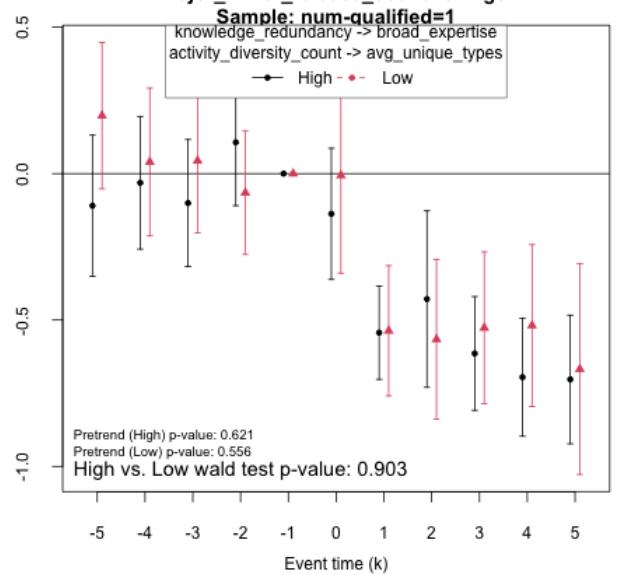


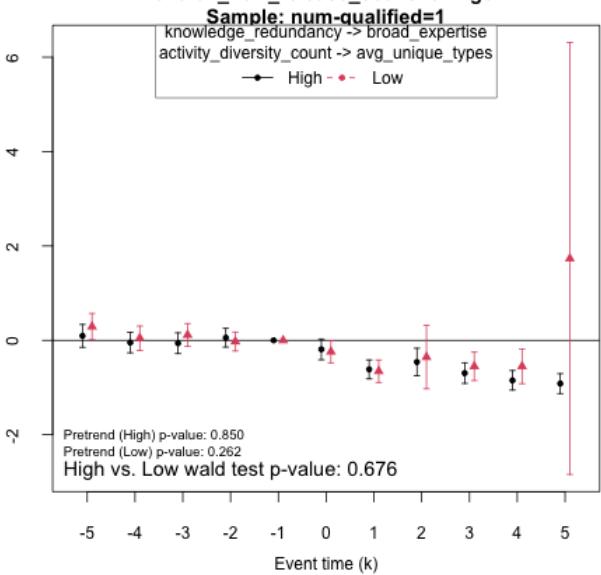
### major\_minor\_release\_count rolling5

Sample: num-qualified=1



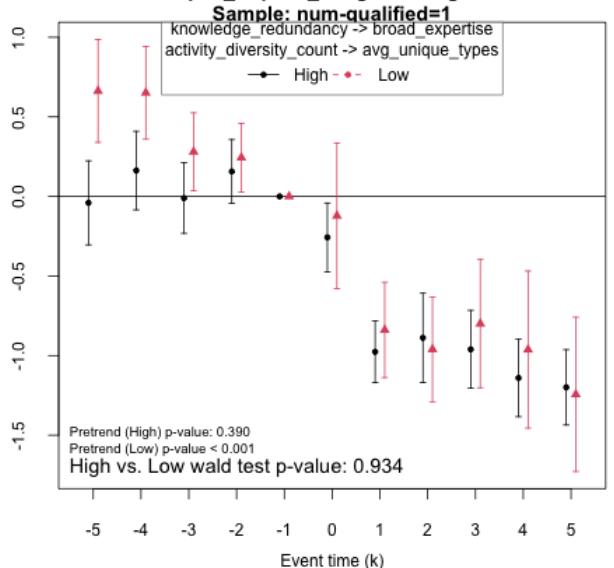
### overall\_new\_release\_count rolling5

Sample: num-qualified=1



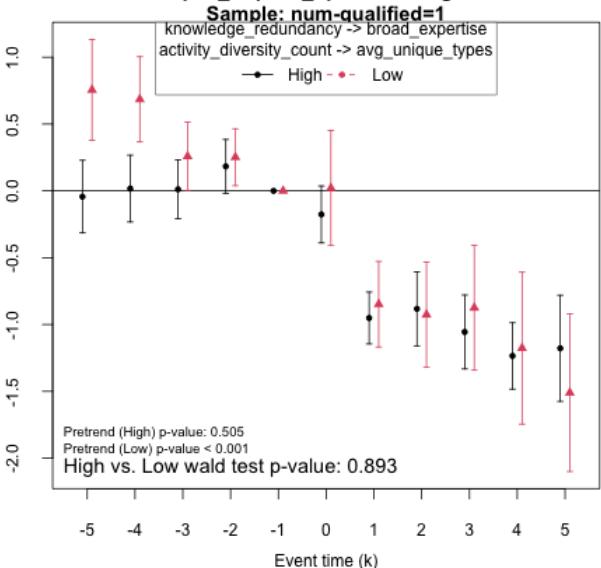
### pull\_request\_merged rolling5

Sample: num-qualified=1

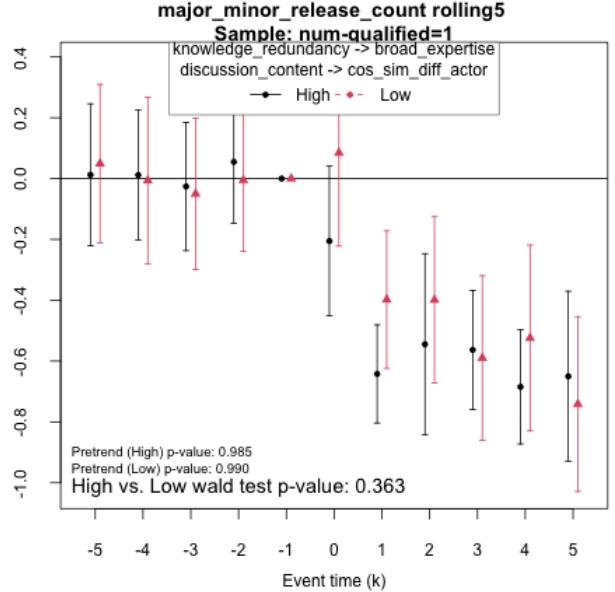


### pull\_request\_opened rolling5

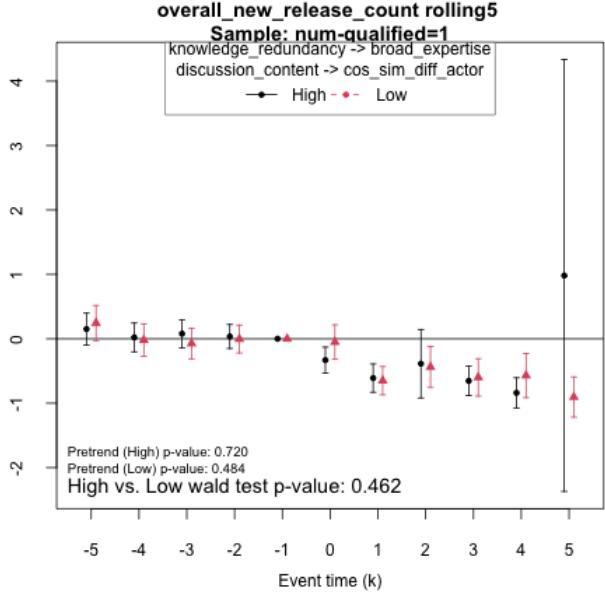
Sample: num-qualified=1



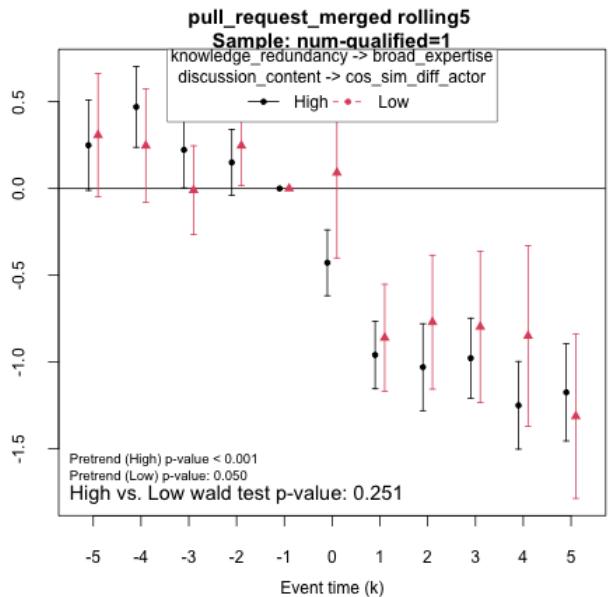
### major\_minor\_release\_count rolling5



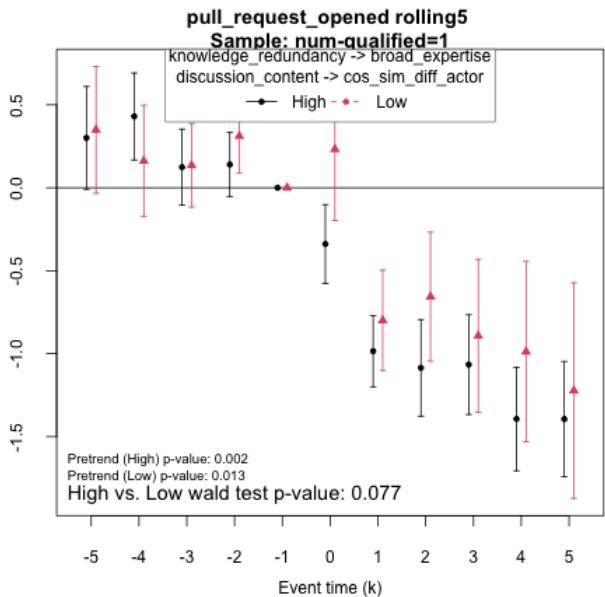
### overall\_new\_release\_count rolling5



### pull\_request\_merged rolling5

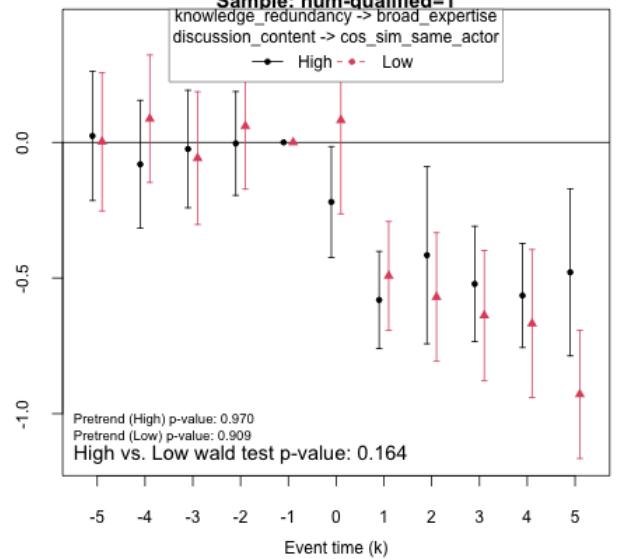


### pull\_request\_opened rolling5



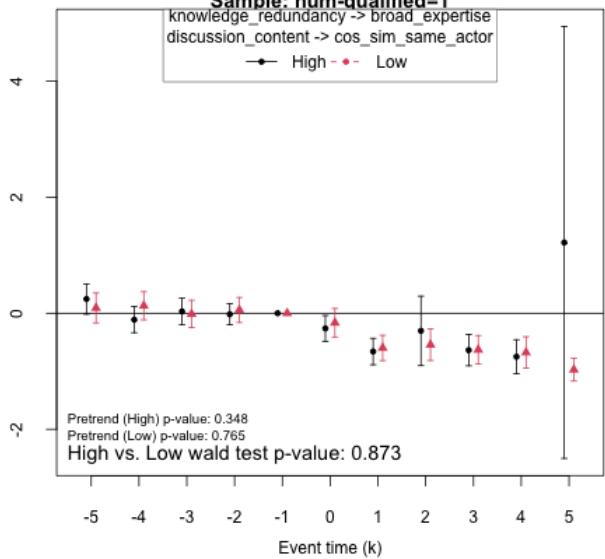
### major\_minor\_release\_count rolling5

Sample: num-qualified=1



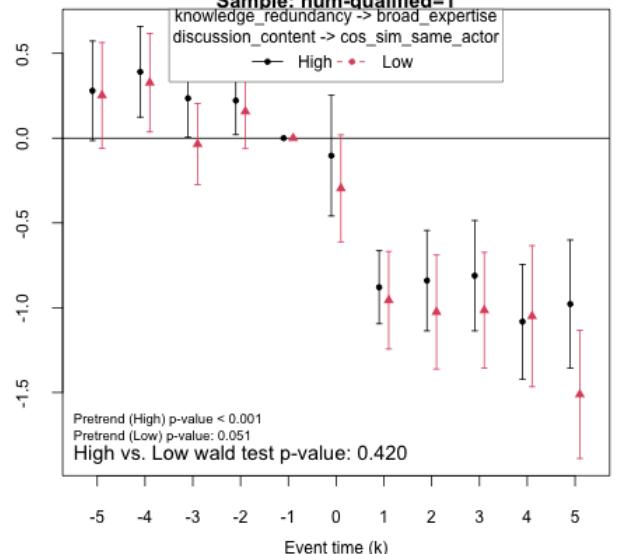
### overall\_new\_release\_count rolling5

Sample: num-qualified=1



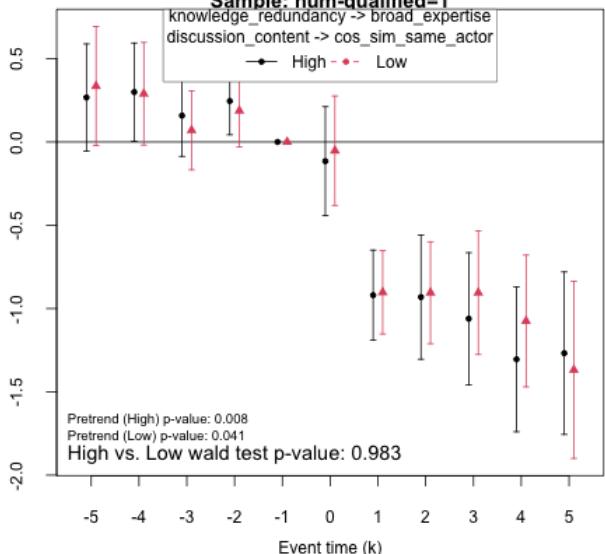
### pull\_request\_merged rolling5

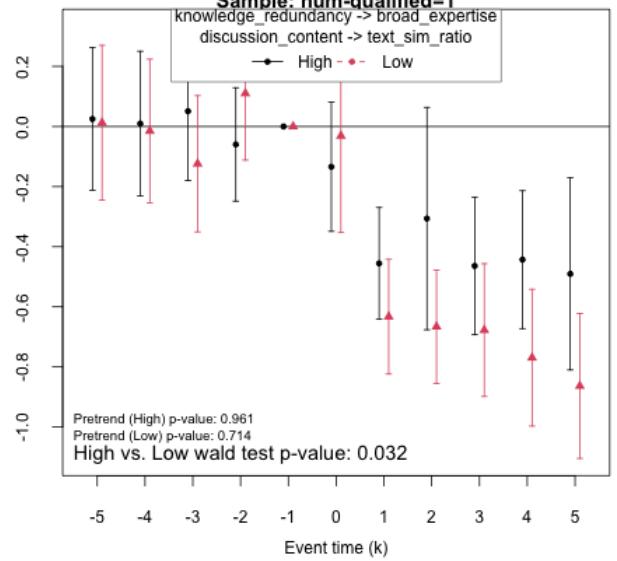
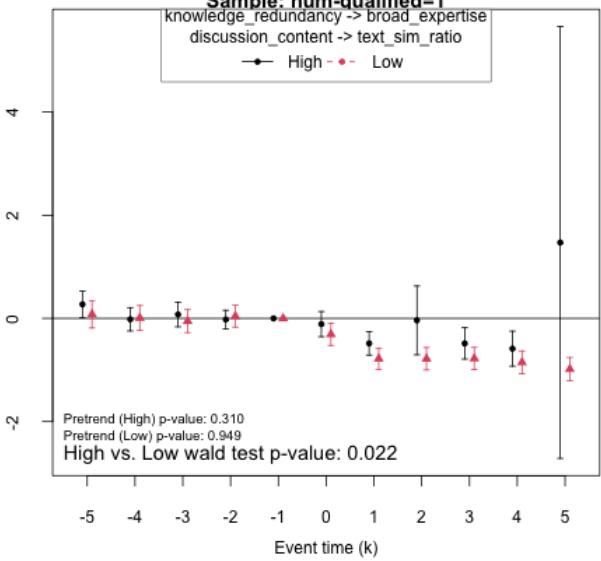
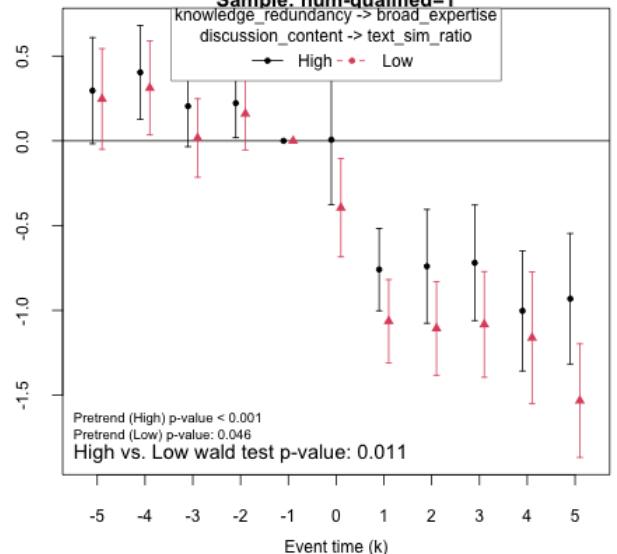
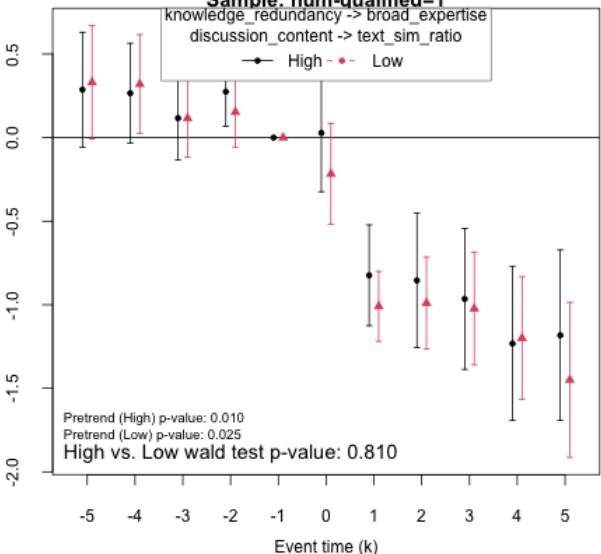
Sample: num-qualified=1

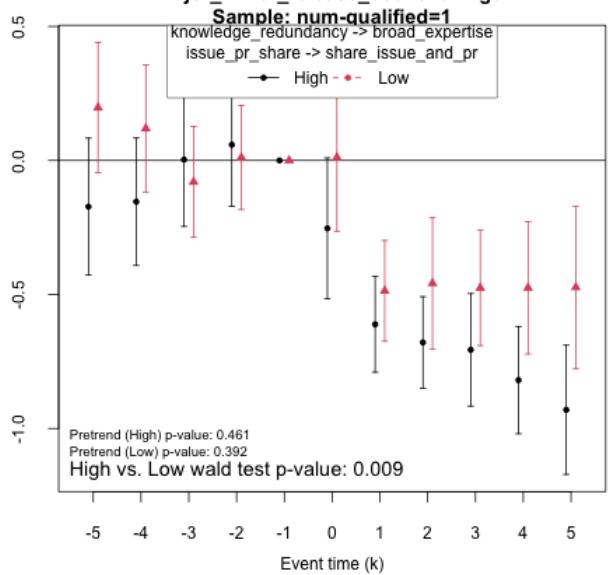
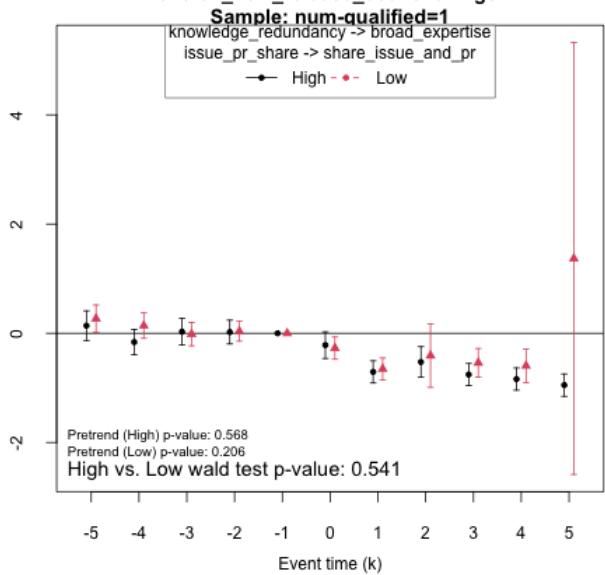
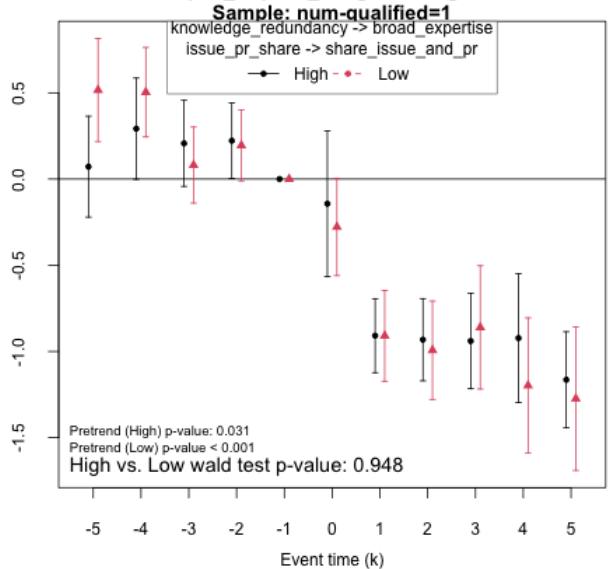
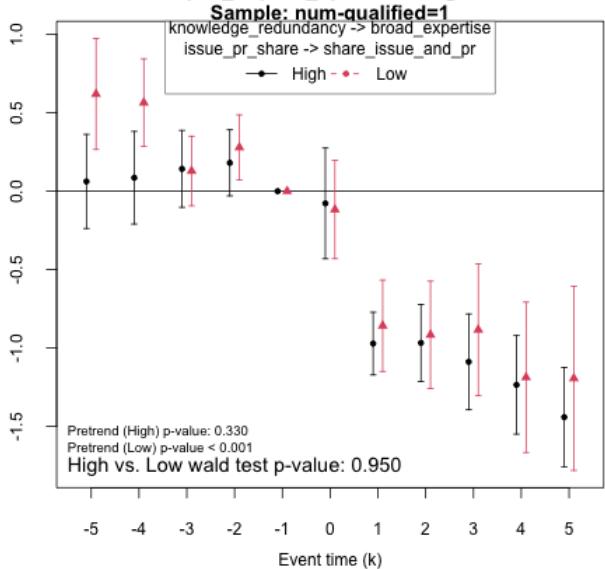


### pull\_request\_opened rolling5

Sample: num-qualified=1

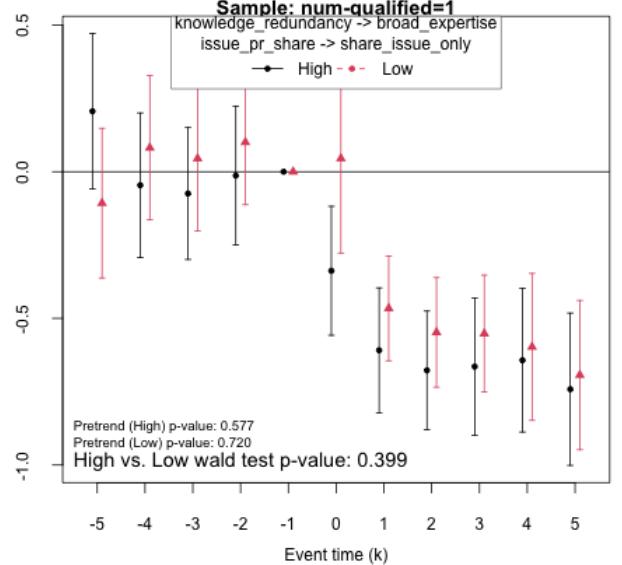


**major\_minor\_release\_count rolling5****Sample: num-qualified=1****overall\_new\_release\_count rolling5****Sample: num-qualified=1****pull\_request\_merged rolling5****Sample: num-qualified=1****pull\_request\_opened rolling5****Sample: num-qualified=1**

**major\_minor\_release\_count rolling5****overall\_new\_release\_count rolling5****pull\_request\_merged rolling5****pull\_request\_opened rolling5**

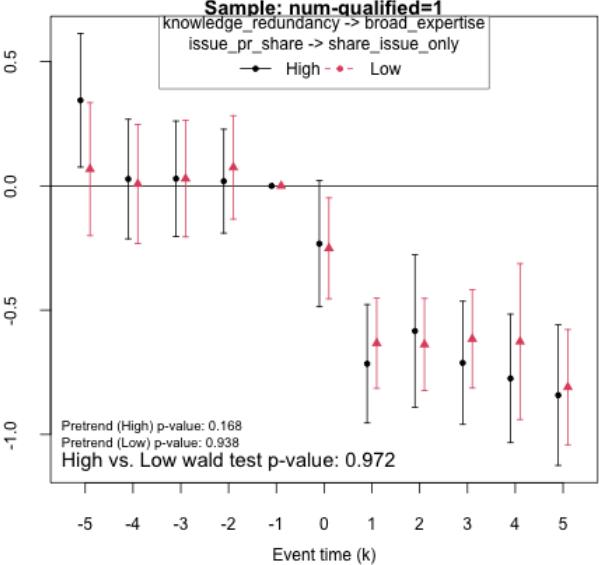
### major\_minor\_release\_count rolling5

Sample: num-qualified=1



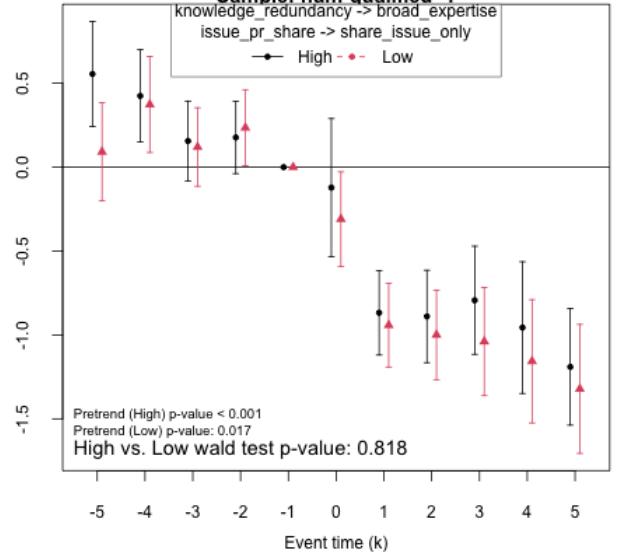
### overall\_new\_release\_count rolling5

Sample: num-qualified=1



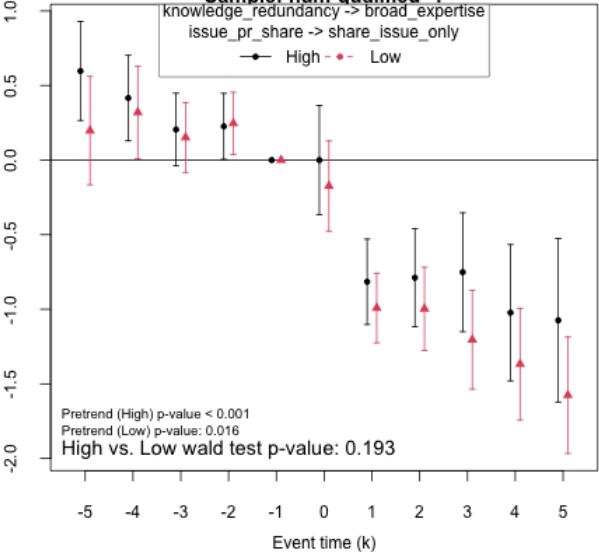
### pull\_request\_merged rolling5

Sample: num-qualified=1



### pull\_request\_opened rolling5

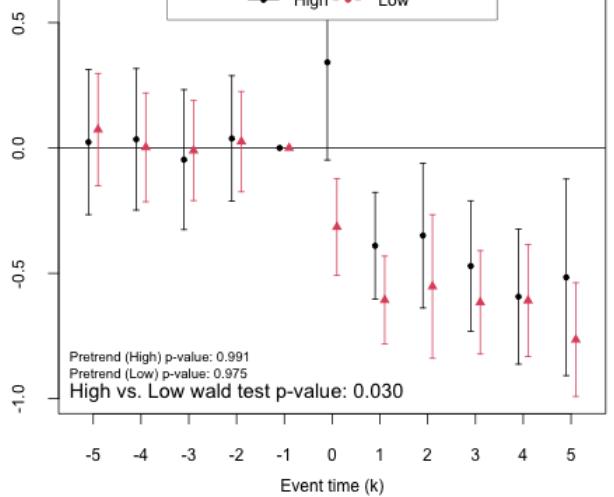
Sample: num-qualified=1



### major\_minor\_release\_count rolling5

Sample: num-qualified=1

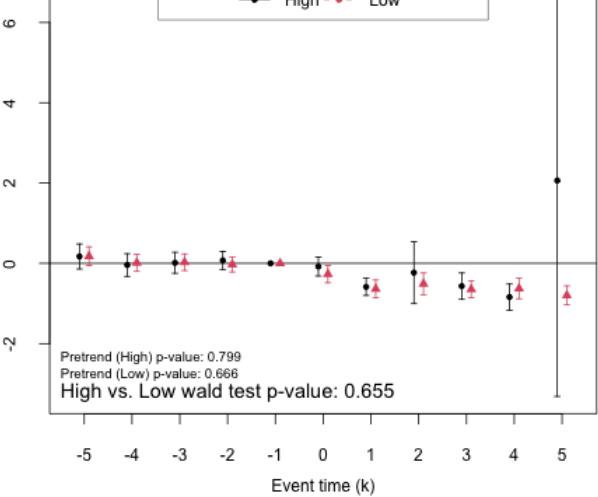
knowledge\_redundancy -> broad\_expertise  
 issue\_pr\_share -> share\_pr\_only  
 ● High ▲ Low



### overall\_new\_release\_count rolling5

Sample: num-qualified=1

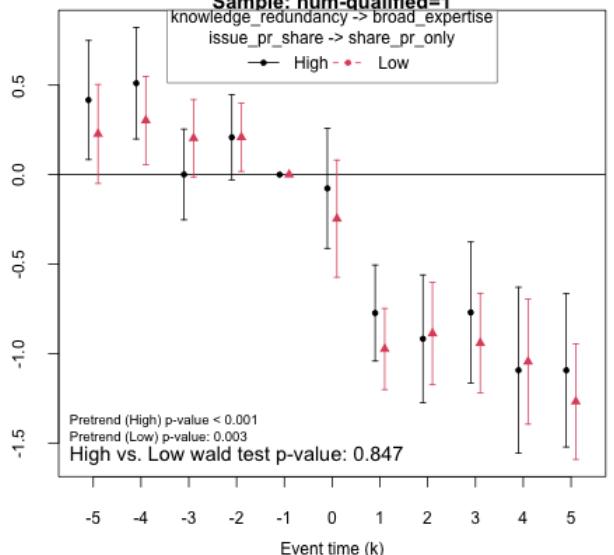
knowledge\_redundancy -> broad\_expertise  
 issue\_pr\_share -> share\_pr\_only  
 ● High ▲ Low



### pull\_request\_merged rolling5

Sample: num-qualified=1

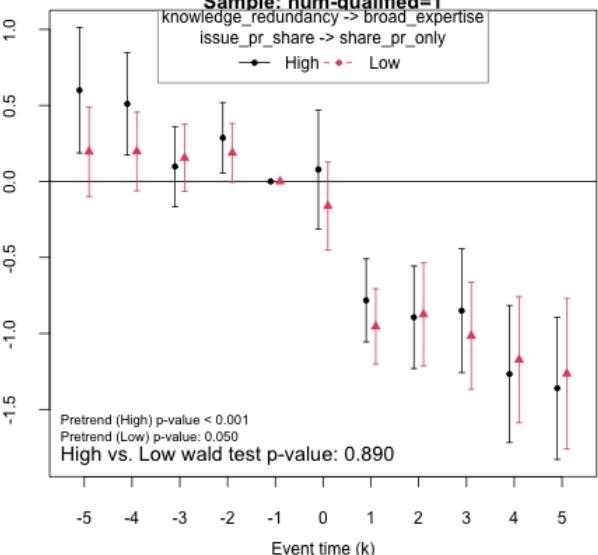
knowledge\_redundancy -> broad\_expertise  
 issue\_pr\_share -> share\_pr\_only  
 ● High ▲ Low



### pull\_request\_opened rolling5

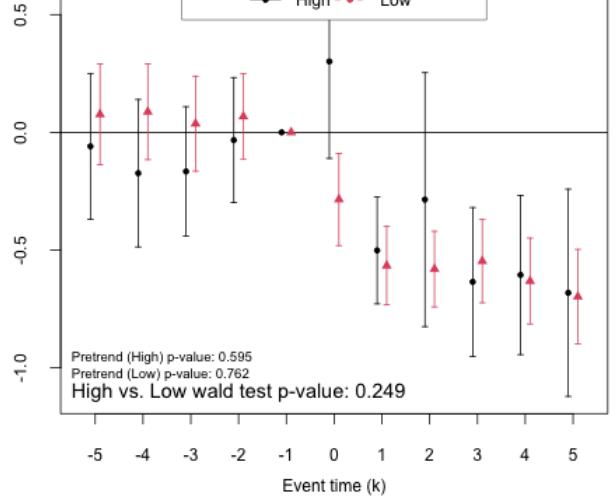
Sample: num-qualified=1

knowledge\_redundancy -> broad\_expertise  
 issue\_pr\_share -> share\_pr\_only  
 ● High ▲ Low

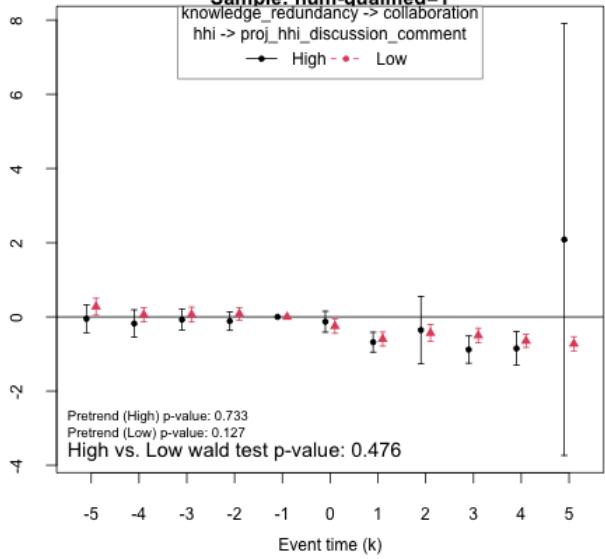


**major\_minor\_release\_count rolling5**

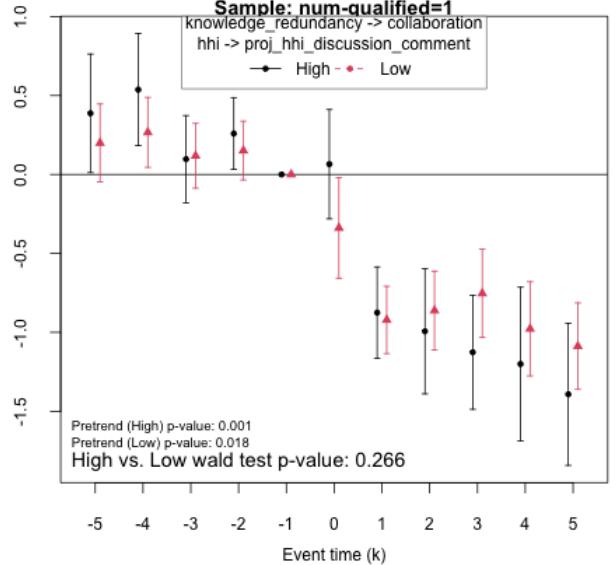
**Sample: num-qualified=1**  
knowledge\_redundancy->collaboration  
 $hh_i \rightarrow proj\_hh_i\_discussion\_comment$   
● High - ▲ Low

**overall\_new\_release\_count rolling5**

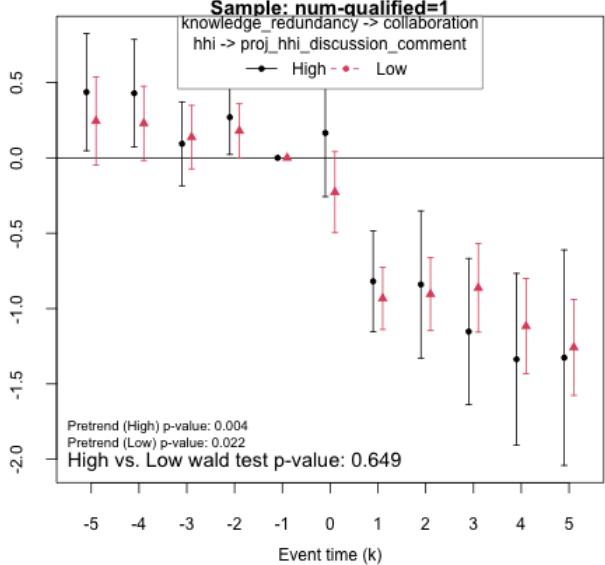
**Sample: num-qualified=1**  
knowledge\_redundancy->collaboration  
 $hh_i \rightarrow proj\_hh_i\_discussion\_comment$   
● High - ▲ Low

**pull\_request\_merged rolling5**

**Sample: num-qualified=1**  
knowledge\_redundancy->collaboration  
 $hh_i \rightarrow proj\_hh_i\_discussion\_comment$   
● High - ▲ Low

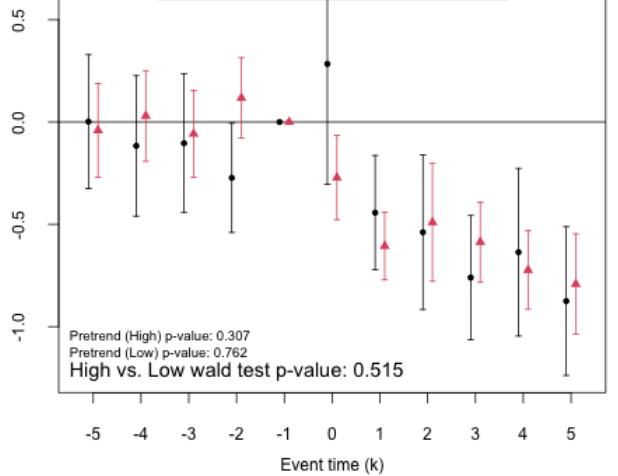
**pull\_request\_opened rolling5**

**Sample: num-qualified=1**  
knowledge\_redundancy->collaboration  
 $hh_i \rightarrow proj\_hh_i\_discussion\_comment$   
● High - ▲ Low

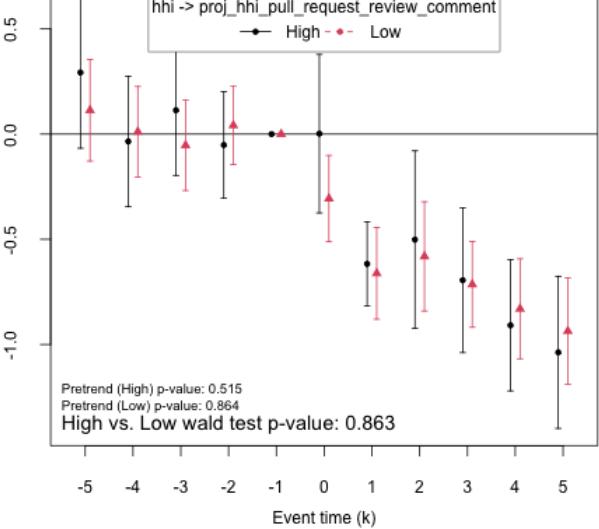


**major\_minor\_release\_count rolling5****Sample: num-qualified=1**

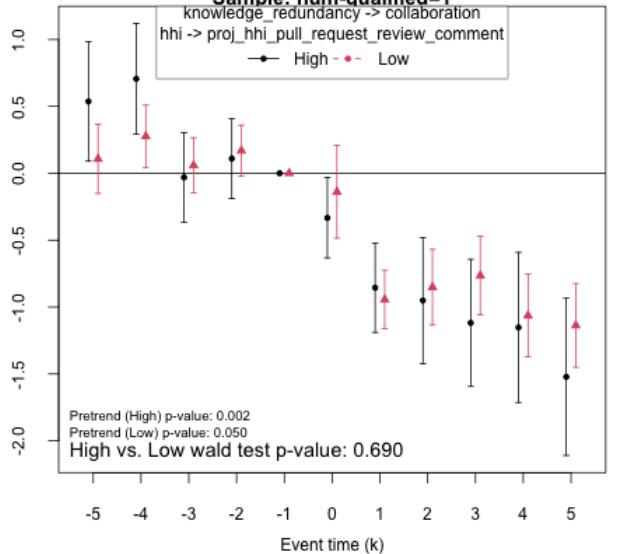
knowledge\_redundancy -> collaboration  
 $hh_i \rightarrow proj\_hh_i\_pull\_request\_review\_comment$   
● High ● Low

**overall\_new\_release\_count rolling5****Sample: num-qualified=1**

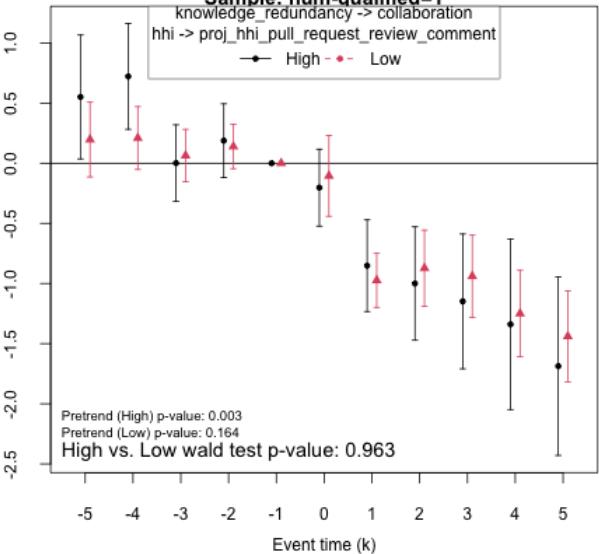
knowledge\_redundancy -> collaboration  
 $hh_i \rightarrow proj\_hh_i\_pull\_request\_review\_comment$   
● High ● Low

**pull\_request\_merged rolling5****Sample: num-qualified=1**

knowledge\_redundancy -> collaboration  
 $hh_i \rightarrow proj\_hh_i\_pull\_request\_review\_comment$   
● High ● Low

**pull\_request\_opened rolling5****Sample: num-qualified=1**

knowledge\_redundancy -> collaboration  
 $hh_i \rightarrow proj\_hh_i\_pull\_request\_review\_comment$   
● High ● Low

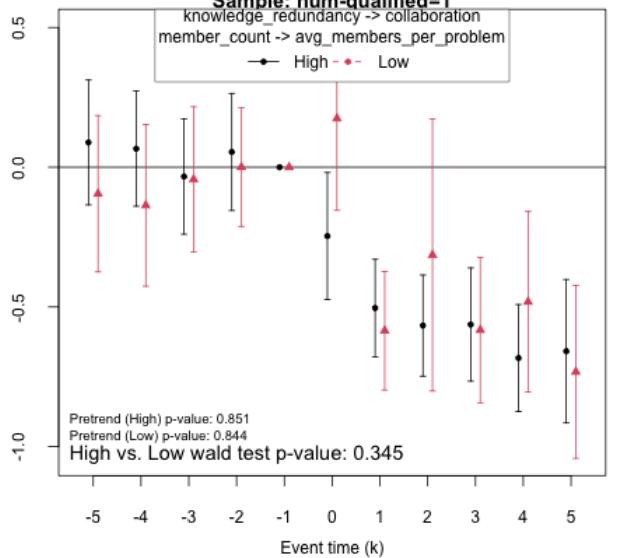


**major\_minor\_release\_count rolling5**

knowledge\_redundancy -&gt; collaboration

member\_count -&gt; avg\_members\_per\_problem

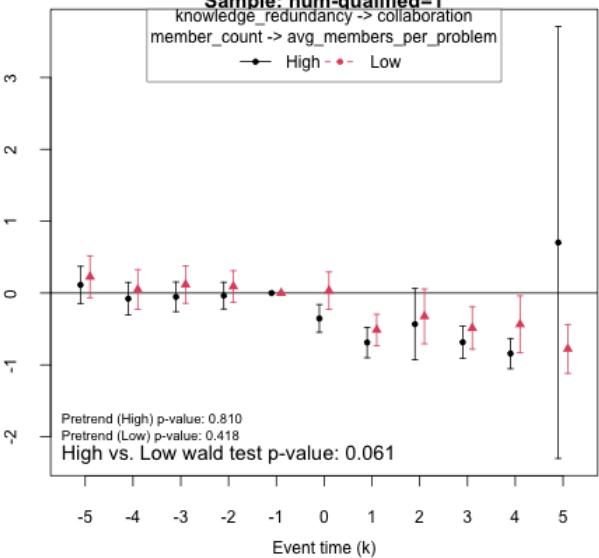
● High ▲ Low

**overall\_new\_release\_count rolling5**

knowledge\_redundancy -&gt; collaboration

member\_count -&gt; avg\_members\_per\_problem

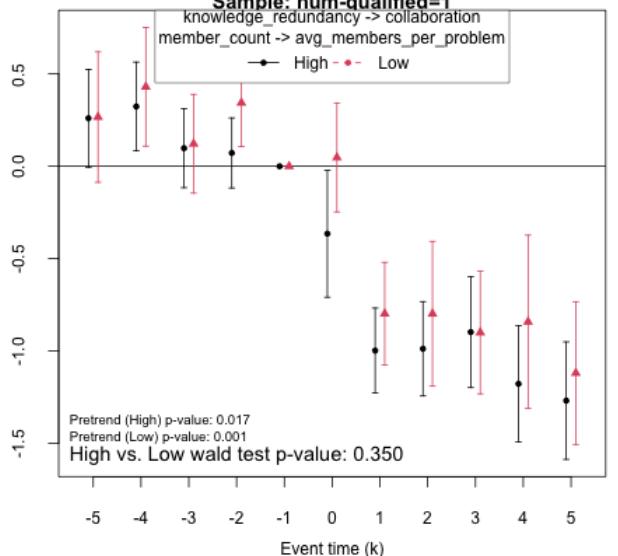
● High ▲ Low

**pull\_request\_merged rolling5**

knowledge\_redundancy -&gt; collaboration

member\_count -&gt; avg\_members\_per\_problem

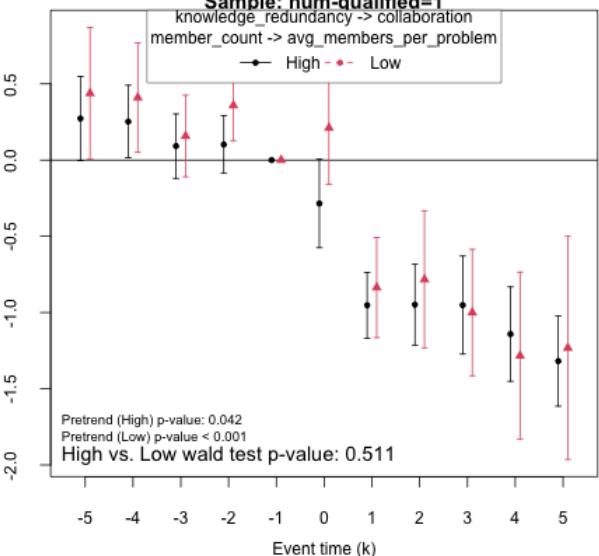
● High ▲ Low

**pull\_request\_opened rolling5**

knowledge\_redundancy -&gt; collaboration

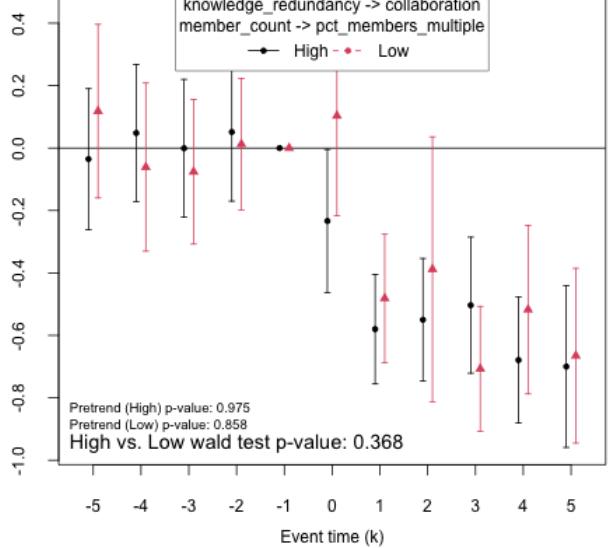
member\_count -&gt; avg\_members\_per\_problem

● High ▲ Low

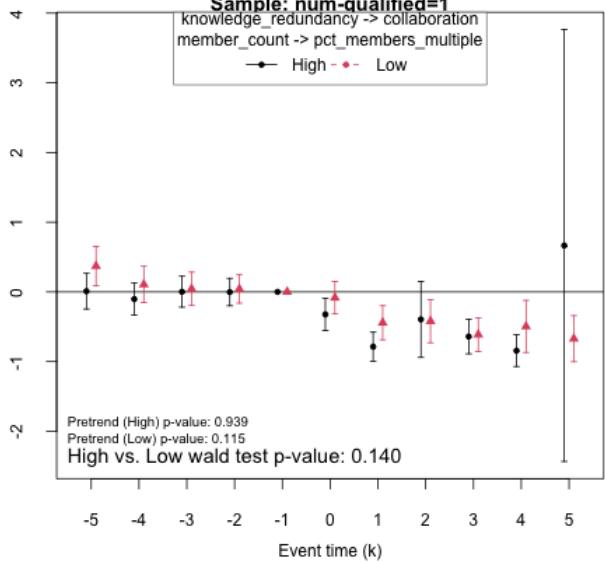


**major\_minor\_release\_count rolling5**

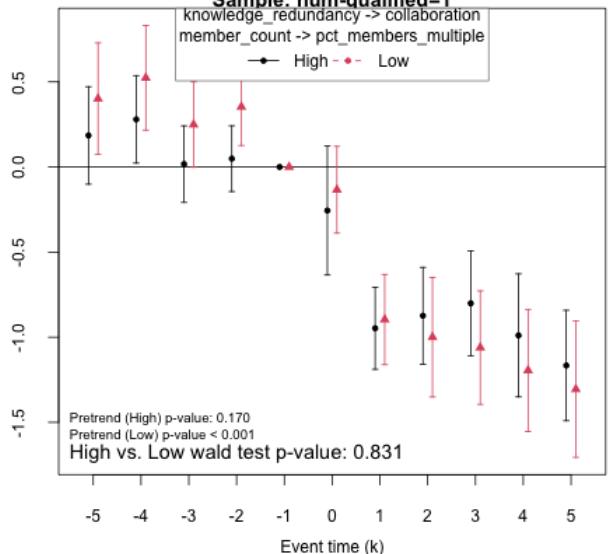
**Sample: num-qualified=1**  
knowledge\_redundancy -> collaboration  
member\_count -> pct\_members\_multiple  
● High ▲ Low

**overall\_new\_release\_count rolling5**

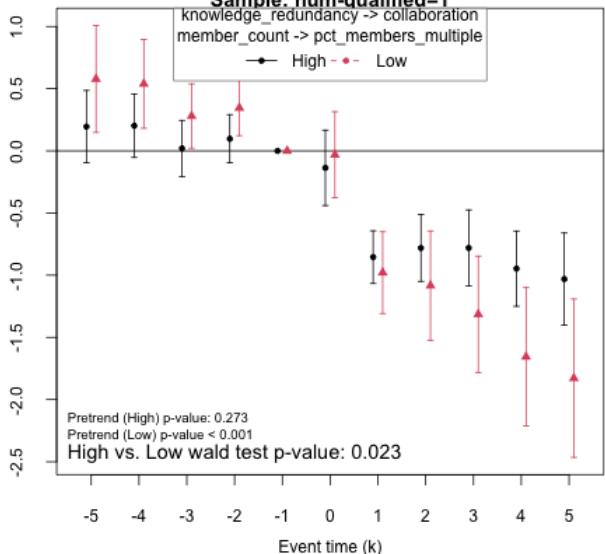
**Sample: num-qualified=1**  
knowledge\_redundancy -> collaboration  
member\_count -> pct\_members\_multiple  
● High ▲ Low

**pull\_request\_merged rolling5**

**Sample: num-qualified=1**  
knowledge\_redundancy -> collaboration  
member\_count -> pct\_members\_multiple  
● High ▲ Low

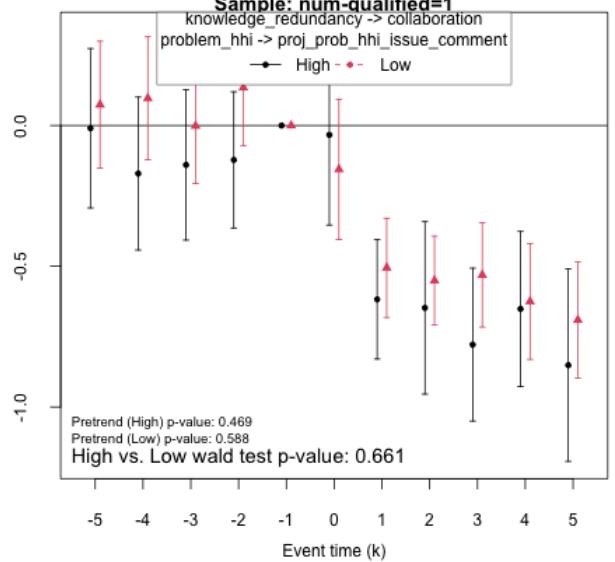
**pull\_request\_opened rolling5**

**Sample: num-qualified=1**  
knowledge\_redundancy -> collaboration  
member\_count -> pct\_members\_multiple  
● High ▲ Low

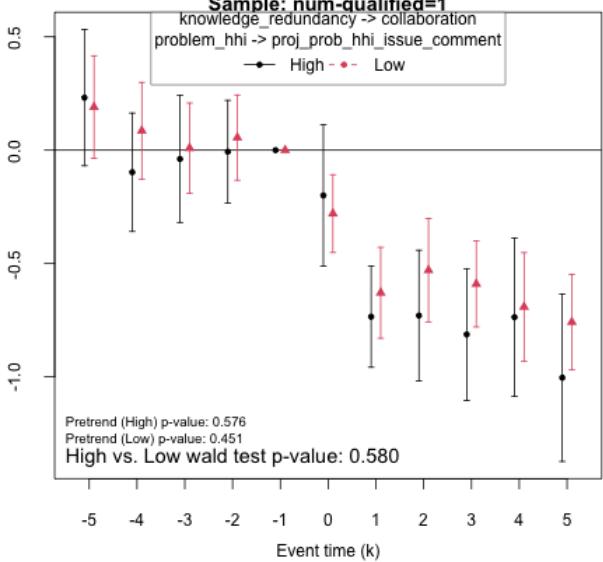


**major\_minor\_release\_count rolling5**

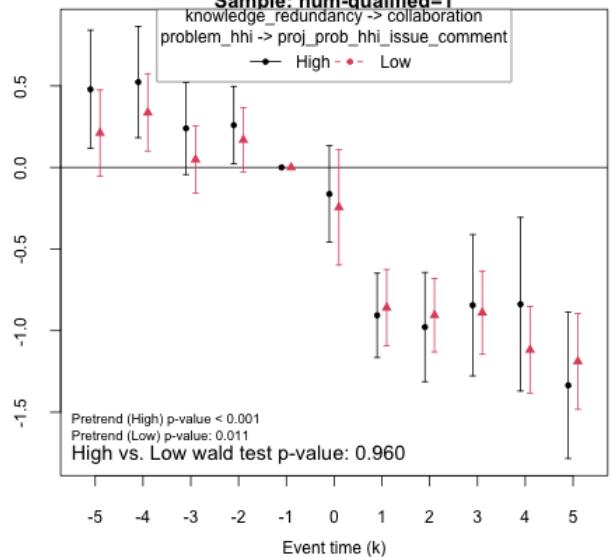
Sample: num-qualified=1

**overall\_new\_release\_count rolling5**

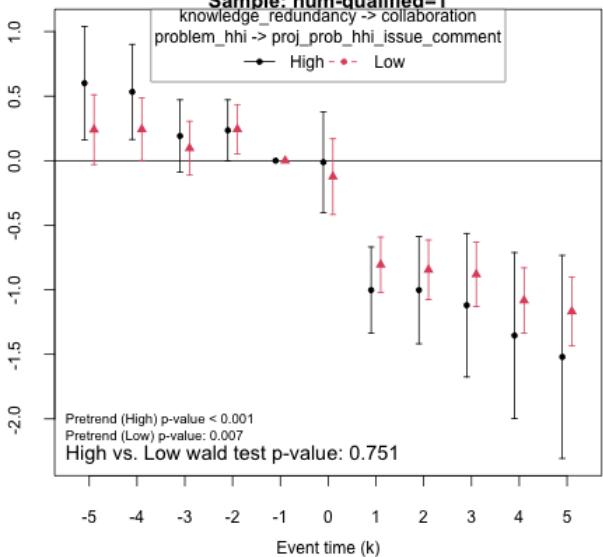
Sample: num-qualified=1

**pull\_request\_merged rolling5**

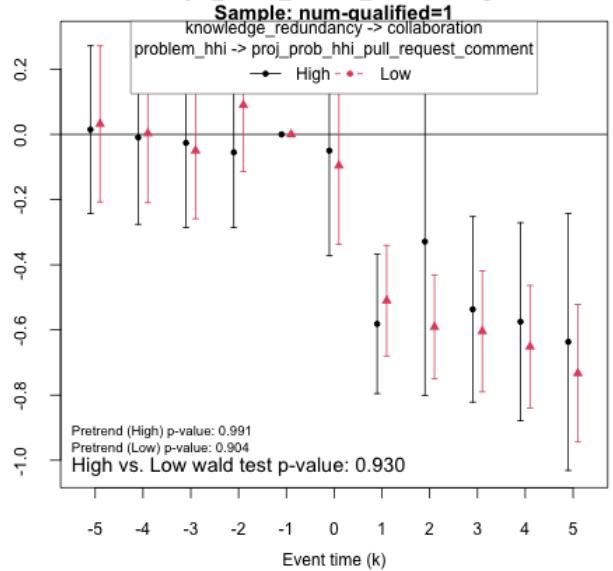
Sample: num-qualified=1

**pull\_request\_opened rolling5**

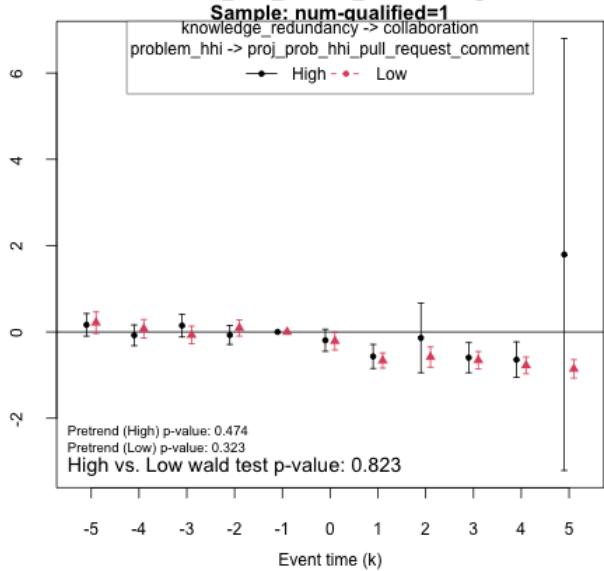
Sample: num-qualified=1



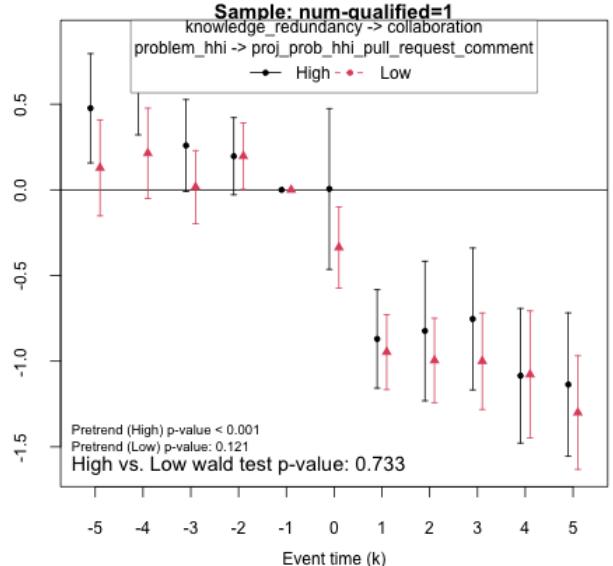
### major\_minor\_release\_count rolling5



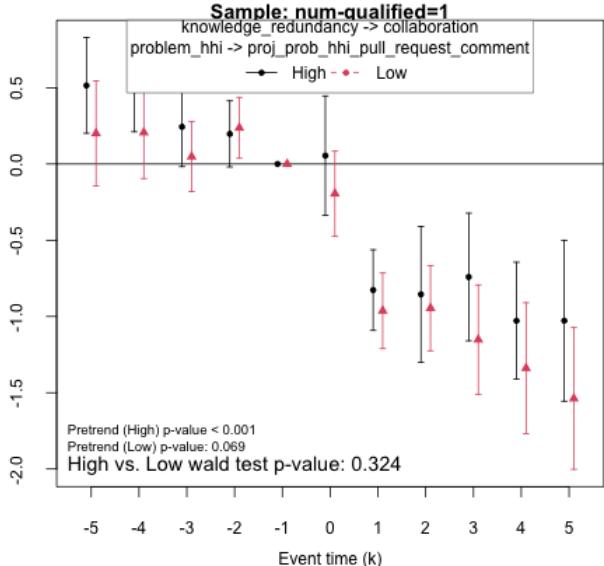
### overall\_new\_release\_count rolling5



### pull\_request\_merged rolling5



### pull\_request\_opened rolling5

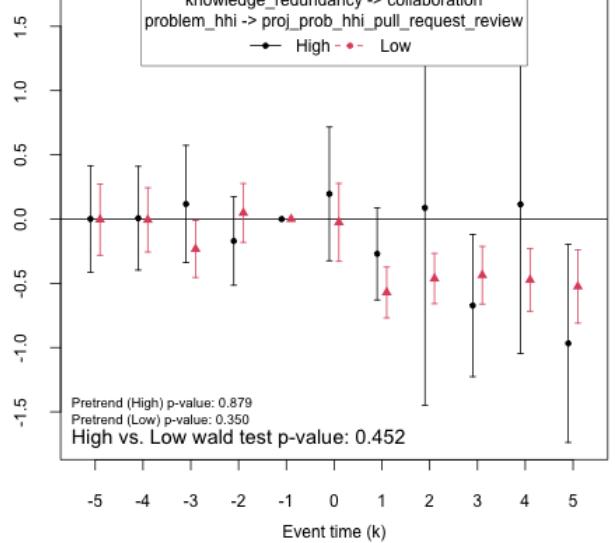


### major\_minor\_release\_count rolling5

knowledge\_redundancy -> collaboration

problem\_hhi -> proj\_prob\_hhi\_pull\_request\_review

● High ▲ Low

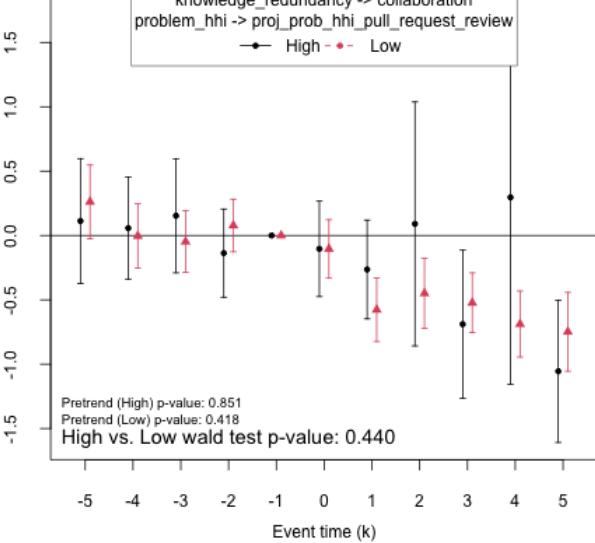


### overall\_new\_release\_count rolling5

knowledge\_redundancy -> collaboration

problem\_hhi -> proj\_prob\_hhi\_pull\_request\_review

● High ▲ Low

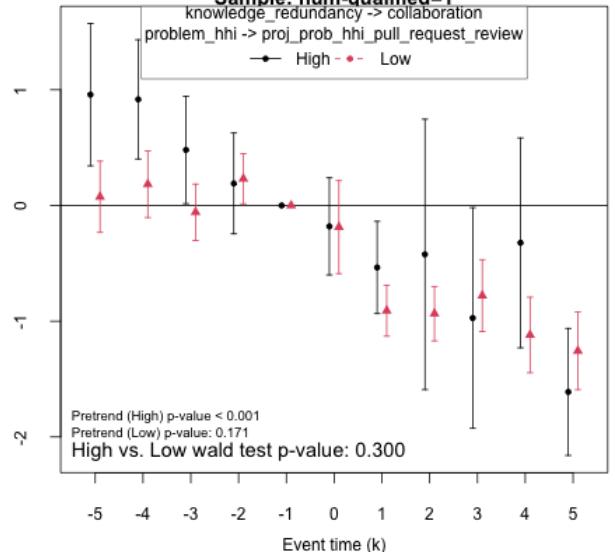


### pull\_request\_merged rolling5

knowledge\_redundancy -> collaboration

problem\_hhi -> proj\_prob\_hhi\_pull\_request\_review

● High ▲ Low

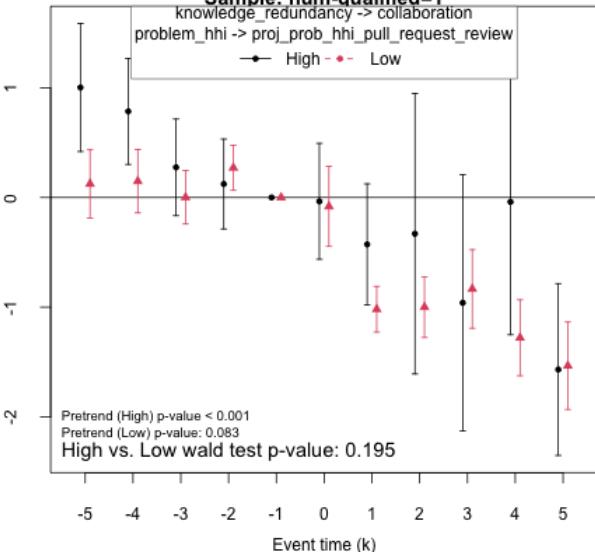


### pull\_request\_opened rolling5

knowledge\_redundancy -> collaboration

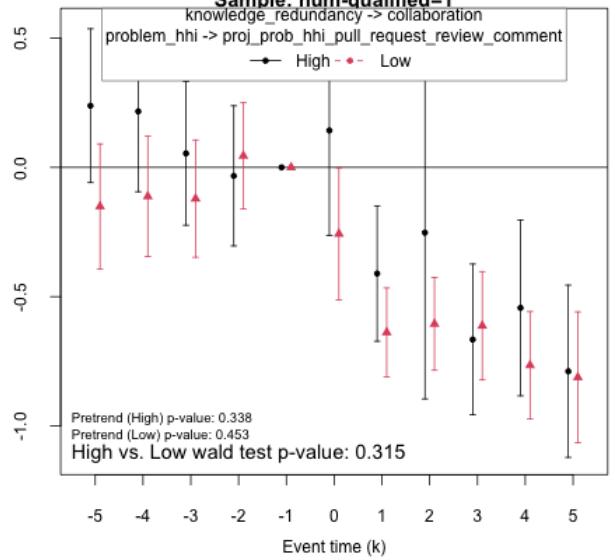
problem\_hhi -> proj\_prob\_hhi\_pull\_request\_review

● High ▲ Low



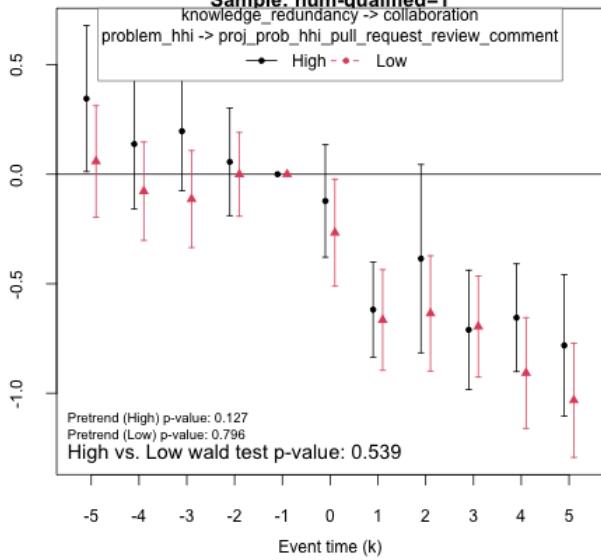
### major\_minor\_release\_count rolling5

Sample: num-qualified=1



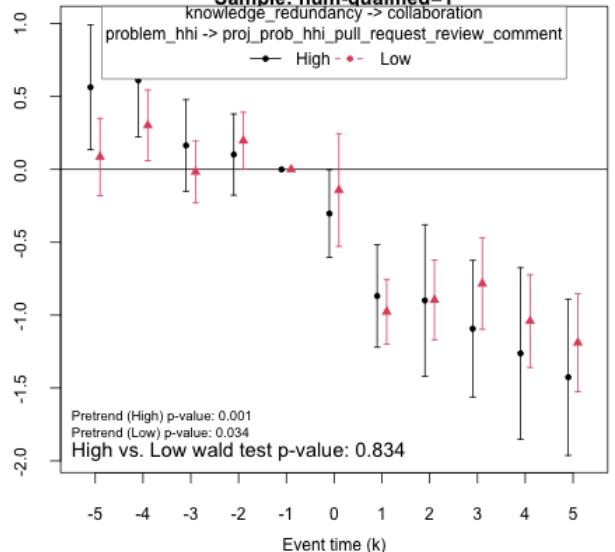
### overall\_new\_release\_count rolling5

Sample: num-qualified=1



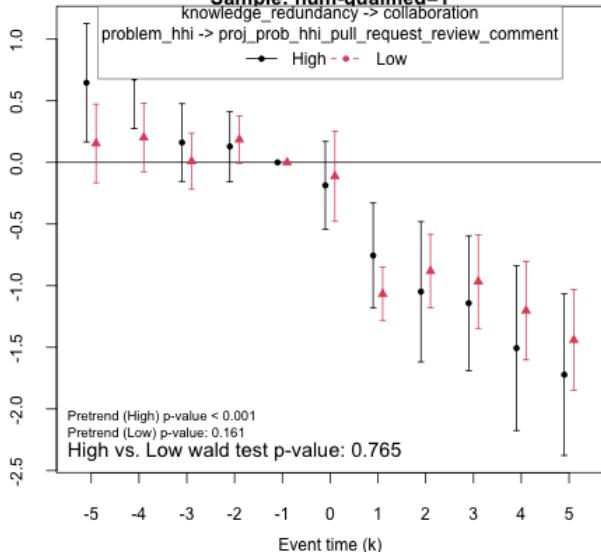
### pull\_request\_merged rolling5

Sample: num-qualified=1



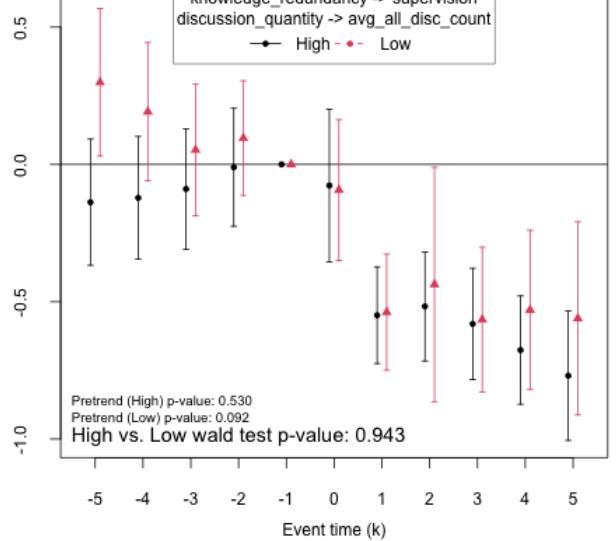
### pull\_request\_opened rolling5

Sample: num-qualified=1



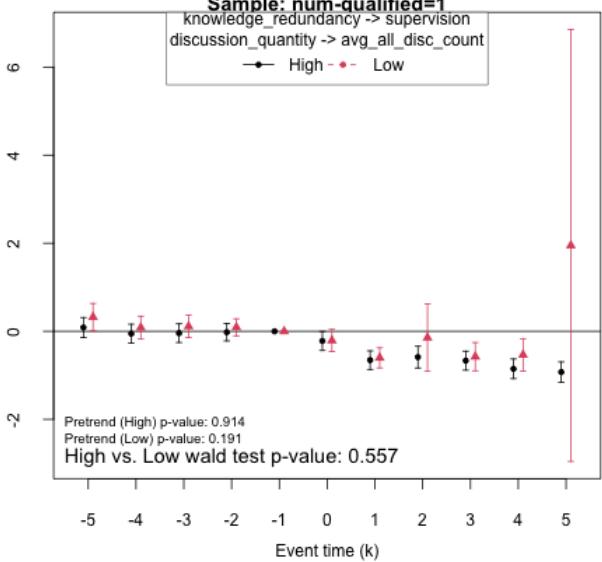
### major\_minor\_release\_count rolling5

Sample: num-qualified=1  
knowledge\_redundancy -> supervision  
discussion\_quantity -> avg\_all\_disc\_count  
● High ▲ Low



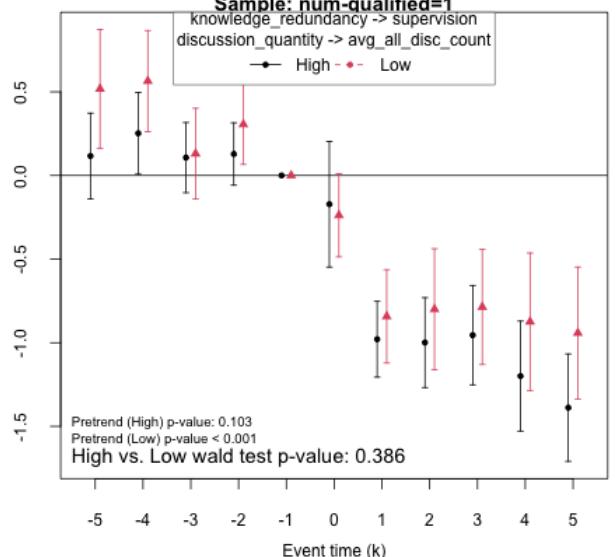
### overall\_new\_release\_count rolling5

Sample: num-qualified=1  
knowledge\_redundancy -> supervision  
discussion\_quantity -> avg\_all\_disc\_count  
● High ▲ Low



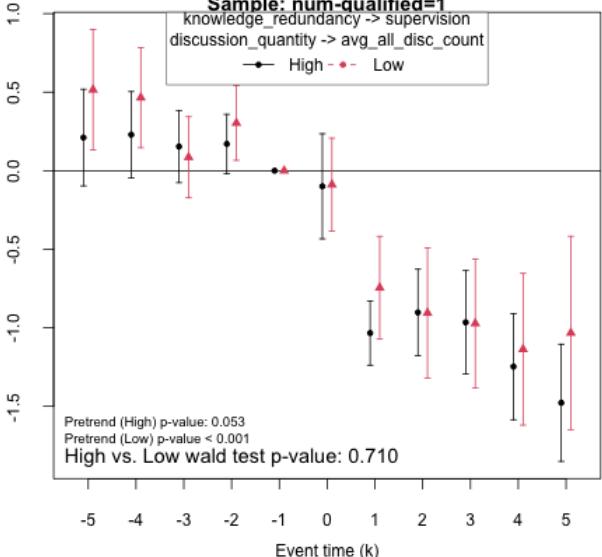
### pull\_request\_merged rolling5

Sample: num-qualified=1  
knowledge\_redundancy -> supervision  
discussion\_quantity -> avg\_all\_disc\_count  
● High ▲ Low

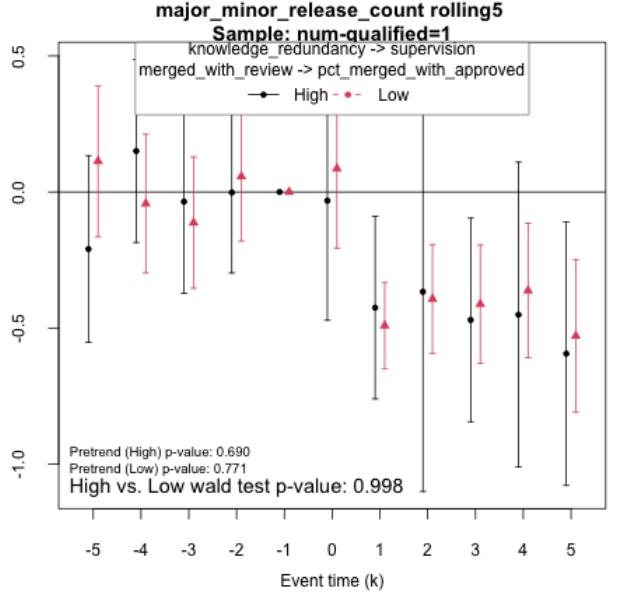


### pull\_request\_opened rolling5

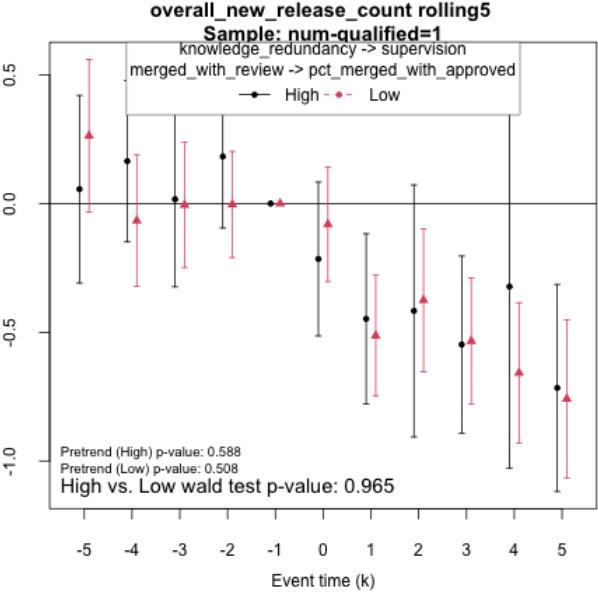
Sample: num-qualified=1  
knowledge\_redundancy -> supervision  
discussion\_quantity -> avg\_all\_disc\_count  
● High ▲ Low



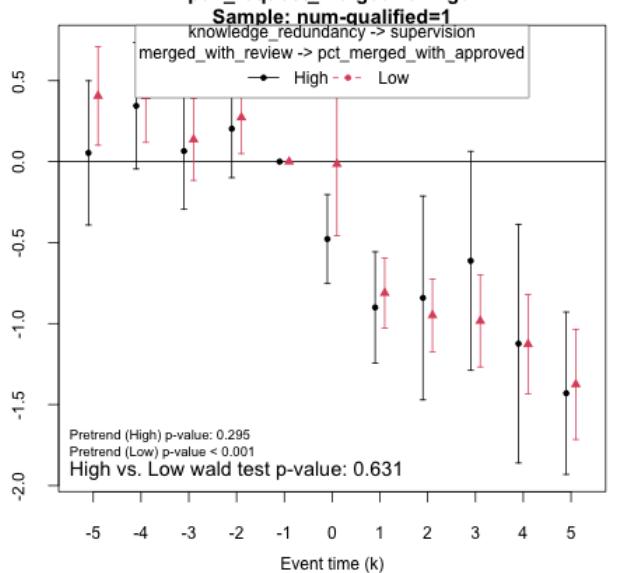
### major\_minor\_release\_count rolling5



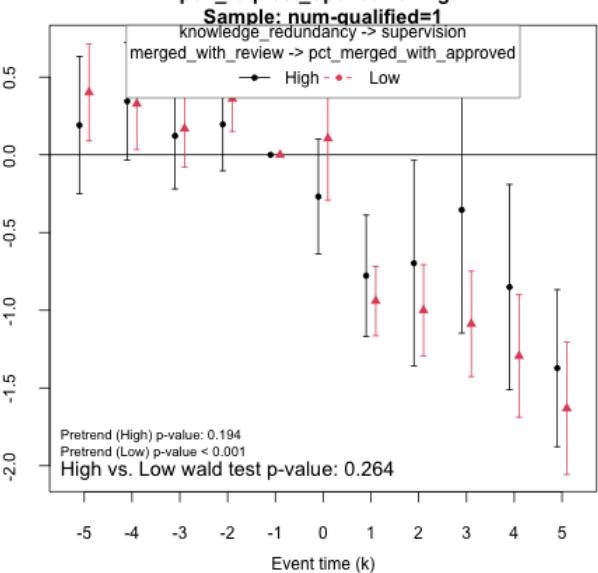
### overall\_new\_release\_count rolling5



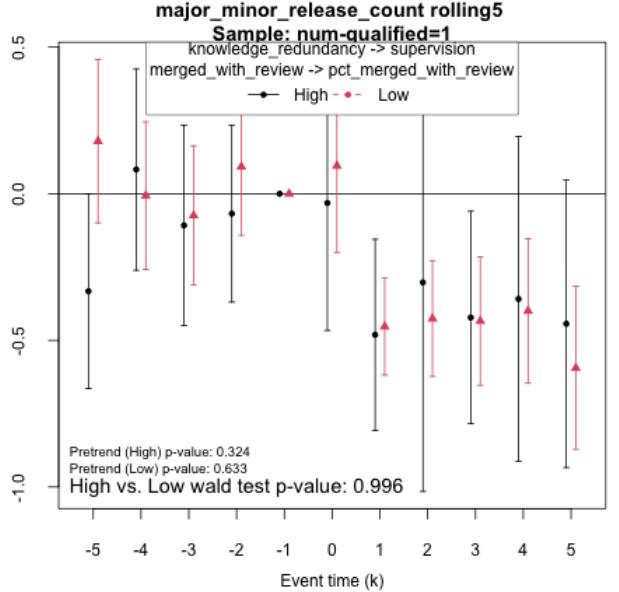
### pull\_request\_merged rolling5



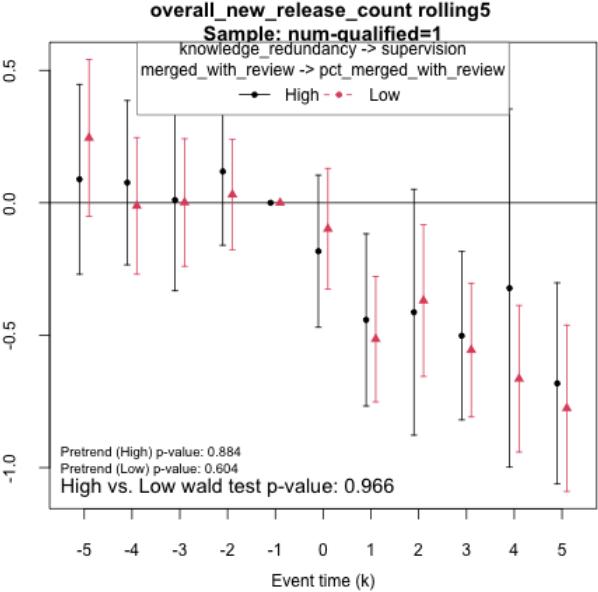
### pull\_request\_opened rolling5



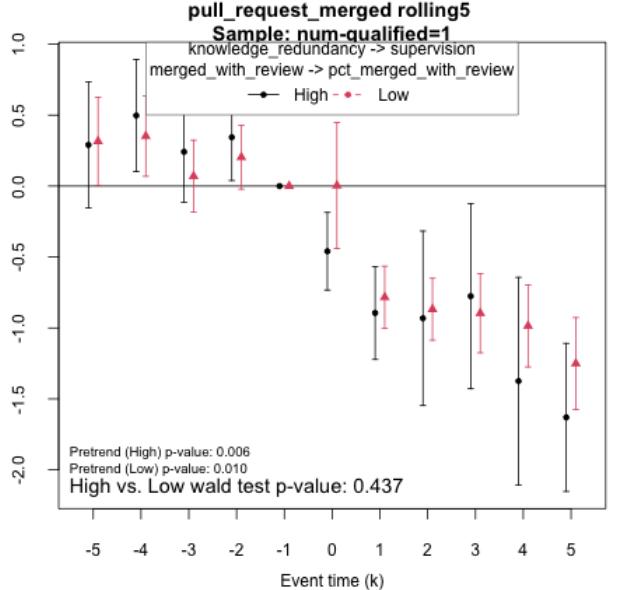
### major\_minor\_release\_count rolling5



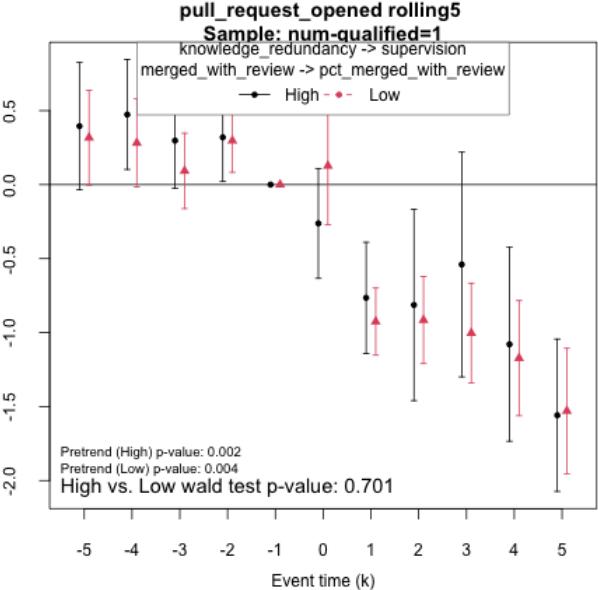
### overall\_new\_release\_count rolling5



### pull\_request\_merged rolling5



### pull\_request\_opened rolling5

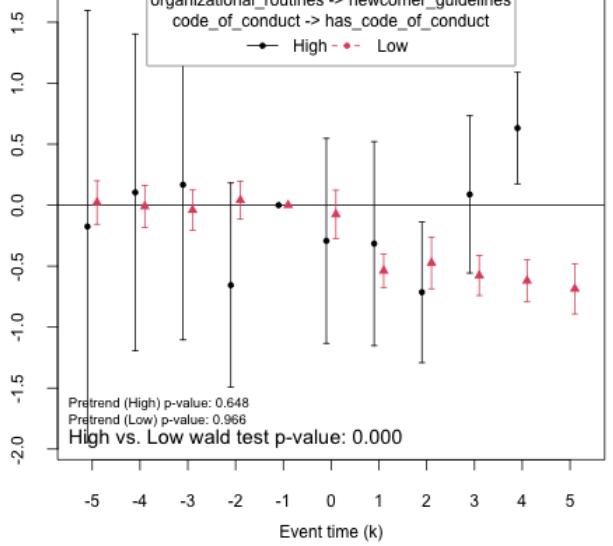


### major\_minor\_release\_count rolling5

Sample: num-qualified=1

organizational\_routines -> newcomer\_guidelines  
code\_of\_conduct -> has\_code\_of\_conduct

● High ● Low

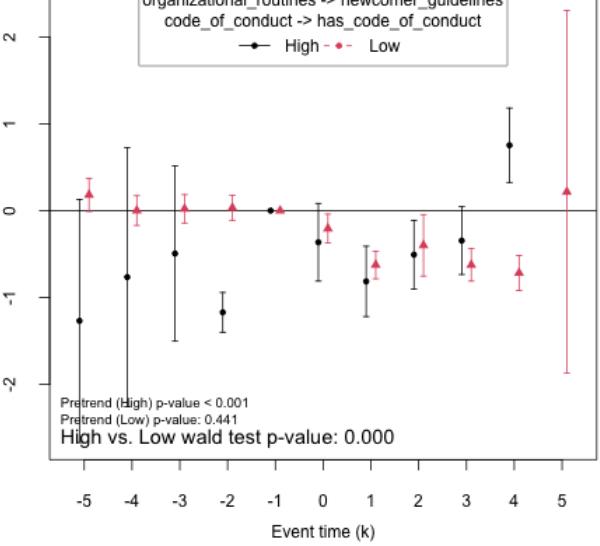


### overall\_new\_release\_count rolling5

Sample: num-qualified=1

organizational\_routines -> newcomer\_guidelines  
code\_of\_conduct -> has\_code\_of\_conduct

● High ● Low

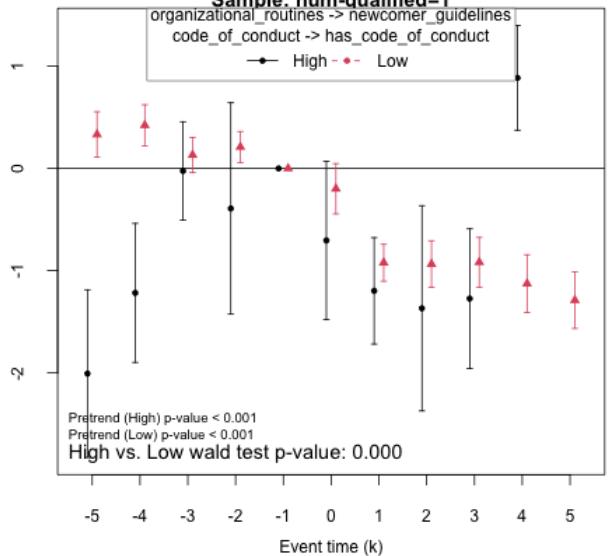


### pull\_request\_merged rolling5

Sample: num-qualified=1

organizational\_routines -> newcomer\_guidelines  
code\_of\_conduct -> has\_code\_of\_conduct

● High ● Low

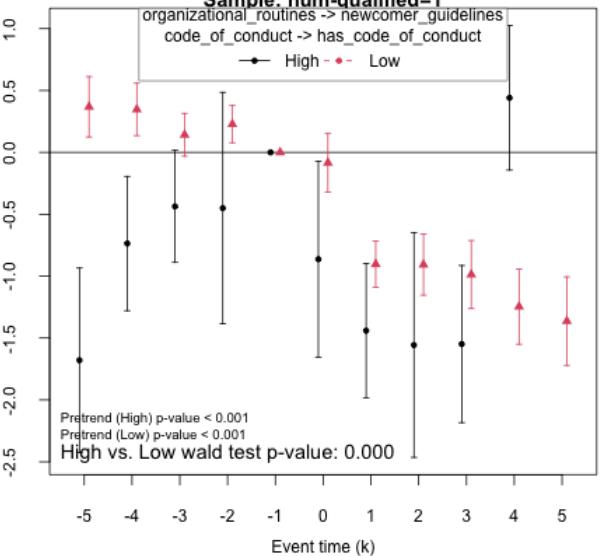


### pull\_request\_opened rolling5

Sample: num-qualified=1

organizational\_routines -> newcomer\_guidelines  
code\_of\_conduct -> has\_code\_of\_conduct

● High ● Low

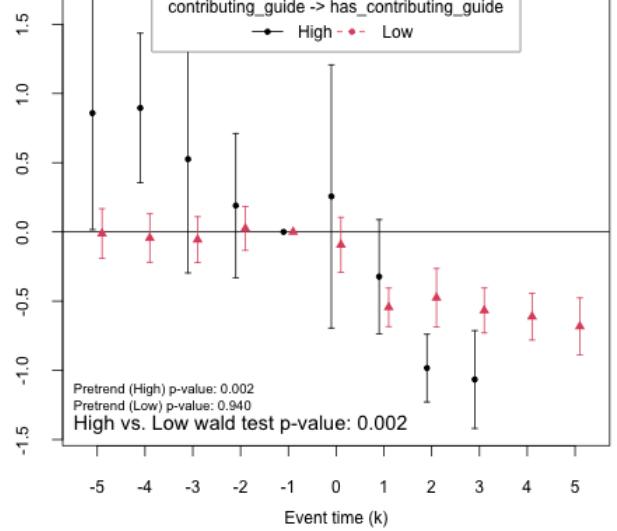


**major\_minor\_release\_count rolling5**

Sample: num-qualified=1

organizational\_routines -> newcomer\_guidelines  
 contributing\_guide -> has\_contributing\_guide

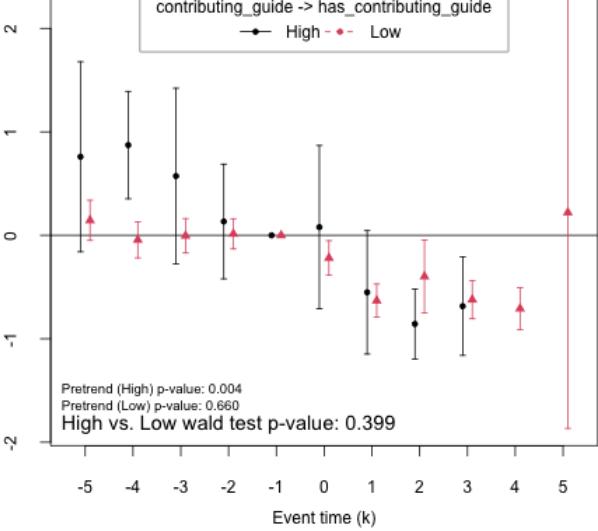
- High
- Low

**overall\_new\_release\_count rolling5**

Sample: num-qualified=1

organizational\_routines -> newcomer\_guidelines  
 contributing\_guide -> has\_contributing\_guide

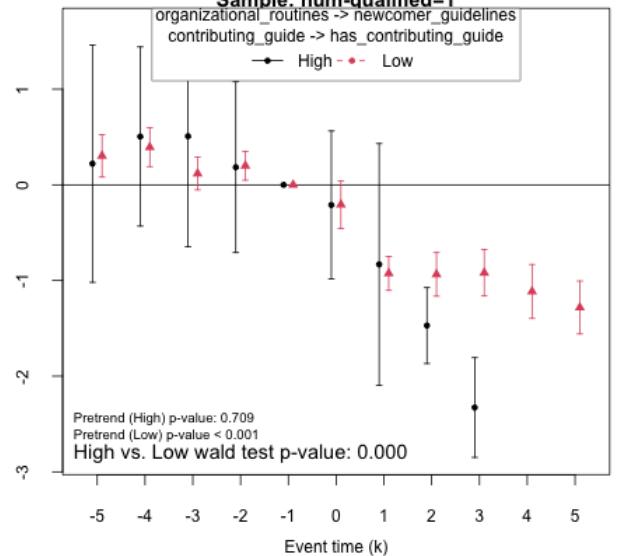
- High
- Low

**pull\_request\_merged rolling5**

Sample: num-qualified=1

organizational\_routines -> newcomer\_guidelines  
 contributing\_guide -> has\_contributing\_guide

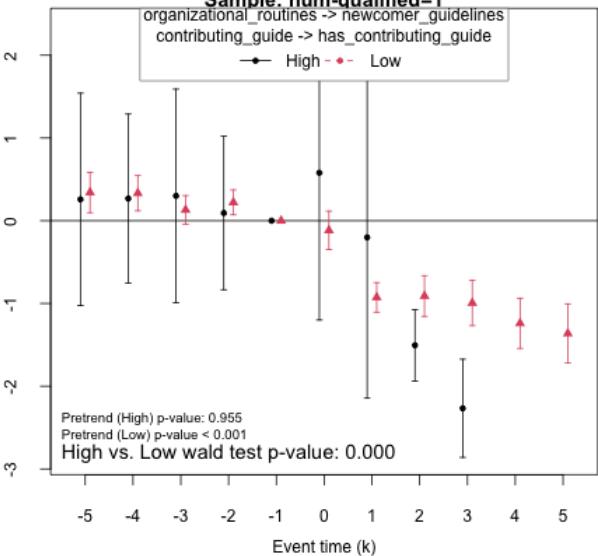
- High
- Low

**pull\_request\_opened rolling5**

Sample: num-qualified=1

organizational\_routines -> newcomer\_guidelines  
 contributing\_guide -> has\_contributing\_guide

- High
- Low

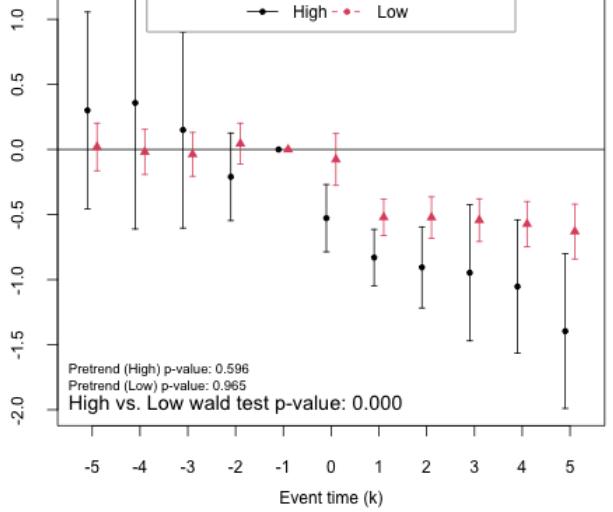


**major\_minor\_release\_count rolling5**

Sample: num-qualified=1

organizational\_routines  $\rightarrow$  newcomer\_guidelines  
 $\text{good\_first\_issue} \rightarrow \text{has\_good\_first\_issue}$

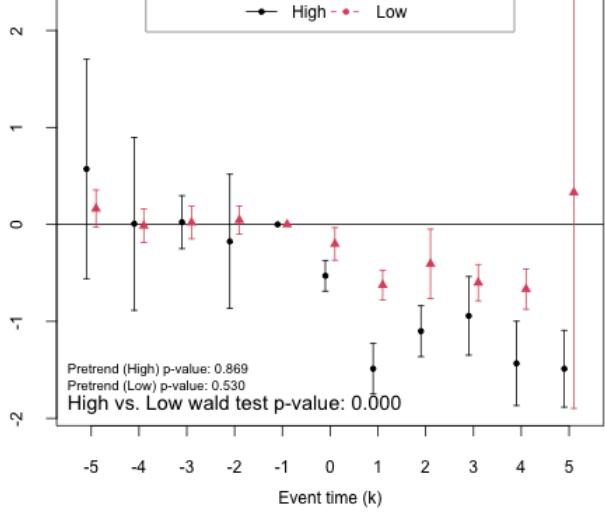
- High
- Low

**overall\_new\_release\_count rolling5**

Sample: num-qualified=1

organizational\_routines  $\rightarrow$  newcomer\_guidelines  
 $\text{good\_first\_issue} \rightarrow \text{has\_good\_first\_issue}$

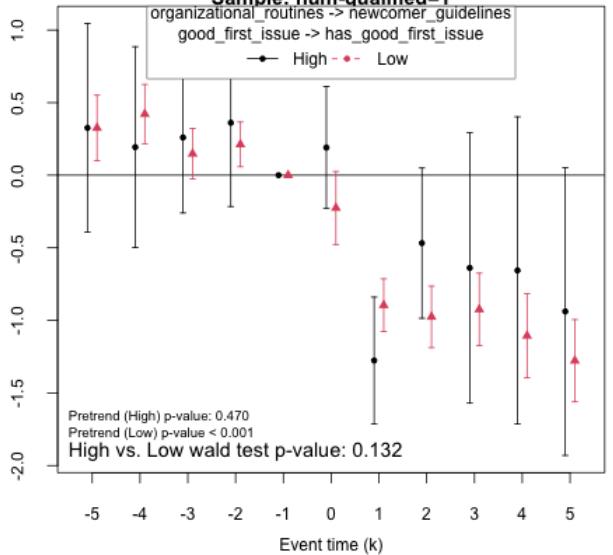
- High
- Low

**pull\_request\_merged rolling5**

Sample: num-qualified=1

organizational\_routines  $\rightarrow$  newcomer\_guidelines  
 $\text{good\_first\_issue} \rightarrow \text{has\_good\_first\_issue}$

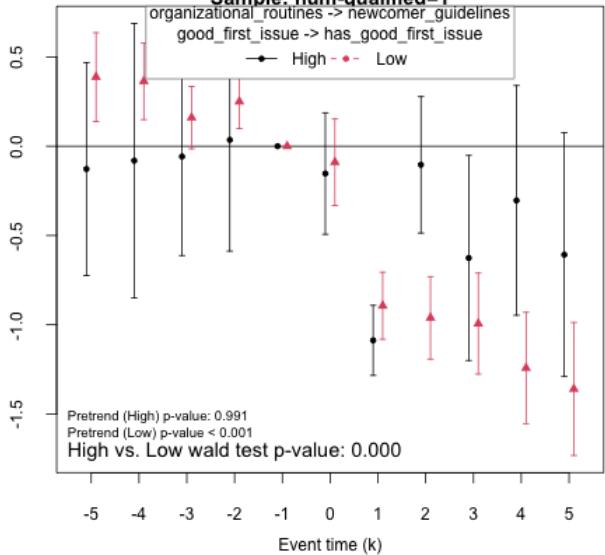
- High
- Low

**pull\_request\_opened rolling5**

Sample: num-qualified=1

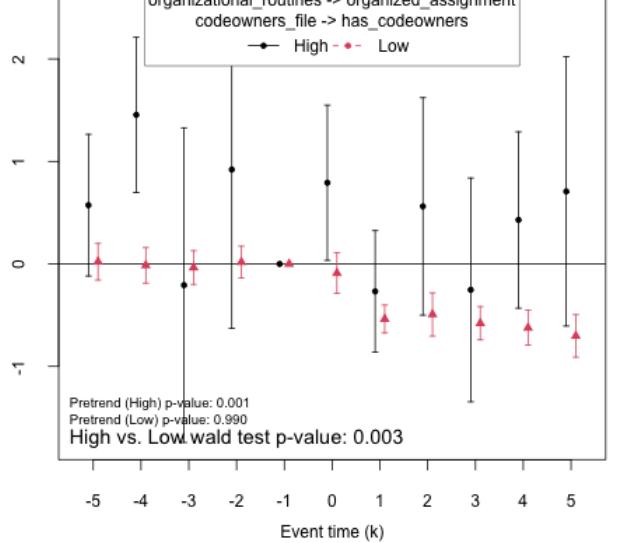
organizational\_routines  $\rightarrow$  newcomer\_guidelines  
 $\text{good\_first\_issue} \rightarrow \text{has\_good\_first\_issue}$

- High
- Low

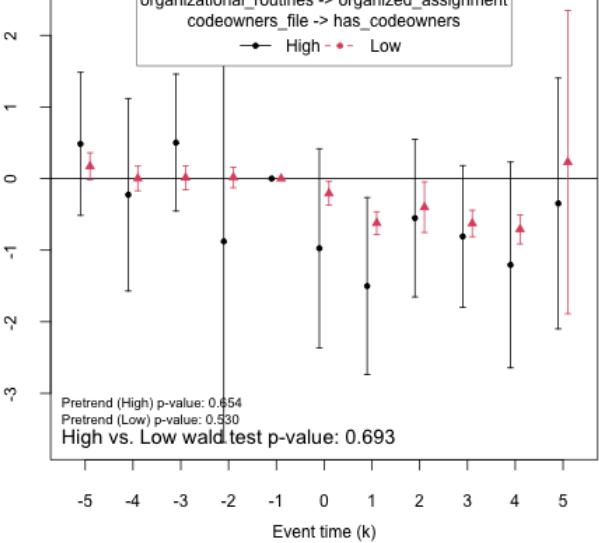


**major\_minor\_release\_count rolling5**

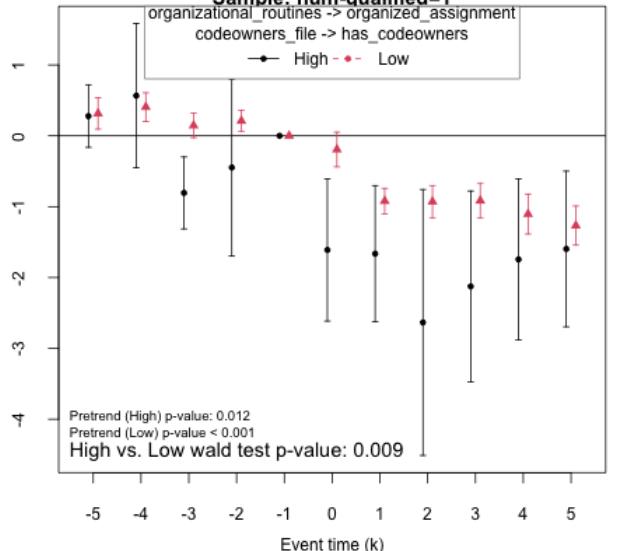
**Sample: num-qualified=1**  
 organizational\_routines -> organized\_assignment  
 codeowners\_file -> has\_codeowners  
 ● High -●- Low

**overall\_new\_release\_count rolling5**

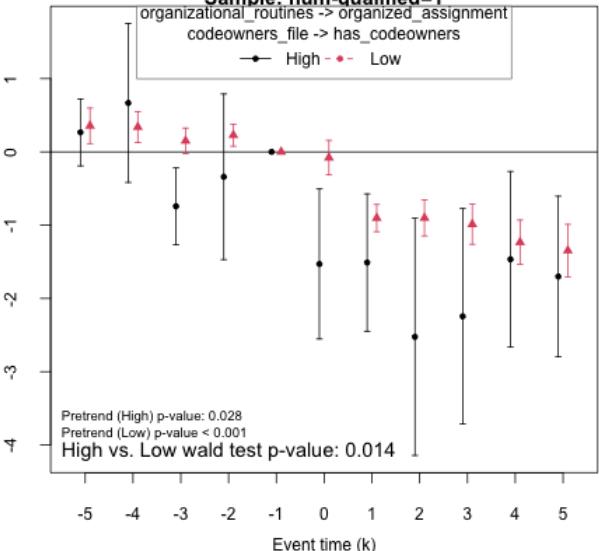
**Sample: num-qualified=1**  
 organizational\_routines -> organized\_assignment  
 codeowners\_file -> has\_codeowners  
 ● High -●- Low

**pull\_request\_merged rolling5**

**Sample: num-qualified=1**  
 organizational\_routines -> organized\_assignment  
 codeowners\_file -> has\_codeowners  
 ● High -●- Low

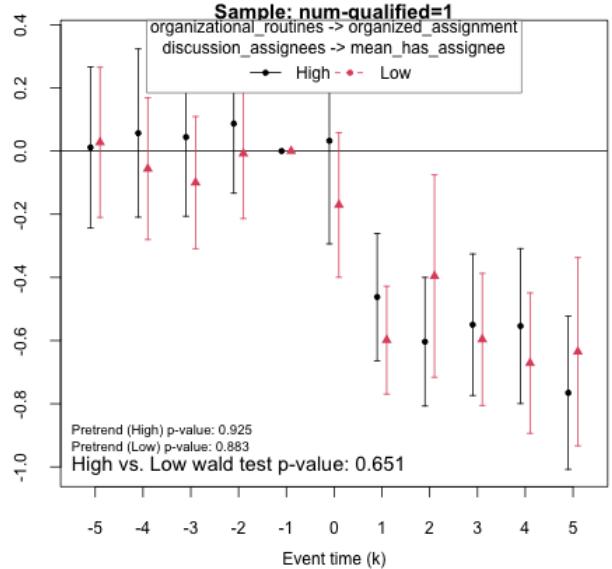
**pull\_request\_opened rolling5**

**Sample: num-qualified=1**  
 organizational\_routines -> organized\_assignment  
 codeowners\_file -> has\_codeowners  
 ● High -●- Low

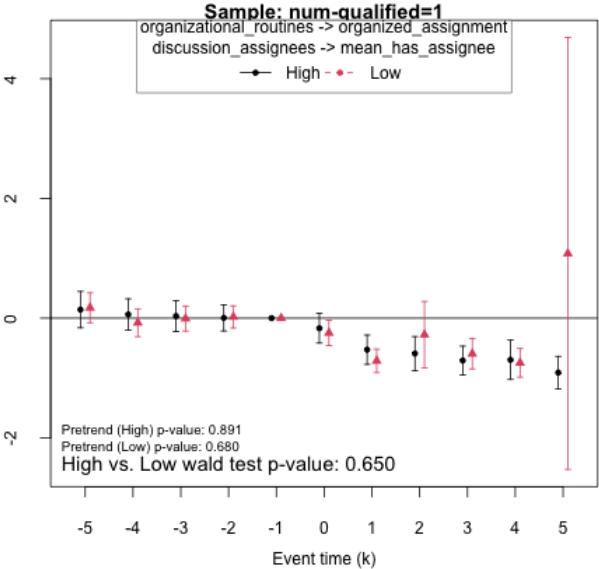


**major\_minor\_release\_count rolling5**

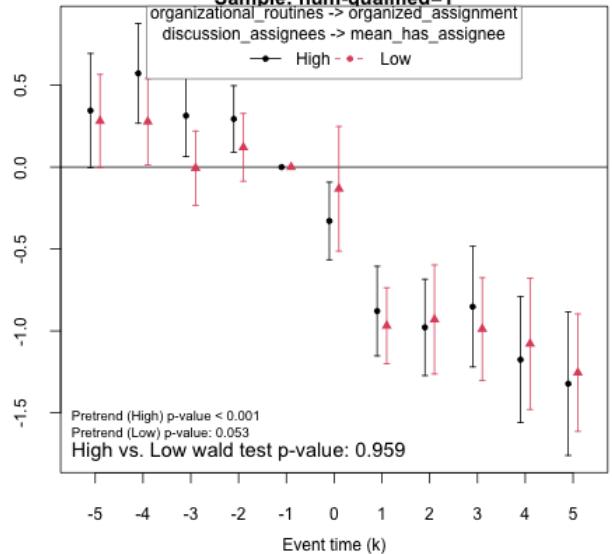
Sample: num-qualified=1

**overall\_new\_release\_count rolling5**

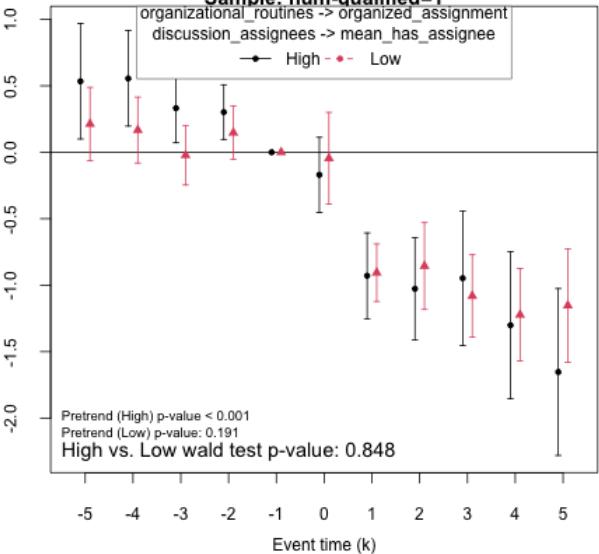
Sample: num-qualified=1

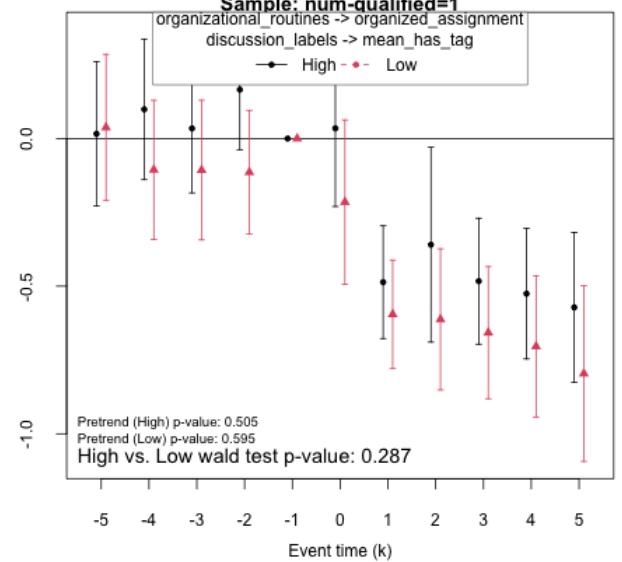
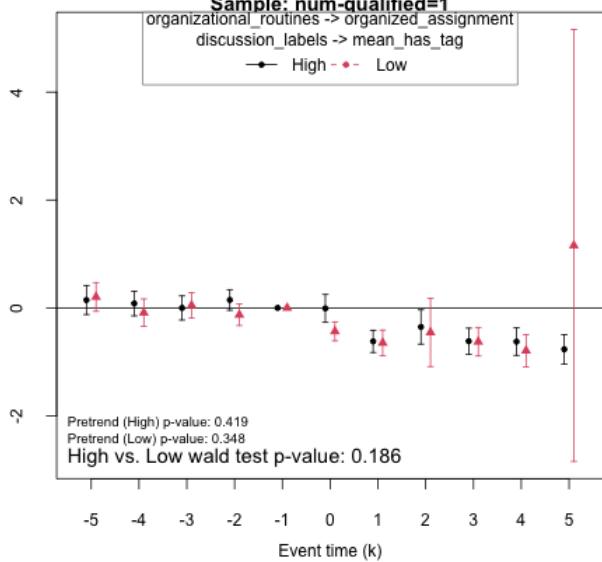
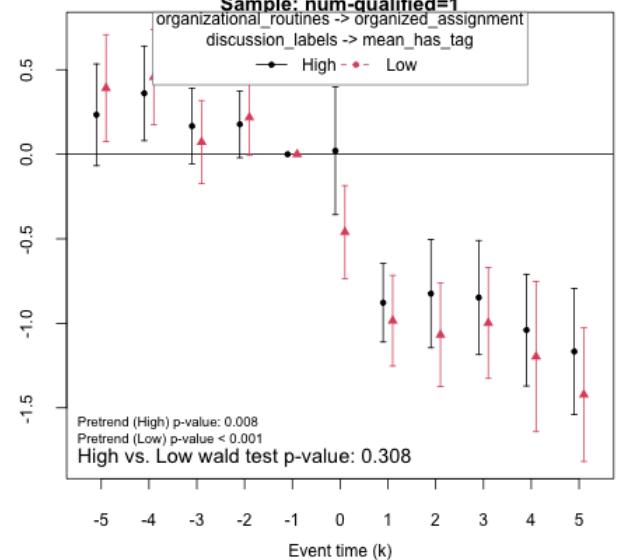
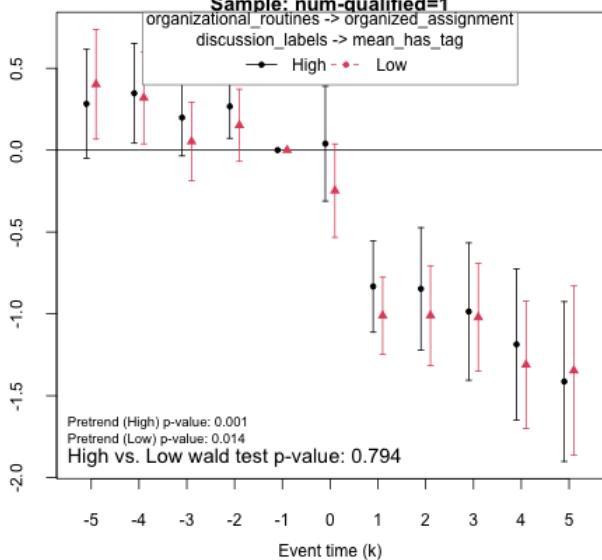
**pull\_request\_merged rolling5**

Sample: num-qualified=1

**pull\_request\_opened rolling5**

Sample: num-qualified=1



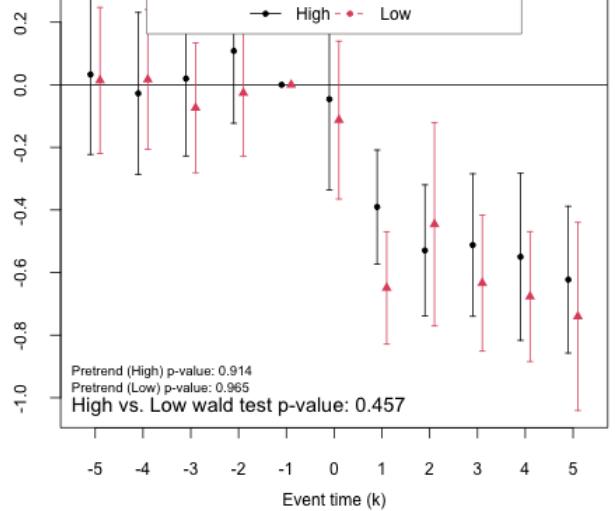
**major\_minor\_release\_count rolling5****Sample: num-qualified=1****overall\_new\_release\_count rolling5****Sample: num-qualified=1****pull\_request\_merged rolling5****Sample: num-qualified=1****pull\_request\_opened rolling5****Sample: num-qualified=1**

### major\_minor\_release\_count rolling5

Sample: num-qualified=1

organizational\_routines -> organized\_assignment  
pr\_reviewers -> mean\_has\_reviewer

● High ▲ Low

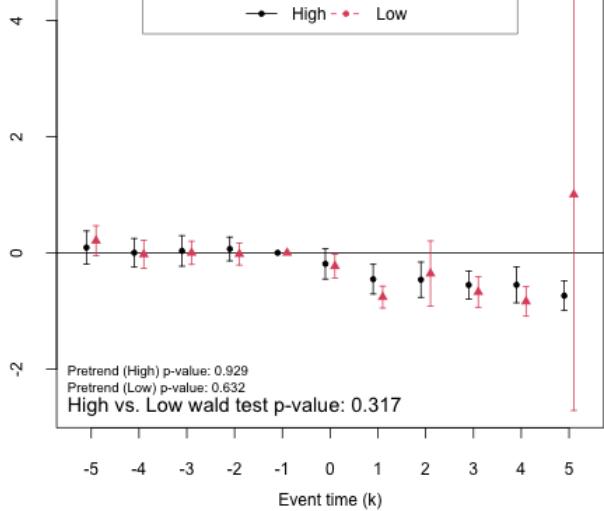


### overall\_new\_release\_count rolling5

Sample: num-qualified=1

organizational\_routines -> organized\_assignment  
pr\_reviewers -> mean\_has\_reviewer

● High ▲ Low

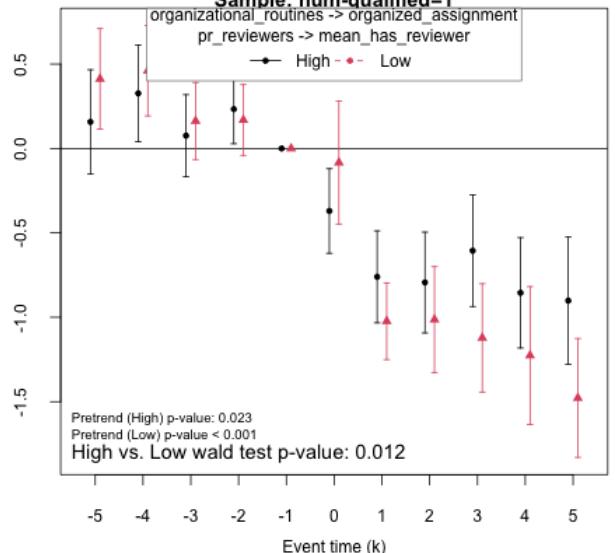


### pull\_request\_merged rolling5

Sample: num-qualified=1

organizational\_routines -> organized\_assignment  
pr\_reviewers -> mean\_has\_reviewer

● High ▲ Low

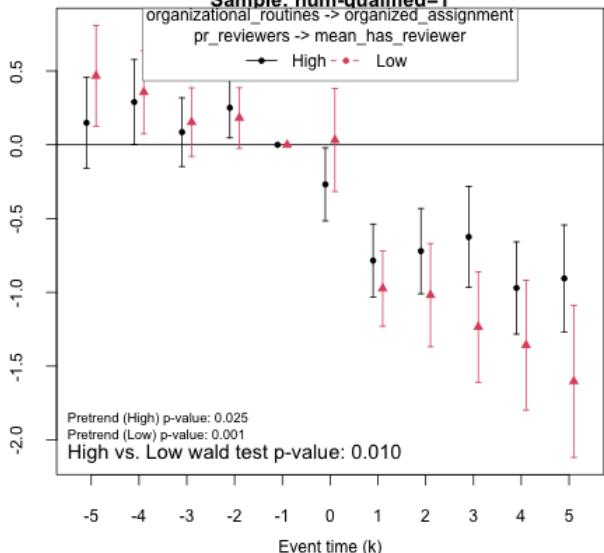


### pull\_request\_opened rolling5

Sample: num-qualified=1

organizational\_routines -> organized\_assignment  
pr\_reviewers -> mean\_has\_reviewer

● High ▲ Low



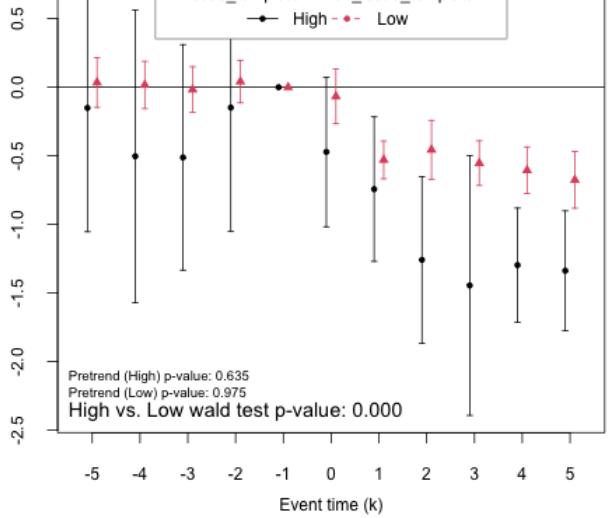
### major\_minor\_release\_count rolling5

Sample: num-qualified=1

organizational\_routines -> organized\_inquiries

issue\_template -> has\_issue\_template

● High - ▲ Low



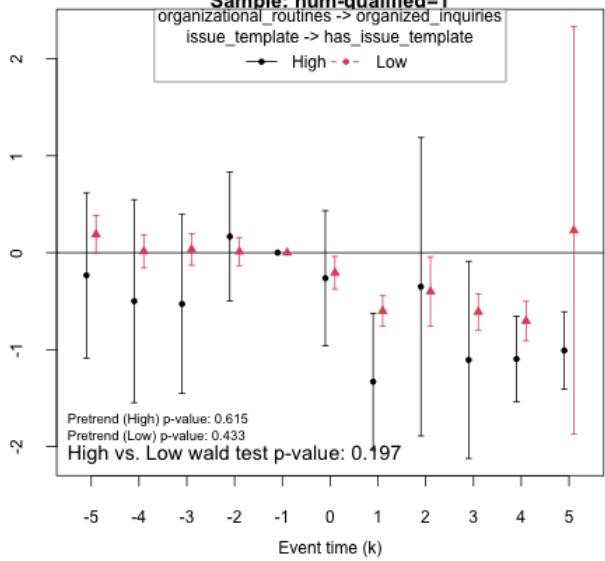
### overall\_new\_release\_count rolling5

Sample: num-qualified=1

organizational\_routines -> organized\_inquiries

issue\_template -> has\_issue\_template

● High - ▲ Low



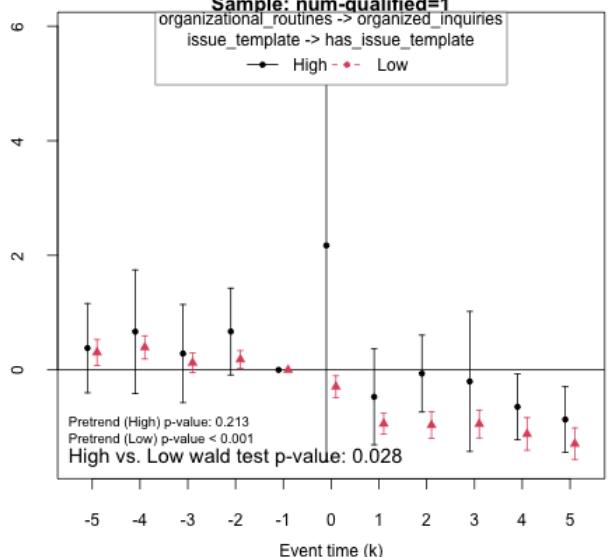
### pull\_request\_merged rolling5

Sample: num-qualified=1

organizational\_routines -> organized\_inquiries

issue\_template -> has\_issue\_template

● High - ▲ Low



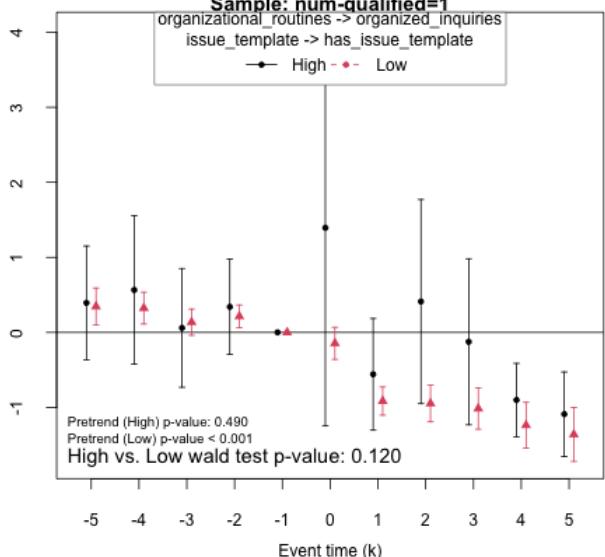
### pull\_request\_opened rolling5

Sample: num-qualified=1

organizational\_routines -> organized\_inquiries

issue\_template -> has\_issue\_template

● High - ▲ Low



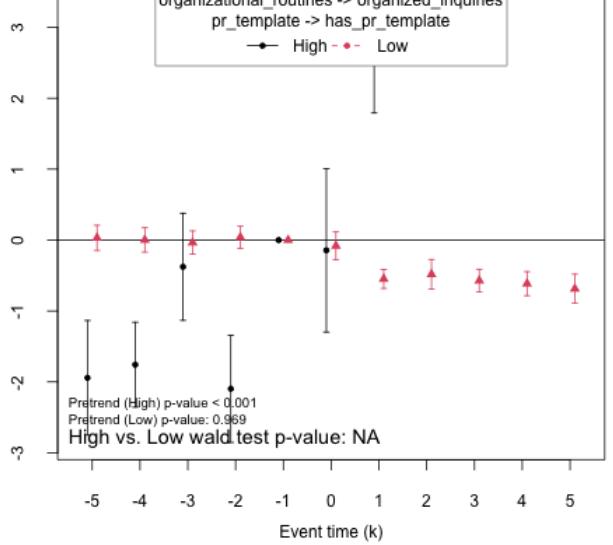
**major\_minor\_release\_count rolling5**

Sample: num-qualified=1

organizational\_routines -&gt; organized\_inquiries

pr\_template -&gt; has\_pr\_template

● High ● Low

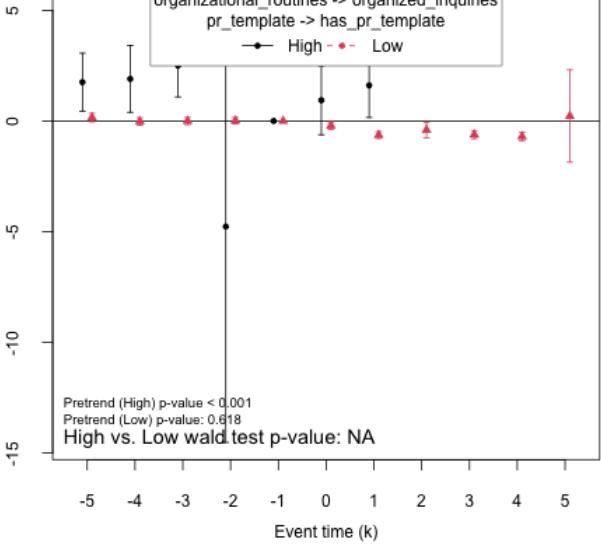
**overall\_new\_release\_count rolling5**

Sample: num-qualified=1

organizational\_routines -&gt; organized\_inquiries

pr\_template -&gt; has\_pr\_template

● High ● Low

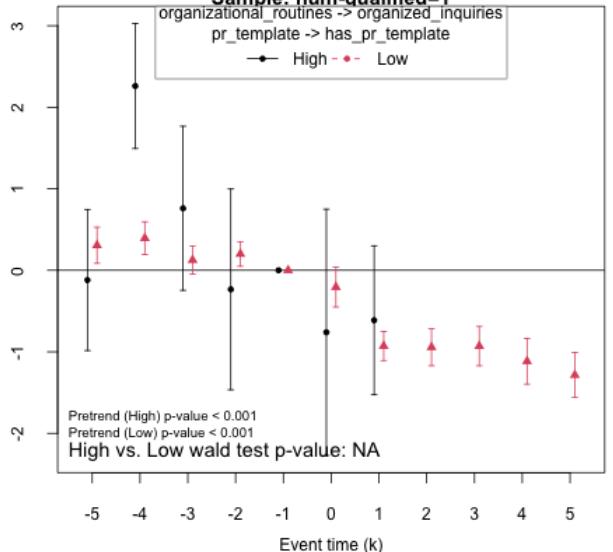
**pull\_request\_merged rolling5**

Sample: num-qualified=1

organizational\_routines -&gt; organized\_inquiries

pr\_template -&gt; has\_pr\_template

● High ● Low

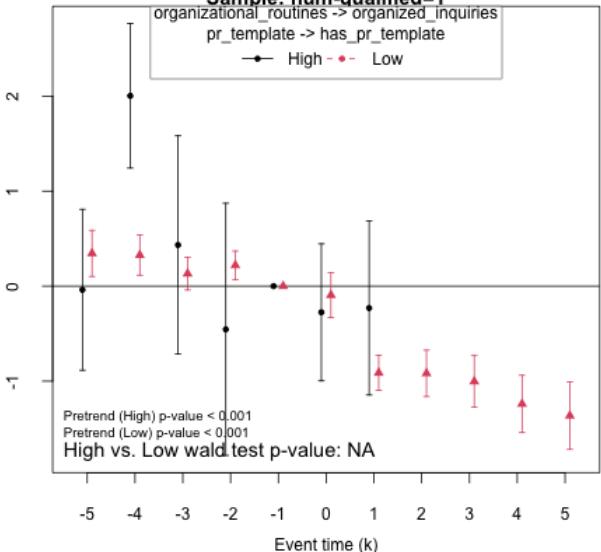
**pull\_request\_opened rolling5**

Sample: num-qualified=1

organizational\_routines -&gt; organized\_inquiries

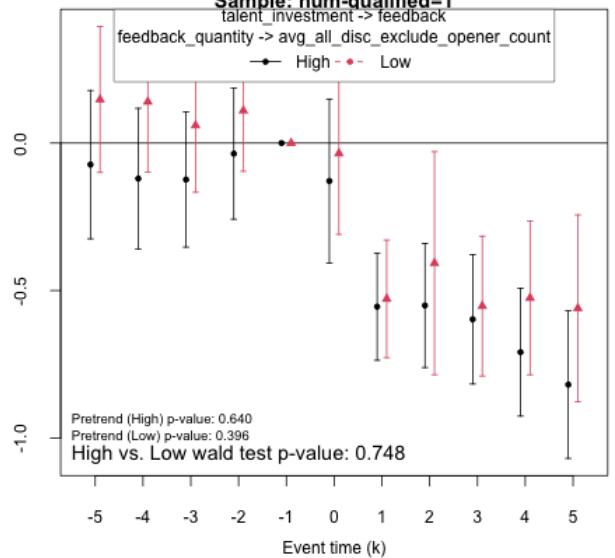
pr\_template -&gt; has\_pr\_template

● High ● Low



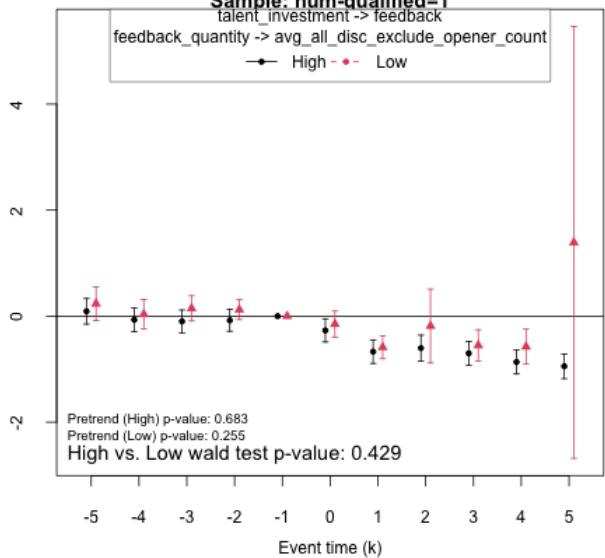
### major\_minor\_release\_count rolling5

Sample: num-qualified=1



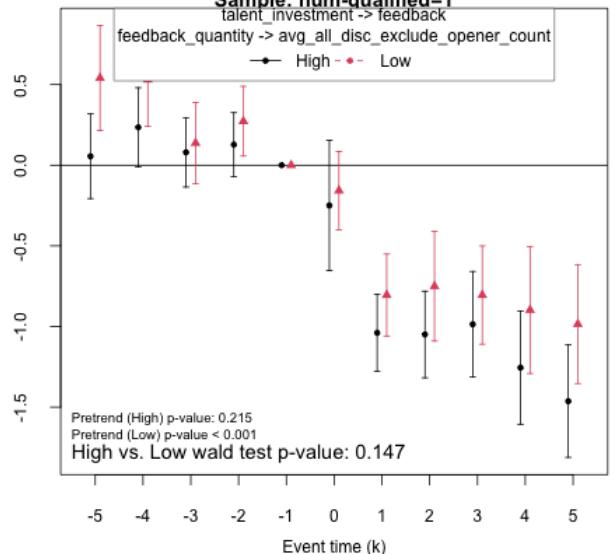
### overall\_new\_release\_count rolling5

Sample: num-qualified=1



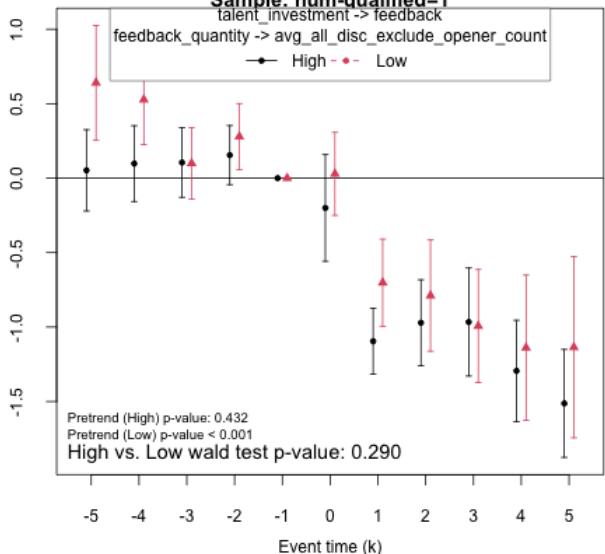
### pull\_request\_merged rolling5

Sample: num-qualified=1



### pull\_request\_opened rolling5

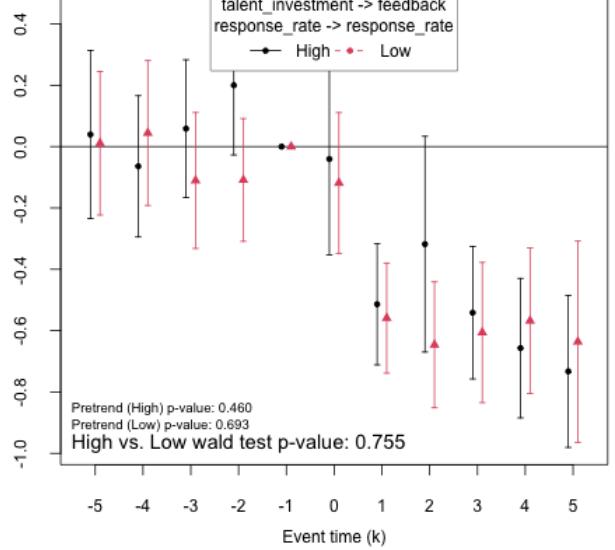
Sample: num-qualified=1



**major\_minor\_release\_count rolling5**

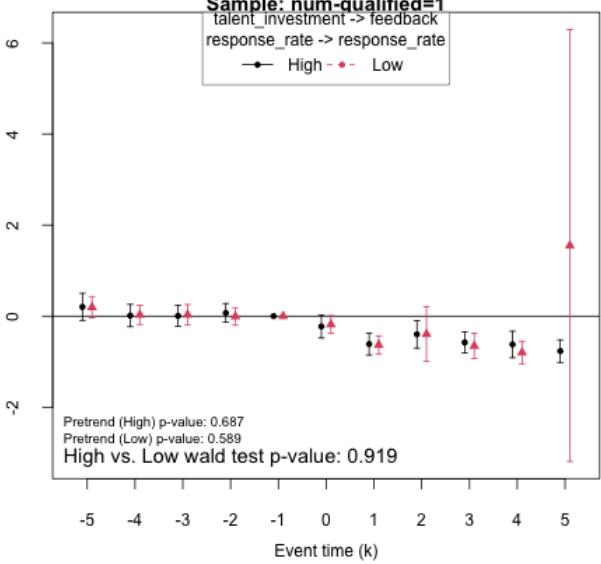
Sample: num-qualified=1

talent\_investment -> feedback  
 response\_rate -> response\_rate  
 ● High ▲ Low

**overall\_new\_release\_count rolling5**

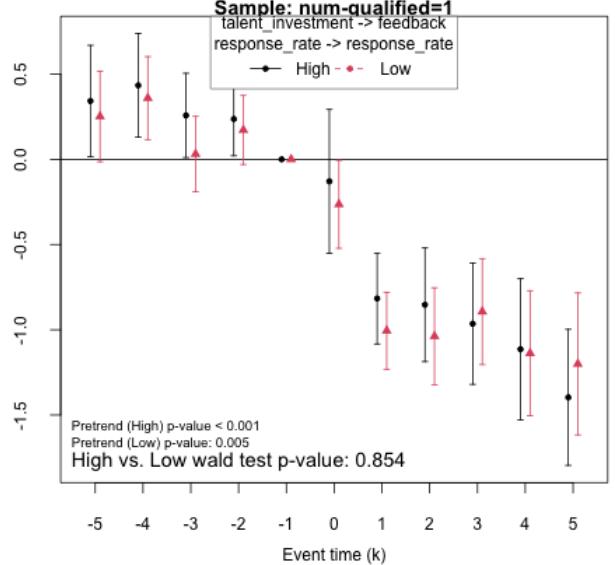
Sample: num-qualified=1

talent\_investment -> feedback  
 response\_rate -> response\_rate  
 ● High ▲ Low

**pull\_request\_merged rolling5**

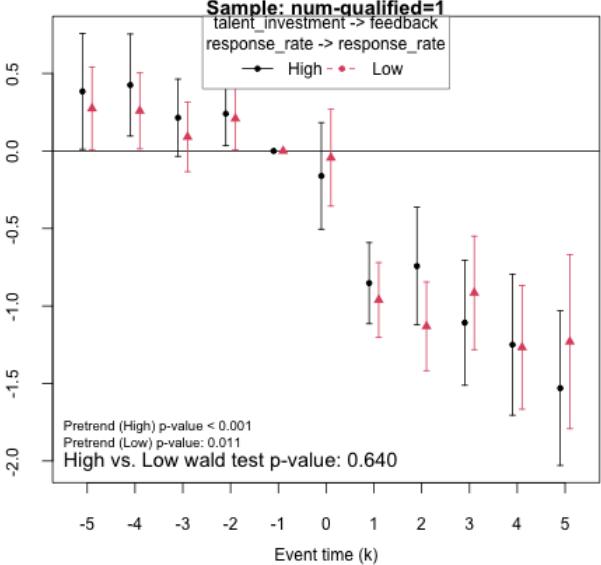
Sample: num-qualified=1

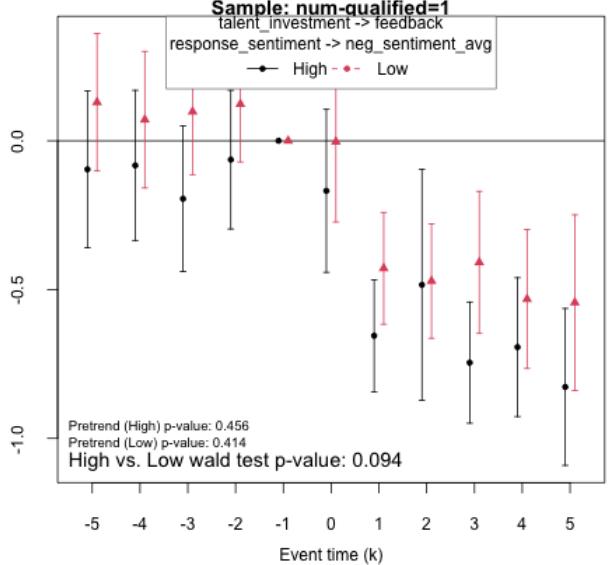
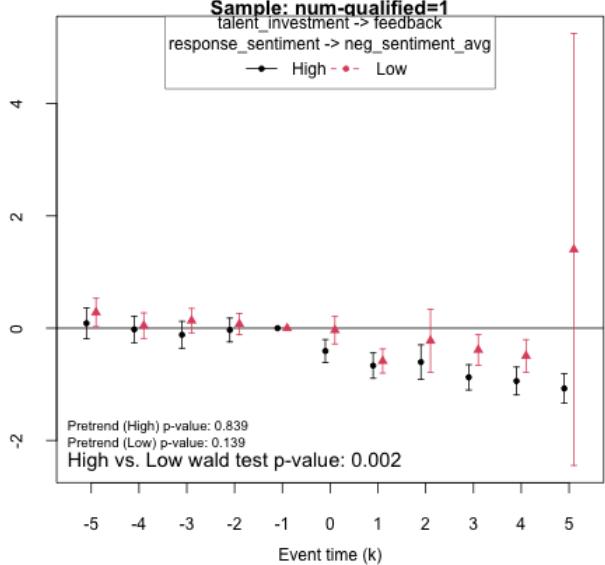
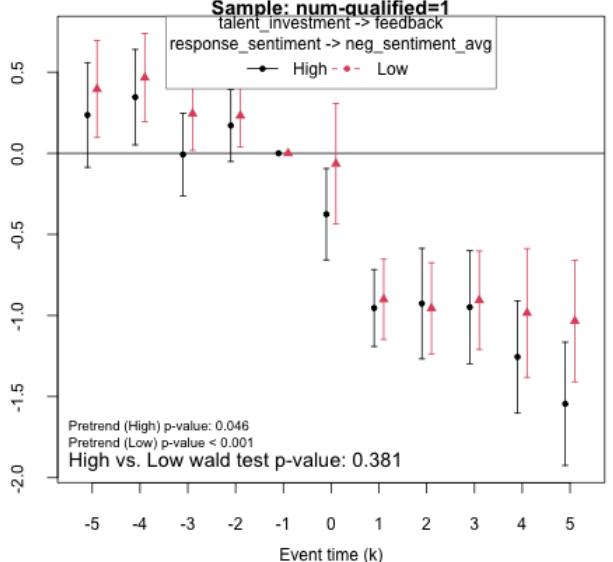
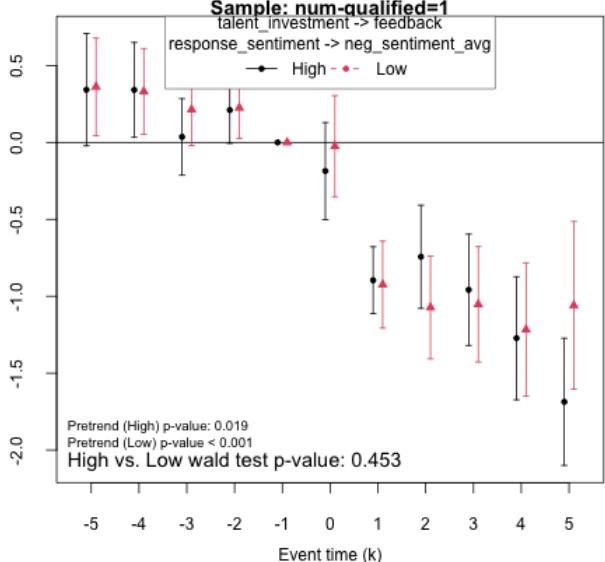
talent\_investment -> feedback  
 response\_rate -> response\_rate  
 ● High ▲ Low

**pull\_request\_opened rolling5**

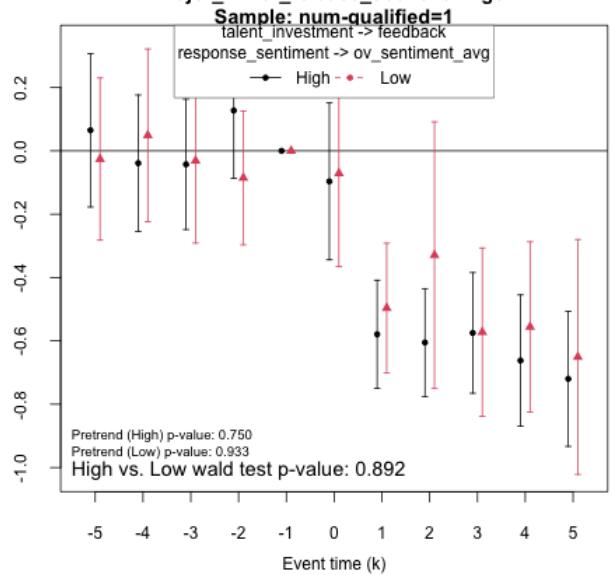
Sample: num-qualified=1

talent\_investment -> feedback  
 response\_rate -> response\_rate  
 ● High ▲ Low

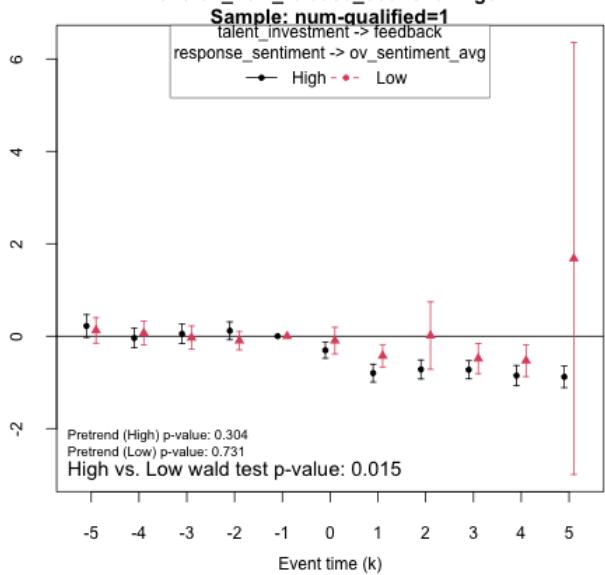


**major\_minor\_release\_count rolling5****Sample: num-qualified=1**talent\_investment -> feedback  
response\_sentiment -> neg\_sentiment\_avg**overall\_new\_release\_count rolling5****Sample: num-qualified=1**talent\_investment -> feedback  
response\_sentiment -> neg\_sentiment\_avg**pull\_request\_merged rolling5****Sample: num-qualified=1**talent\_investment -> feedback  
response\_sentiment -> neg\_sentiment\_avg**pull\_request\_opened rolling5****Sample: num-qualified=1**talent\_investment -> feedback  
response\_sentiment -> neg\_sentiment\_avg

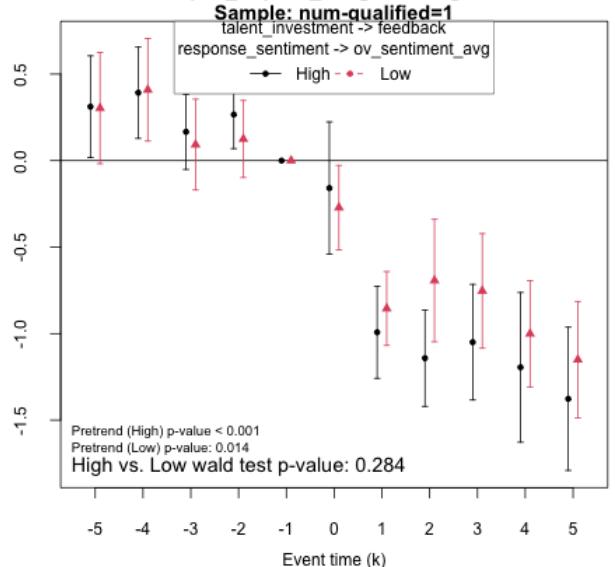
### major\_minor\_release\_count rolling5



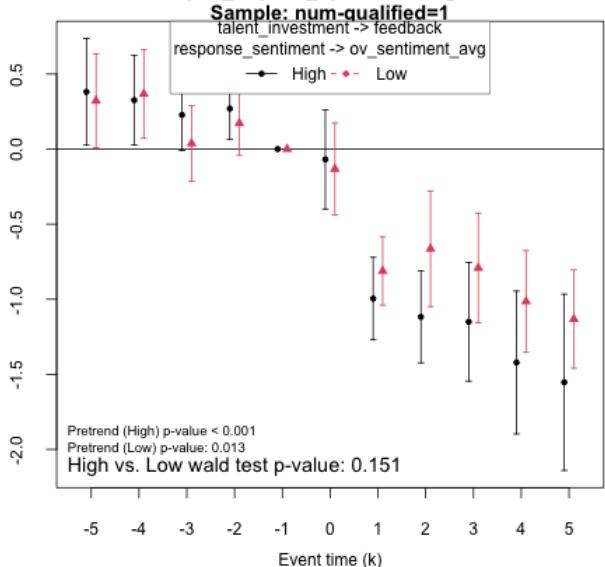
### overall\_new\_release\_count rolling5

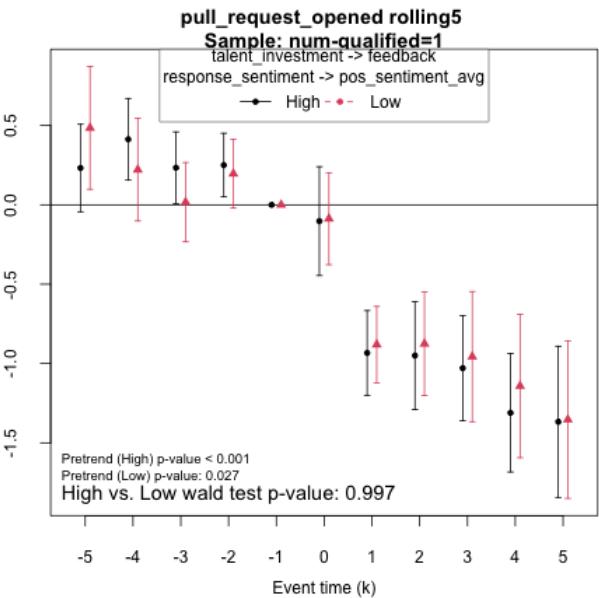
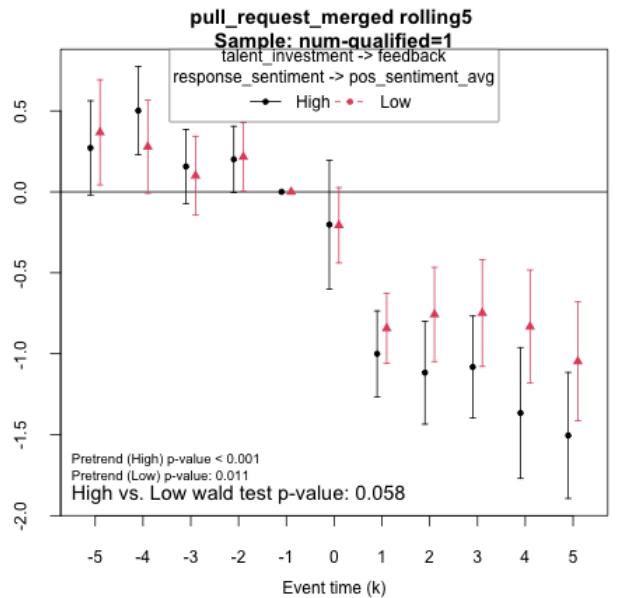
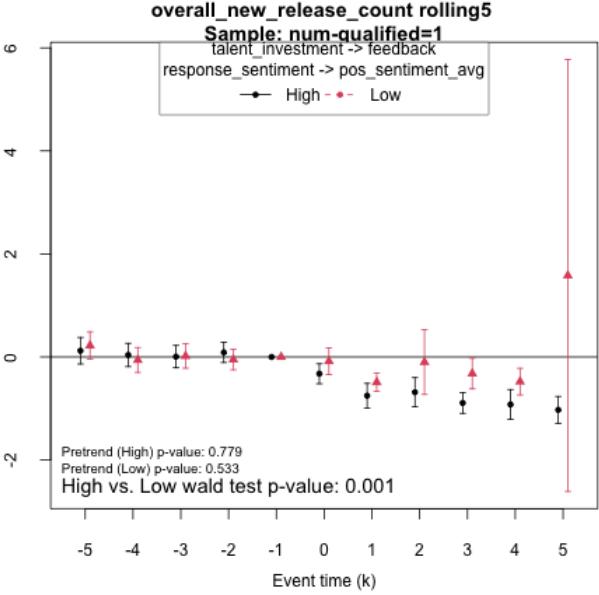
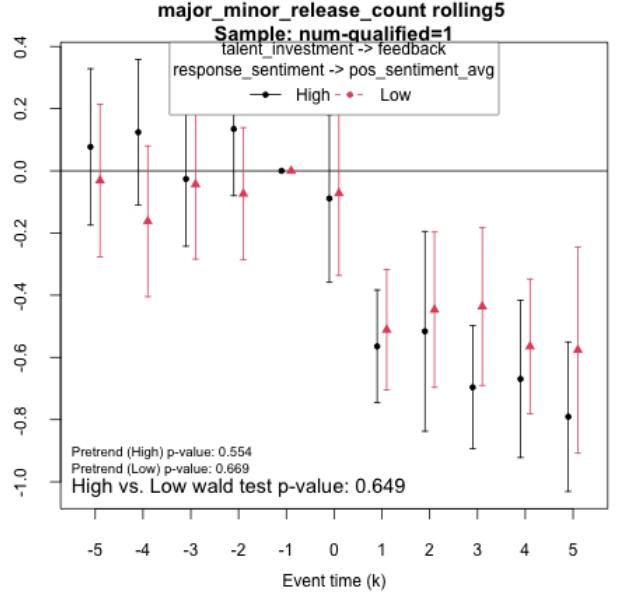


### pull\_request\_merged rolling5



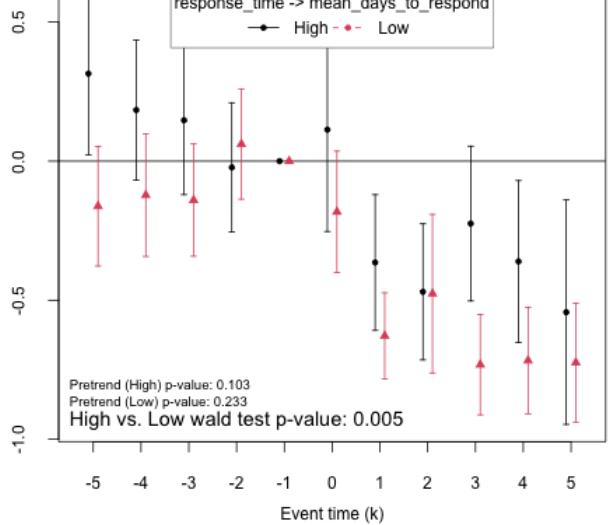
### pull\_request\_opened rolling5



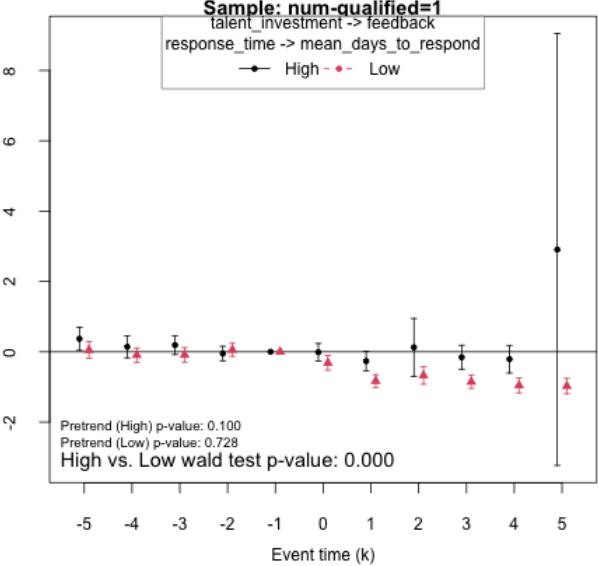


**major\_minor\_release\_count rolling5****Sample: num-qualified=1**talent\_investment -> feedback  
response\_time -> mean\_days\_to\_respond

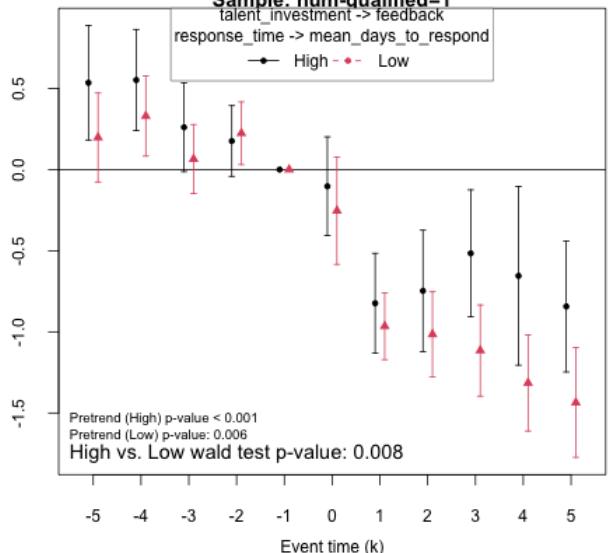
● High ▲ Low

**overall\_new\_release\_count rolling5****Sample: num-qualified=1**talent\_investment -> feedback  
response\_time -> mean\_days\_to\_respond

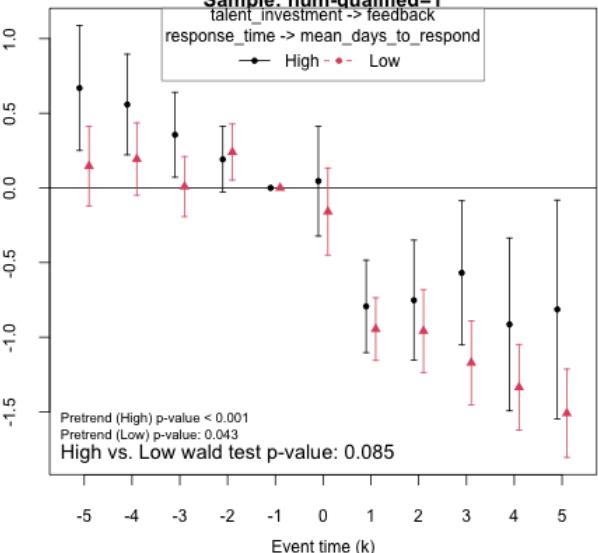
● High ▲ Low

**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

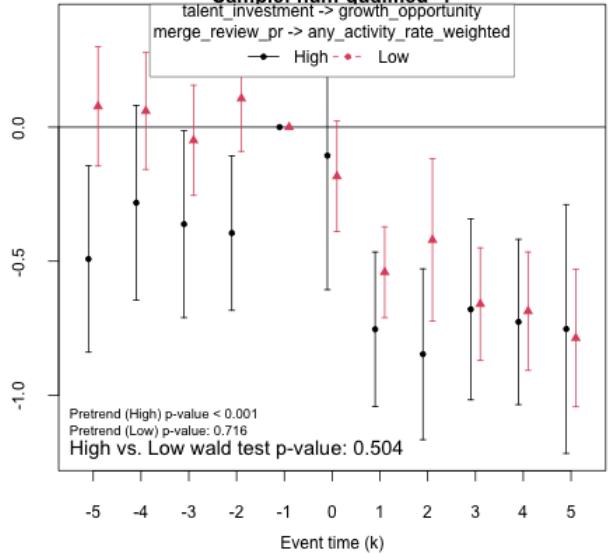


**major\_minor\_release\_count rolling5**

Sample: num-qualified=1

talent\_investment->growth\_opportunity  
merge\_review\_pr -> any\_activity\_rate\_weighted

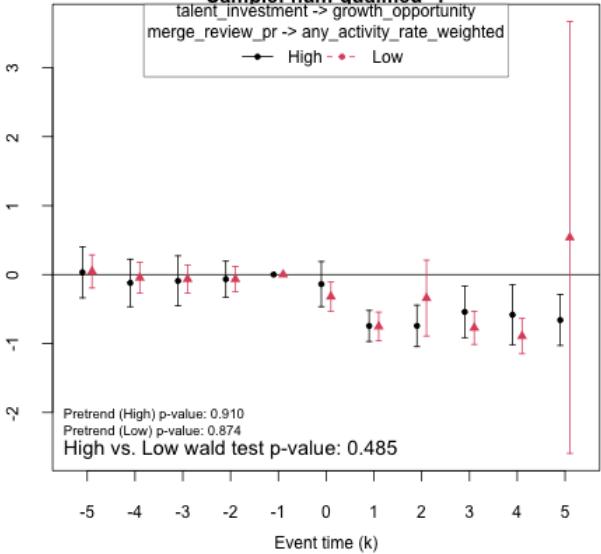
● High - ▲ Low

**overall\_new\_release\_count rolling5**

Sample: num-qualified=1

talent\_investment->growth\_opportunity  
merge\_review\_pr -> any\_activity\_rate\_weighted

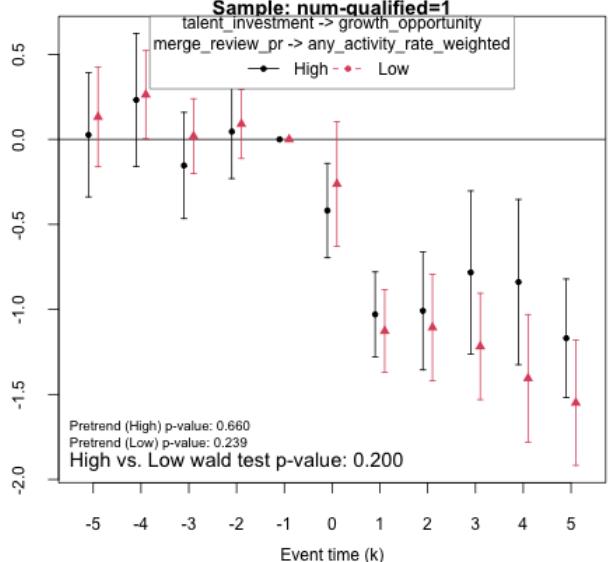
● High - ▲ Low

**pull\_request\_merged rolling5**

Sample: num-qualified=1

talent\_investment->growth\_opportunity  
merge\_review\_pr -> any\_activity\_rate\_weighted

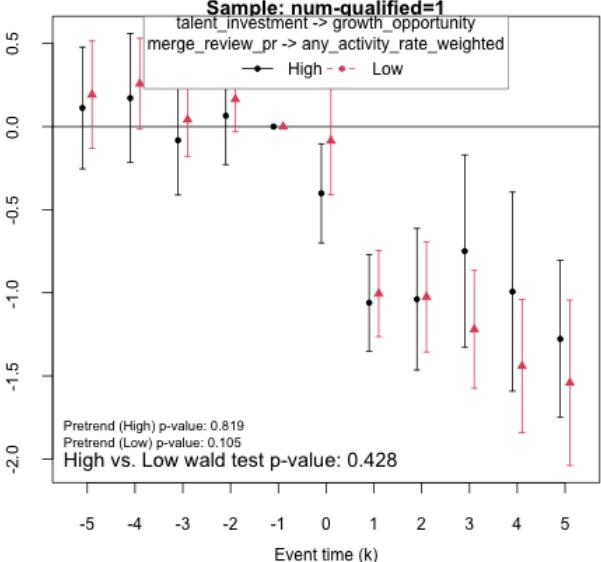
● High - ▲ Low

**pull\_request\_opened rolling5**

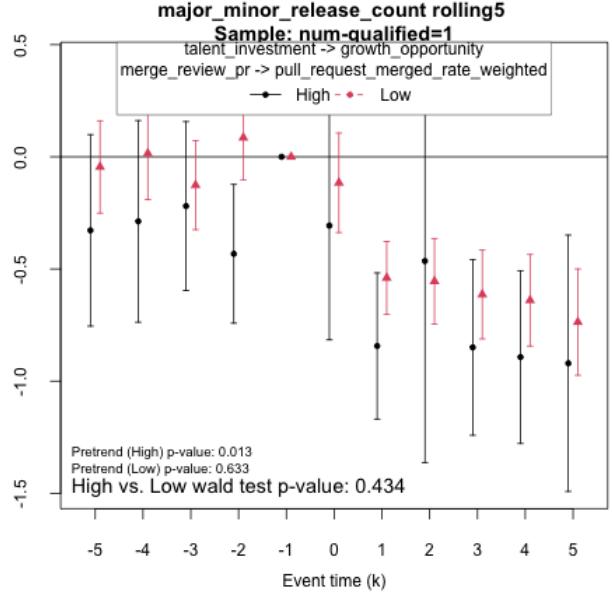
Sample: num-qualified=1

talent\_investment->growth\_opportunity  
merge\_review\_pr -> any\_activity\_rate\_weighted

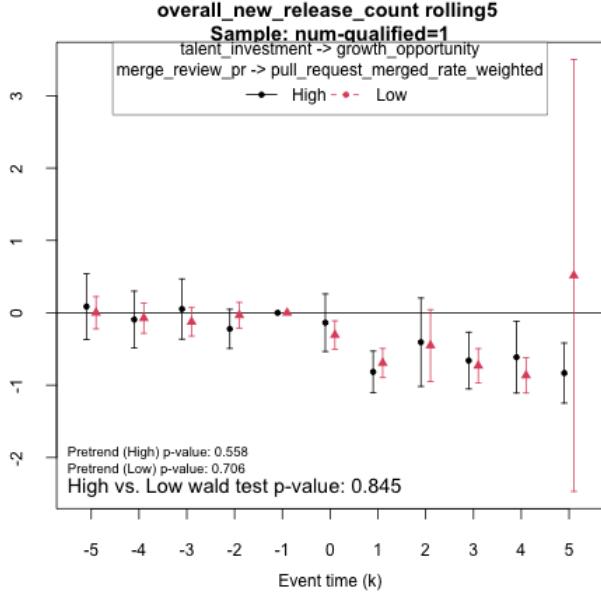
● High - ▲ Low



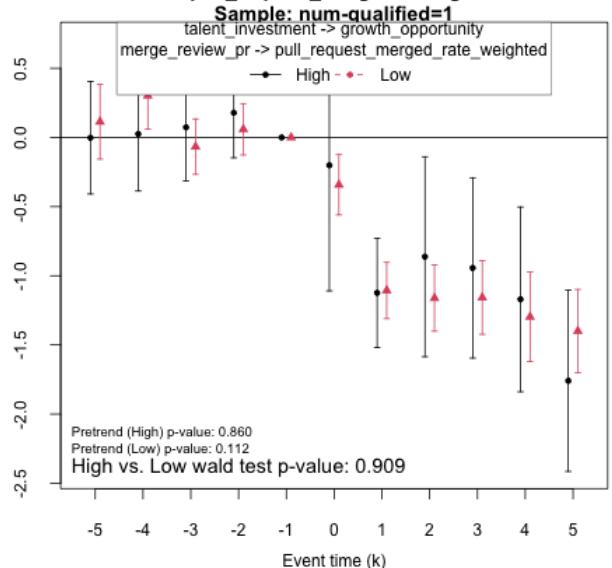
### major\_minor\_release\_count rolling5



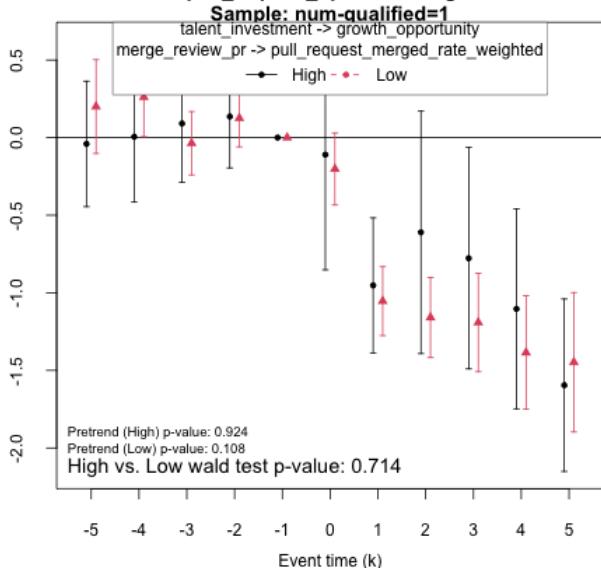
### overall\_new\_release\_count rolling5



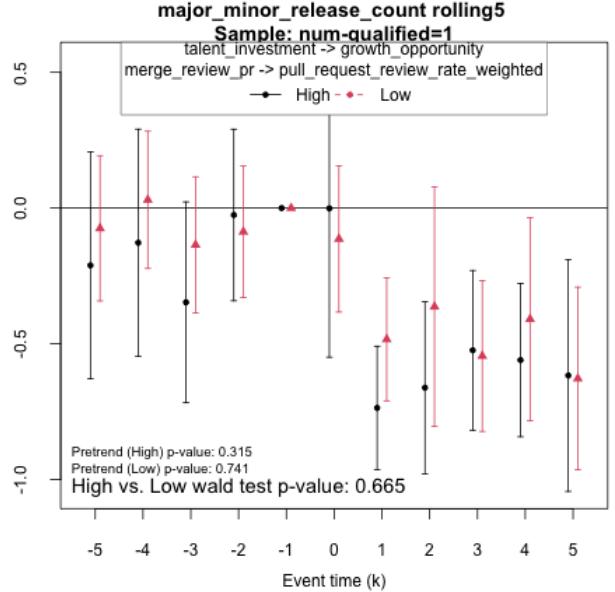
### pull\_request\_merged rolling5



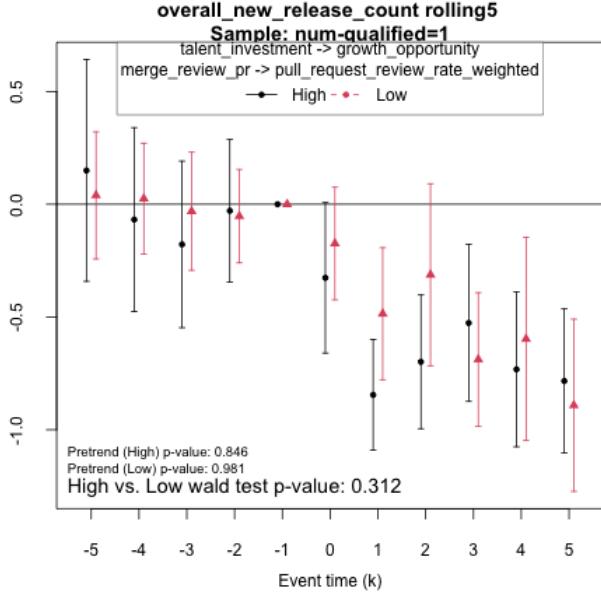
### pull\_request\_opened rolling5



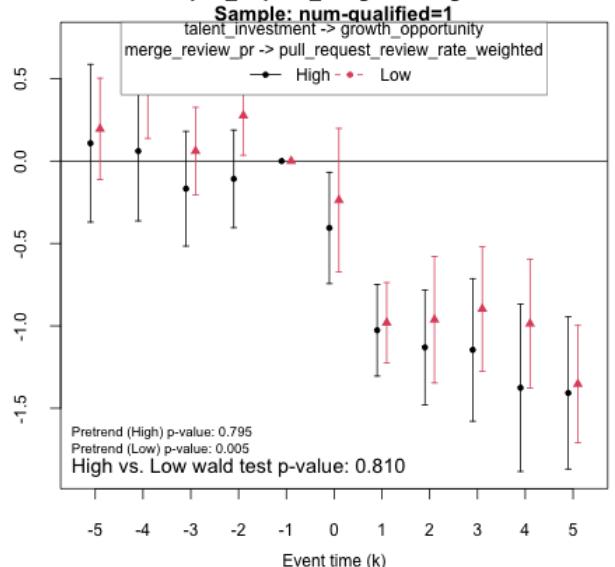
### major\_minor\_release\_count rolling5



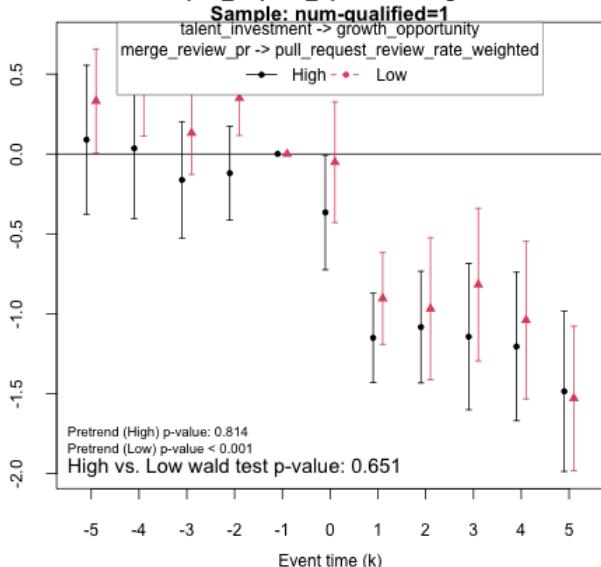
### overall\_new\_release\_count rolling5



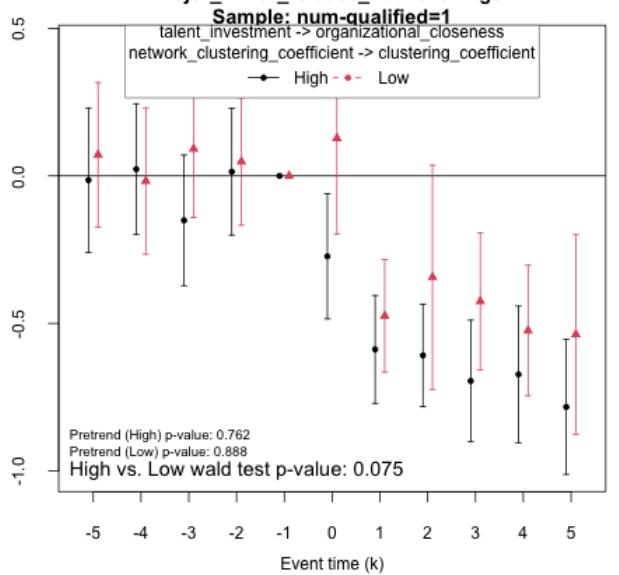
### pull\_request\_merged rolling5



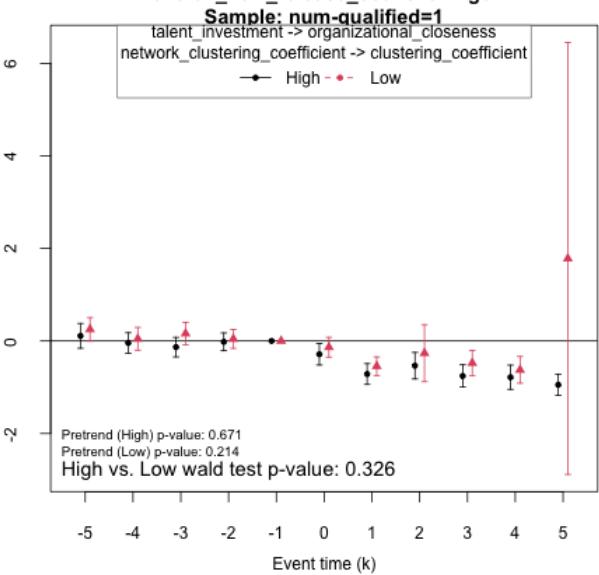
### pull\_request\_opened rolling5



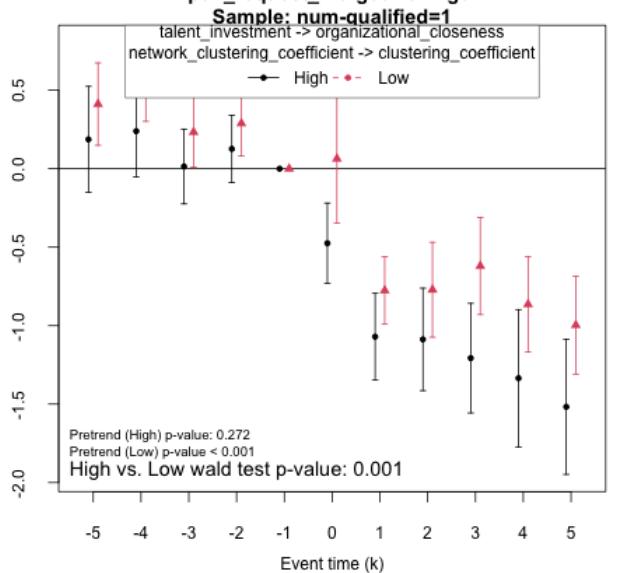
### major\_minor\_release\_count rolling5



### overall\_new\_release\_count rolling5



### pull\_request\_merged rolling5



### pull\_request\_opened rolling5

