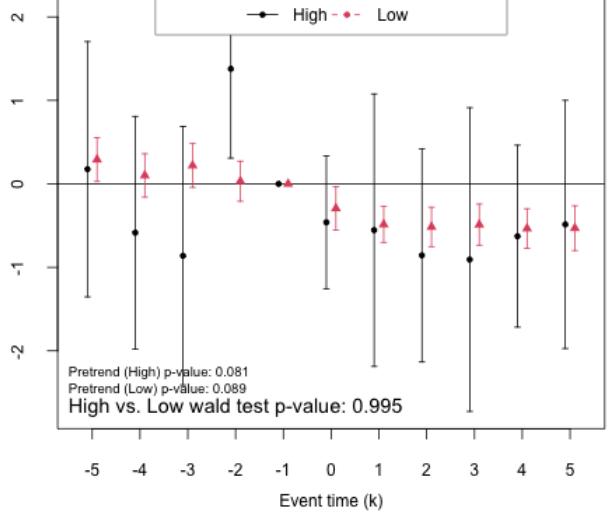
major_minor_release_count rolling5

Sample: num-qualified=1

organizational_routines -> organized_inquiries

issue_template -> has_issue_template

● High - ● Low

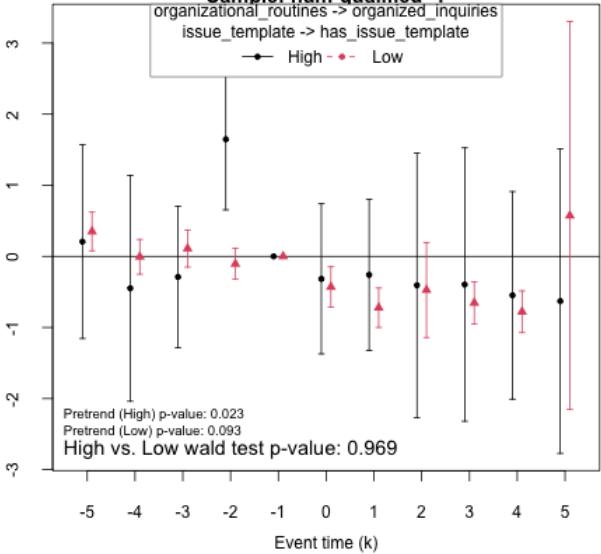
**overall_new_release_count rolling5**

Sample: num-qualified=1

organizational_routines -> organized_inquiries

issue_template -> has_issue_template

● High - ● Low

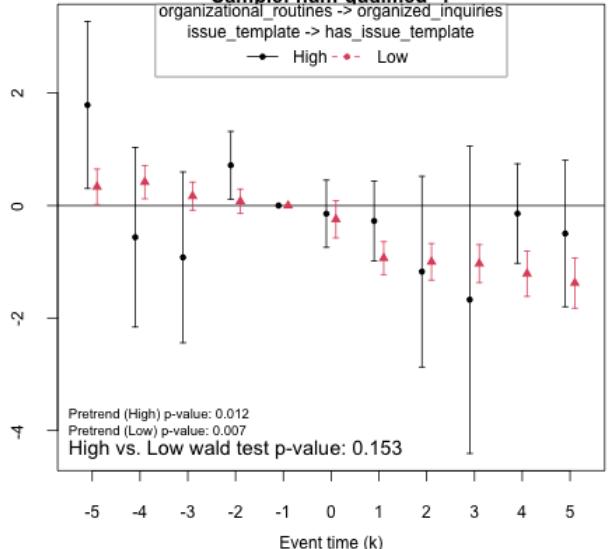
**pull_request_merged rolling5**

Sample: num-qualified=1

organizational_routines -> organized_inquiries

issue_template -> has_issue_template

● High - ● Low

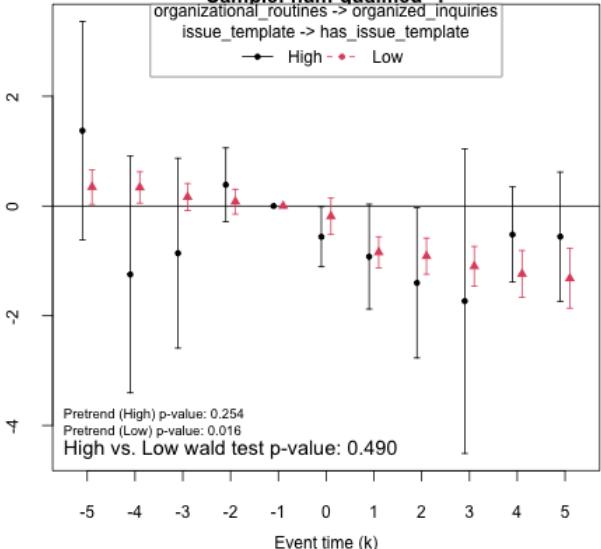
**pull_request_opened rolling5**

Sample: num-qualified=1

organizational_routines -> organized_inquiries

issue_template -> has_issue_template

● High - ● Low

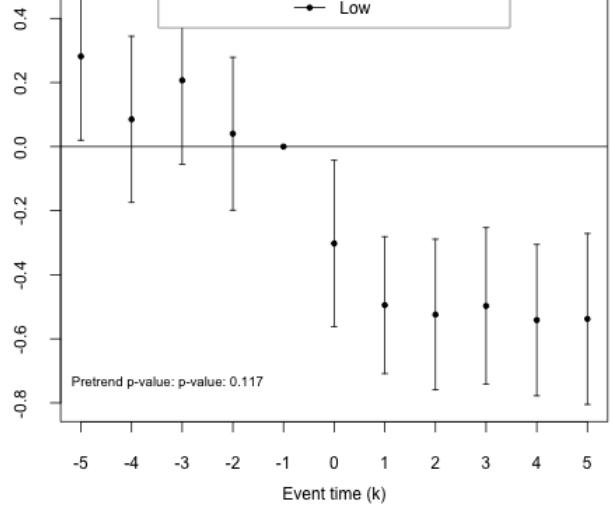


major_minor_release_count rolling5**Sample: num-qualified=1**

organizational_routines -> organized_inquiries

pr_template -> has_pr_template

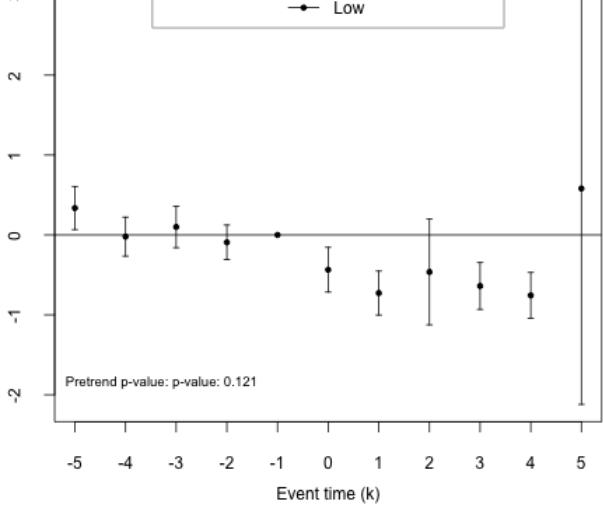
● Low

**overall_new_release_count rolling5****Sample: num-qualified=1**

organizational_routines -> organized_inquiries

pr_template -> has_pr_template

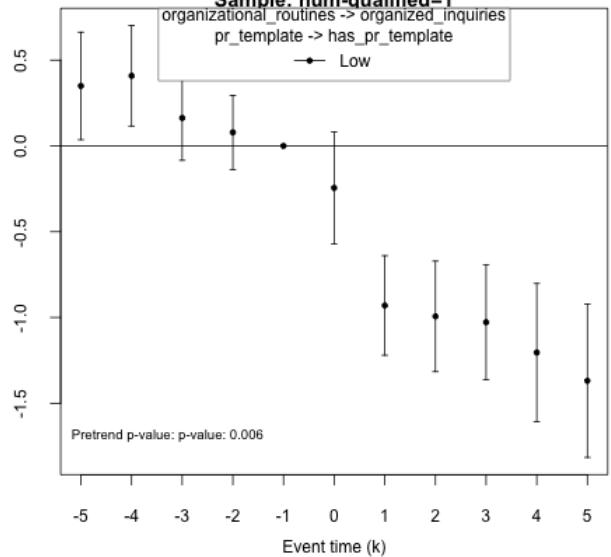
● Low

**pull_request_merged rolling5****Sample: num-qualified=1**

organizational_routines -> organized_inquiries

pr_template -> has_pr_template

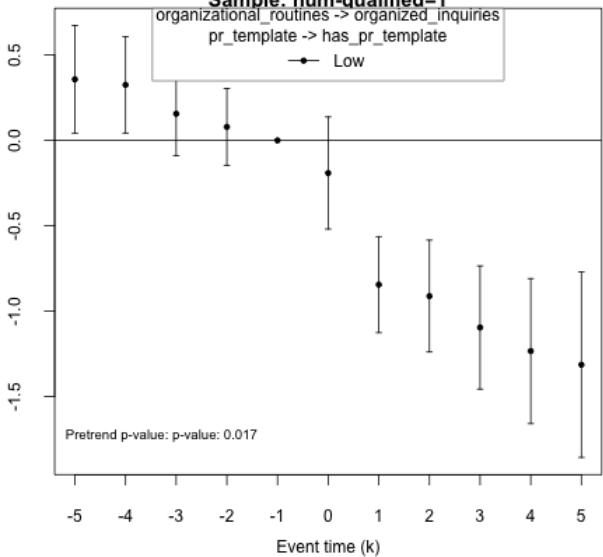
● Low

**pull_request_opened rolling5****Sample: num-qualified=1**

organizational_routines -> organized_inquiries

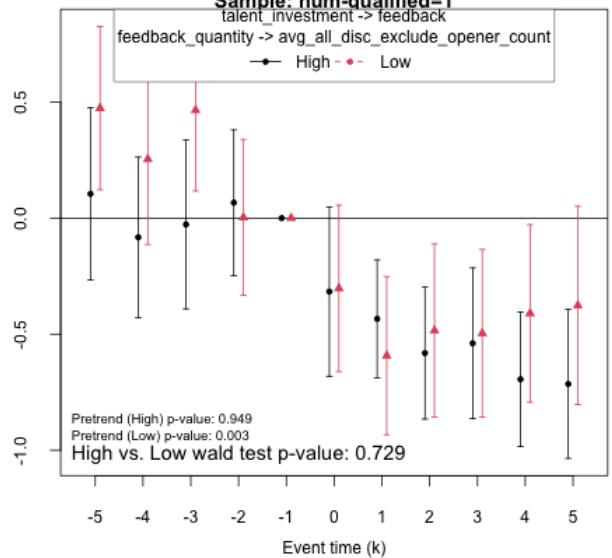
pr_template -> has_pr_template

● Low



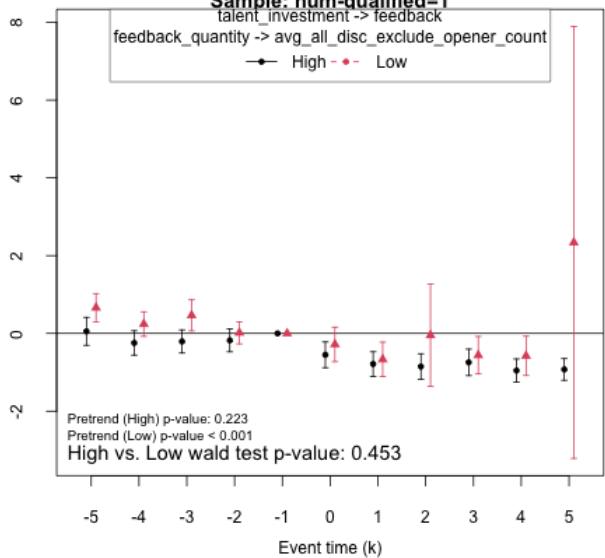
major_minor_release_count rolling5

Sample: num-qualified=1



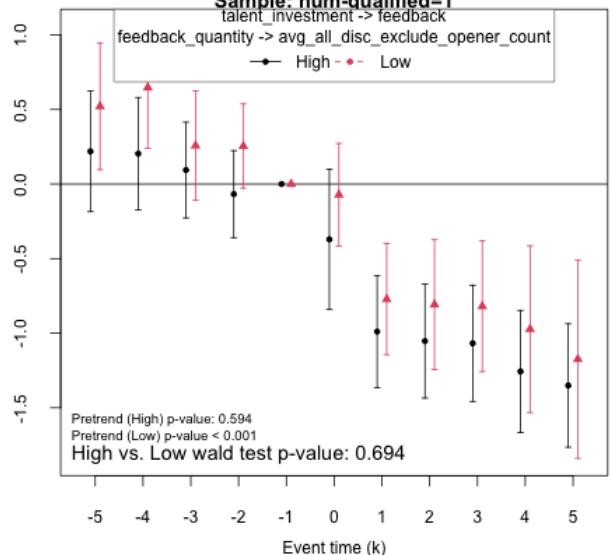
overall_new_release_count rolling5

Sample: num-qualified=1



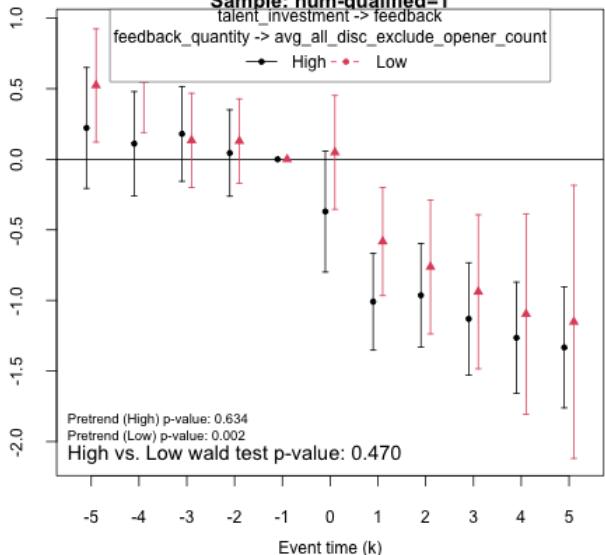
pull_request_merged rolling5

Sample: num-qualified=1



pull_request_opened rolling5

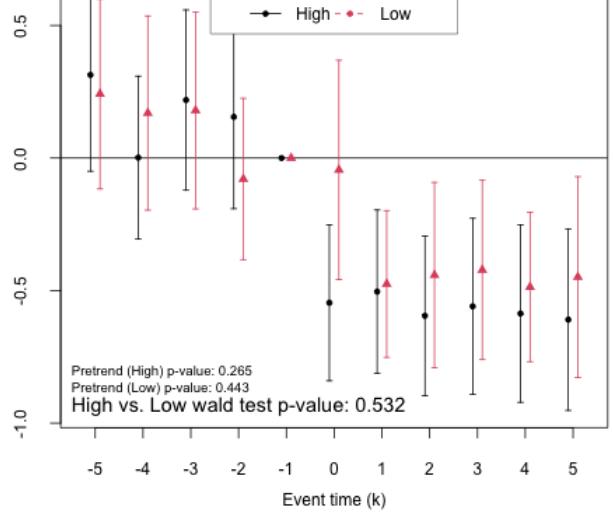
Sample: num-qualified=1



major_minor_release_count rolling5

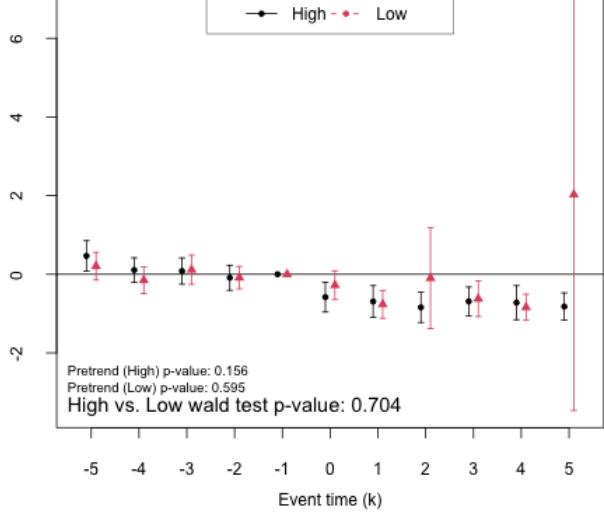
Sample: num-qualified=1

talent_investment -> feedback
 response_rate -> response_rate
 ● High ▲ Low

**overall_new_release_count rolling5**

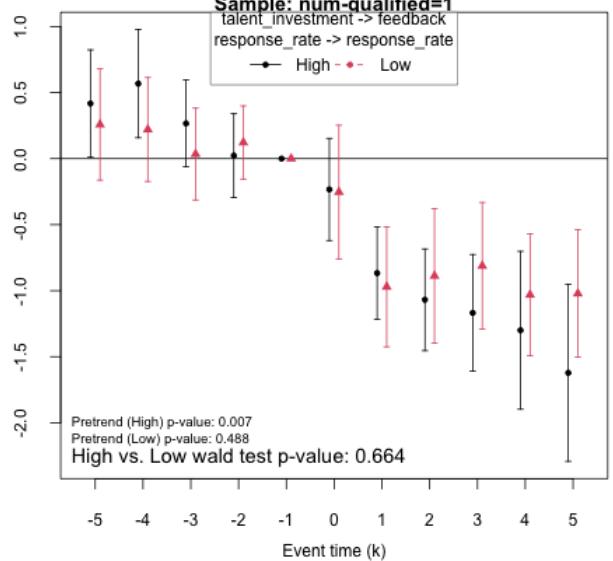
Sample: num-qualified=1

talent_investment -> feedback
 response_rate -> response_rate
 ● High ▲ Low

**pull_request_merged rolling5**

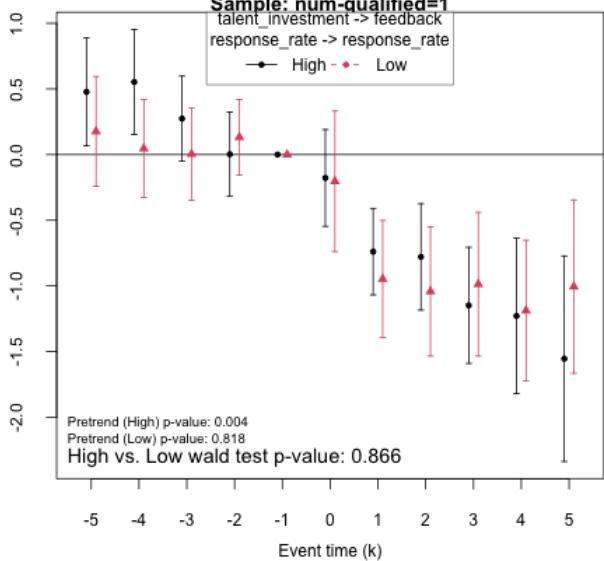
Sample: num-qualified=1

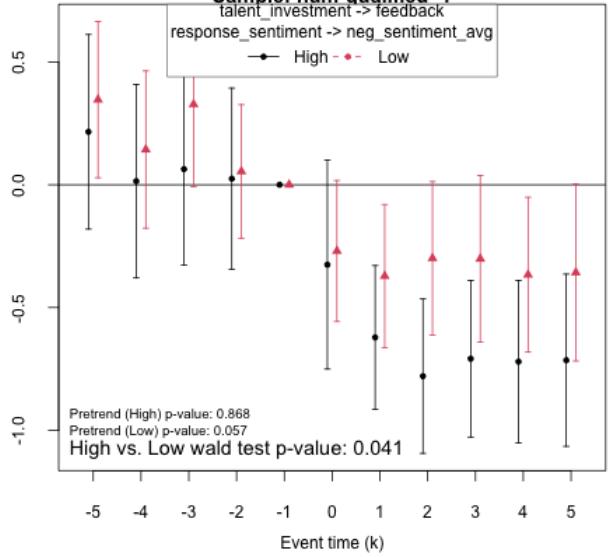
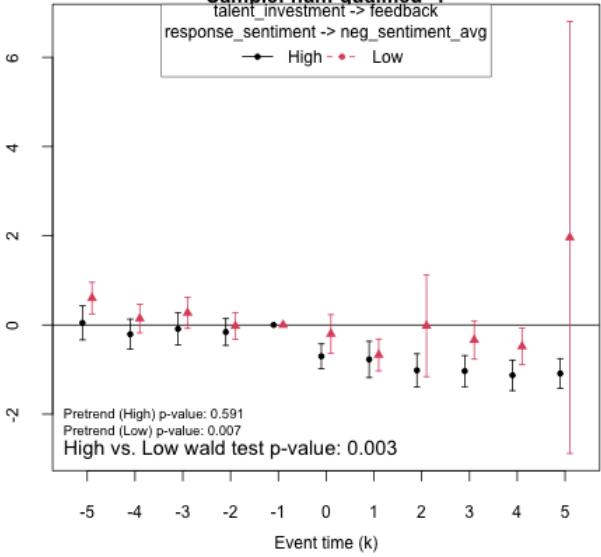
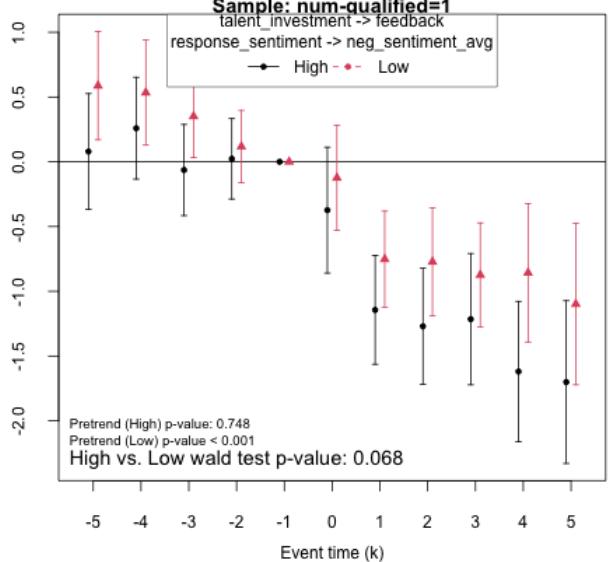
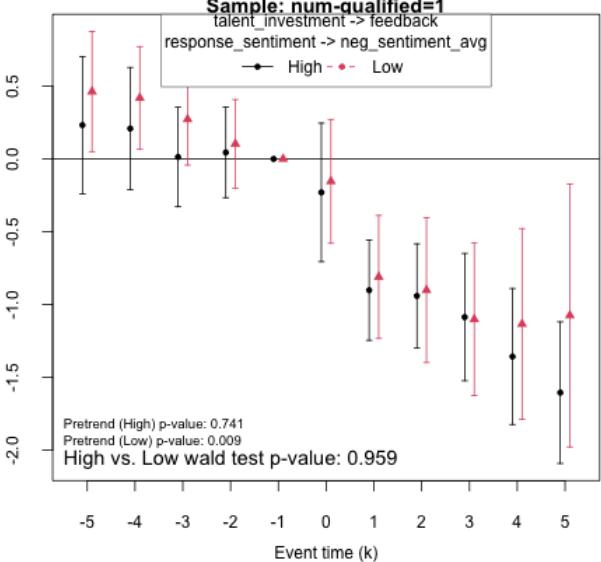
talent_investment -> feedback
 response_rate -> response_rate
 ● High ▲ Low

**pull_request_opened rolling5**

Sample: num-qualified=1

talent_investment -> feedback
 response_rate -> response_rate
 ● High ▲ Low



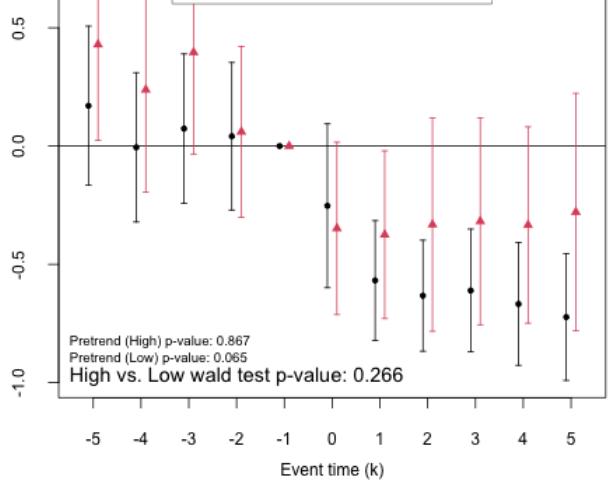
major_minor_release_count rolling5**Sample: num-qualified=1****overall_new_release_count rolling5****Sample: num-qualified=1****pull_request_merged rolling5****Sample: num-qualified=1****pull_request_opened rolling5****Sample: num-qualified=1**

major_minor_release_count rolling5

Sample: num-qualified=1

talent_investment -> feedback
response_sentiment -> ov_sentiment_avg

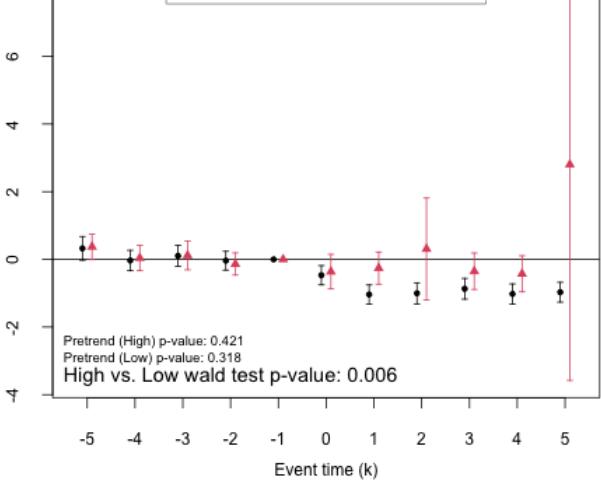
● High ▲ Low

**overall_new_release_count rolling5**

Sample: num-qualified=1

talent_investment -> feedback
response_sentiment -> ov_sentiment_avg

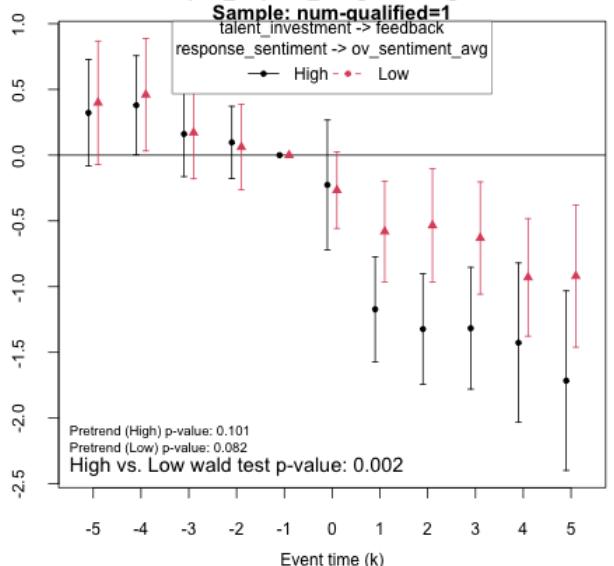
● High ▲ Low

**pull_request_merged rolling5**

Sample: num-qualified=1

talent_investment -> feedback
response_sentiment -> ov_sentiment_avg

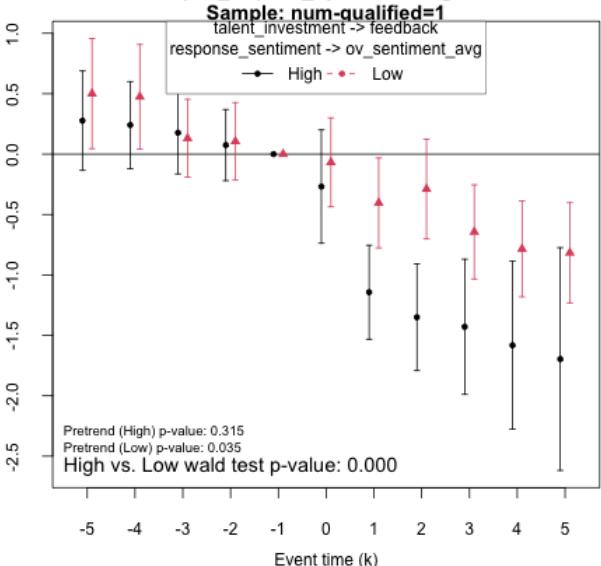
● High ▲ Low

**pull_request_opened rolling5**

Sample: num-qualified=1

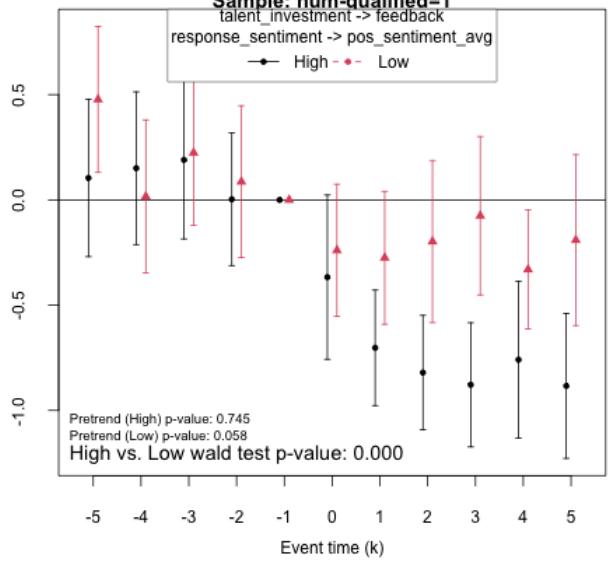
talent_investment -> feedback
response_sentiment -> ov_sentiment_avg

● High ▲ Low

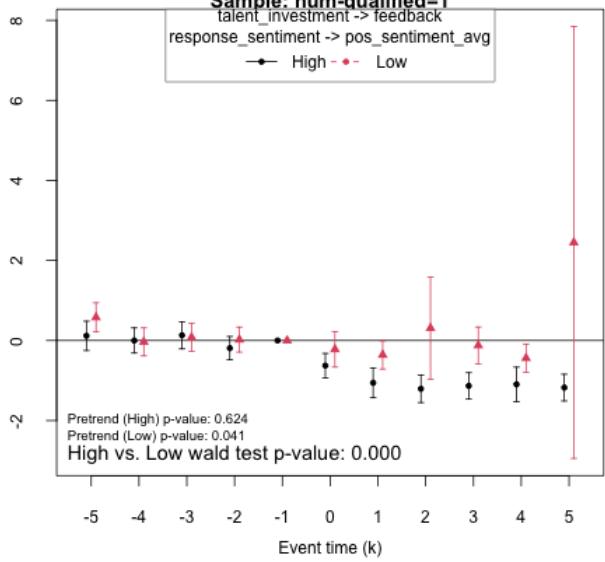


major_minor_release_count rolling5

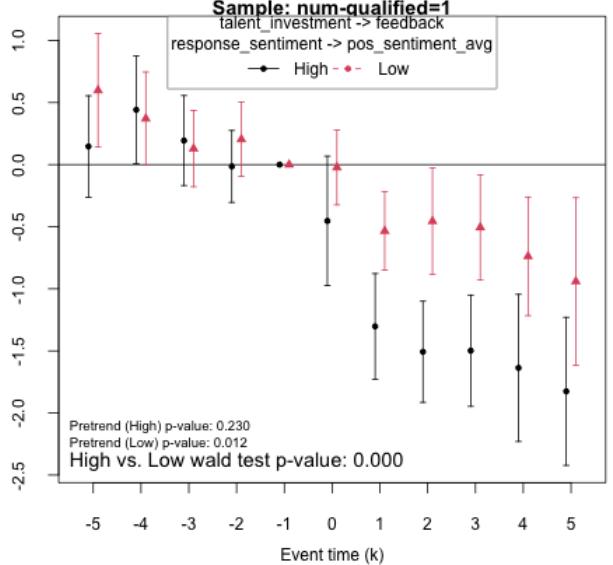
Sample: num-qualified=1

**overall_new_release_count rolling5**

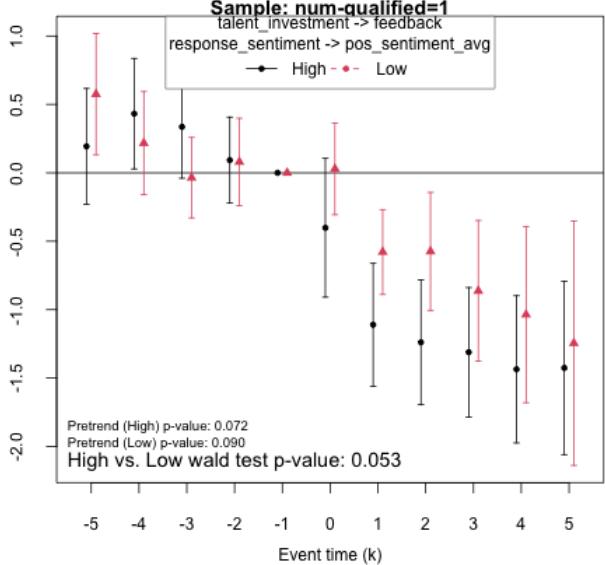
Sample: num-qualified=1

**pull_request_merged rolling5**

Sample: num-qualified=1

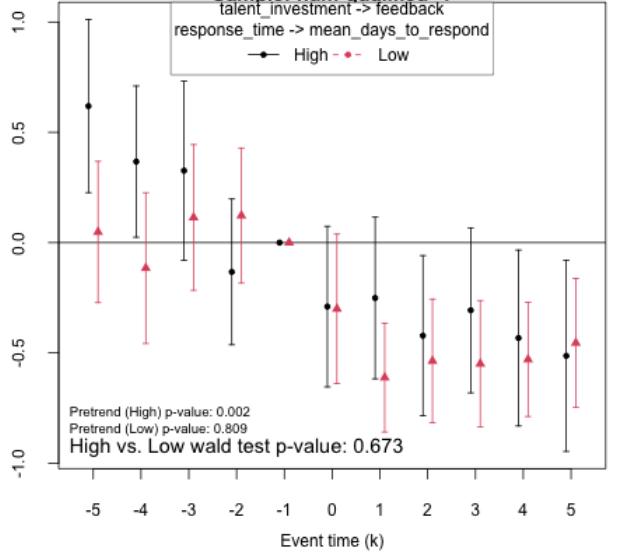
**pull_request_opened rolling5**

Sample: num-qualified=1

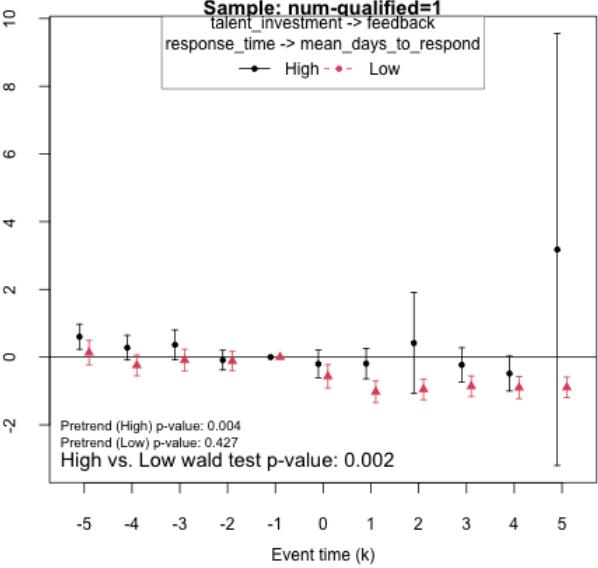


major_minor_release_count rolling5**Sample: num-qualified=1**talent_investment -> feedback
response_time -> mean_days_to_respond

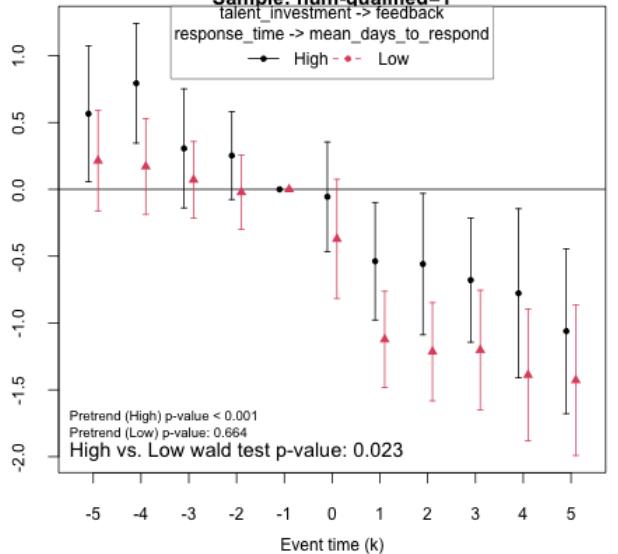
● High ▲ Low

**overall_new_release_count rolling5****Sample: num-qualified=1**talent_investment -> feedback
response_time -> mean_days_to_respond

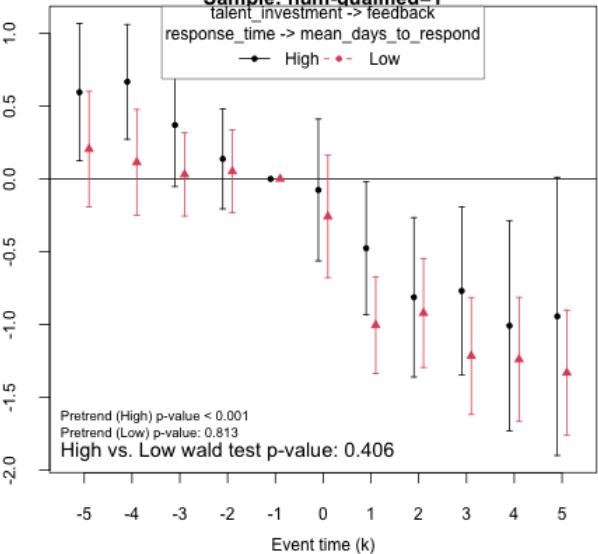
● High ▲ Low

**pull_request_merged rolling5****Sample: num-qualified=1**talent_investment -> feedback
response_time -> mean_days_to_respond

● High ▲ Low

**pull_request_opened rolling5****Sample: num-qualified=1**talent_investment -> feedback
response_time -> mean_days_to_respond

● High ▲ Low

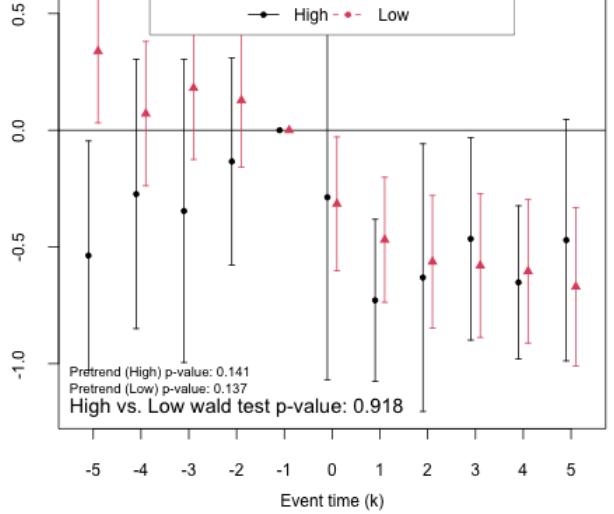


major_minor_release_count rolling5

Sample: num-qualified=1

talent_investment->growth_opportunity
 merge_review_pr -> any_activity_rate_weighted

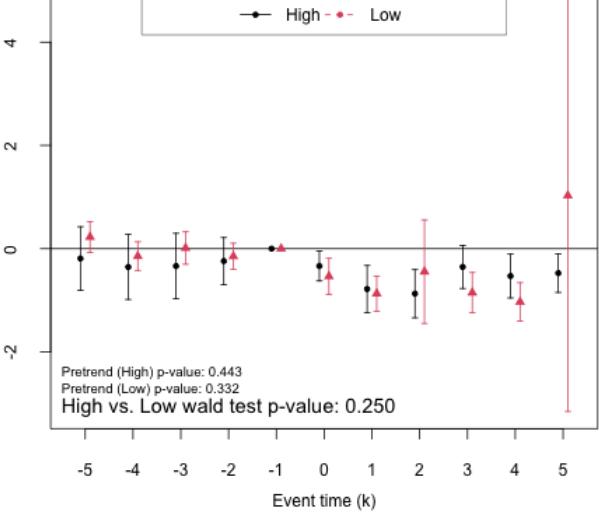
- High
- Low

**overall_new_release_count rolling5**

Sample: num-qualified=1

talent_investment->growth_opportunity
 merge_review_pr -> any_activity_rate_weighted

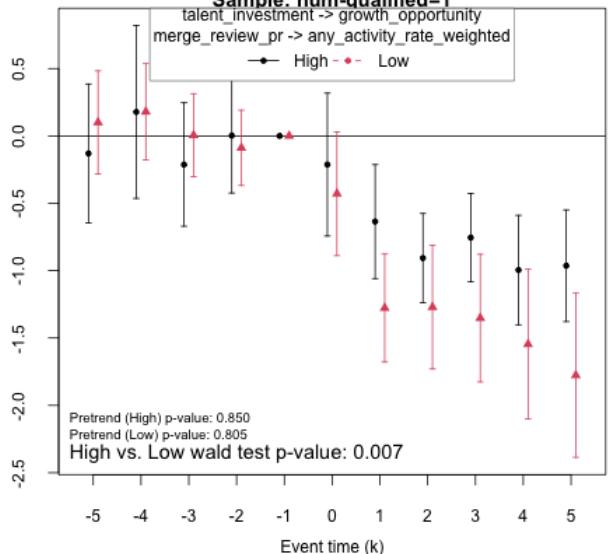
- High
- Low

**pull_request_merged rolling5**

Sample: num-qualified=1

talent_investment->growth_opportunity
 merge_review_pr -> any_activity_rate_weighted

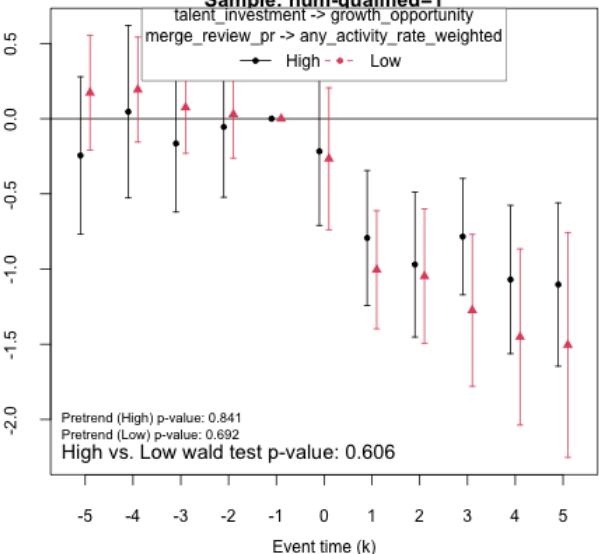
- High
- Low

**pull_request_opened rolling5**

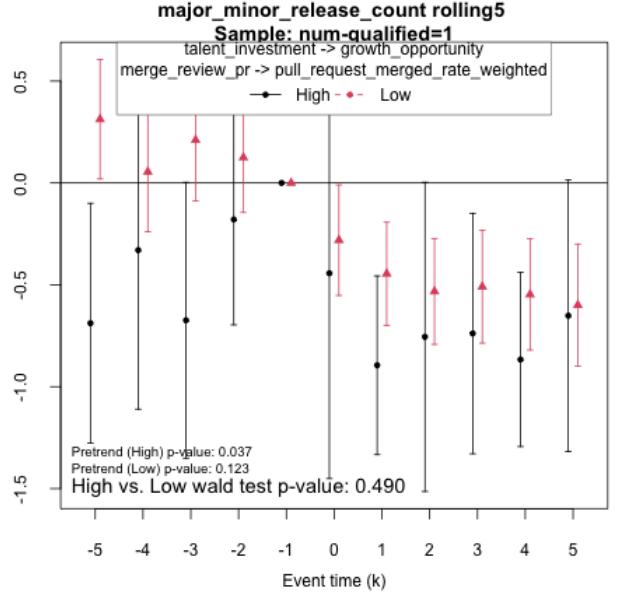
Sample: num-qualified=1

talent_investment->growth_opportunity
 merge_review_pr -> any_activity_rate_weighted

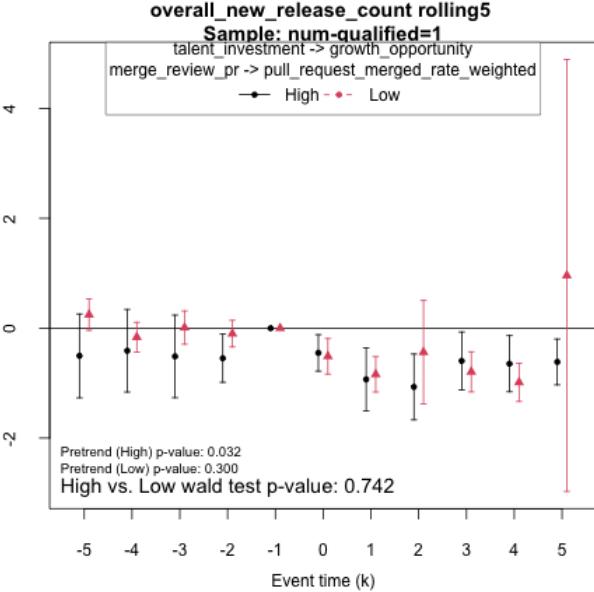
- High
- Low



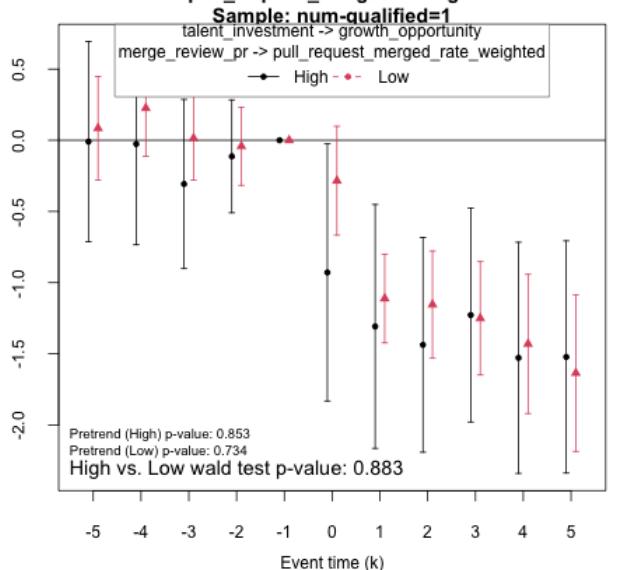
major_minor_release_count rolling5



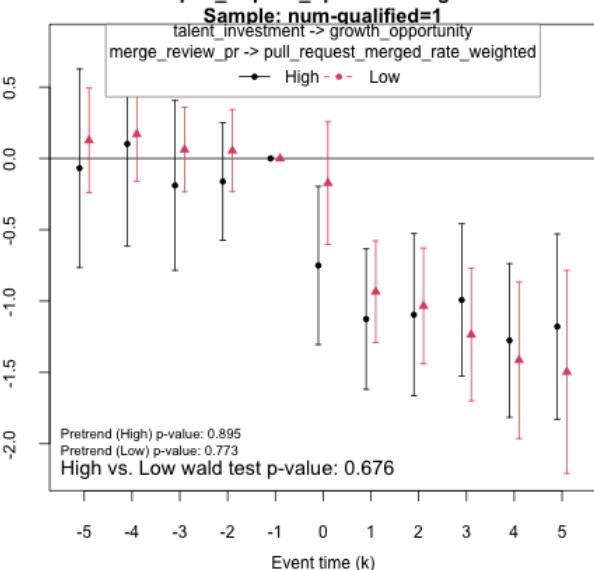
overall_new_release_count rolling5



pull_request_merged rolling5



pull_request_opened rolling5

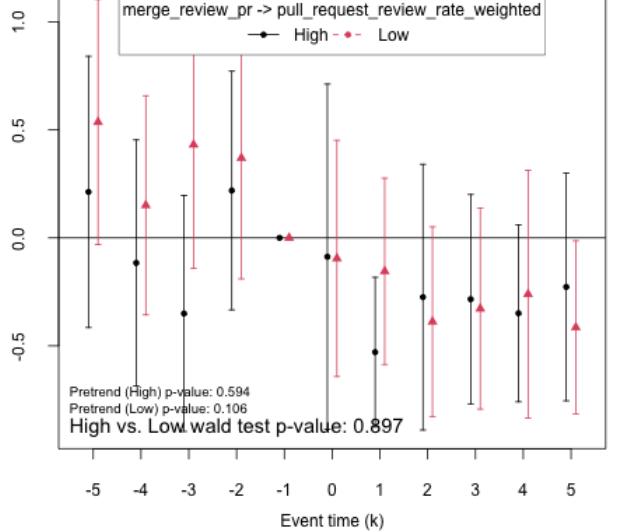


major_minor_release_count rolling5

Sample: num-qualified=1

talent_investment->growth_opportunity
merge_review_pr -> pull_request_review_rate_weighted

● High ▲ Low

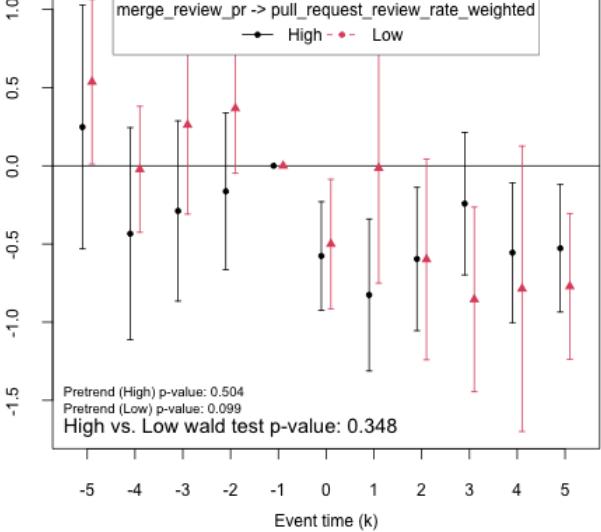


overall_new_release_count rolling5

Sample: num-qualified=1

talent_investment->growth_opportunity
merge_review_pr -> pull_request_review_rate_weighted

● High ▲ Low

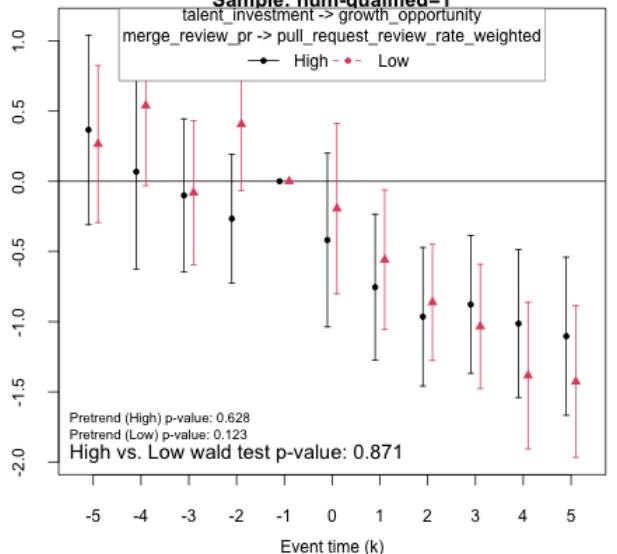


pull_request_merged rolling5

Sample: num-qualified=1

talent_investment->growth_opportunity
merge_review_pr -> pull_request_review_rate_weighted

● High ▲ Low

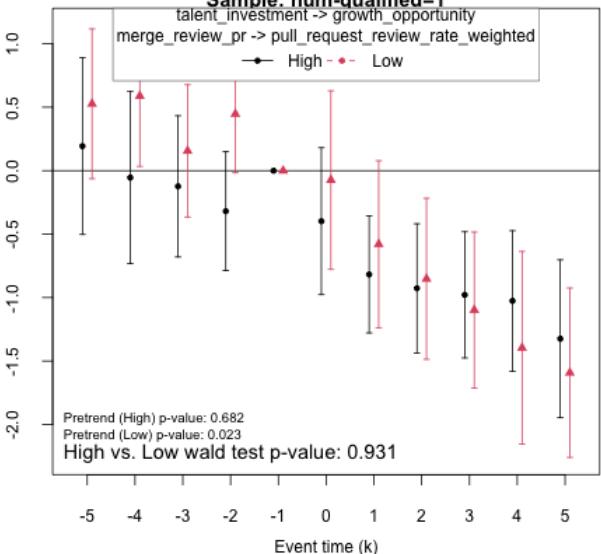


pull_request_opened rolling5

Sample: num-qualified=1

talent_investment->growth_opportunity
merge_review_pr -> pull_request_review_rate_weighted

● High ▲ Low

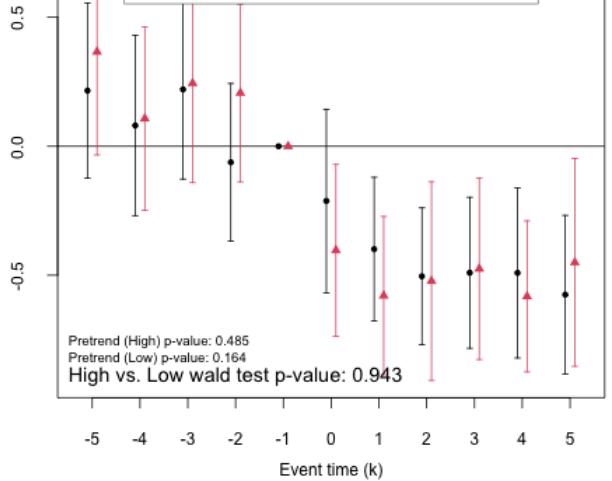


major_minor_release_count rolling5

Sample: num-qualified=1

talent_investment -> organizational_closeness
network_clustering_coefficient -> clustering_coefficient

● High ▲ Low

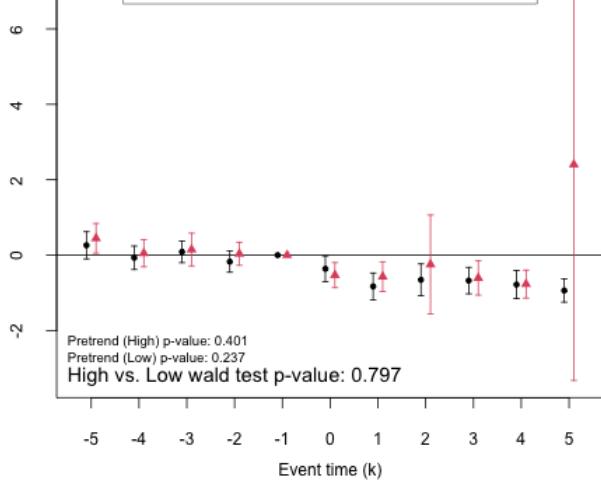


overall_new_release_count rolling5

Sample: num-qualified=1

talent_investment -> organizational_closeness
network_clustering_coefficient -> clustering_coefficient

● High ▲ Low

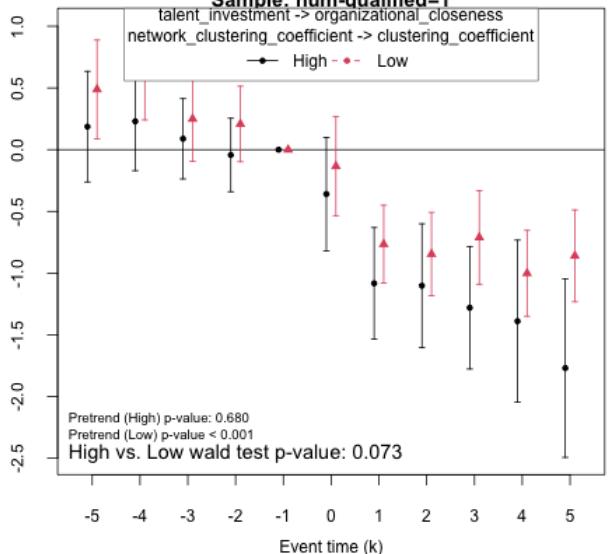


pull_request_merged rolling5

Sample: num-qualified=1

talent_investment -> organizational_closeness
network_clustering_coefficient -> clustering_coefficient

● High ▲ Low



pull_request_opened rolling5

Sample: num-qualified=1

talent_investment -> organizational_closeness
network_clustering_coefficient -> clustering_coefficient

● High ▲ Low

