MASDS Thesis Data and Methedology

RDD applied to LAUSD

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Data Sources and Variables

Summary

- CALPADS UPC Source File (TK/K–12) 2021-2022
  - https://www.cde.ca.gov/ds/ad/filescupc.asp
  - https://www.cde.ca.gov/fg/aa/lc/lcffoverview.asp
- Chronic Absenteeism Data 2021-2022
  - https://www.cde.ca.gov/ds/ad/filesabd.asp
- Enrollment by School (2020–2022)
  - https://www.cde.ca.gov/ds/ad/fileshistenr8122.asp
- Free or Reduced-Price Meal (Student Poverty) Data
  - https://www.cde.ca.gov/ds/ad/filessp.asp
- Beyond the Bell Program Data for Before and After School Programs, 2021-2022
  - LAUSD open data catalog
  - https://my.lausd.net/OpenDataCatalog/DocView.aspx?id=3145&dbid=0&repo=OpenDataCatalog&searchid=344a4203-6de0-446f-9b1c-d0f93417830b
- CAASPP Test Scores

```
caaspp_scores_path <- "data/sb_ca2022_all_19_64733_csv_v1.txt"
caaspp <- read_delim(caaspp_scores_path, delim="^")
```

```
## Rows: 276082 Columns: 33
## -- Column specification --------------------------------------------------------
## Delimiter: "^"
## chr (25): School Code, Test Type, Total Tested at Reporting Level, Total Tes...
## dbl  (7): County Code, District Code, Test Year, Student Group ID, Grade, Te...
## lgl  (1): Filler
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

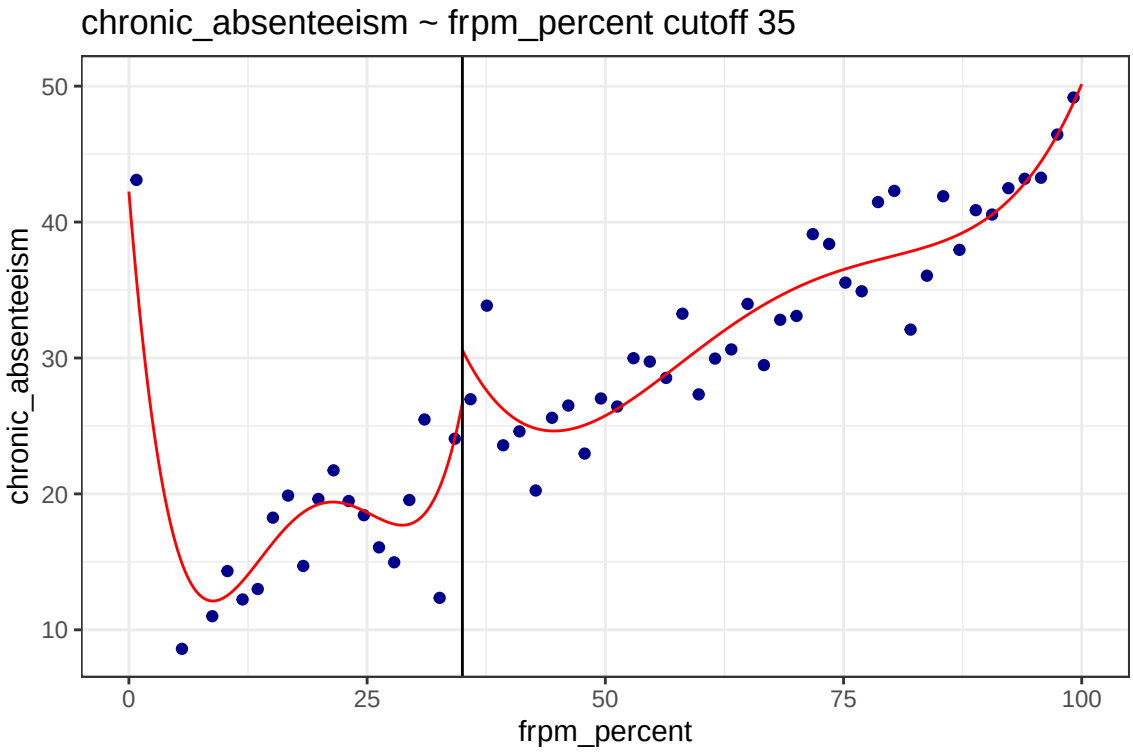
```r
colnames(caaspp) <- c(
  "county_code",
  "district_code",
  "school_code",
  "filler",
  "test_year",
  "student_group_id",
  "test_type",
  "total_tested_reporting_level",
  "total_tested_with_scores",
  "grade",
  "test_id",
  "students_enrolled",
  "students_tested",
  "mean_scale_score",
  "pct_standard_exceeded",
  "pct_standard_met",
  "pct_standard_met_and_above",
  "pct_standard_nearly_met",
  "pct_standard_not_met",
  "students_with_scores",
  "area1_pct_above_standard",
  "area1_pct_near_standard",
  "area1_pct_below_standard",
  "area2_pct_above_standard",
  "area2_pct_near_standard",
  "area2_pct_below_standard",
  "area3_pct_above_standard",
  "area3_pct_near_standard",
  "area3_pct_below_standard",
  "area4_pct_above_standard",
  "area4_pct_near_standard",
  "area4_pct_below_standard",
  "type_id"
)

lausd_caaspp <- caaspp %>%
    filter(district_code=="64733") %>%
    inner_join(frpm_lausd, by="school_code") %>%
  filter(student_group_id == 1) %>%  # All Students only
  mutate(
    test_subject = case_when(
      test_id == 1 ~ "ELA",
      test_id == 2 ~ "Math",
      TRUE ~ NA_character_
    )
  ) %>%
  filter(!is.na(test_subject))  # Keep only ELA and Math

# 2. Convert test scores to numeric (some may be "*")
lausd_caaspp_numeric <- lausd_caaspp %>%
  mutate(across(
    c(mean_scale_score,
```

```
      pct_standard_met_and_above,
      pct_standard_not_met),
    ~ as.numeric(na_if(., "*"))
  ))

# 3. Aggregate to school-subject-year level
school_scores <- lausd_caaspp_numeric %>%
  group_by(school_code, test_year, test_subject) %>%
  summarise(
    avg_pct_met_above = mean(pct_standard_met_and_above, na.rm = TRUE),
    avg_pct_not_met   = mean(pct_standard_not_met, na.rm = TRUE),
    avg_scale_score   = mean(mean_scale_score, na.rm = TRUE),
    .groups = "drop"
  ) %>%
  pivot_wider(
    names_from = test_subject,
    values_from = c(avg_pct_met_above, avg_pct_not_met, avg_scale_score),
    names_glue = "{.value}_{test_subject}"
  )


glimpse(school_scores)
```

```
## Rows: 969
## Columns: 8
## $ school_code            <chr> "0100289", "0100669", "0100677", "0100743", "01~
## $ test_year              <dbl> 2022, 2022, 2022, 2022, 2022, 2022, 2022, 2022,~
## $ avg_pct_met_above_ELA  <dbl> 30.34750, 39.63600, 72.60000, 49.55400, 26.1700~
## $ avg_pct_met_above_Math <dbl> 27.67750, 15.47800, 39.73000, 36.60600, 12.0400~
## $ avg_pct_not_met_ELA    <dbl> 45.33750, 35.01400, 6.85000, 23.88200, 52.34000~
## $ avg_pct_not_met_Math   <dbl> 38.07750, 55.85600, 28.77000, 36.05200, 66.6700~
## $ avg_scale_score_ELA    <dbl> 2425.200, 2505.125, 2647.100, 2477.125, 2502.00~
## $ avg_scale_score_Math   <dbl> 2436.367, 2469.575, 2610.600, 2463.050, 2493.00~
```

- Final Data Set is merged on school code

All RDD Plots



##

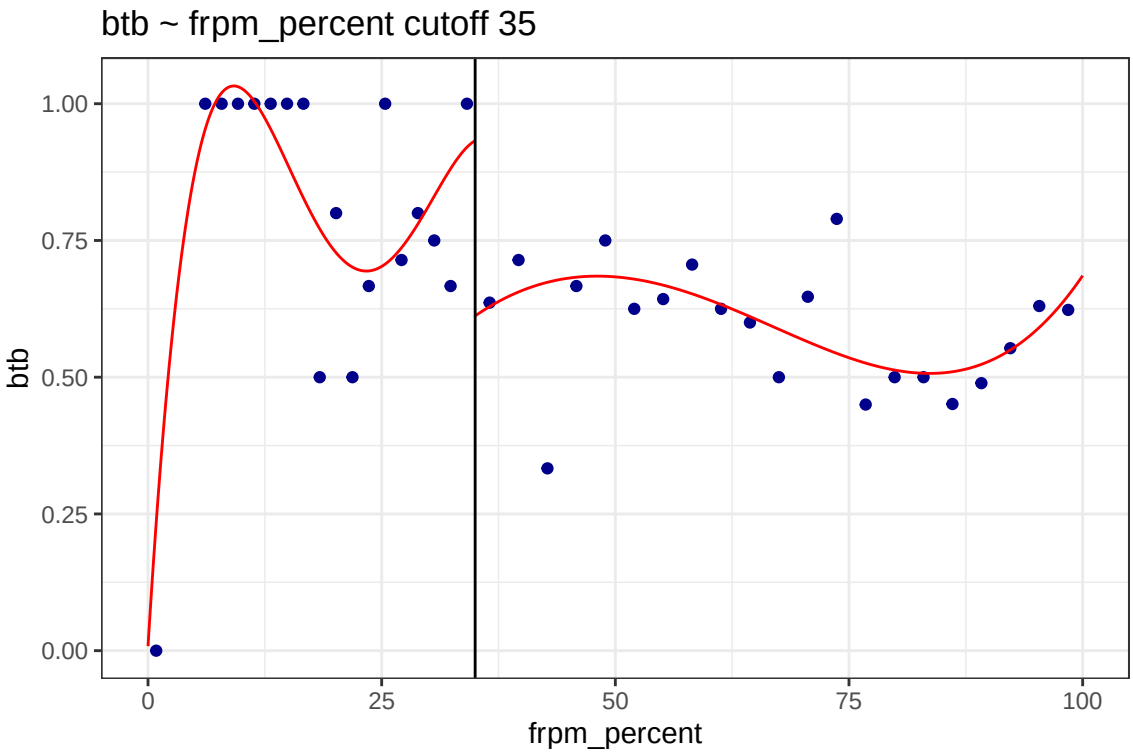
chronic_absenteeism ~ frpm_percent @ 35

Estimate (tau): 6.478
SE: 4.216
95% CI: [-1.784, 14.741]
p-value: 0.124

Call: rdplot

Number of Obs. 1001 Kernel Uniform

Number of Obs. 68 933 Eff. Number of Obs. 68 933 Order poly. fit (p) 4 4 BW poly. fit (h) 35.000 65.000 Number of bins scale 1.000 1.000



btb

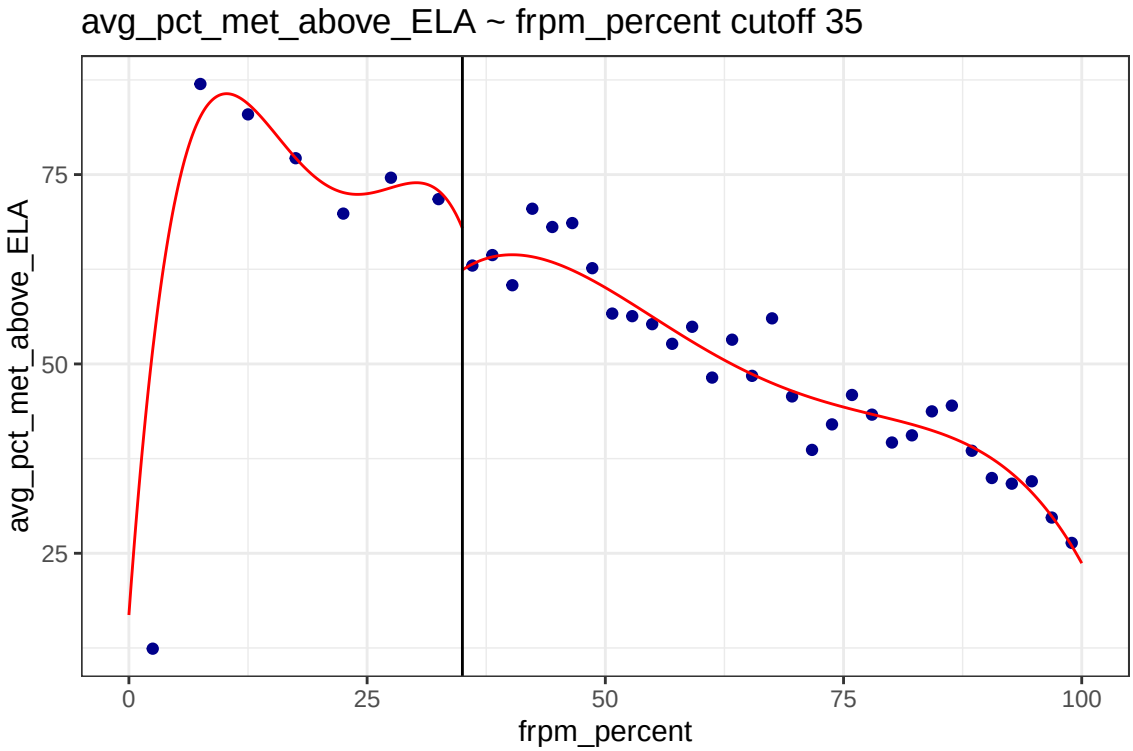
~ frpm_percent @ 35

Estimate (tau): -0.127
SE: 0.162
95% CI: [-0.445, 0.190]
p-value: 0.432

Call: rdplot

Number of Obs. 1001 Kernel Uniform

Number of Obs. 68 933 Eff. Number of Obs. 68 933 Order poly. fit (p) 4 4 BW poly. fit (h) 35.000 65.000 Number of bins scale 1.000 1.000



##

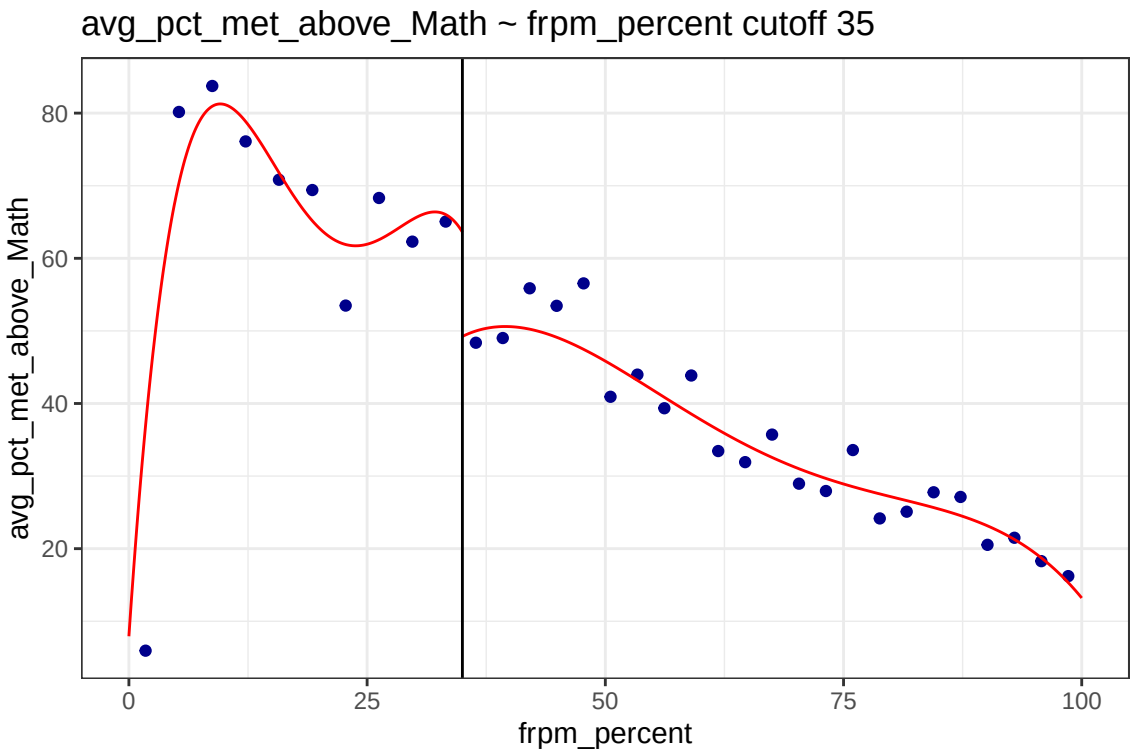
avg_pct_met_above_ELA ~ frpm_percent @ 35

Estimate (tau): -9.420
SE: 6.423
95% CI: [-22.009, 3.170]
p-value: 0.143

Call: rdplot

Number of Obs. 951 Kernel Uniform

Number of Obs. 65 886 Eff. Number of Obs. 65 886 Order poly. fit (p) 4 4 BW poly. fit (h) 35.000 65.000 Number of bins scale 1.000 1.000



##

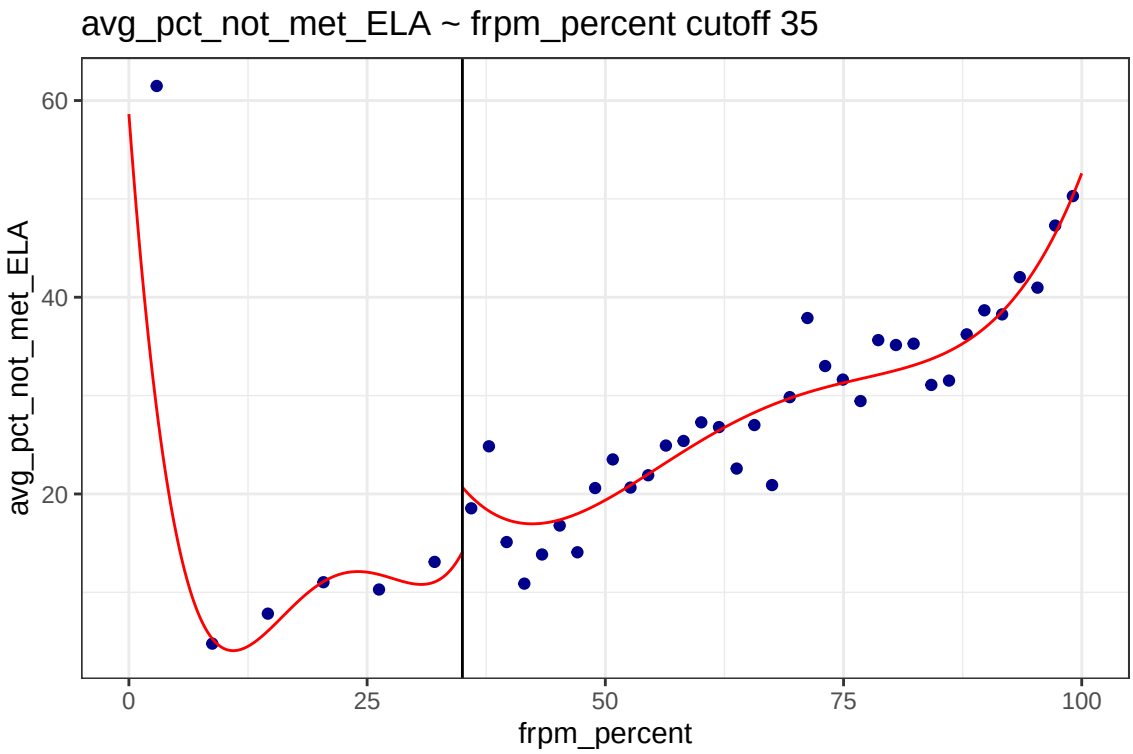
avg_pct_met_above_Math ~ frpm_percent @ 35

Estimate (tau): -17.191
SE: 9.421
95% CI: [-35.655, 1.274]
p-value: 0.068

Call: rdplot

Number of Obs. 949 Kernel Uniform

Number of Obs. 65 884 Eff. Number of Obs. 65 884 Order poly. fit (p) 4 4 BW poly. fit (h) 35.000 65.000 Number of bins scale 1.000 1.000



##

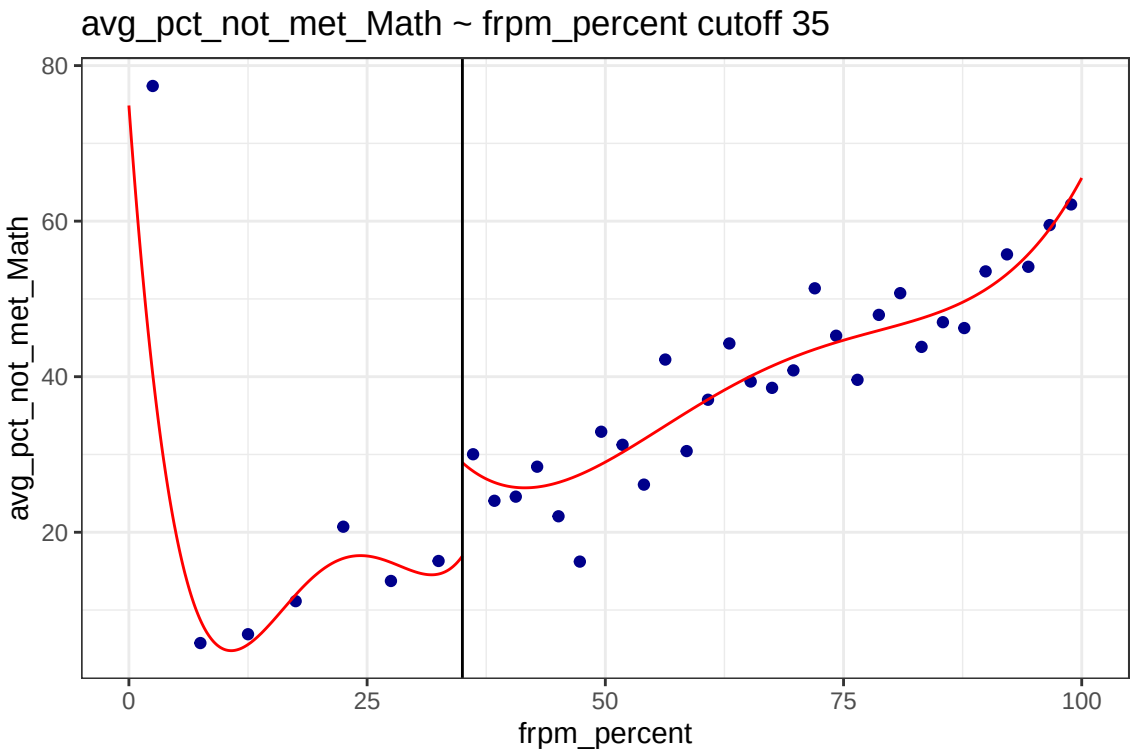
avg_pct_not_met_ELA ~ frpm_percent @ 35

Estimate (tau): 7.928
SE: 4.115
95% CI: [-0.137, 15.993]
p-value: 0.054

Call: rdplot

Number of Obs. 951 Kernel Uniform

Number of Obs. 65 886 Eff. Number of Obs. 65 886 Order poly. fit (p) 4 4 BW poly. fit (h) 35.000 65.000 Number of bins scale 1.000 1.000



##

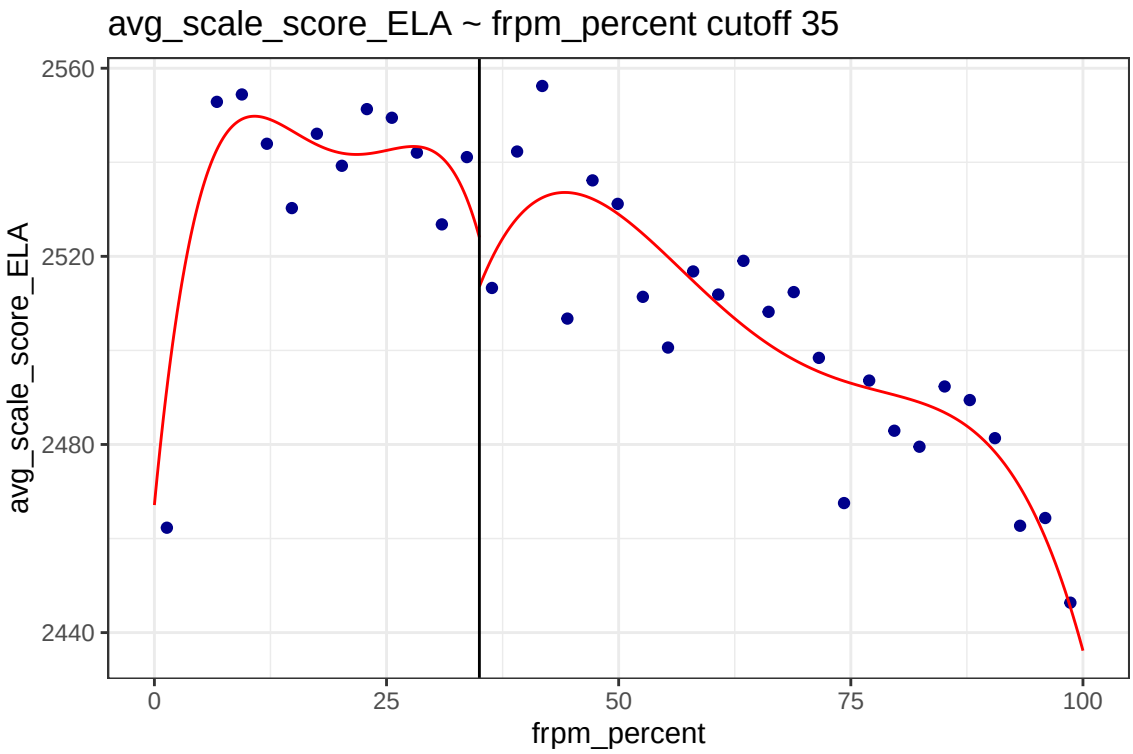
avg_pct_not_met_Math ~ frpm_percent @ 35

Estimate (tau): 14.556
SE: 7.738
95% CI: [-0.609, 29.722]
p-value: 0.060

Call: rdplot

Number of Obs. 949 Kernel Uniform

Number of Obs. 65 884 Eff. Number of Obs. 65 884 Order poly. fit (p) 4 4 BW poly. fit (h) 35.000 65.000 Number of bins scale 1.000 1.000



##

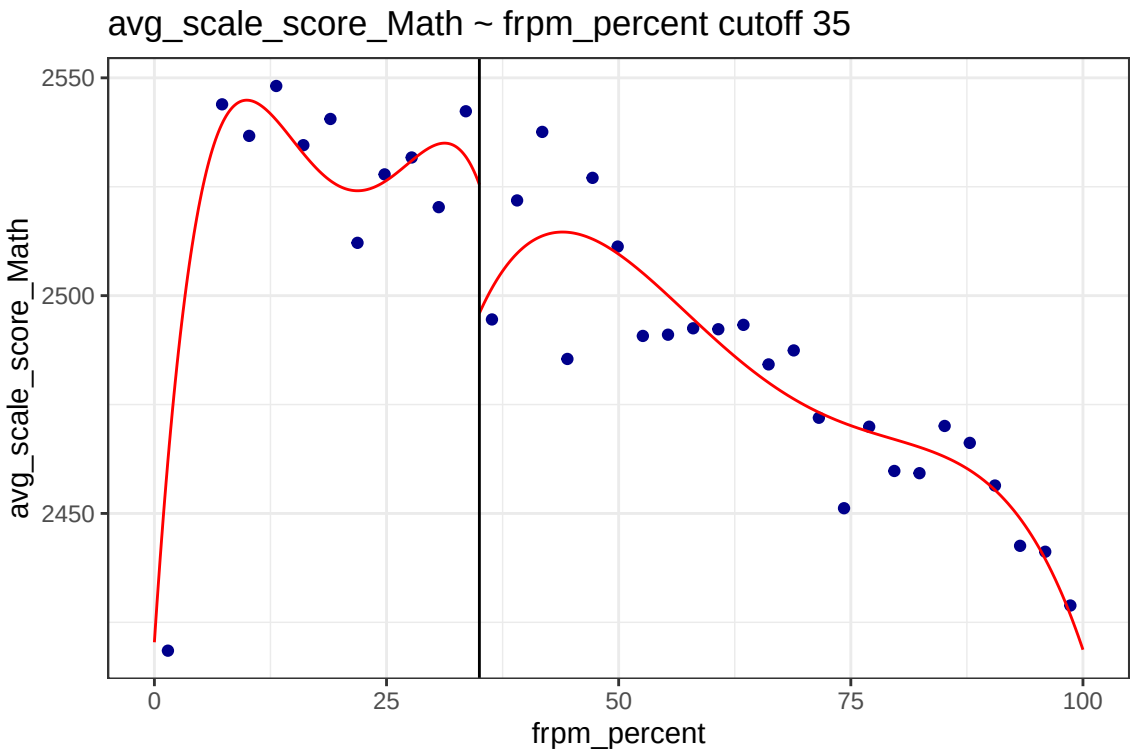
avg_scale_score_ELA ~ frpm_percent @ 35

Estimate (tau): -19.381
SE: 23.225
95% CI: [-64.901, 26.138]
p-value: 0.404

Call: rdplot

Number of Obs. 950 Kernel Uniform

Number of Obs. 65 885 Eff. Number of Obs. 65 885 Order poly. fit (p) 4 4 BW poly. fit (h) 35.000 65.000 Number of bins scale 1.000 1.000



##

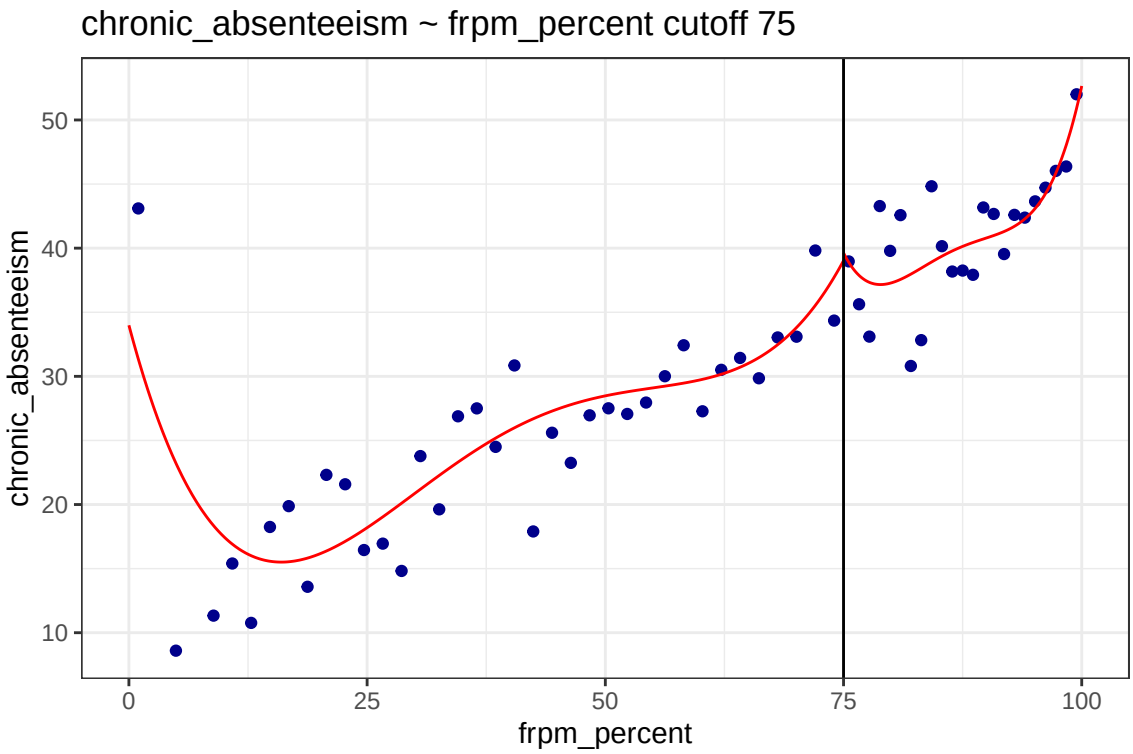
avg_scale_score_Math ~ frpm_percent @ 35

Estimate (tau): -43.856
SE: 27.243
95% CI: [-97.251, 9.540]
p-value: 0.107

Call: rdplot

Number of Obs. 948 Kernel Uniform

Number of Obs. 65 883 Eff. Number of Obs. 65 883 Order poly. fit (p) 4 4 BW poly. fit (h) 35.000 65.000 Number of bins scale 1.000 1.000



##

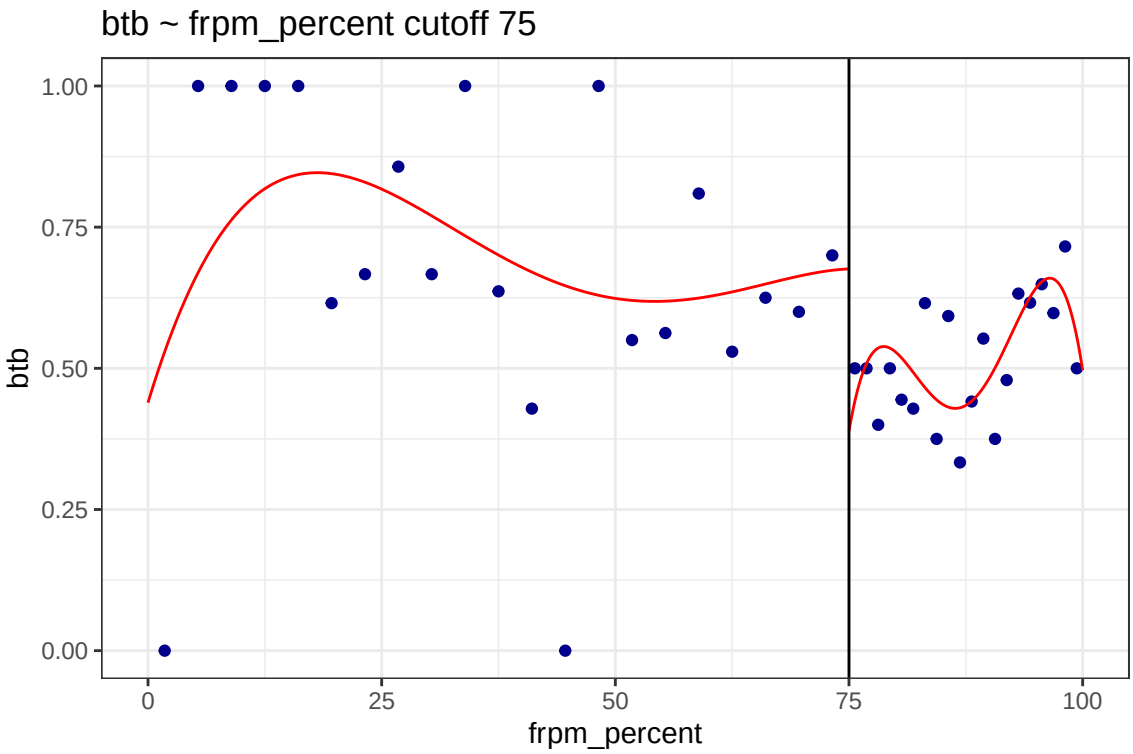
chronic_absenteeism ~ frpm_percent @ 75

Estimate (tau): 1.488
SE: 4.687
95% CI: [-7.698, 10.674]
p-value: 0.751

Call: rdplot

Number of Obs. 1001 Kernel Uniform

Number of Obs. 235 766 Eff. Number of Obs. 235 766 Order poly. fit (p) 4 4 BW poly. fit (h) 75.000 25.000 Number of bins scale 1.000 1.000



btb

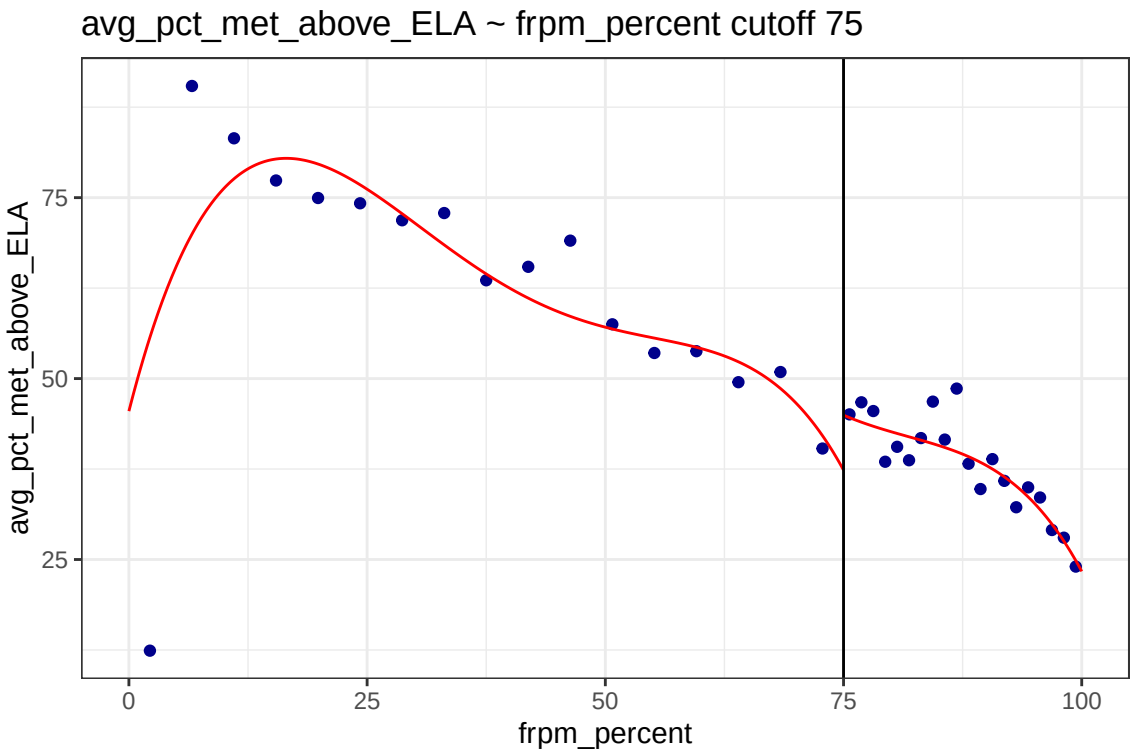
~ frpm_percent @ 75

Estimate (tau): -0.319
SE: 0.173
95% CI: [-0.658, 0.020]
p-value: 0.065

Call: rdplot

Number of Obs. 1001 Kernel Uniform

Number of Obs. 235 766 Eff. Number of Obs. 235 766 Order poly. fit (p) 4 4 BW poly. fit (h) 75.000 25.000 Number of bins scale 1.000 1.000



##

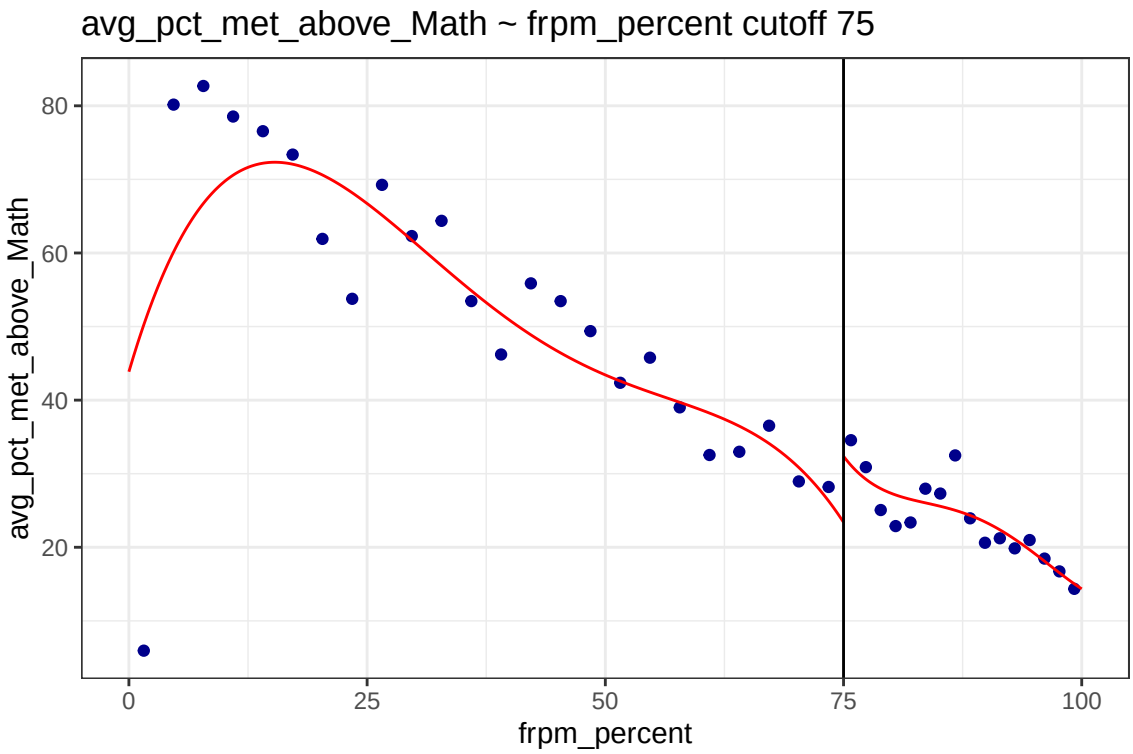
avg_pct_met_above_ELA ~ frpm_percent @ 75

Estimate (tau): 8.530
SE: 4.482
95% CI: [-0.254, 17.315]
p-value: 0.057

Call: rdplot

Number of Obs. 951 Kernel Uniform

Number of Obs. 226 725 Eff. Number of Obs. 226 725 Order poly. fit (p) 4 4 BW poly. fit (h) 75.000 25.000 Number of bins scale 1.000 1.000



##

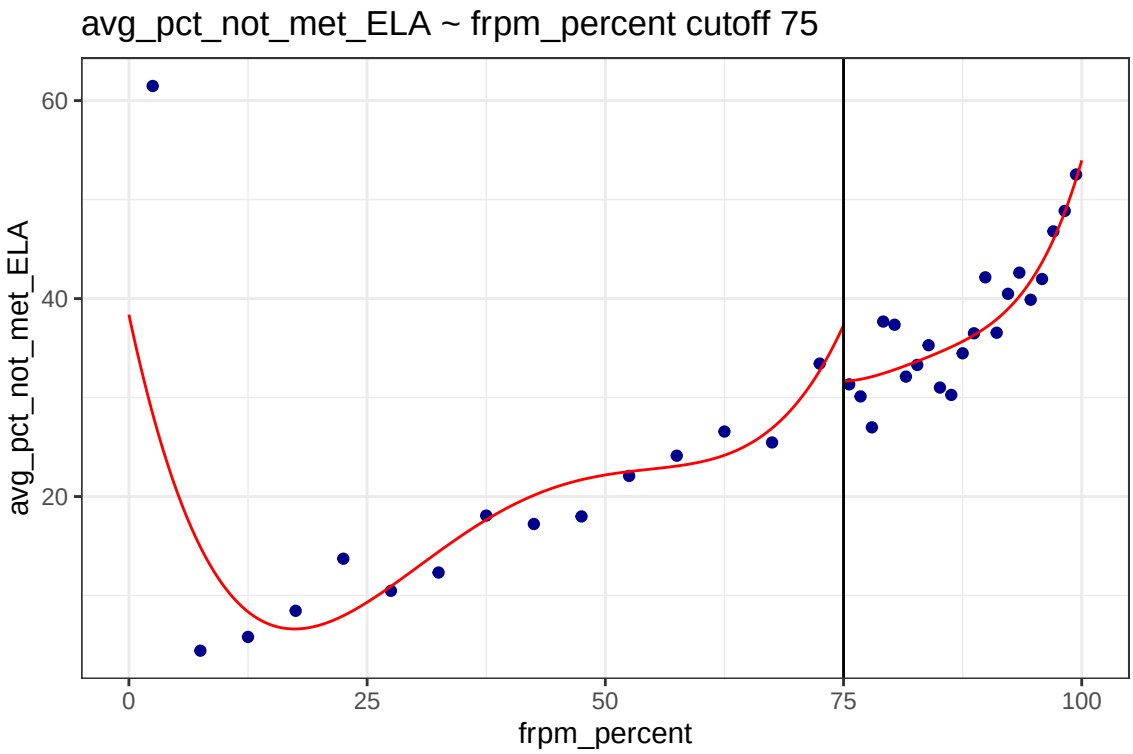
avg_pct_met_above_Math ~ frpm_percent @ 75

Estimate (tau): 6.781
SE: 6.247
95% CI: [-5.462, 19.025]
p-value: 0.278

Call: rdplot

Number of Obs. 949 Kernel Uniform

Number of Obs. 226 723 Eff. Number of Obs. 226 723 Order poly. fit (p) 4 4 BW poly. fit (h) 75.000 25.000 Number of bins scale 1.000 1.000



##

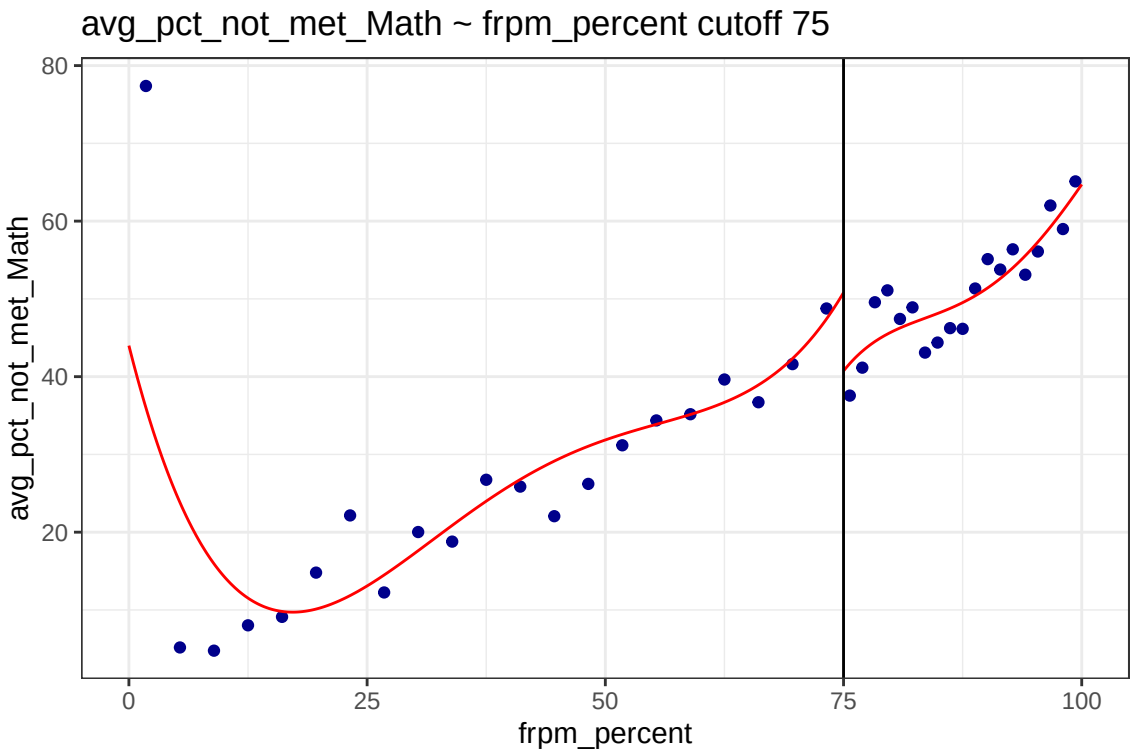
avg_pct_not_met_ELA ~ frpm_percent @ 75

Estimate (tau): -7.452
SE: 3.894
95% CI: [-15.083, 0.179]
p-value: 0.056

Call: rdplot

Number of Obs. 951 Kernel Uniform

Number of Obs. 226 725 Eff. Number of Obs. 226 725 Order poly. fit (p) 4 4 BW poly. fit (h) 75.000 25.000 Number of bins scale 1.000 1.000



##

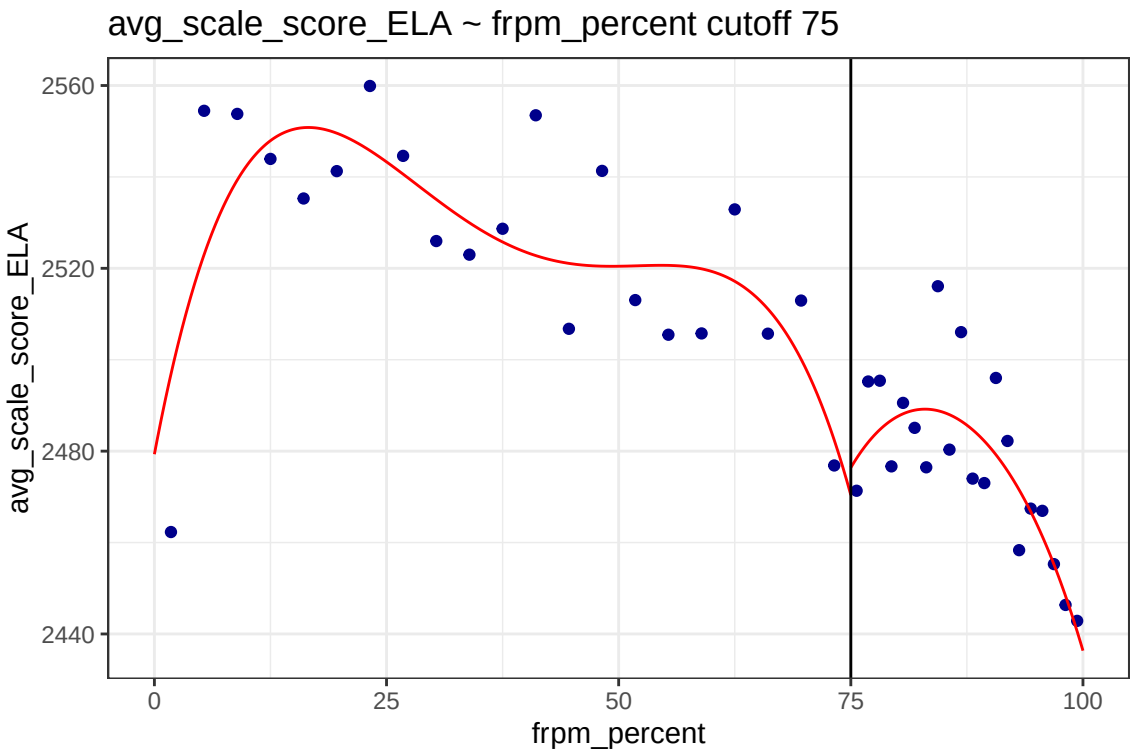
avg_pct_not_met_Math ~ frpm_percent @ 75

Estimate (tau): -8.804
SE: 7.020
95% CI: [-22.562, 4.954]
p-value: 0.210

Call: rdplot

Number of Obs. 949 Kernel Uniform

Number of Obs. 226 723 Eff. Number of Obs. 226 723 Order poly. fit (p) 4 4 BW poly. fit (h) 75.000 25.000 Number of bins scale 1.000 1.000



##

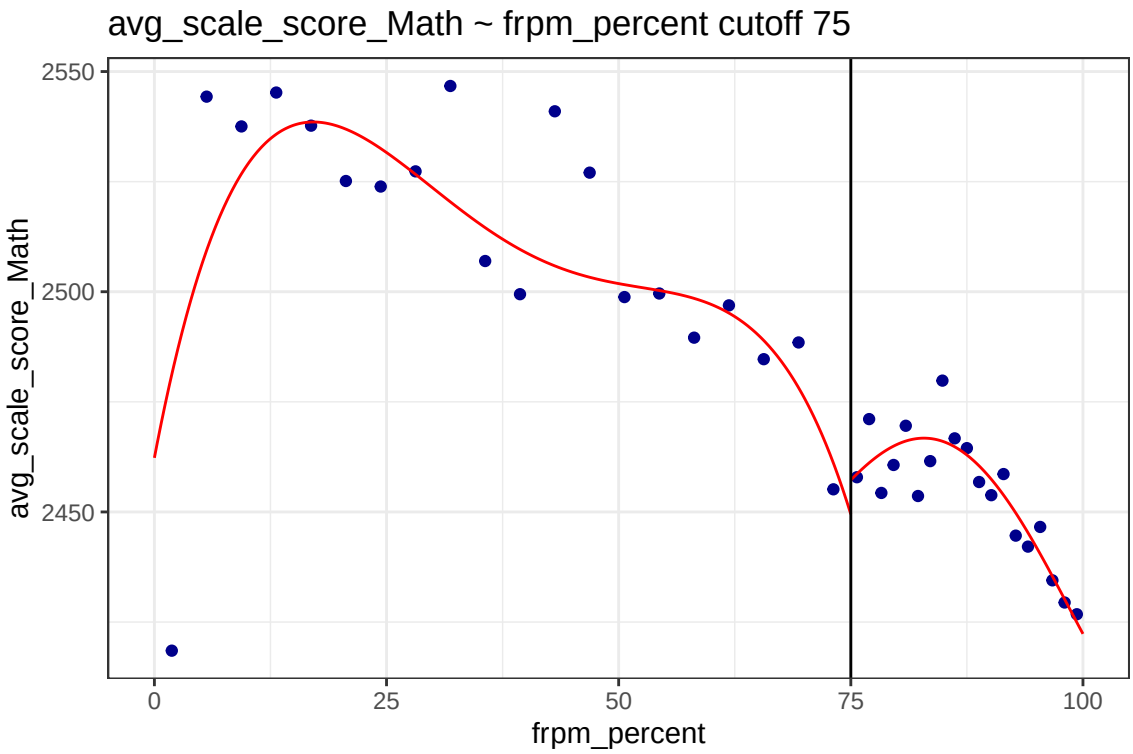
avg_scale_score_ELA ~ frpm_percent @ 75

Estimate (tau): 25.373
SE: 16.088
95% CI: [-6.159, 56.904]
p-value: 0.115

Call: rdplot

Number of Obs. 950 Kernel Uniform

Number of Obs. 226 724 Eff. Number of Obs. 226 724 Order poly. fit (p) 4 4 BW poly. fit (h) 75.000 25.000 Number of bins scale 1.000 1.000



##

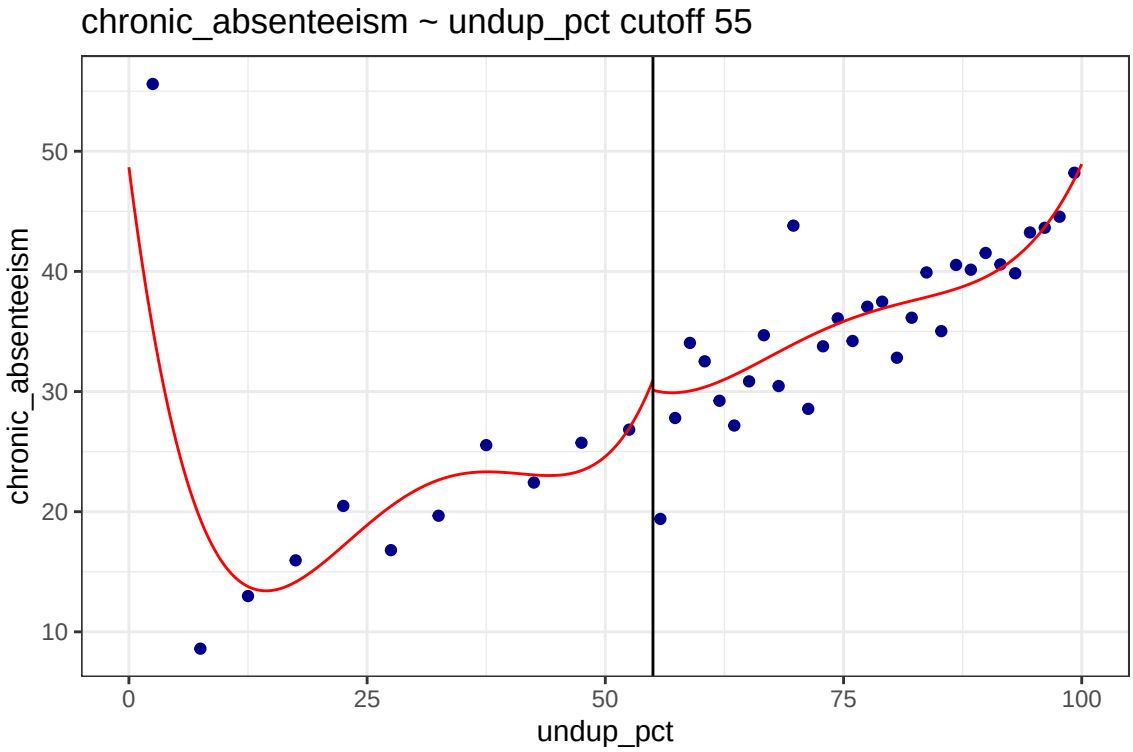
avg_scale_score_Math ~ frpm_percent @ 75

Estimate (tau): 19.637
SE: 11.306
95% CI: [-2.523, 41.797]
p-value: 0.082

Call: rdplot

Number of Obs. 948 Kernel Uniform

Number of Obs. 226 722 Eff. Number of Obs. 226 722 Order poly. fit (p) 4 4 BW poly. fit (h) 75.000 25.000 Number of bins scale 1.000 1.000



##

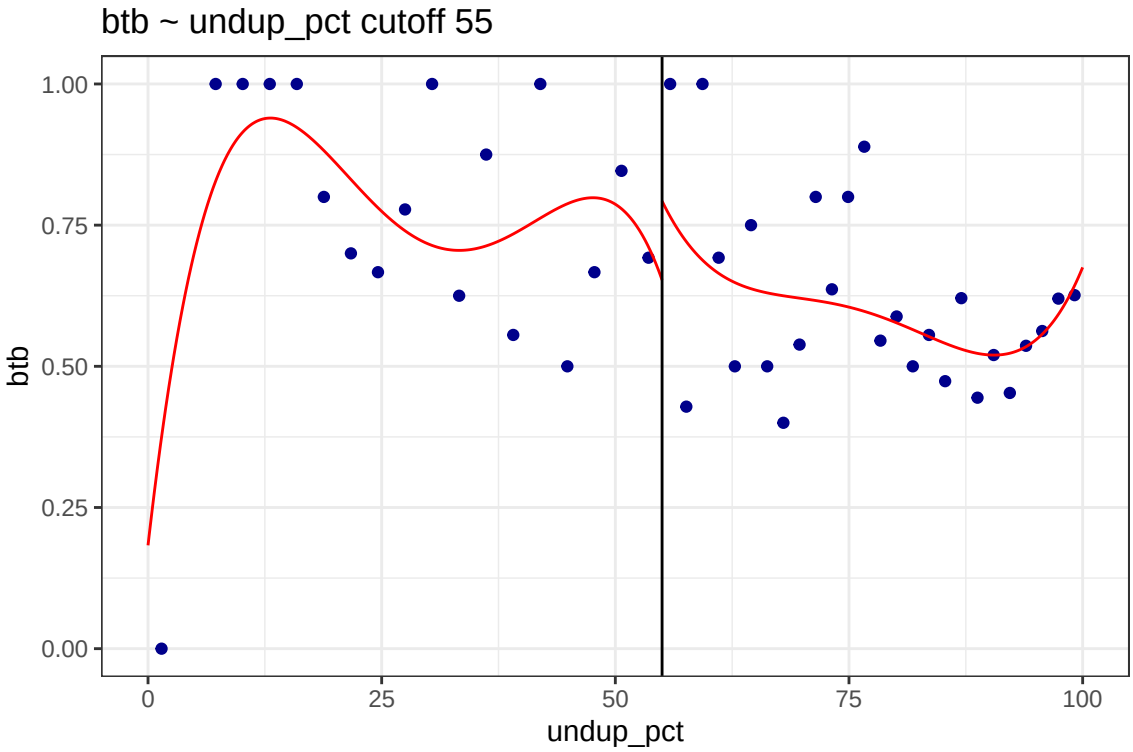
chronic_absenteeism ~ undup_pct @ 55

Estimate (tau): -0.188
SE: 3.485
95% CI: [-7.019, 6.643]
p-value: 0.957

Call: rdplot

Number of Obs. 1001 Kernel Uniform

Number of Obs. 114 887 Eff. Number of Obs. 114 887 Order poly. fit (p) 4 4 BW poly. fit (h) 55.000 45.000 Number of bins scale 1.000 1.000



btb

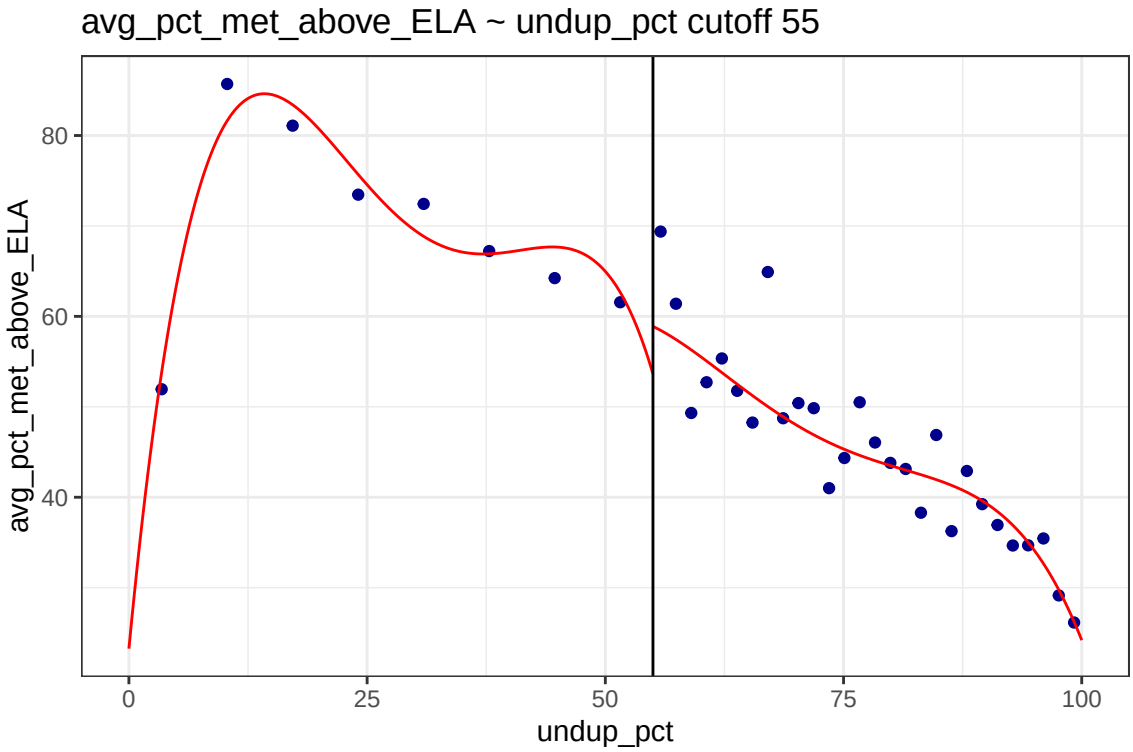
~ undup_pct @ 55

Estimate (tau): 0.110
SE: 0.224
95% CI: [-0.330, 0.550]
p-value: 0.623

Call: rdplot

Number of Obs. 1001 Kernel Uniform

Number of Obs. 114 887 Eff. Number of Obs. 114 887 Order poly. fit (p) 4 4 BW poly. fit (h) 55.000 45.000 Number of bins scale 1.000 1.000



##

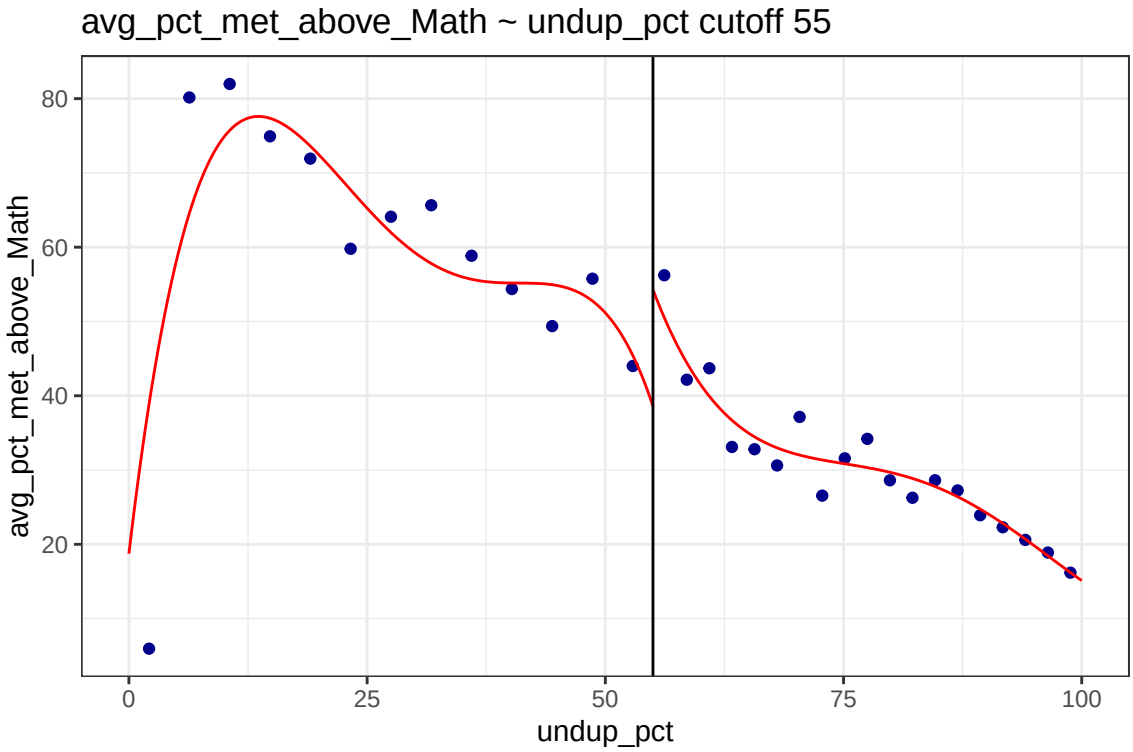
avg_pct_met_above_ELA ~ undup_pct @ 55

Estimate (tau): 8.486
SE: 3.543
95% CI: [1.542, 15.429]
p-value: 0.017

Call: rdplot

Number of Obs. 951 Kernel Uniform

Number of Obs. 111 840 Eff. Number of Obs. 111 840 Order poly. fit (p) 4 4 BW poly. fit (h) 55.000 45.000 Number of bins scale 1.000 1.000



##

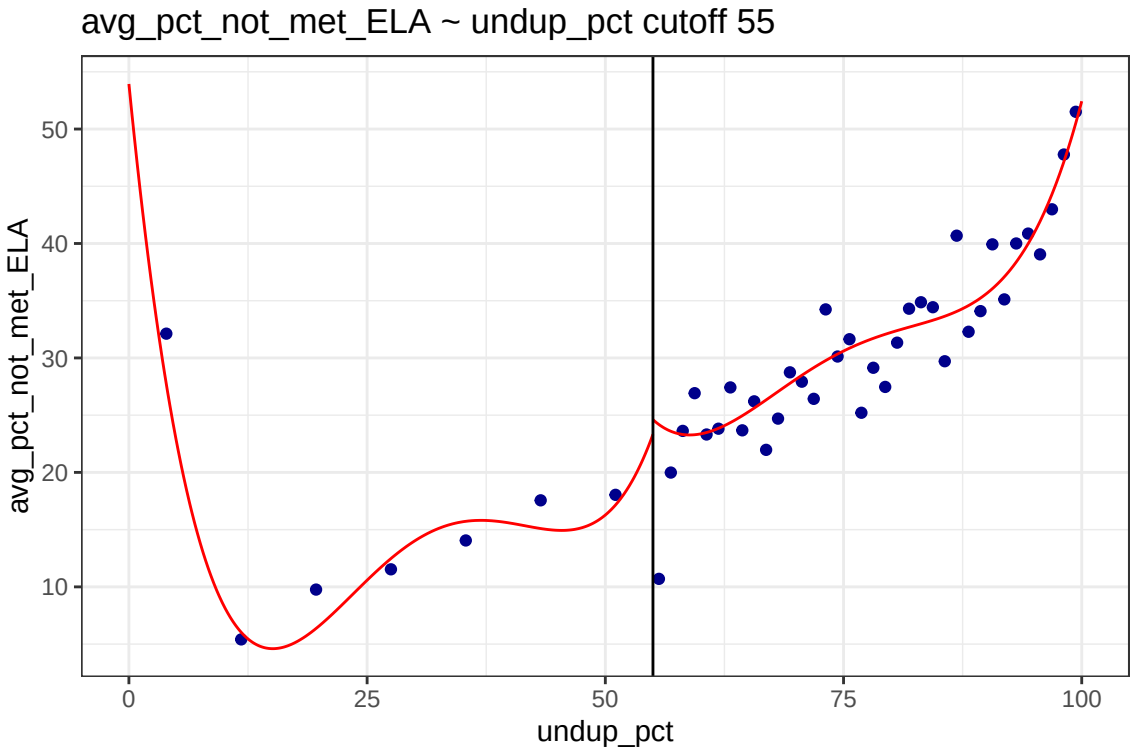
avg_pct_met_above_Math ~ undup_pct @ 55

Estimate (tau): 7.368
SE: 6.005
95% CI: [-4.402, 19.137]
p-value: 0.220

Call: rdplot

Number of Obs. 949 Kernel Uniform

Number of Obs. 111 838 Eff. Number of Obs. 111 838 Order poly. fit (p) 4 4 BW poly. fit (h) 55.000 45.000 Number of bins scale 1.000 1.000



##

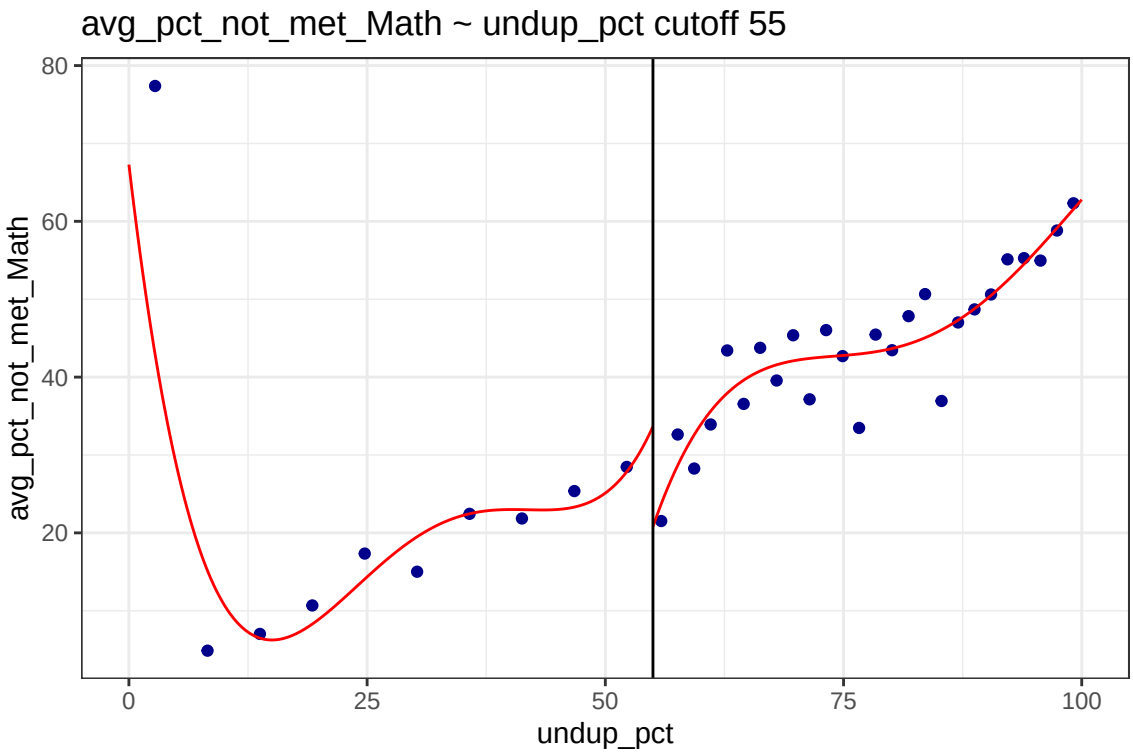
avg_pct_not_met_ELA ~ undup_pct @ 55

Estimate (tau): -0.657
SE: 2.825
95% CI: [-6.194, 4.880]
p-value: 0.816

Call: rdplot

Number of Obs. 951 Kernel Uniform

Number of Obs. 111 840 Eff. Number of Obs. 111 840 Order poly. fit (p) 4 4 BW poly. fit (h) 55.000 45.000 Number of bins scale 1.000 1.000



##

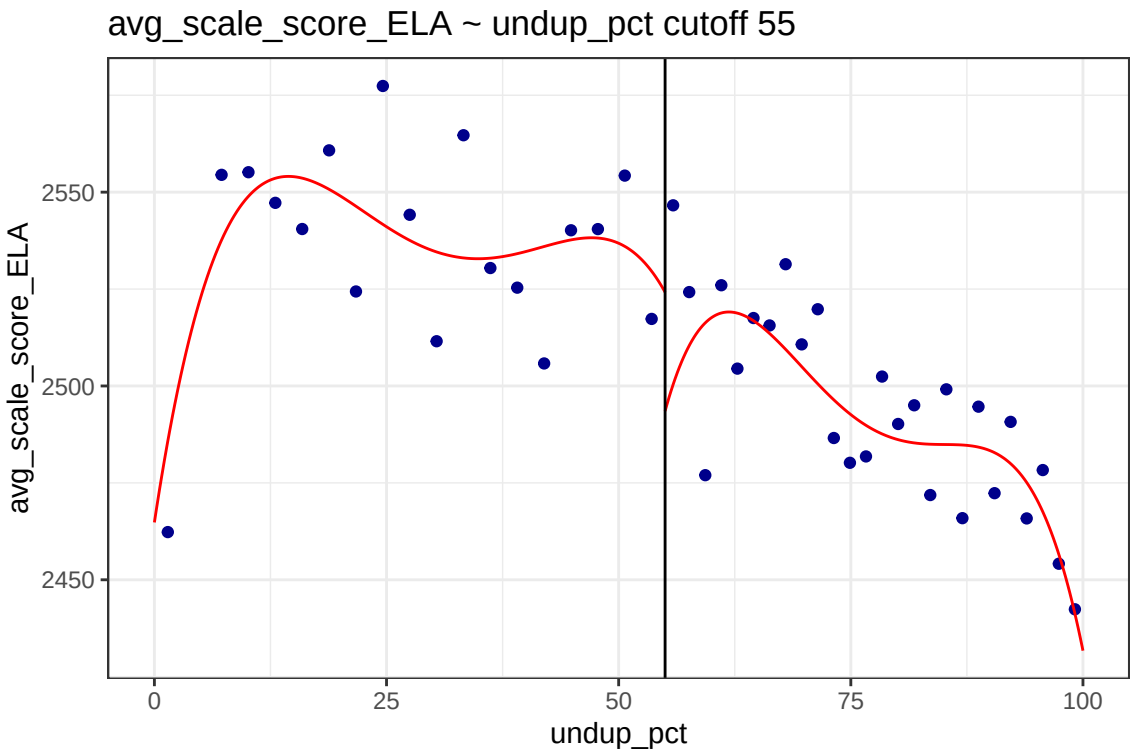
avg_pct_not_met_Math ~ undup_pct @ 55

Estimate (tau): -5.347
SE: 4.977
95% CI: [-15.102, 4.407]
p-value: 0.283

Call: rdplot

Number of Obs. 949 Kernel Uniform

Number of Obs. 111 838 Eff. Number of Obs. 111 838 Order poly. fit (p) 4 4 BW poly. fit (h) 55.000 45.000 Number of bins scale 1.000 1.000



##

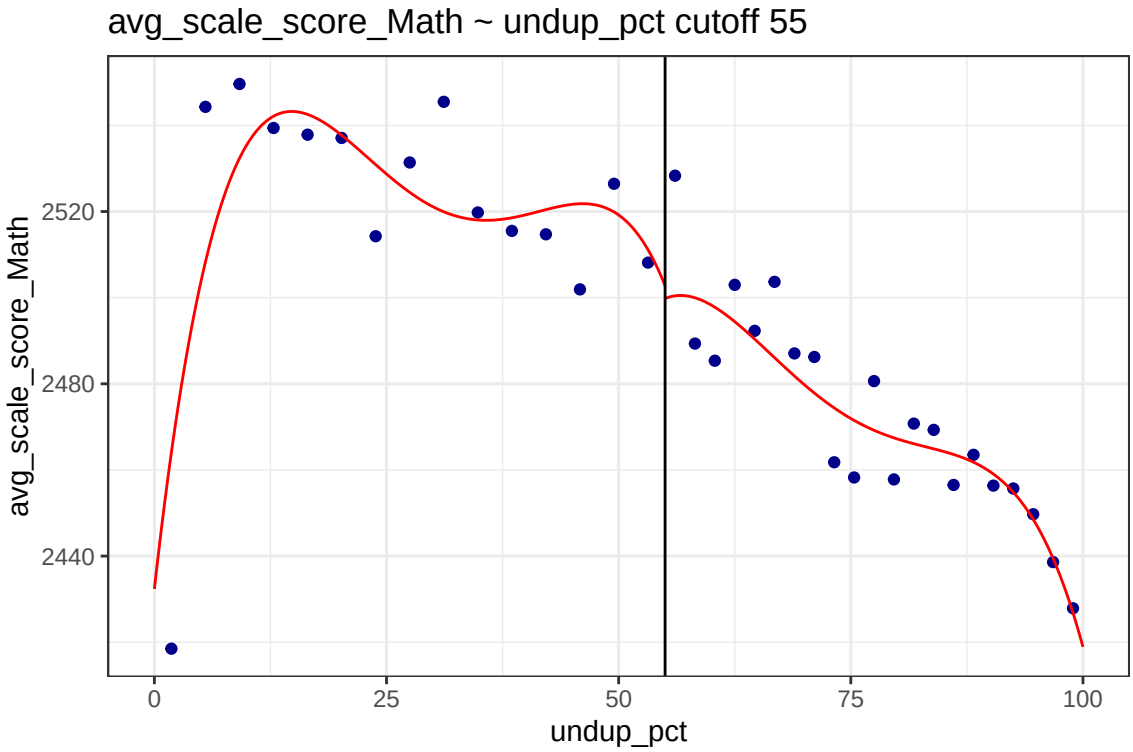
avg_scale_score_ELA ~ undup_pct @ 55

Estimate (tau): 7.918
SE: 29.685
95% CI: [-50.263, 66.100]
p-value: 0.790

Call: rdplot

Number of Obs. 950 Kernel Uniform

Number of Obs. 111 839 Eff. Number of Obs. 111 839 Order poly. fit (p) 4 4 BW poly. fit (h) 55.000 45.000 Number of bins scale 1.000 1.000



##

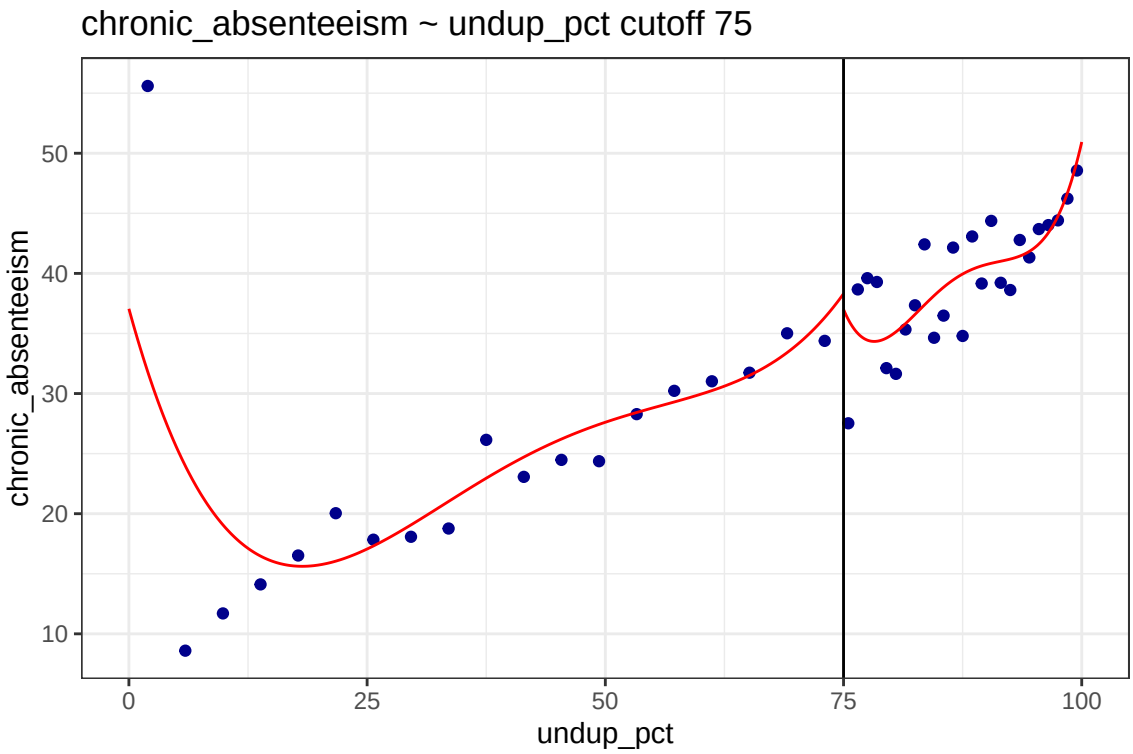
avg_scale_score_Math ~ undup_pct @ 55

Estimate (tau): 8.085
SE: 19.270
95% CI: [-29.683, 45.853]
p-value: 0.675

Call: rdplot

Number of Obs. 948 Kernel Uniform

Number of Obs. 111 837 Eff. Number of Obs. 111 837 Order poly. fit (p) 4 4 BW poly. fit (h) 55.000 45.000 Number of bins scale 1.000 1.000



##

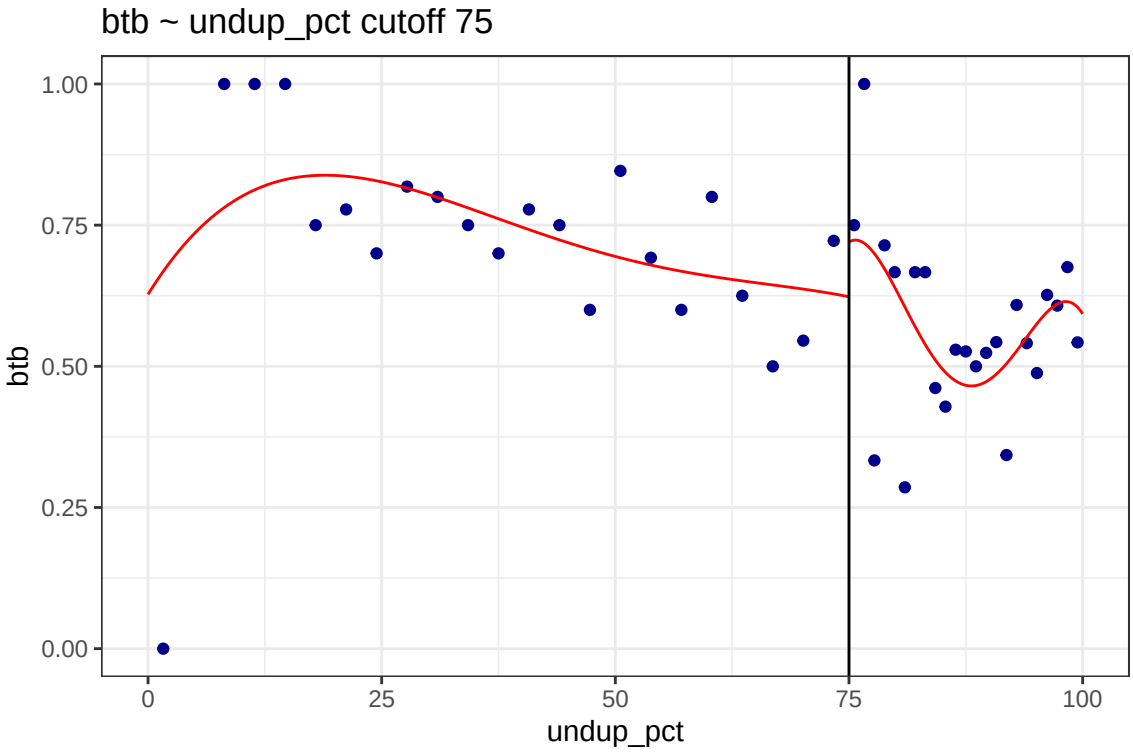
chronic_absenteeism ~ undup_pct @ 75

Estimate (tau): -1.684
SE: 4.928
95% CI: [-11.342, 7.974]
p-value: 0.733

Call: rdplot

Number of Obs. 1001 Kernel Uniform

Number of Obs. 214 787 Eff. Number of Obs. 214 787 Order poly. fit (p) 4 4 BW poly. fit (h) 75.000 25.000 Number of bins scale 1.000 1.000



btb

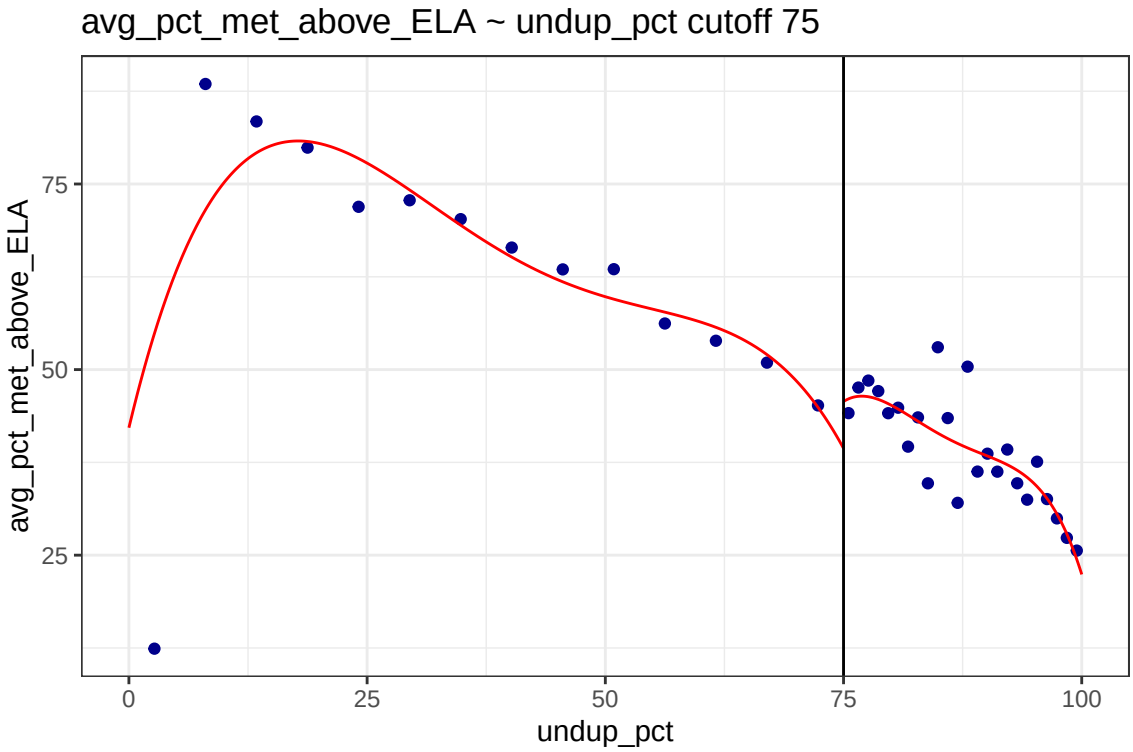
~ undup_pct @ 75

Estimate (tau): -0.007
SE: 0.174
95% CI: [-0.348, 0.334]
p-value: 0.970

Call: rdplot

Number of Obs. 1001 Kernel Uniform

Number of Obs. 214 787 Eff. Number of Obs. 214 787 Order poly. fit (p) 4 4 BW poly. fit (h) 75.000 25.000 Number of bins scale 1.000 1.000



##

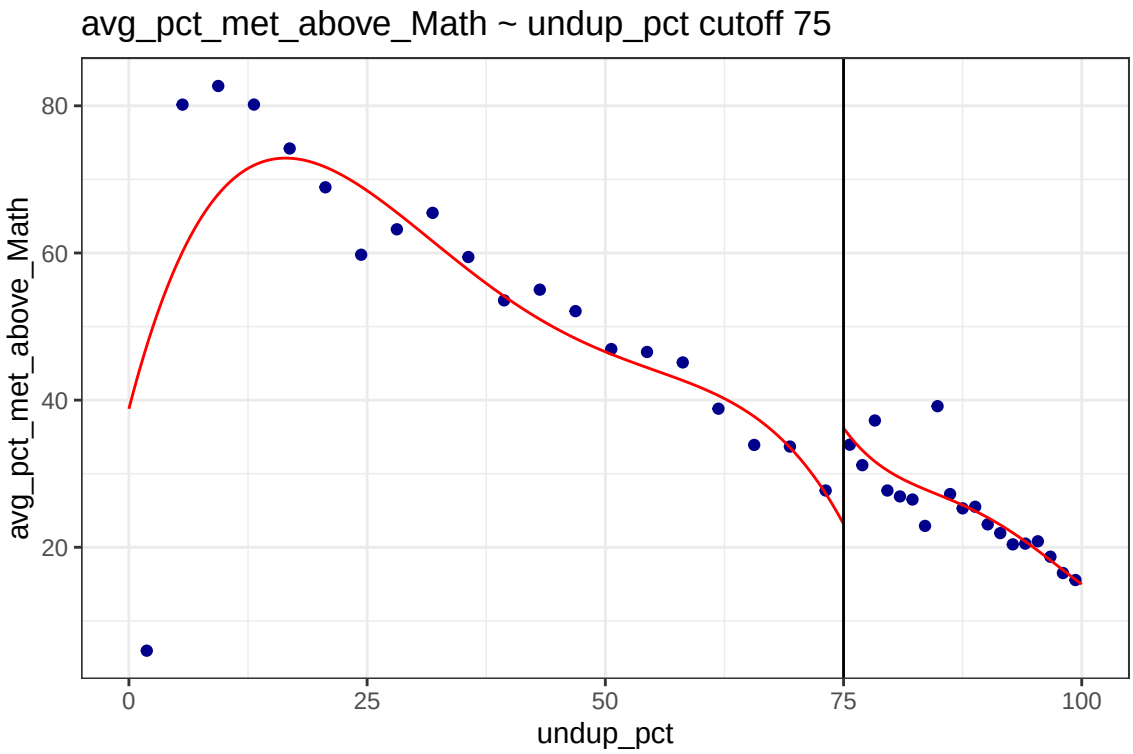
avg_pct_met_above_ELA ~ undup_pct @ 75

Estimate (tau): 6.400
SE: 3.953
95% CI: [-1.348, 14.148]
p-value: 0.105

Call: rdplot

Number of Obs. 951 Kernel Uniform

Number of Obs. 205 746 Eff. Number of Obs. 205 746 Order poly. fit (p) 4 4 BW poly. fit (h) 75.000 25.000 Number of bins scale 1.000 1.000



##

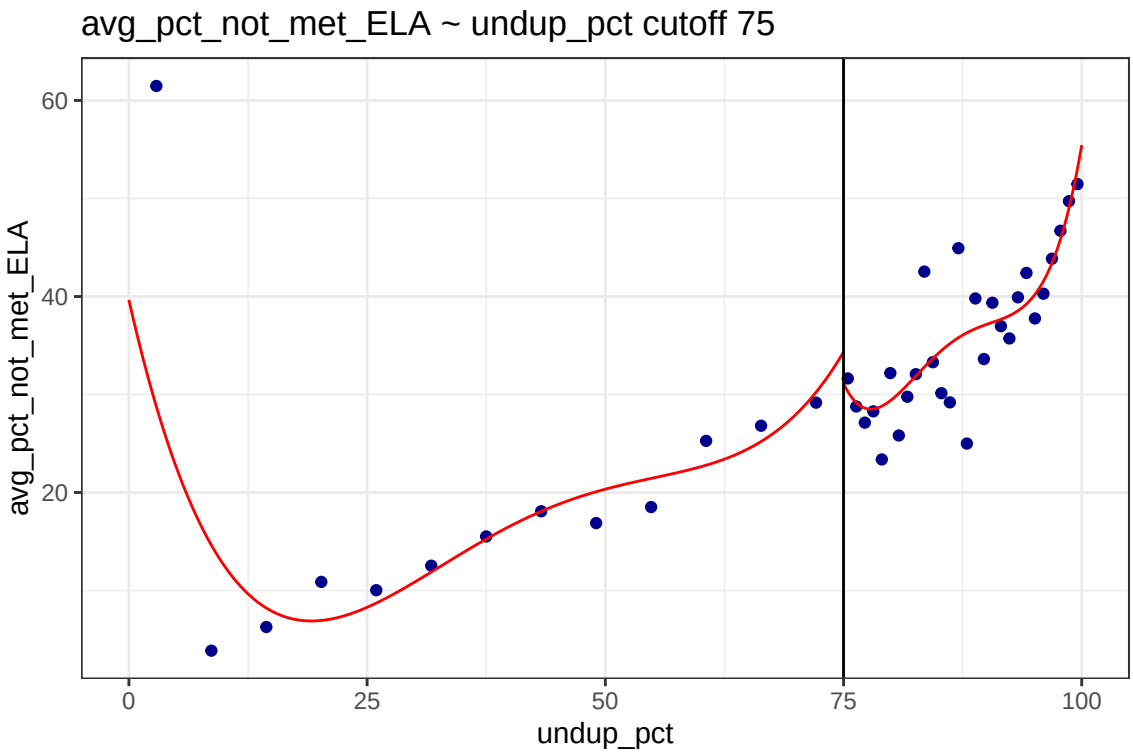
avg_pct_met_above_Math ~ undup_pct @ 75

Estimate (tau): 9.840
SE: 5.053
95% CI: [-0.063, 19.744]
p-value: 0.051

Call: rdplot

Number of Obs. 949 Kernel Uniform

Number of Obs. 205 744 Eff. Number of Obs. 205 744 Order poly. fit (p) 4 4 BW poly. fit (h) 75.000 25.000 Number of bins scale 1.000 1.000



##

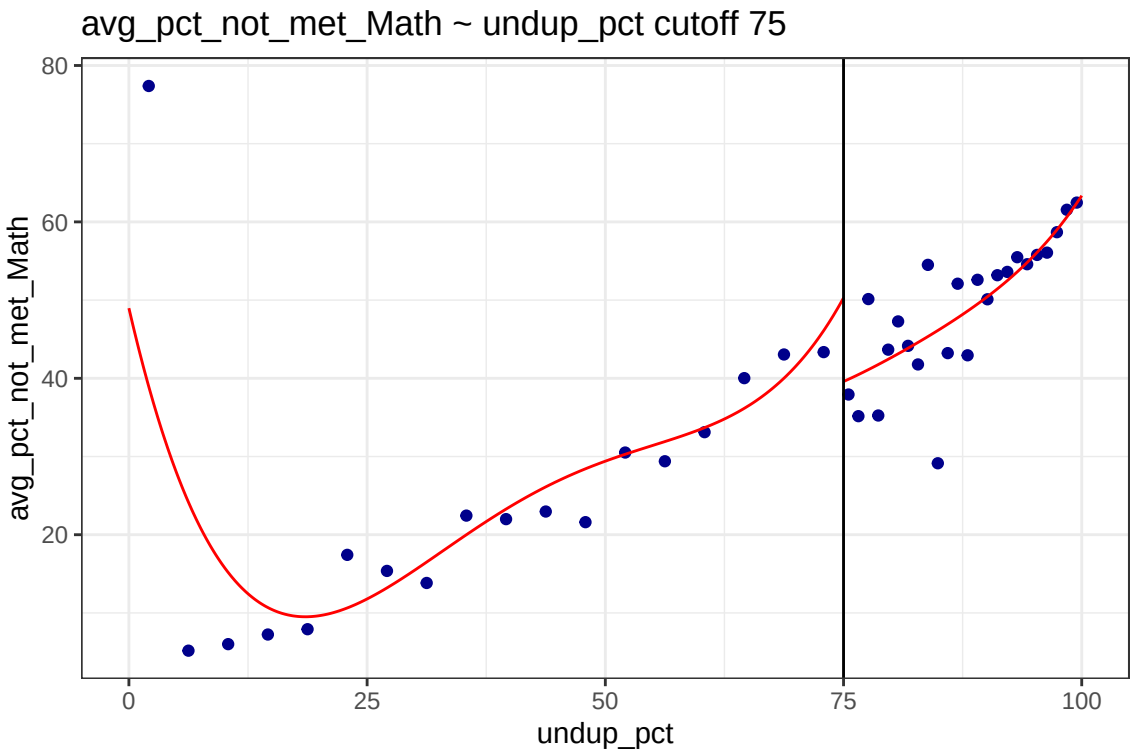
avg_pct_not_met_ELA ~ undup_pct @ 75

Estimate (tau): -2.805
SE: 3.709
95% CI: [-10.075, 4.466]
p-value: 0.450

Call: rdplot

Number of Obs. 951 Kernel Uniform

Number of Obs. 205 746 Eff. Number of Obs. 205 746 Order poly. fit (p) 4 4 BW poly. fit (h) 75.000 25.000 Number of bins scale 1.000 1.000



##

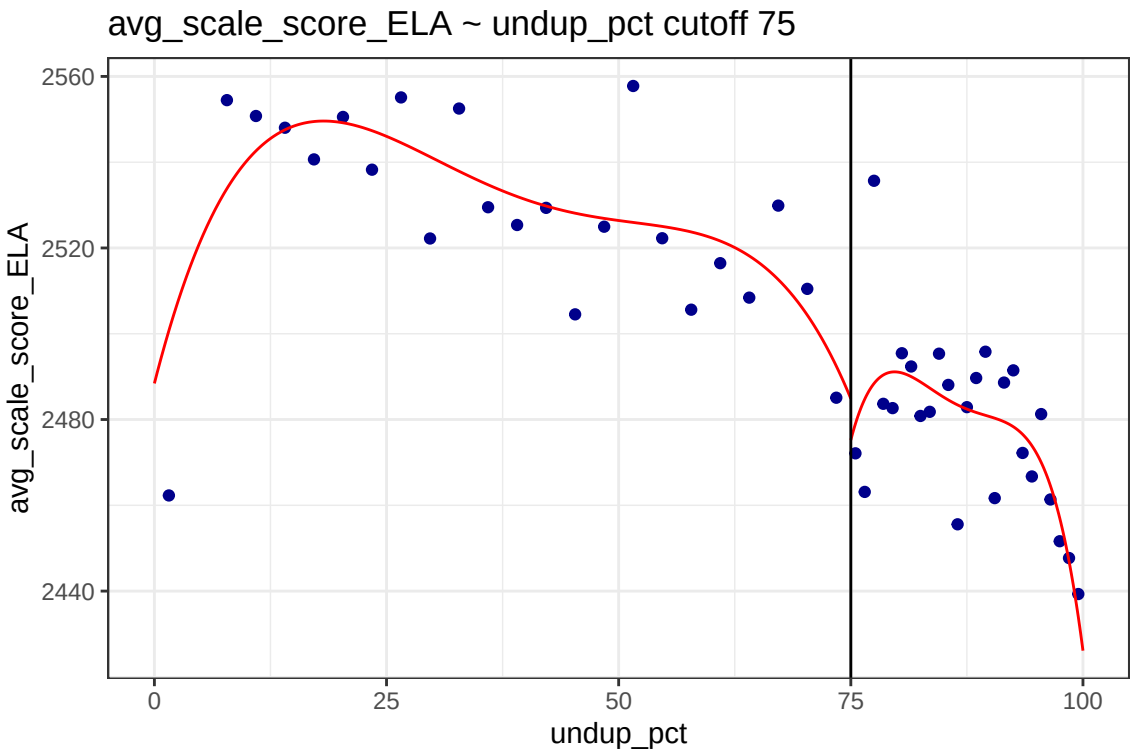
avg_pct_not_met_Math ~ undup_pct @ 75

Estimate (tau): -7.134
SE: 5.851
95% CI: [-18.603, 4.334]
p-value: 0.223

Call: rdplot

Number of Obs. 949 Kernel Uniform

Number of Obs. 205 744 Eff. Number of Obs. 205 744 Order poly. fit (p) 4 4 BW poly. fit (h) 75.000 25.000 Number of bins scale 1.000 1.000



##

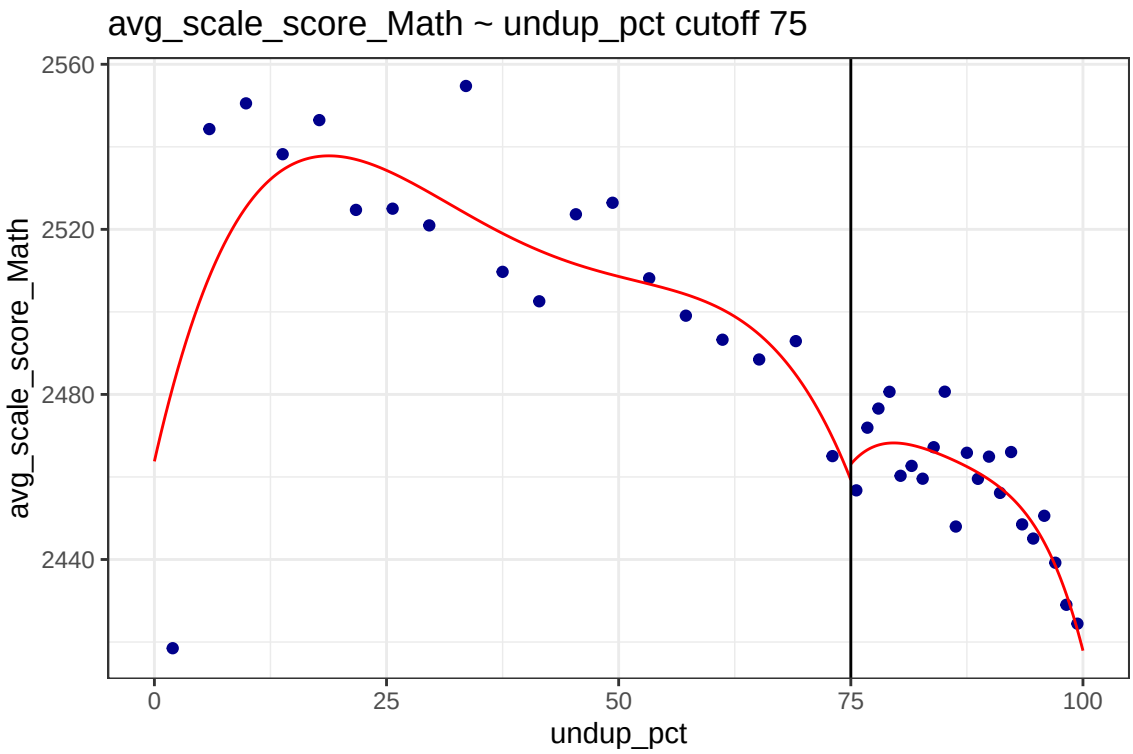
avg_scale_score_ELA ~ undup_pct @ 75

Estimate (tau): 1.452
SE: 20.822
95% CI: [-39.359, 42.263]
p-value: 0.944

Call: rdplot

Number of Obs. 950 Kernel Uniform

Number of Obs. 205 745 Eff. Number of Obs. 205 745 Order poly. fit (p) 4 4 BW poly. fit (h) 75.000 25.000 Number of bins scale 1.000 1.000



##

avg_scale_score_Math ~ undup_pct @ 75

Estimate (tau): 7.400
SE: 12.853
95% CI: [-17.791, 32.591]
p-value: 0.565

Call: rdplot

Number of Obs. 948 Kernel Uniform

Number of Obs. 205 743 Eff. Number of Obs. 205 743 Order poly. fit (p) 4 4 BW poly. fit (h) 75.000 25.000 Number of bins scale 1.000 1.000

A tibble: 32 x 8

outcome running_variable cutoff tau se ci_lower ci_upper p_value 1 chronic_ab~ frpm_percent 35 6.48e+0 4.22 -1.78 14.7 0.124 2 btb frpm_percent 35 -1.27e-1 0.162 -0.445 0.190 0.432 3 avg_pct_me~ frpm_percent 35 -9.42e+0 6.42 -22.0 3.17 0.143 4 avg_pct_me~ frpm_percent 35 -1.72e+1 9.42 -35.7 1.27 0.0680 5 avg_pct_no~ frpm_percent 35 7.93e+0 4.11 -0.137 16.0 0.0540 6 avg_pct_no~ frpm_percent 35 1.46e+1 7.74 -0.609 29.7 0.0599 7 avg_scale_~ frpm_percent 35 -1.94e+1 23.2 -64.9 26.1 0.404 8 avg_scale_~ frpm_percent 35 -4.39e+1 27.2 -97.3 9.54 0.107 9 chronic_ab~ frpm_percent 75 1.49e+0 4.69 -7.70 10.7 0.751 10 btb frpm_percent 75 -3.19e-1 0.173 -0.658 0.0202 0.0653 11 avg_pct_me~ frpm_percent 75 8.53e+0 4.48 -0.254 17.3 0.0570 12 avg_pct_me~ frpm_percent 75 6.78e+0 6.25 -5.46 19.0 0.278 13 avg_pct_no~ frpm_percent 75 -7.45e+0 3.89 -15.1 0.179 0.0556 14 avg_pct_no~ frpm_percent 75 -8.80e+0 7.02 -22.6 4.95 0.210 15 avg_scale_~ frpm_percent 75 2.54e+1 16.1 -6.16 56.9 0.115 16 avg_scale_~ frpm_percent 75 1.96e+1 11.3 -2.52 41.8 0.0824 17 chronic_ab~ undup_pct 55 -1.88e-1 3.49 -7.02 6.64 0.957 18 btb undup_pct 55 1.10e-1 0.224 -0.330 0.550 0.623 19 avg_pct_me~ undup_pct 55 8.49e+0 3.54 1.54 15.4 0.0166 20 avg_pct_me~ undup_pct 55 7.37e+0 6.01 -4.40 19.1 0.220 21 avg_pct_no~ undup_pct 55 -6.57e-1 2.83 -6.19 4.88 0.816 22 avg_pct_no~ undup_pct 55 -5.35e+0 4.98 -15.1 4.41 0.283 23 avg_scale_~

undup_pct 55 7.92e+0 29.7 -50.3 66.1 0.790 24 avg_scale_~ undup_pct 55 8.09e+0 19.3 -29.7 45.9 0.675 25 chronic_ab~ undup_pct 75 -1.68e+0 4.93 -11.3 7.97 0.733 26 btb undup_pct 75 -6.64e-3 0.174 -0.348 0.334 0.970 27 avg_pct_me~ undup_pct 75 6.40e+0 3.95 -1.35 14.1 0.105 28 avg_pct_me~ undup_pct 75 9.84e+0 5.05 -0.0627 19.7 0.0515 29 avg_pct_no~ undup_pct 75 -2.80e+0 3.71 -10.1 4.47 0.450 30 avg_pct_no~ undup_pct 75 -7.13e+0 5.85 -18.6 4.33 0.223 31 avg_scale_~ undup_pct 75 1.45e+0 20.8 -39.4 42.3 0.944 32 avg_scale_~ undup_pct 75 7.40e+0 12.9 -17.8 32.6 0.565

GP RDD - chronic_abseentism ~ FRPM % - 35 cut off

```
#######################################################
# GP RDD
# chronic_abseentism ~ FRPM % - 35 cut off
#######################################################
rdd_res_absenteeism_frpm_35_cutoff <- gp_rdd(
  df_clean$frpm_percent,
  df_clean$chronic_absenteeism,
  35
)
rdd_res_absenteeism_frpm_35_cutoff$tau     # estimated effect
```

```
## [1] 7.865098
```

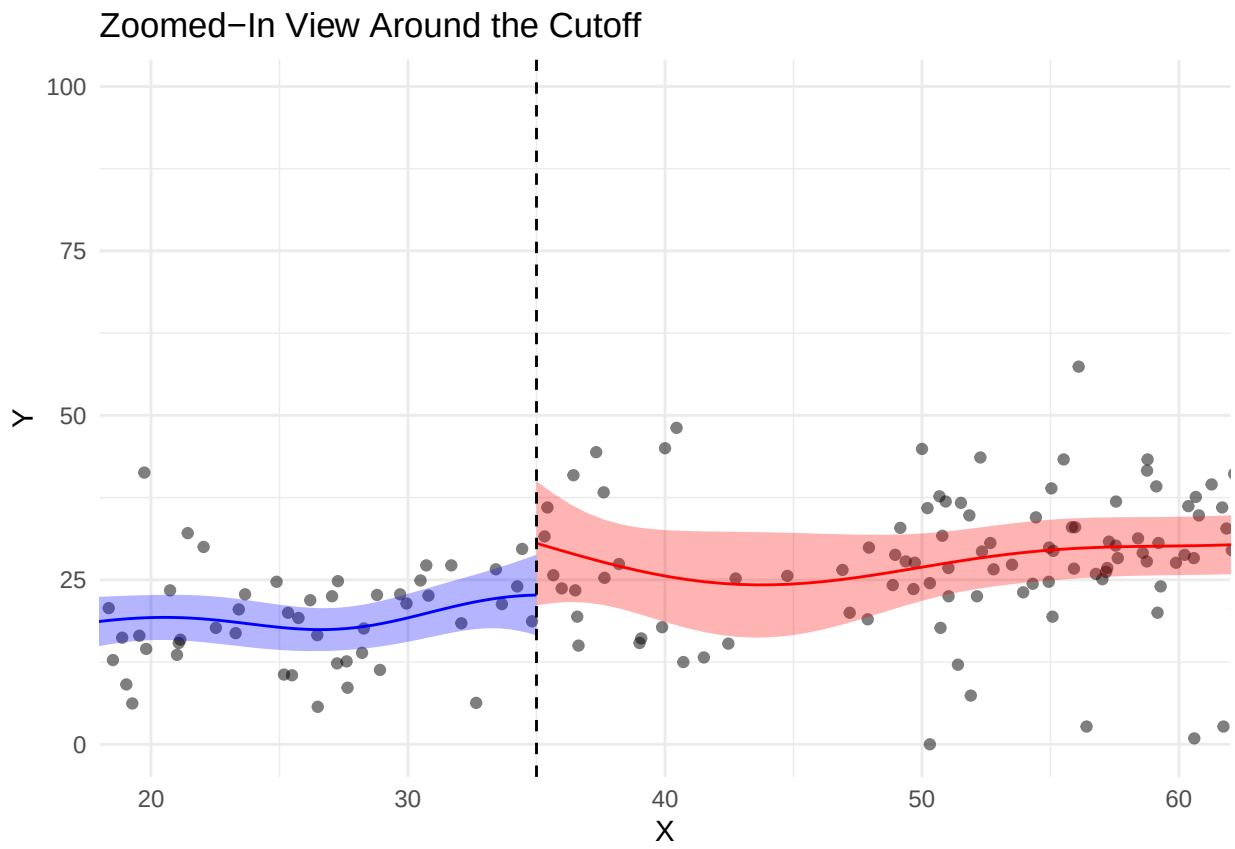
```
rdd_res_absenteeism_frpm_35_cutoff$se      # standard error
```

```
## [1] 5.739285
```

```
rdd_res_absenteeism_frpm_35_cutoff$ci      # confidence interval
```

```
##     lower     upper
## -3.383694 19.113891
```

```
rdd_result_plot_1 <- gp_rdd_plot(rdd_res_absenteeism_frpm_35_cutoff) +
  geom_vline(xintercept = 35, linetype = "dashed") +
  coord_cartesian(xlim = c(20, 60)) +
  labs(title = "Zoomed-In View Around the Cutoff")
print(rdd_result_plot_1)
```



GP RDD - chronic_abseentism ~ FRPM % - 75 cut off

```
##########################################################
# GP RDD
# chronic_abseentism ~ FRPM % - 75 cut off
##########################################################
# Example using formula interface:
rdd_res_absenteeism_frpm_75_cutoff <- gp_rdd(
  df_clean$frpm_percent,
  df_clean$chronic_absenteeism,
  75
)
rdd_res_absenteeism_frpm_75_cutoff$tau     # estimated effect
```

```
## [1] -0.07402481
```

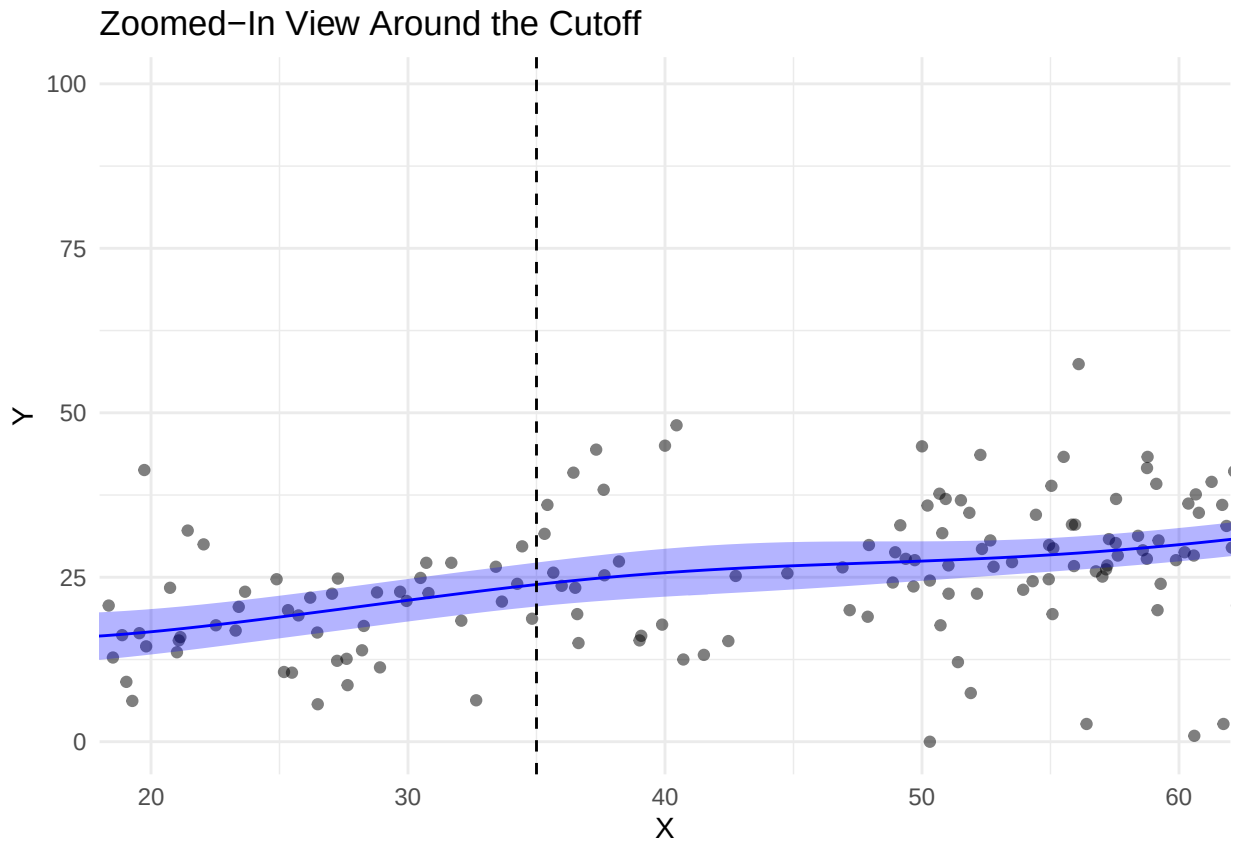
```
rdd_res_absenteeism_frpm_75_cutoff$se      # standard error
```

```
## [1] 6.059793
```

```
rdd_res_absenteeism_frpm_75_cutoff$ci      # confidence interval
```

```
##     lower     upper
## -11.95100  11.80295
```

```
rdd_result_plot_2 <- gp_rdd_plot(rdd_res_absenteeism_frpm_75_cutoff) +
  geom_vline(xintercept = 35, linetype = "dashed") +
  coord_cartesian(xlim = c(20, 60)) +
  labs(title = "Zoomed-In View Around the Cutoff")
print(rdd_result_plot_2)
```



GP RDD - BTB ~ FRPM % - 35 cut off

```
########################################################
# GP RDD
# BTB ~ FRPM % - 35 cut off
########################################################
rdd_res_absenteeism_BTB_35_cutoff <- gp_rdd(
  df_clean$frpm_percent,
  df_clean$btb,
  35
```

```
)
rdd_res_absenteeism_BTB_35_cutoff$tau     # estimated effect
```

```
## [1] -0.2305462
```

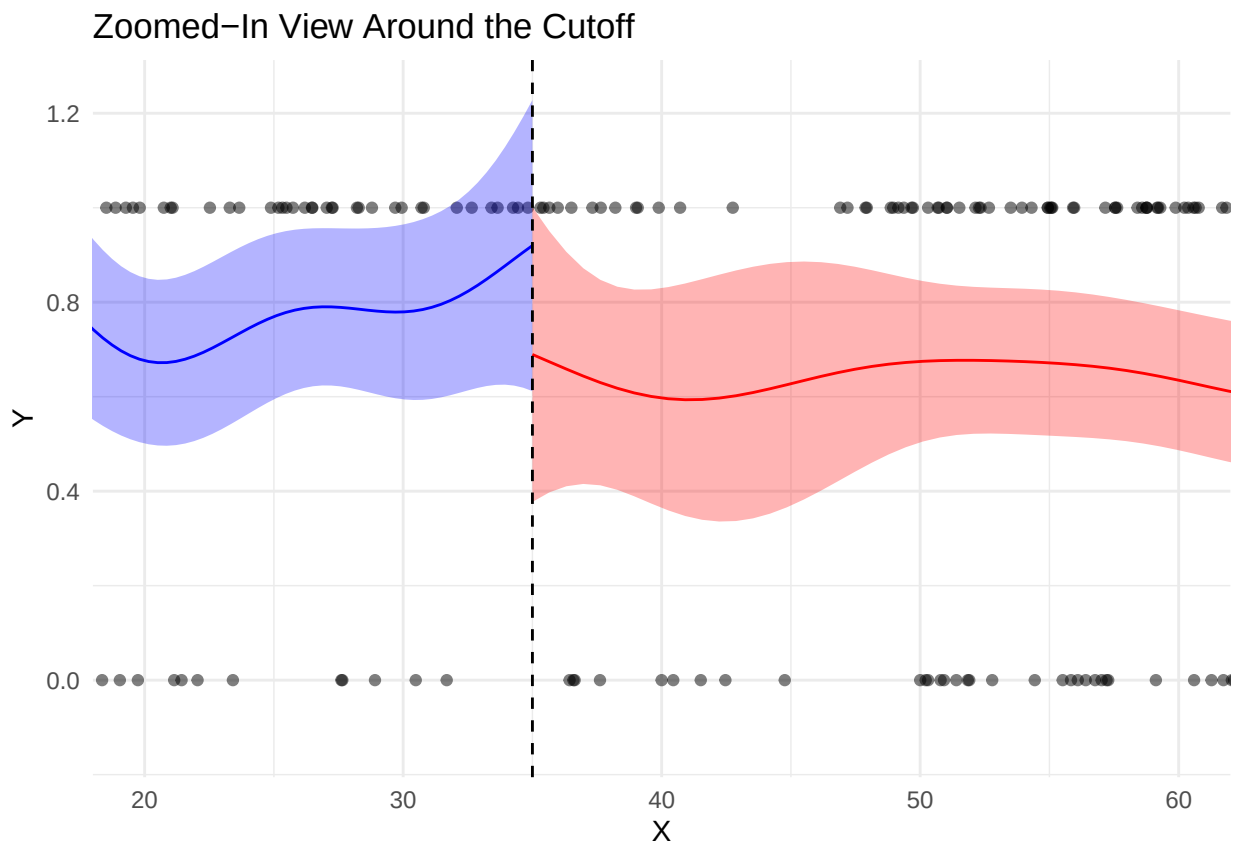
```
rdd_res_absenteeism_BTB_35_cutoff$se      # standard error
```

```
## [1] 0.2237574
```

```
rdd_res_absenteeism_BTB_35_cutoff$ci      # confidence interval
```

```
##      lower      upper
## -0.6691026  0.2080103
```

```
rdd_result_plot_3 <- gp_rdd_plot(rdd_res_absenteeism_BTB_35_cutoff) +
  geom_vline(xintercept = 35, linetype = "dashed") +
  coord_cartesian(xlim = c(20, 60)) +
  labs(title = "Zoomed-In View Around the Cutoff")
print(rdd_result_plot_3)
```



GP RDD - BTB ~ FRPM % - 75 cut off

```
#########################################################
# GP RDD
# BTB ~ FRPM % - 75 cut off
#########################################################
rdd_res_absenteeism_BTB_75_cutoff <- gp_rdd(
  df_clean$frpm_percent,
  df_clean$btb,
  75
)
rdd_res_absenteeism_BTB_75_cutoff$tau     # estimated effect
```

```
## [1] -0.1589799
```

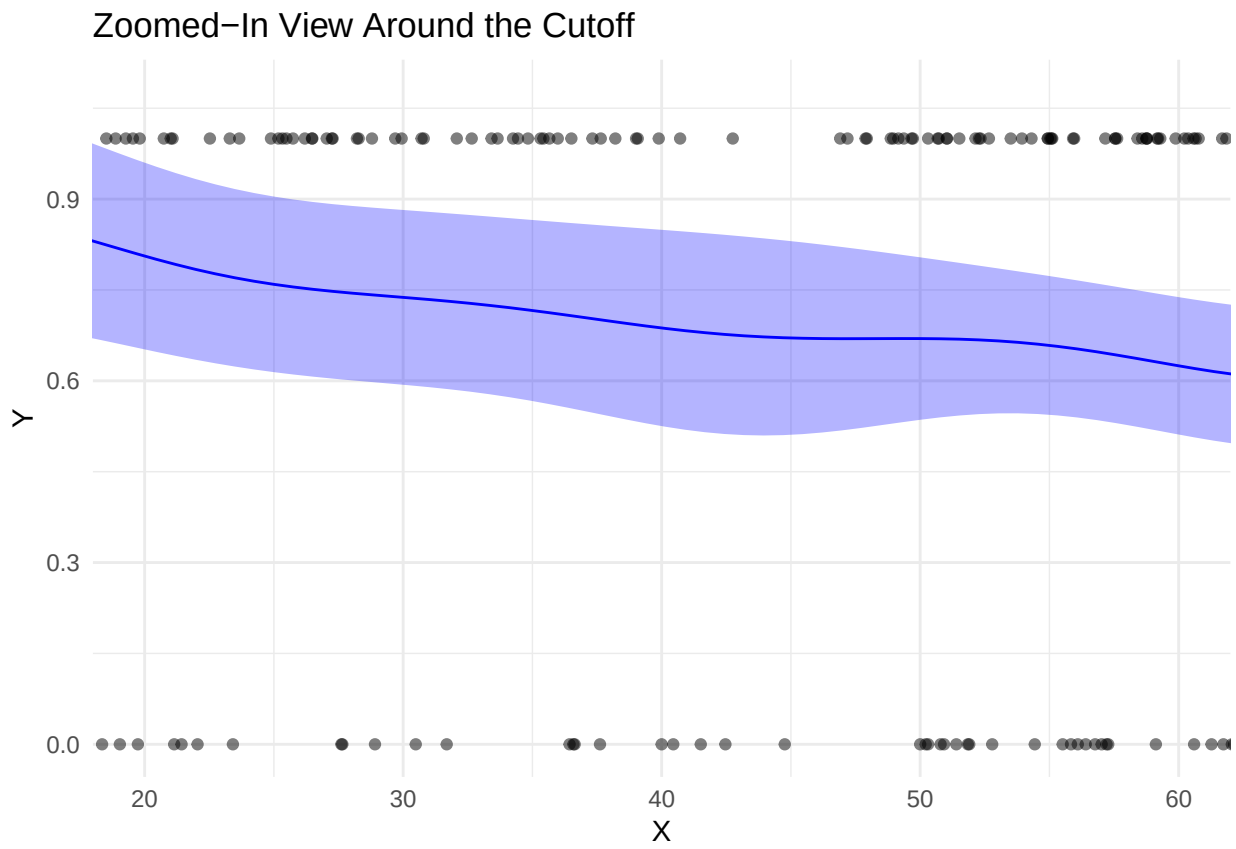
```
rdd_res_absenteeism_BTB_75_cutoff$se      # standard error
```

```
## [1] 0.2079251
```

```
rdd_res_absenteeism_BTB_75_cutoff$ci      # confidence interval
```

```
##      lower      upper
## -0.5665055  0.2485458
```

```
rdd_result_plot_4 <- gp_rdd_plot(rdd_res_absenteeism_BTB_75_cutoff) +
                      geom_vline(xintercept = 75, linetype = "dashed") +
                      coord_cartesian(xlim = c(20, 60)) +
                      labs(title = "Zoomed-In View Around the Cutoff")
print(rdd_result_plot_4)
```



GP RDD - chronic_abseentism ~ Unduplicated Pupil % - 55% cut off

```
rdd_res_absenteeism_undup_55_cutoff <- gp_rdd(
  df_clean$undup_pct,
  df_clean$chronic_absenteeism,
  55
)

rdd_res_absenteeism_undup_55_cutoff$tau
```

```
## [1] 3.060495
```

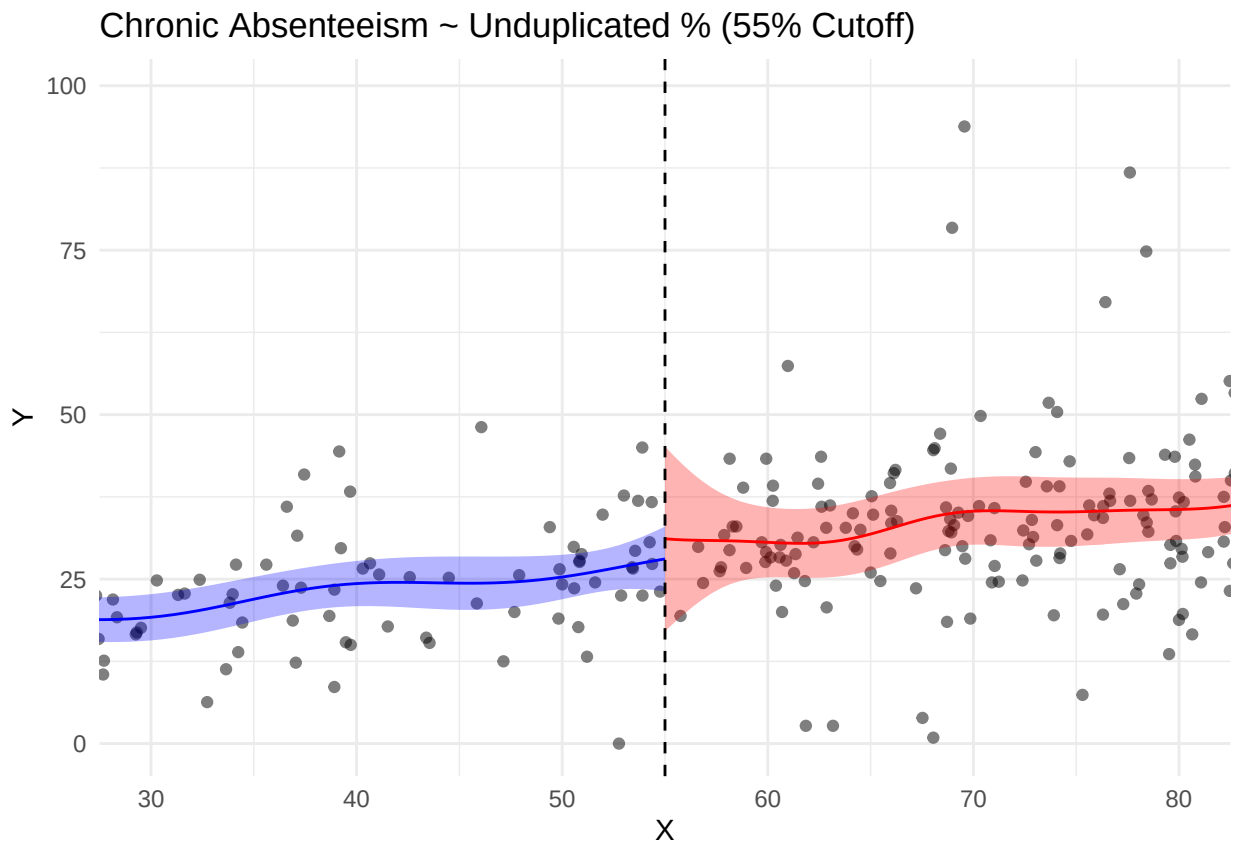
```
rdd_res_absenteeism_undup_55_cutoff$se
```

```
## [1] 7.58411
```

```
rdd_res_absenteeism_undup_55_cutoff$ci
```

```
##     lower     upper
## -11.80409  17.92508
```

```
rdd_plot_undup_55_absent <- gp_rdd_plot(rdd_res_absenteeism_undup_55_cutoff) +
  geom_vline(xintercept = 55, linetype = "dashed") +
  coord_cartesian(xlim = c(30, 80)) +
  labs(title = "Chronic Absenteeism ~ Unduplicated % (55% Cutoff)")
print(rdd_plot_undup_55_absent)
```



GP RDD - chronic_abseentism ~ Unduplicated Pupil % - 75% cut off

```
rdd_res_absenteeism_undup_75_cutoff <- gp_rdd(
  df_clean$undup_pct,
  df_clean$chronic_absenteeism,
  75
)

rdd_res_absenteeism_undup_75_cutoff$tau
```

```
## [1] -1.667907
```

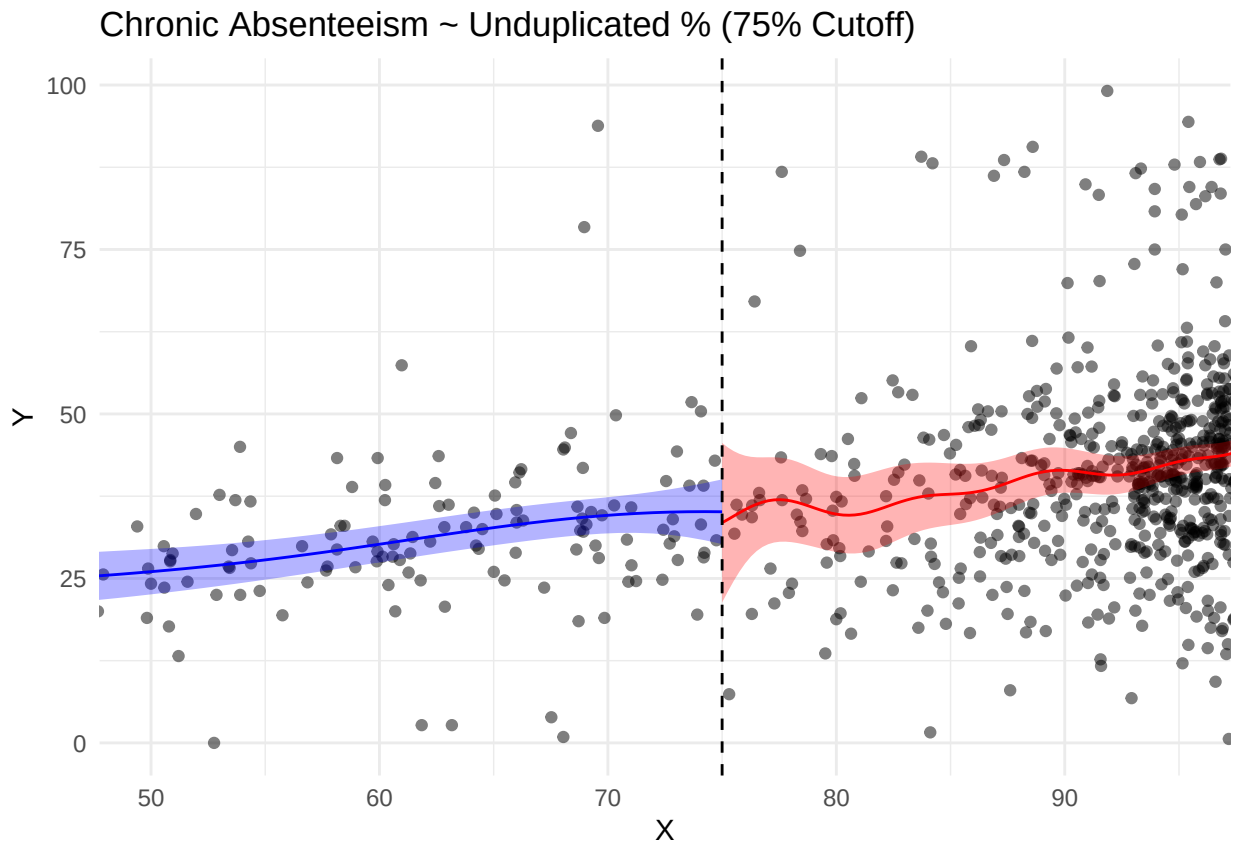
```
rdd_res_absenteeism_undup_75_cutoff$se
```

```
## [1] 6.675245
```

```
rdd_res_absenteeism_undup_75_cutoff$ci
```

```
##     lower     upper
## -14.75115  11.41533
```

```
rdd_plot_undup_75_absent <- gp_rdd_plot(rdd_res_absenteeism_undup_75_cutoff) +
  geom_vline(xintercept = 75, linetype = "dashed") +
  coord_cartesian(xlim = c(50, 95)) +
  labs(title = "Chronic Absenteeism ~ Unduplicated % (75% Cutoff)")
print(rdd_plot_undup_75_absent)
```



GP RDD - BTB ~ Unduplicated Pupil % - 55% cut off

```
rdd_res_btb_undup_55_cutoff <- gp_rdd(
  df_clean$undup_pct,
  df_clean$btb,
  55
)

rdd_res_btb_undup_55_cutoff$tau
```

```
## [1] -0.02215456
```

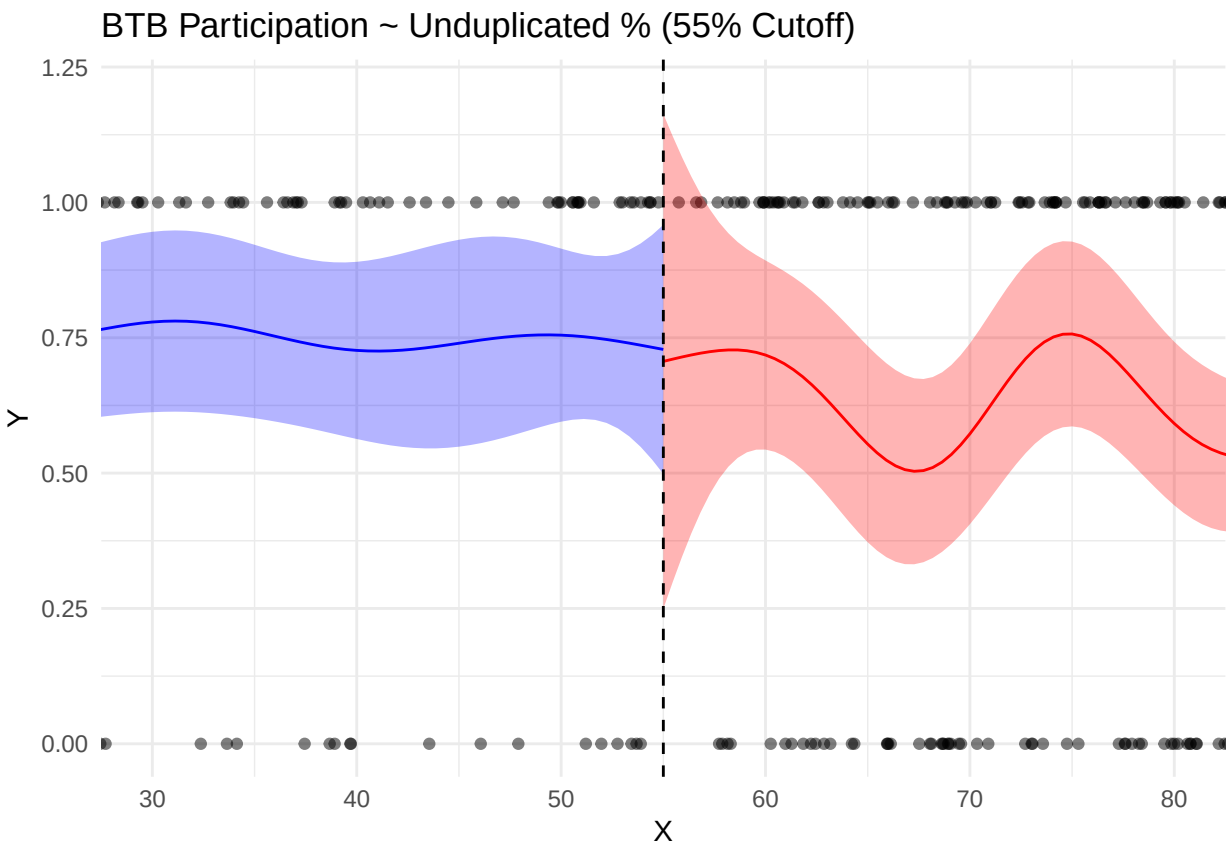
```
rdd_res_btb_undup_55_cutoff$se
```

```
## [1] 0.2609895
```

```
rdd_res_btb_undup_55_cutoff$ci
```

```
##      lower      upper
## -0.5336846  0.4893755
```

```
rdd_plot_undup_55_btb <- gp_rdd_plot(rdd_res_btb_undup_55_cutoff) +
  geom_vline(xintercept = 55, linetype = "dashed") +
  coord_cartesian(xlim = c(30, 80)) +
  labs(title = "BTB Participation ~ Unduplicated % (55% Cutoff)")
print(rdd_plot_undup_55_btb)
```



GP RDD - BTB ~ Unduplicated Pupil % - 75% cut off

```
rdd_res_btb_undup_75_cutoff <- gp_rdd(
  df_clean$undup_pct,
  df_clean$btb,
  75
```

```
)

rdd_res_btb_undup_75_cutoff$tau
```

```
## [1] 0.094369
```

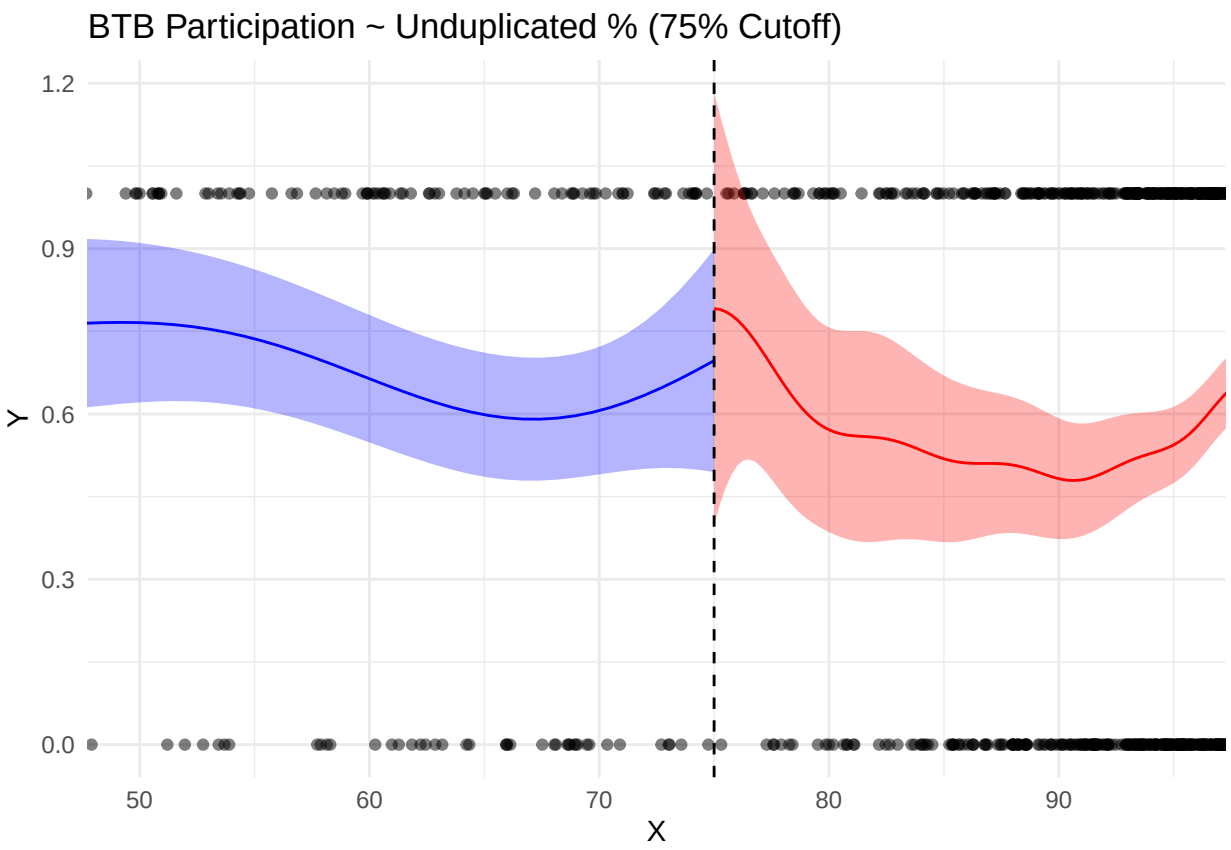
```
rdd_res_btb_undup_75_cutoff$se
```

```
## [1] 0.2249487
```

```
rdd_res_btb_undup_75_cutoff$ci
```

```
##      lower      upper
## -0.3465223  0.5352603
```

```
rdd_plot_undup_75_btb <- gp_rdd_plot(rdd_res_btb_undup_75_cutoff) +
  geom_vline(xintercept = 75, linetype = "dashed") +
  coord_cartesian(xlim = c(50, 95)) +
  labs(title = "BTB Participation ~ Unduplicated % (75% Cutoff)")
print(rdd_plot_undup_75_btb)
```



GP RDD - avg_pct_met_above_ELA ~ FRPM % - 35 cutoff

```
rdd_avg_pct_met_above_ela_frpm_35 <- gp_rdd(df_clean$frpm_percent, df_clean$avg_pct_met_above_ELA, 35)
rdd_avg_pct_met_above_ela_frpm_35$tau
```

```
## [1] -13.25667
```

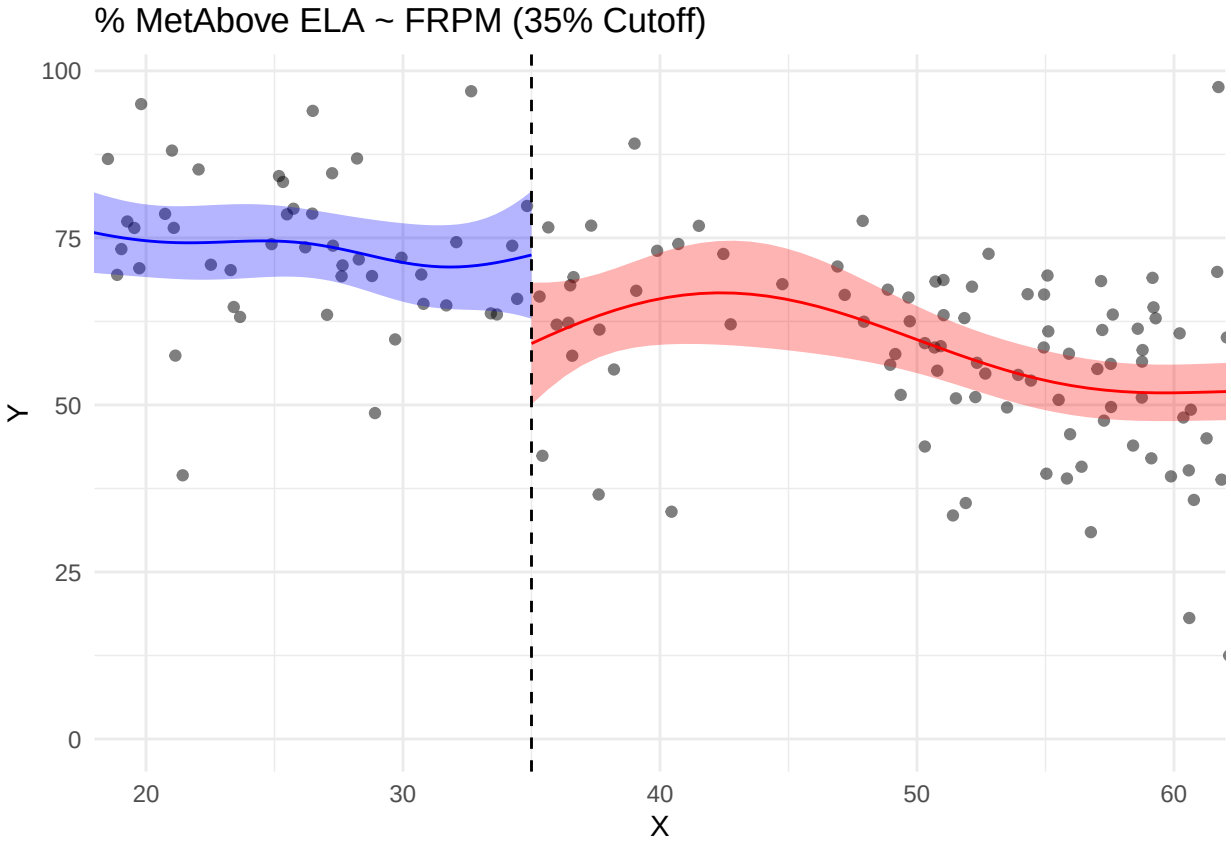
```
rdd_avg_pct_met_above_ela_frpm_35$se
```

```
## [1] 6.72869
```

```
rdd_avg_pct_met_above_ela_frpm_35$ci
```

```
##        lower        upper
## -26.44465966  -0.06867845
```

```
rdd_plot_avg_pct_met_above_ela_frpm_35 <- gp_rdd_plot(rdd_avg_pct_met_above_ela_frpm_35) +
  geom_vline(xintercept = 35, linetype = "dashed") +
  coord_cartesian(xlim = c(20, 60)) +
  labs(title = "% MetAbove ELA ~ FRPM (35% Cutoff)")
print(rdd_plot_avg_pct_met_above_ela_frpm_35)
```



GP RDD - avg_pct_met_above_ELA ~ FRPM % - 75 cutoff

```
rdd_avg_pct_met_above_ela_frpm_75 <- gp_rdd(df_clean$frpm_percent, df_clean$avg_pct_met_above_ELA, 75)
rdd_avg_pct_met_above_ela_frpm_75$tau
```

```
## [1] 4.231876
```

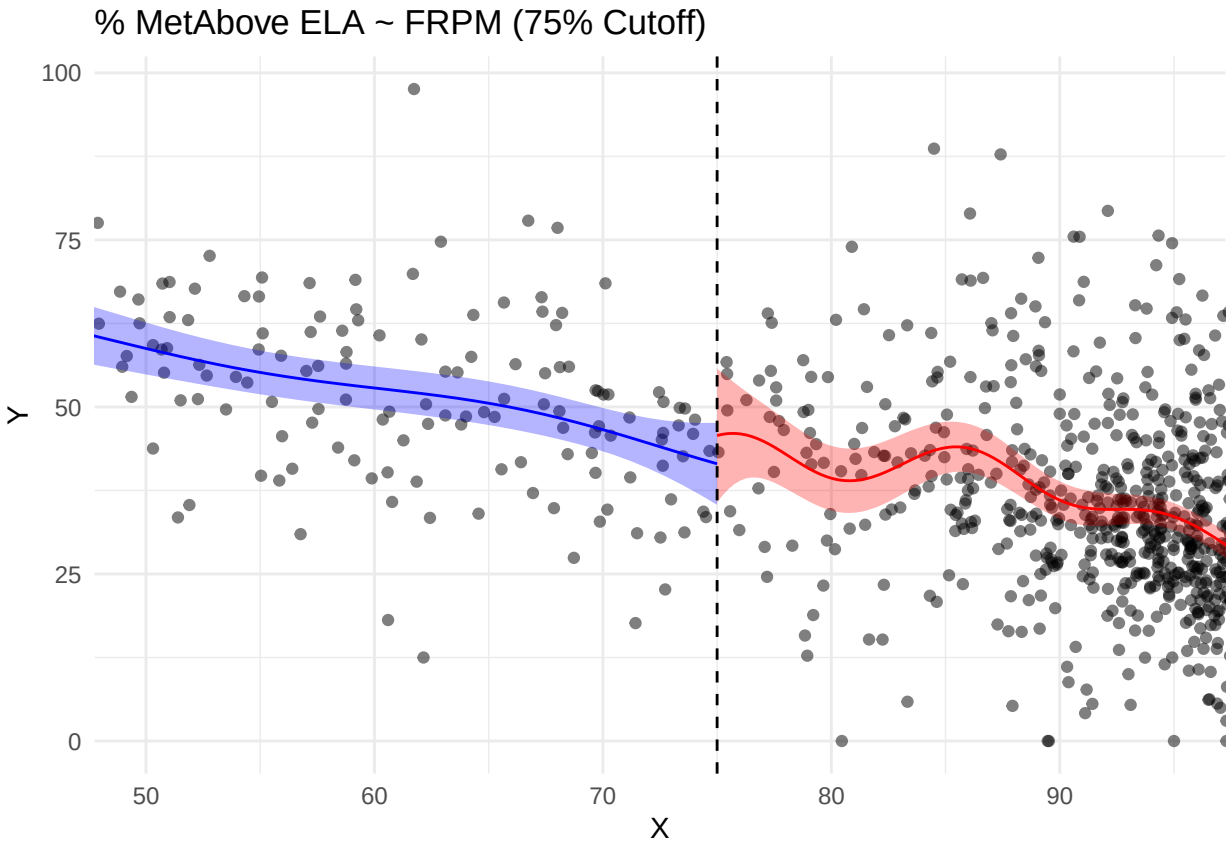
```
rdd_avg_pct_met_above_ela_frpm_75$se
```

```
## [1] 5.992236
```

```
rdd_avg_pct_met_above_ela_frpm_75$ci
```

```
##    lower    upper
## -7.51269 15.97644
```

```
rdd_plot_avg_pct_met_above_ela_frpm_75 <- gp_rdd_plot(rdd_avg_pct_met_above_ela_frpm_75) +
  geom_vline(xintercept = 75, linetype = "dashed") +
  coord_cartesian(xlim = c(50, 95)) +
  labs(title = "% MetAbove ELA ~ FRPM (75% Cutoff)")
print(rdd_plot_avg_pct_met_above_ela_frpm_75)
```



GP RDD - avg_pct_met_above_ELA ~ Undup % - 55 cutoff

```
rdd_avg_pct_met_above_ela_undup_55 <- gp_rdd(df_clean$undup_pct, df_clean$avg_pct_met_above_ELA, 55)
rdd_avg_pct_met_above_ela_undup_55$tau
```

```
## [1] -1.715285
```

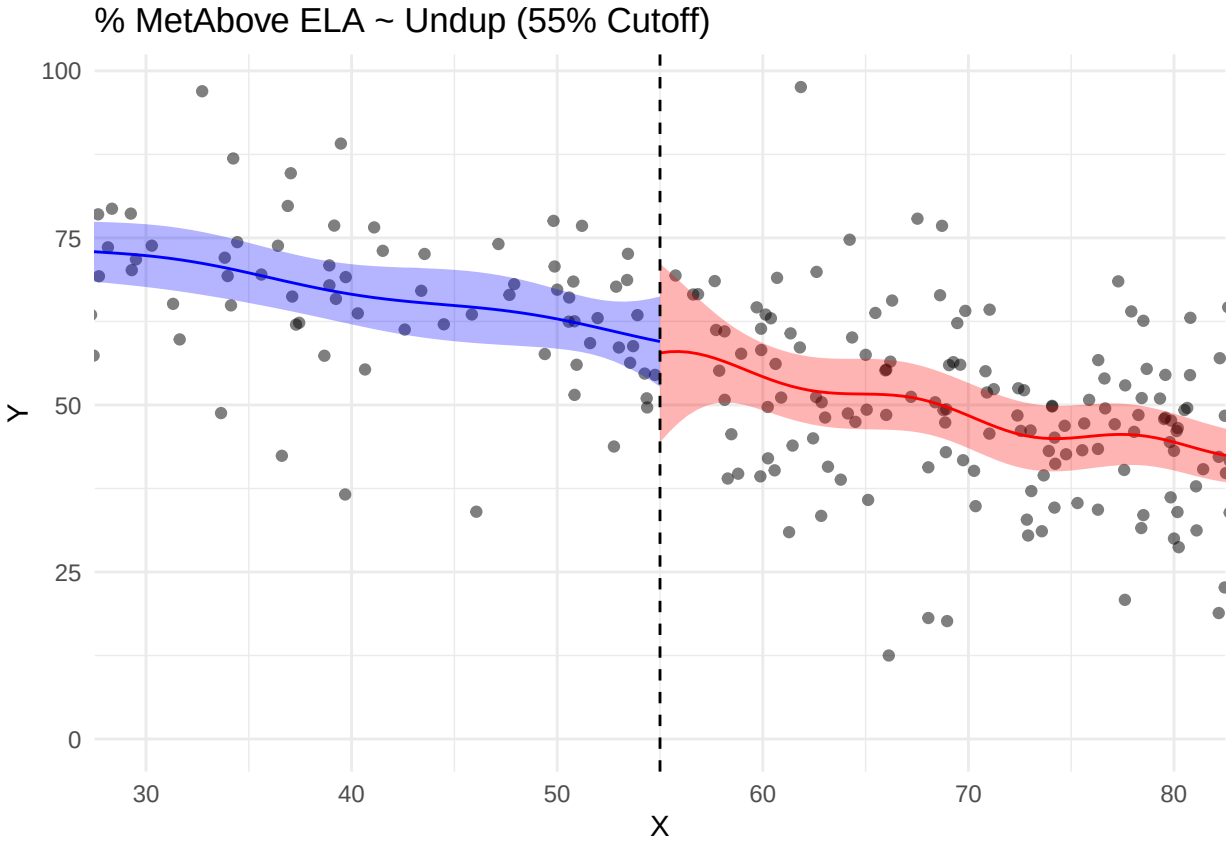
```
rdd_avg_pct_met_above_ela_undup_55$se
```

```
## [1] 7.63961
```

```
rdd_avg_pct_met_above_ela_undup_55$ci
```

```
##     lower     upper
## -16.68865  13.25808
```

```
rdd_plot_avg_pct_met_above_ela_undup_55 <- gp_rdd_plot(rdd_avg_pct_met_above_ela_undup_55) +
  geom_vline(xintercept = 55, linetype = "dashed") +
  coord_cartesian(xlim = c(30, 80)) +
  labs(title = "% MetAbove ELA ~ Undup (55% Cutoff)")
print(rdd_plot_avg_pct_met_above_ela_undup_55)
```



GP RDD - avg_pct_met_above_ELA ~ Undup % - 75 cutoff

```
rdd_avg_pct_met_above_ela_undup_75 <- gp_rdd(df_clean$undup_pct, df_clean$avg_pct_met_above_ELA, 75)
rdd_avg_pct_met_above_ela_undup_75$tau
```

```
## [1] -1.760139
```

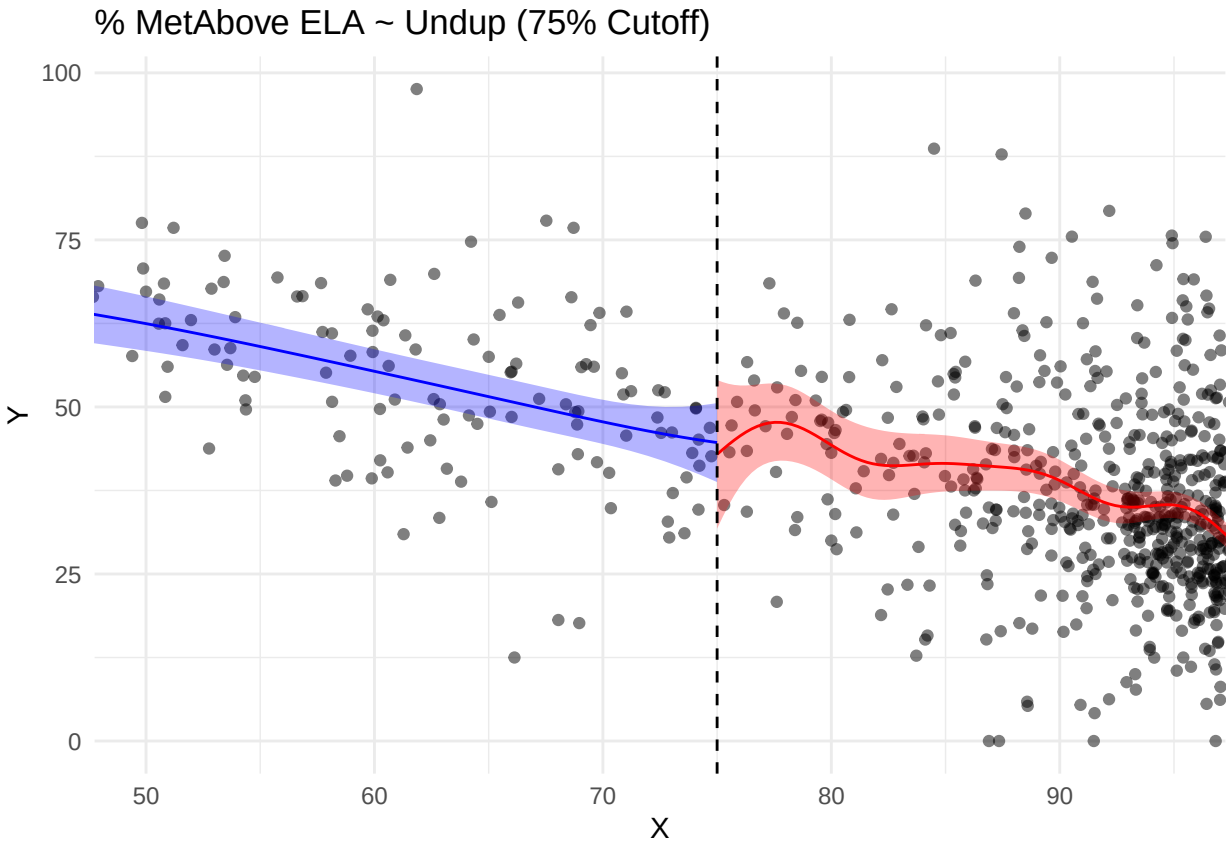
```
rdd_avg_pct_met_above_ela_undup_75$se
```

```
## [1] 6.42819
```

```
rdd_avg_pct_met_above_ela_undup_75$ci
```

```
##     lower     upper
## -14.35916  10.83888
```

```
rdd_plot_avg_pct_met_above_ela_undup_75 <- gp_rdd_plot(rdd_avg_pct_met_above_ela_undup_75) +
  geom_vline(xintercept = 75, linetype = "dashed") +
  coord_cartesian(xlim = c(50, 95)) +
  labs(title = "% MetAbove ELA ~ Undup (75% Cutoff)")
print(rdd_plot_avg_pct_met_above_ela_undup_75)
```



GP RDD - avg_pct_met_above_Math ~ FRPM % - 35 cutoff

```
rdd_avg_pct_met_above_math_frpm_35 <- gp_rdd(df_clean$frpm_percent, df_clean$avg_pct_met_above_Math, 35)
rdd_avg_pct_met_above_math_frpm_35$tau
```

```
## [1] -20.57441
```

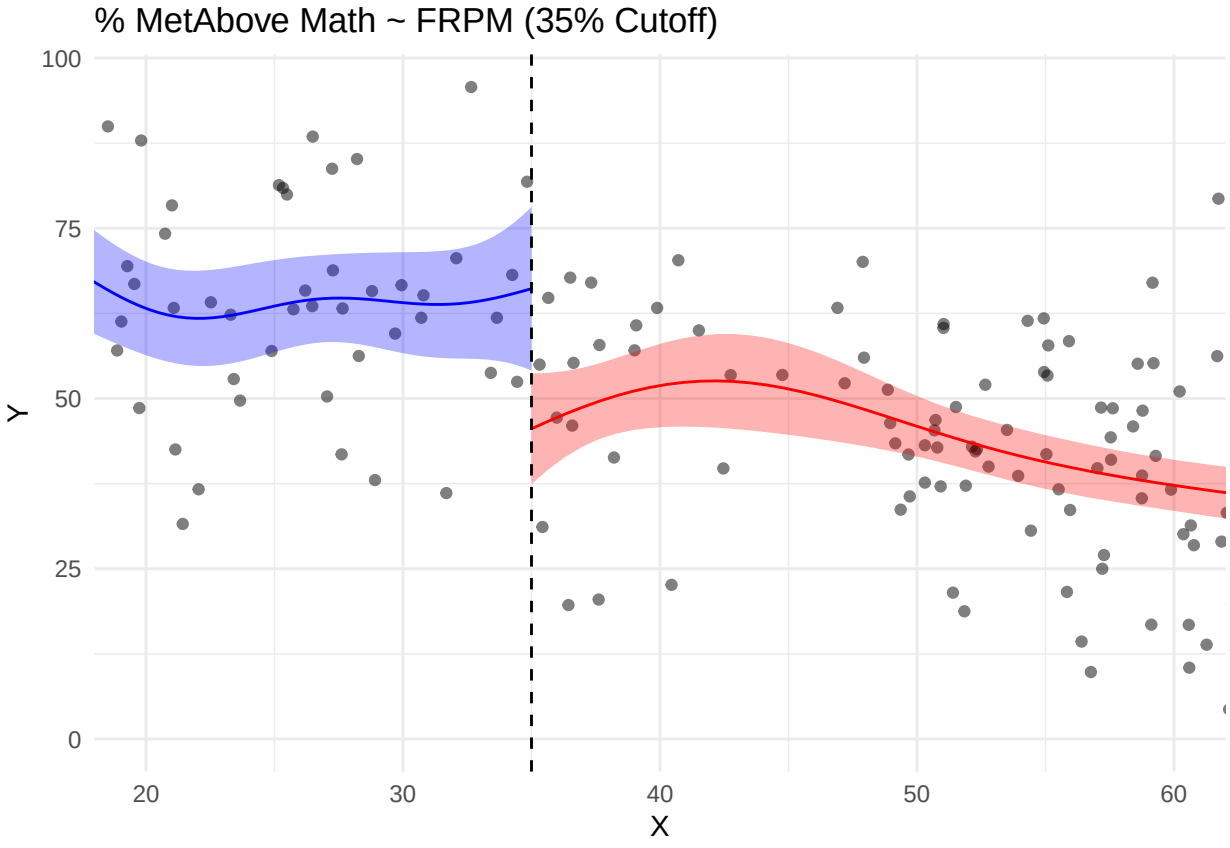
```
rdd_avg_pct_met_above_math_frpm_35$se
```

```
## [1] 7.387712
```

```
rdd_avg_pct_met_above_math_frpm_35$ci
```

```
##      lower      upper
## -35.054063  -6.094766
```

```
rdd_plot_avg_pct_met_above_math_frpm_35 <- gp_rdd_plot(rdd_avg_pct_met_above_math_frpm_35) +
  geom_vline(xintercept = 35, linetype = "dashed") +
  coord_cartesian(xlim = c(20, 60)) +
  labs(title = "% MetAbove Math ~ FRPM (35% Cutoff)")
print(rdd_plot_avg_pct_met_above_math_frpm_35)
```



GP RDD - avg_pct_met_above_Math ~ FRPM % - 75 cutoff

```
rdd_avg_pct_met_above_math_frpm_75 <- gp_rdd(df_clean$frpm_percent, df_clean$avg_pct_met_above_Math, 75)
rdd_avg_pct_met_above_math_frpm_75$tau
```

```
## [1] 4.415222
```

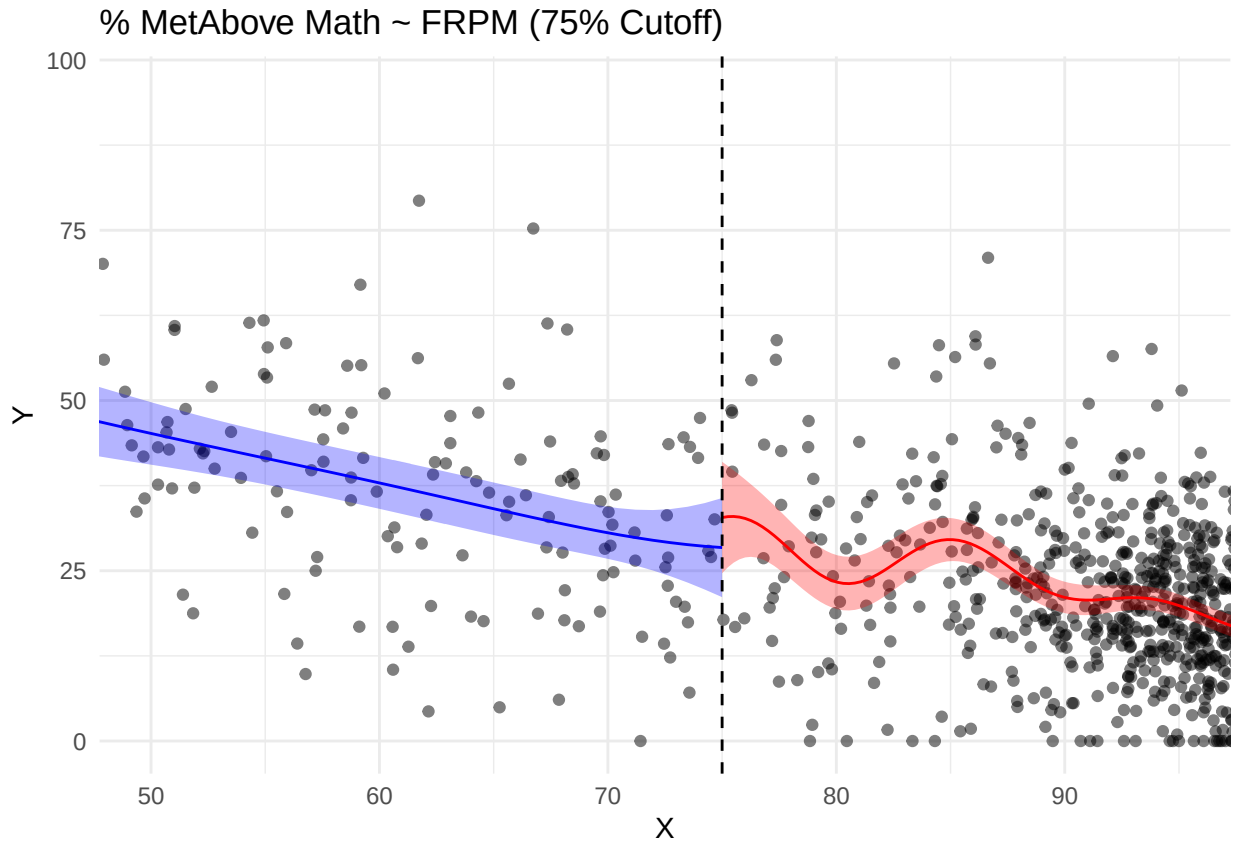
```
rdd_avg_pct_met_above_math_frpm_75$se
```

```
## [1] 5.586812
```

```
rdd_avg_pct_met_above_math_frpm_75$ci
```

```
##     lower     upper
## -6.534728 15.365173
```

```
rdd_plot_avg_pct_met_above_math_frpm_75 <- gp_rdd_plot(rdd_avg_pct_met_above_math_frpm_75) +
  geom_vline(xintercept = 75, linetype = "dashed") +
  coord_cartesian(xlim = c(50, 95)) +
  labs(title = "% MetAbove Math ~ FRPM (75% Cutoff)")
print(rdd_plot_avg_pct_met_above_math_frpm_75)
```



GP RDD - avg_pct_met_above_Math ~ Undup % - 55 cutoff

```
rdd_avg_pct_met_above_math_undup_55 <- gp_rdd(df_clean$undup_pct, df_clean$avg_pct_met_above_Math, 55)
rdd_avg_pct_met_above_math_undup_55$tau
```

```
## [1] -2.108655
```

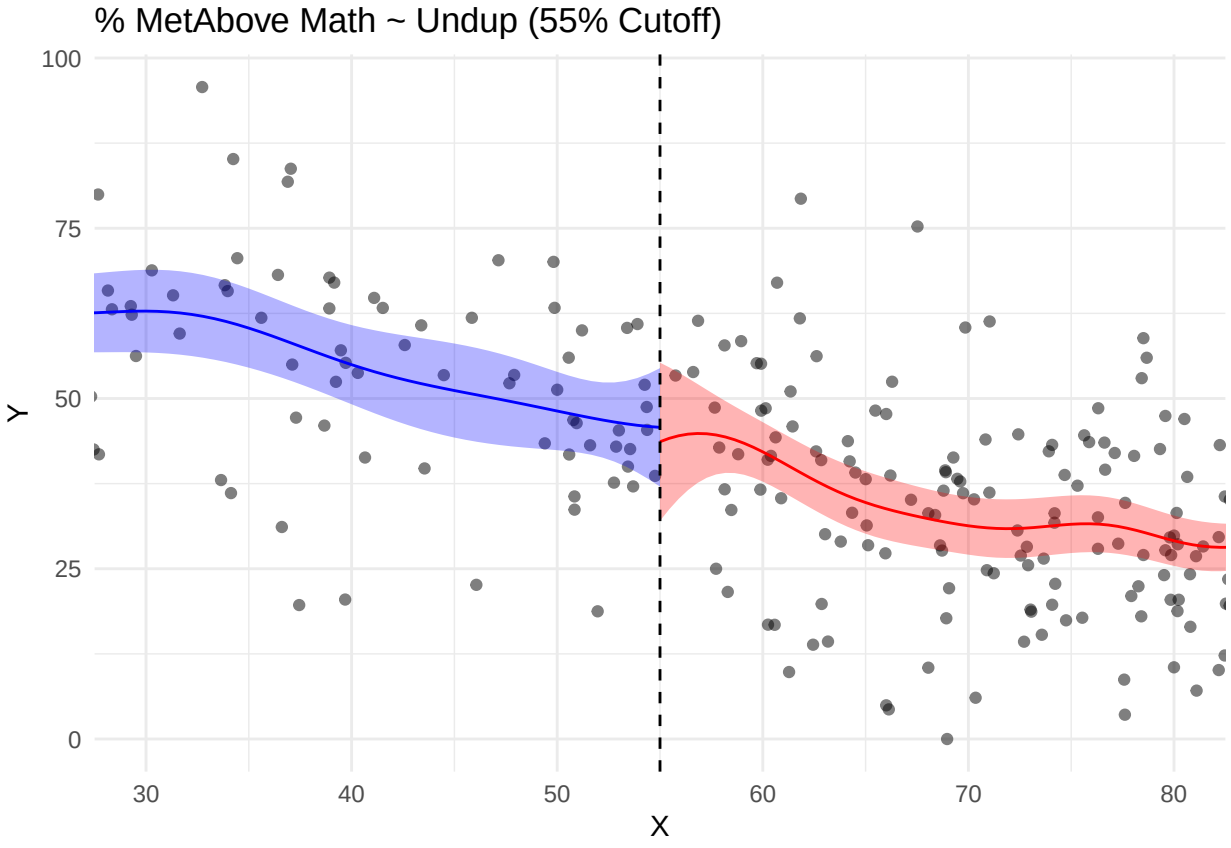
```
rdd_avg_pct_met_above_math_undup_55$se
```

```
## [1] 7.403259
```

```
rdd_avg_pct_met_above_math_undup_55$ci
```

```
##     lower     upper
## -16.61877  12.40147
```

```
rdd_plot_avg_pct_met_above_math_undup_55 <- gp_rdd_plot(rdd_avg_pct_met_above_math_undup_55) +
  geom_vline(xintercept = 55, linetype = "dashed") +
  coord_cartesian(xlim = c(30, 80)) +
  labs(title = "% MetAbove Math ~ Undup (55% Cutoff)")
print(rdd_plot_avg_pct_met_above_math_undup_55)
```



GP RDD - avg_pct_met_above_Math ~ Undup % - 75 cutoff

```
rdd_avg_pct_met_above_math_undup_75 <- gp_rdd(df_clean$undup_pct, df_clean$avg_pct_met_above_Math, 75)
rdd_avg_pct_met_above_math_undup_75$tau
```

```
## [1] 3.737309
```

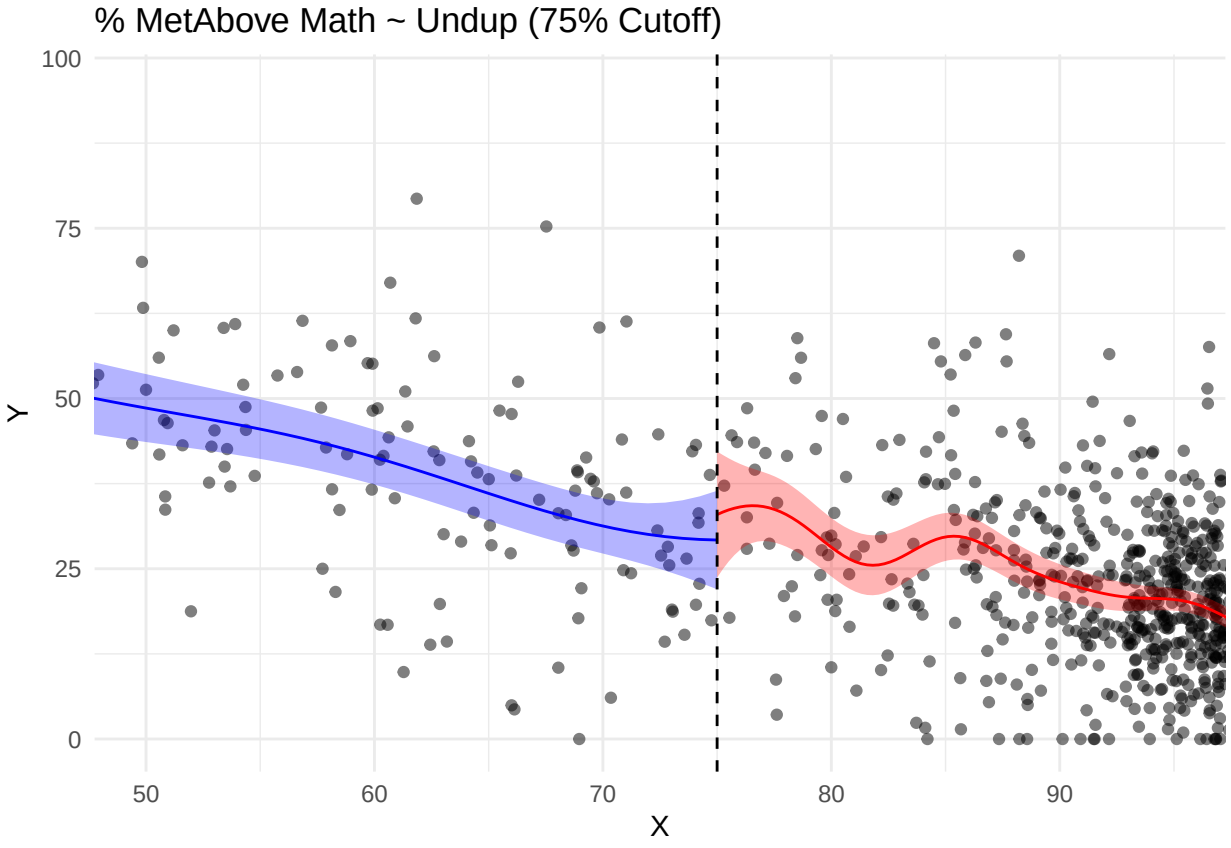
```
rdd_avg_pct_met_above_math_undup_75$se
```

```
## [1] 5.99488
```

```
rdd_avg_pct_met_above_math_undup_75$ci
```

```
##     lower     upper
## -8.012439 15.487057
```

```
rdd_plot_avg_pct_met_above_math_undup_75 <- gp_rdd_plot(rdd_avg_pct_met_above_math_undup_75) +
  geom_vline(xintercept = 75, linetype = "dashed") +
  coord_cartesian(xlim = c(50, 95)) +
  labs(title = "% MetAbove Math ~ Undup (75% Cutoff)")
print(rdd_plot_avg_pct_met_above_math_undup_75)
```



GP RDD - avg_pct_not_met_ELA ~ FRPM % - 35 cutoff

```
rdd_avg_pct_not_met_ela_frpm_35 <- gp_rdd(df_clean$frpm_percent, df_clean$avg_pct_not_met_ELA, 35)
rdd_avg_pct_not_met_ela_frpm_35$tau
```

```
## [1] 10.72026
```

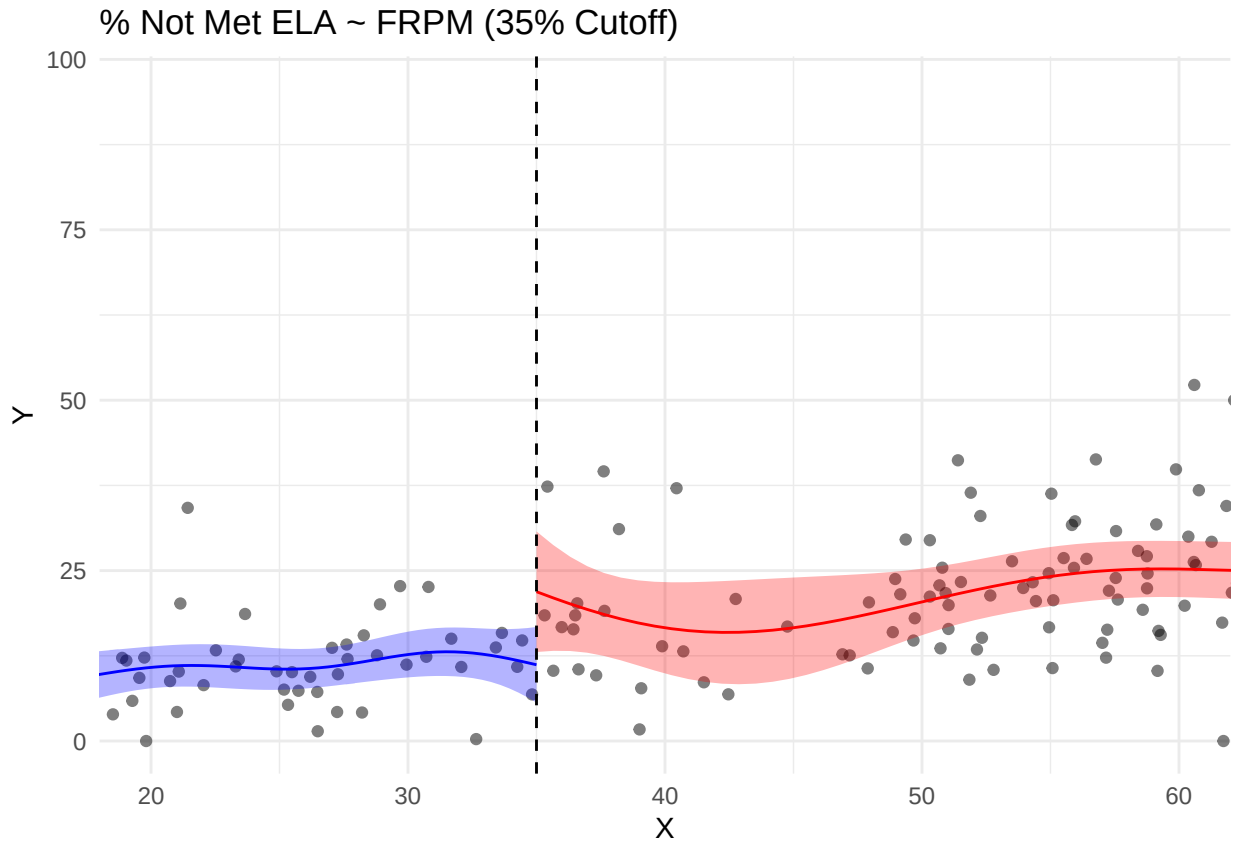
```
rdd_avg_pct_not_met_ela_frpm_35$se
```

```
## [1] 5.328043
```

```
rdd_avg_pct_not_met_ela_frpm_35$ci
```

```
##      lower      upper
##  0.2774905 21.1630355
```

```
rdd_plot_avg_pct_not_met_ela_frpm_35 <- gp_rdd_plot(rdd_avg_pct_not_met_ela_frpm_35) +
  geom_vline(xintercept = 35, linetype = "dashed") +
  coord_cartesian(xlim = c(20, 60)) +
  labs(title = "% Not Met ELA ~ FRPM (35% Cutoff)")
print(rdd_plot_avg_pct_not_met_ela_frpm_35)
```



GP RDD - avg_pct_not_met_ELA ~ FRPM % - 75 cutoff

```
rdd_avg_pct_not_met_ela_frpm_75 <- gp_rdd(df_clean$frpm_percent, df_clean$avg_pct_not_met_ELA, 75)
rdd_avg_pct_not_met_ela_frpm_75$tau
```

```
## [1] -3.42106
```

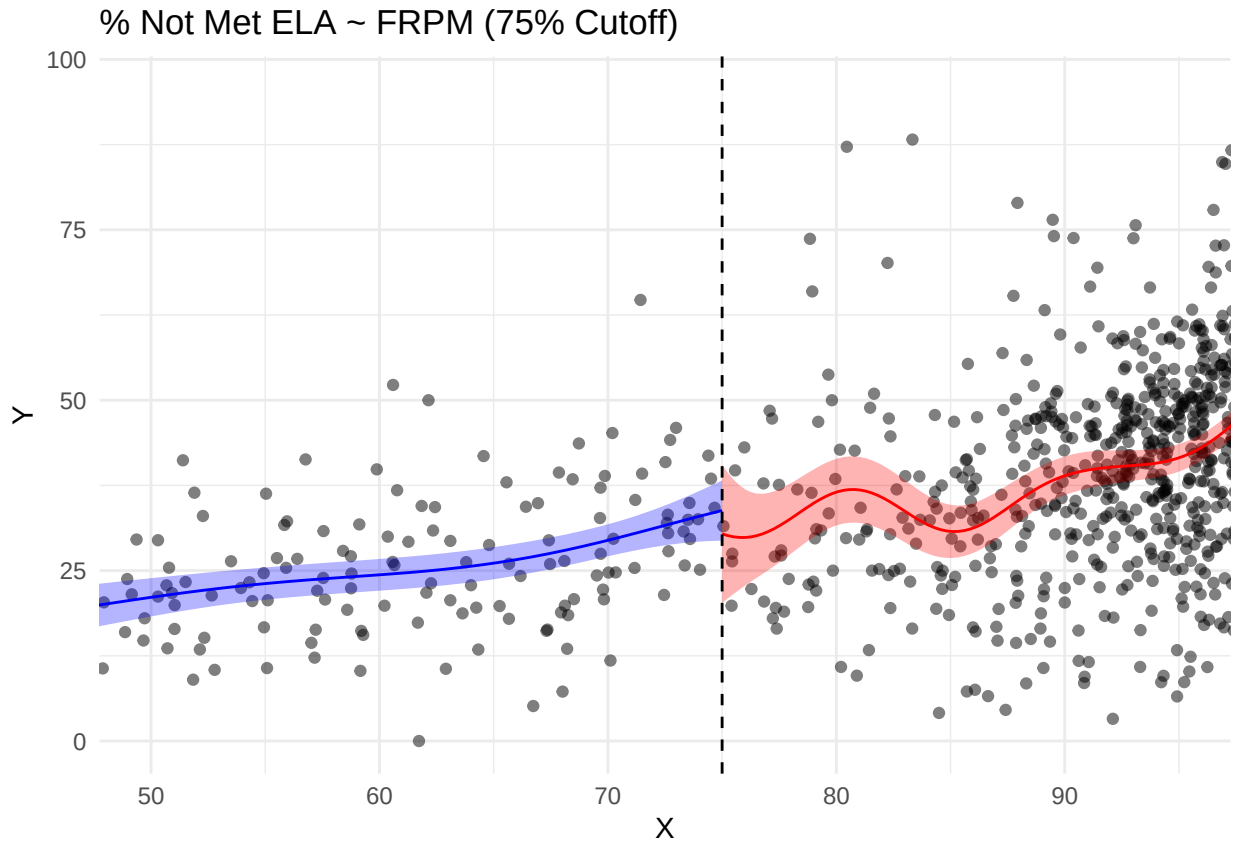
```
rdd_avg_pct_not_met_ela_frpm_75$se
```

```
## [1] 5.642007
```

```
rdd_avg_pct_not_met_ela_frpm_75$ci
```

```
##      lower      upper
## -14.479192   7.637071
```

```
rdd_plot_avg_pct_not_met_ela_frpm_75 <- gp_rdd_plot(rdd_avg_pct_not_met_ela_frpm_75) +
  geom_vline(xintercept = 75, linetype = "dashed") +
  coord_cartesian(xlim = c(50, 95)) +
  labs(title = "% Not Met ELA ~ FRPM (75% Cutoff)")
print(rdd_plot_avg_pct_not_met_ela_frpm_75)
```



GP RDD - avg_pct_not_met_ELA ~ Undup % - 55 cutoff

```
rdd_avg_pct_not_met_ela_undup_55 <- gp_rdd(df_clean$undup_pct, df_clean$avg_pct_not_met_ELA, 55)
rdd_avg_pct_not_met_ela_undup_55$tau
```

```
## [1] 3.354191
```

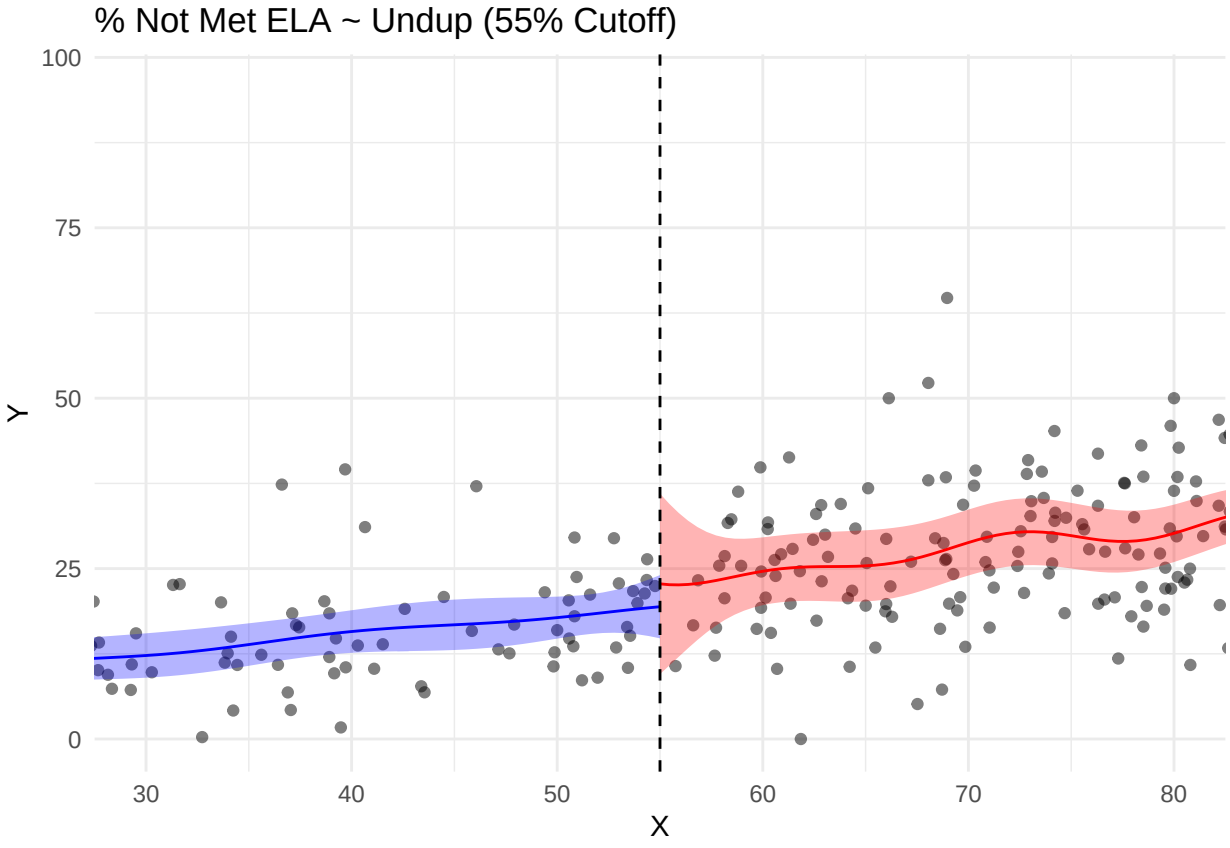
```
rdd_avg_pct_not_met_ela_undup_55$se
```

```
## [1] 7.155742
```

```
rdd_avg_pct_not_met_ela_undup_55$ci
```

```
##     lower     upper
## -10.67080  17.37919
```

```
rdd_plot_avg_pct_not_met_ela_undup_55 <- gp_rdd_plot(rdd_avg_pct_not_met_ela_undup_55) +
  geom_vline(xintercept = 55, linetype = "dashed") +
  coord_cartesian(xlim = c(30, 80)) +
  labs(title = "% Not Met ELA ~ Undup (55% Cutoff)")
print(rdd_plot_avg_pct_not_met_ela_undup_55)
```



GP RDD - avg_pct_not_met_ELA ~ Undup % - 75 cutoff

```
rdd_avg_pct_not_met_ela_undup_75 <- gp_rdd(df_clean$undup_pct, df_clean$avg_pct_not_met_ELA, 75)
rdd_avg_pct_not_met_ela_undup_75$tau
```

```
## [1] 2.358593
```

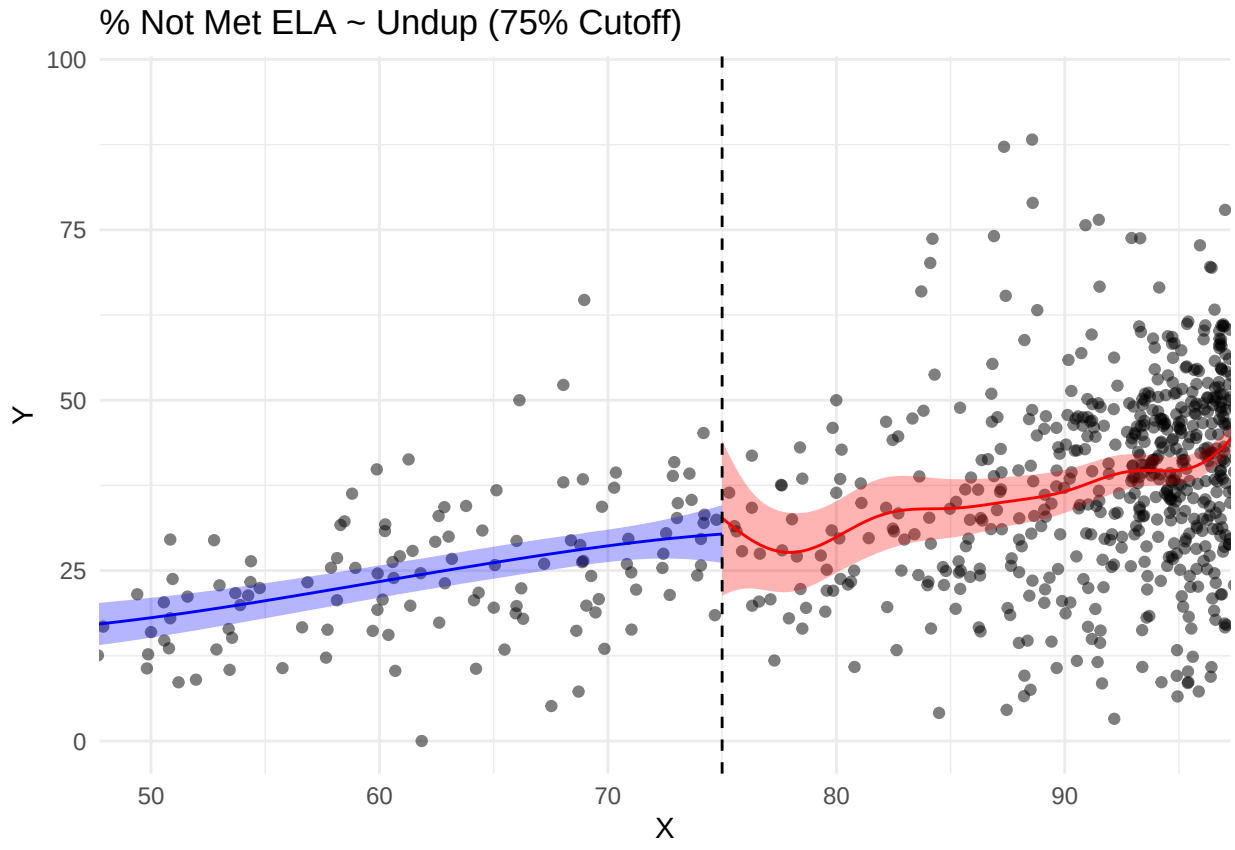
```
rdd_avg_pct_not_met_ela_undup_75$se
```

```
## [1] 6.205645
```

```
rdd_avg_pct_not_met_ela_undup_75$ci
```

```
##     lower     upper
## -9.804247 14.521433
```

```
rdd_plot_avg_pct_not_met_ela_undup_75 <- gp_rdd_plot(rdd_avg_pct_not_met_ela_undup_75) +
  geom_vline(xintercept = 75, linetype = "dashed") +
  coord_cartesian(xlim = c(50, 95)) +
  labs(title = "% Not Met ELA ~ Undup (75% Cutoff)")
print(rdd_plot_avg_pct_not_met_ela_undup_75)
```



GP RDD - avg_pct_not_met_Math ~ FRPM % - 35 cutoff

```
rdd_avg_pct_not_met_math_frpm_35 <- gp_rdd(df_clean$frpm_percent, df_clean$avg_pct_not_met_Math, 35)
rdd_avg_pct_not_met_math_frpm_35$tau
```

```
## [1] 17.33424
```

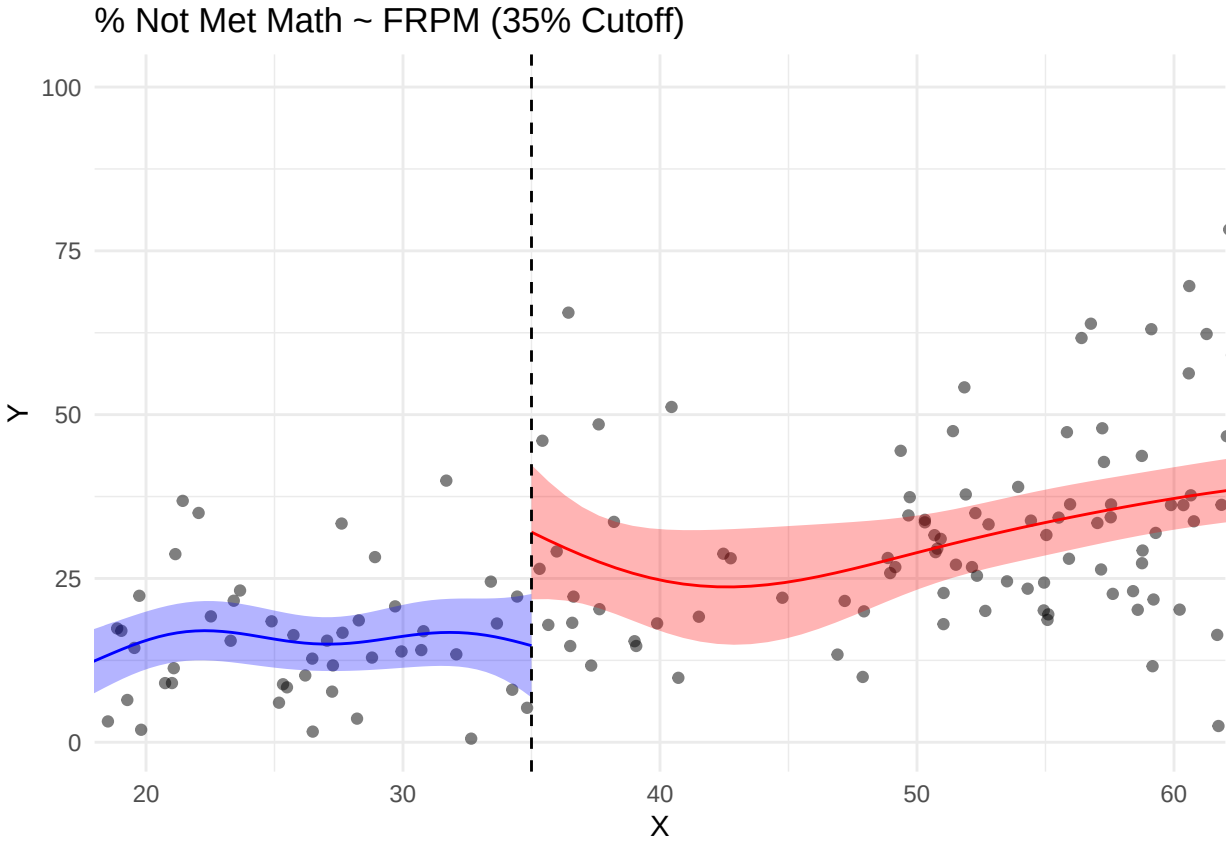
```
rdd_avg_pct_not_met_math_frpm_35$se
```

```
## [1] 6.600448
```

```
rdd_avg_pct_not_met_math_frpm_35$ci
```

```
##     lower     upper
##  4.397601 30.270883
```

```
rdd_plot_avg_pct_not_met_math_frpm_35 <- gp_rdd_plot(rdd_avg_pct_not_met_math_frpm_35) +
  geom_vline(xintercept = 35, linetype = "dashed") +
  coord_cartesian(xlim = c(20, 60)) +
  labs(title = "% Not Met Math ~ FRPM (35% Cutoff)")
print(rdd_plot_avg_pct_not_met_math_frpm_35)
```



GP RDD - avg_pct_not_met_Math ~ FRPM % - 75 cutoff

```
rdd_avg_pct_not_met_math_frpm_75 <- gp_rdd(df_clean$frpm_percent, df_clean$avg_pct_not_met_Math, 75)
rdd_avg_pct_not_met_math_frpm_75$tau
```

```
## [1] -6.403279
```

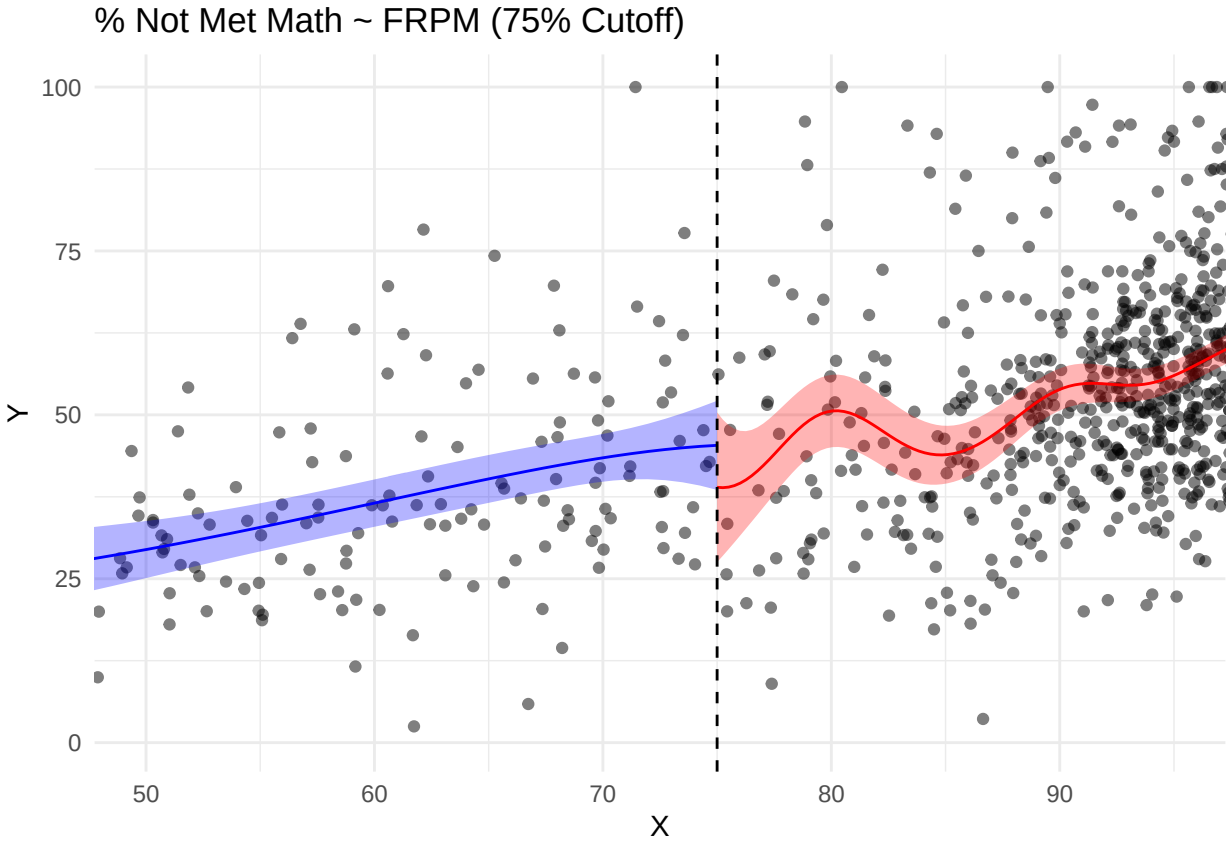
```
rdd_avg_pct_not_met_math_frpm_75$se
```

```
## [1] 6.779727
```

```
rdd_avg_pct_not_met_math_frpm_75$ci
```

```
##      lower      upper
## -19.691299   6.884742
```

```
rdd_plot_avg_pct_not_met_math_frpm_75 <- gp_rdd_plot(rdd_avg_pct_not_met_math_frpm_75) +
  geom_vline(xintercept = 75, linetype = "dashed") +
  coord_cartesian(xlim = c(50, 95)) +
  labs(title = "% Not Met Math ~ FRPM (75% Cutoff)")
print(rdd_plot_avg_pct_not_met_math_frpm_75)
```



GP RDD - avg_pct_not_met_Math ~ Undup % - 55 cutoff

```
rdd_avg_pct_not_met_math_undup_55 <- gp_rdd(df_clean$undup_pct, df_clean$avg_pct_not_met_Math, 55)
rdd_avg_pct_not_met_math_undup_55$tau
```

```
## [1] 3.280395
```

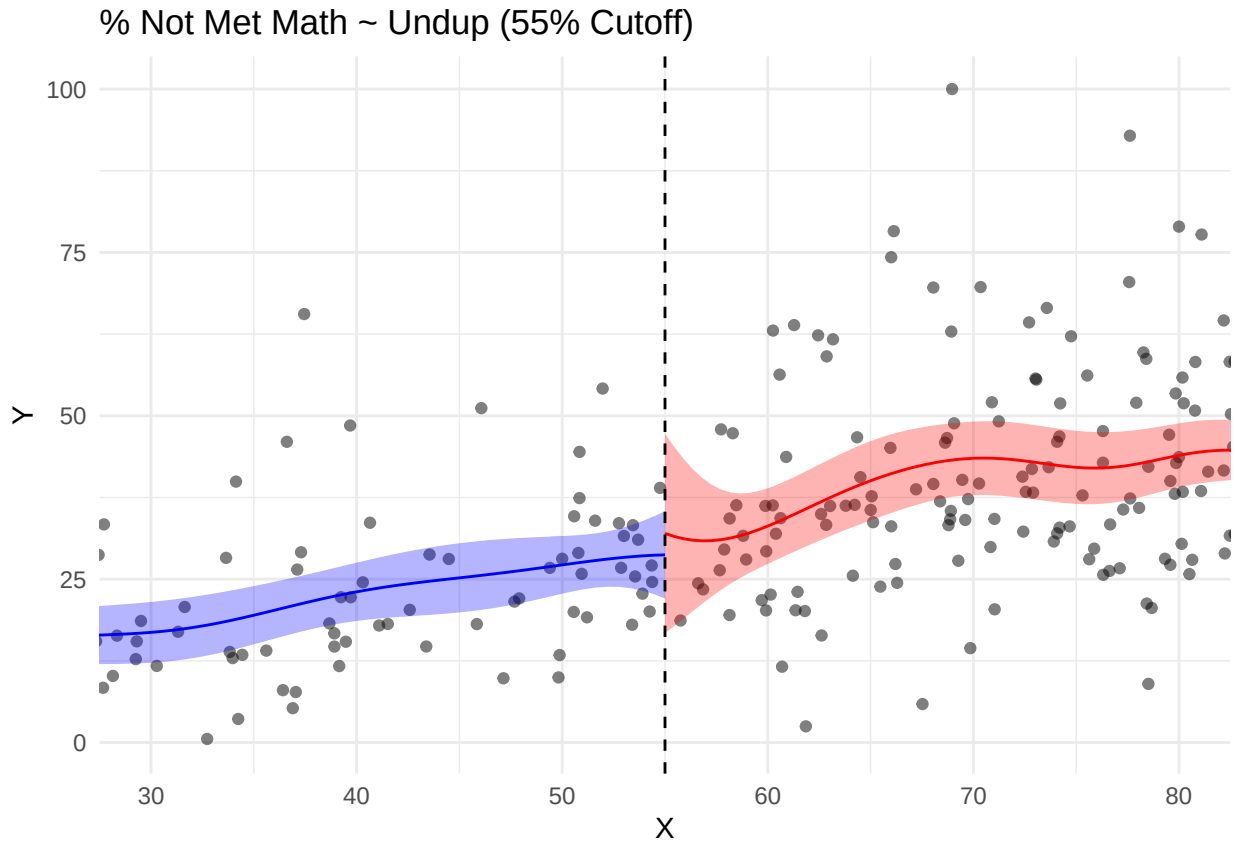
```
rdd_avg_pct_not_met_math_undup_55$se
```

```
## [1] 8.499056
```

```
rdd_avg_pct_not_met_math_undup_55$ci
```

```
##     lower     upper
## -13.37745  19.93824
```

```
rdd_plot_avg_pct_not_met_math_undup_55 <- gp_rdd_plot(rdd_avg_pct_not_met_math_undup_55) +
  geom_vline(xintercept = 55, linetype = "dashed") +
  coord_cartesian(xlim = c(30, 80)) +
  labs(title = "% Not Met Math ~ Undup (55% Cutoff)")
print(rdd_plot_avg_pct_not_met_math_undup_55)
```



GP RDD - avg_pct_not_met_Math ~ Undup % - 75 cutoff

```
rdd_avg_pct_not_met_math_undup_75 <- gp_rdd(df_clean$undup_pct, df_clean$avg_pct_not_met_Math, 75)
rdd_avg_pct_not_met_math_undup_75$tau
```

```
## [1] -3.075305
```

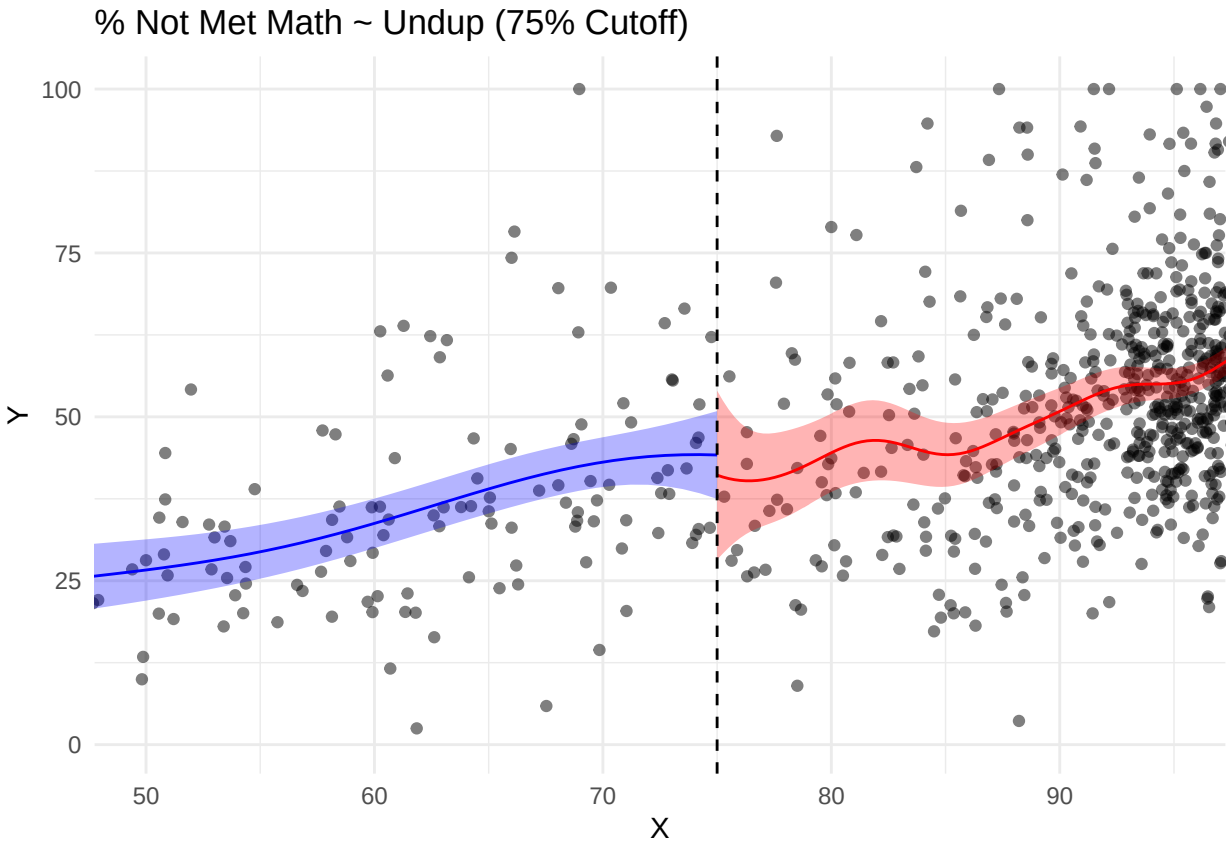
```
rdd_avg_pct_not_met_math_undup_75$se
```

```
## [1] 7.41122
```

```
rdd_avg_pct_not_met_math_undup_75$ci
```

```
##     lower     upper
## -17.60103  11.45042
```

```
rdd_plot_avg_pct_not_met_math_undup_75 <- gp_rdd_plot(rdd_avg_pct_not_met_math_undup_75) +
  geom_vline(xintercept = 75, linetype = "dashed") +
  coord_cartesian(xlim = c(50, 95)) +
  labs(title = "% Not Met Math ~ Undup (75% Cutoff)")
print(rdd_plot_avg_pct_not_met_math_undup_75)
```



GP RDD - avg_pct_not_met_Math ~ FRPM % - 35 cutoff

```
rdd_avg_pct_not_met_math_frpm_35 <- gp_rdd(df_clean$frpm_percent, df_clean$avg_pct_not_met_Math, 35)
rdd_avg_pct_not_met_math_frpm_35$tau
```

```
## [1] 17.33424
```

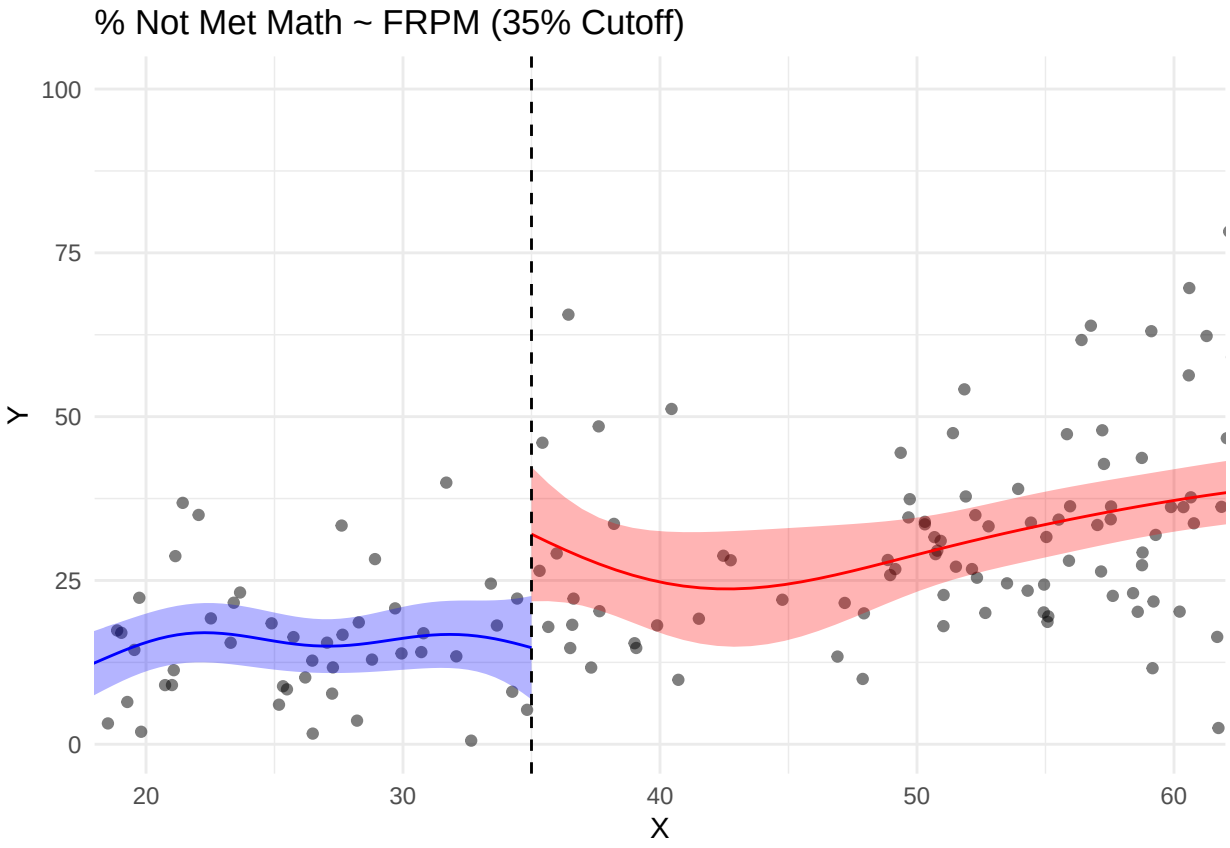
```
rdd_avg_pct_not_met_math_frpm_35$se
```

```
## [1] 6.600448
```

```
rdd_avg_pct_not_met_math_frpm_35$ci
```

```
##     lower     upper
##  4.397601 30.270883
```

```
rdd_plot_avg_pct_not_met_math_frpm_35 <- gp_rdd_plot(rdd_avg_pct_not_met_math_frpm_35) +
  geom_vline(xintercept = 35, linetype = "dashed") +
  coord_cartesian(xlim = c(20, 60)) +
  labs(title = "% Not Met Math ~ FRPM (35% Cutoff)")
print(rdd_plot_avg_pct_not_met_math_frpm_35)
```



GP RDD - avg_pct_not_met_Math ~ FRPM % - 75 cutoff

```
rdd_avg_pct_not_met_math_frpm_75 <- gp_rdd(df_clean$frpm_percent, df_clean$avg_pct_not_met_Math, 75)
rdd_avg_pct_not_met_math_frpm_75$tau
```

```
## [1] -6.403279
```

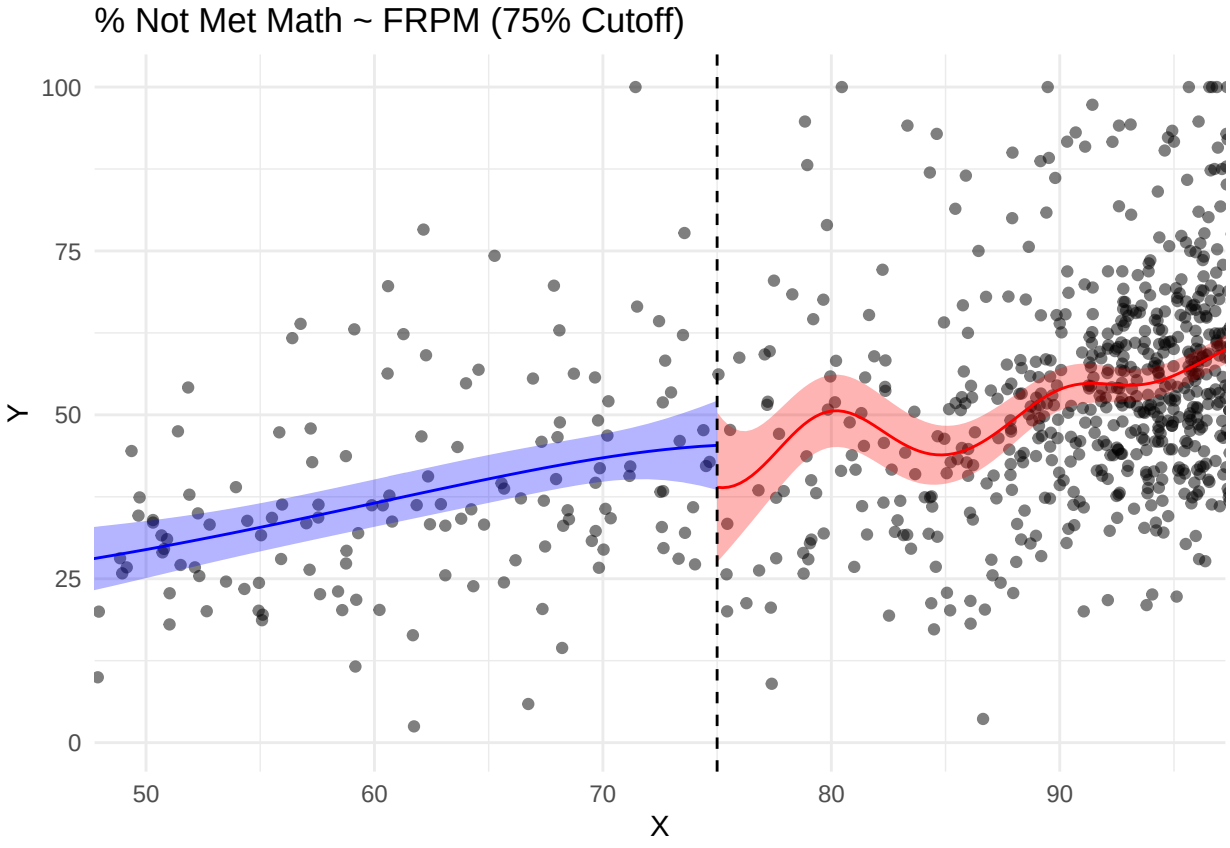
```
rdd_avg_pct_not_met_math_frpm_75$se
```

```
## [1] 6.779727
```

```
rdd_avg_pct_not_met_math_frpm_75$ci
```

```
##      lower      upper
## -19.691299   6.884742
```

```
rdd_plot_avg_pct_not_met_math_frpm_75 <- gp_rdd_plot(rdd_avg_pct_not_met_math_frpm_75) +
  geom_vline(xintercept = 75, linetype = "dashed") +
  coord_cartesian(xlim = c(50, 95)) +
  labs(title = "% Not Met Math ~ FRPM (75% Cutoff)")
print(rdd_plot_avg_pct_not_met_math_frpm_75)
```



GP RDD - avg_pct_not_met_Math ~ Undup % - 55 cutoff

```
rdd_avg_pct_not_met_math_undup_55 <- gp_rdd(df_clean$undup_pct, df_clean$avg_pct_not_met_Math, 55)
rdd_avg_pct_not_met_math_undup_55$tau
```

```
## [1] 3.280395
```

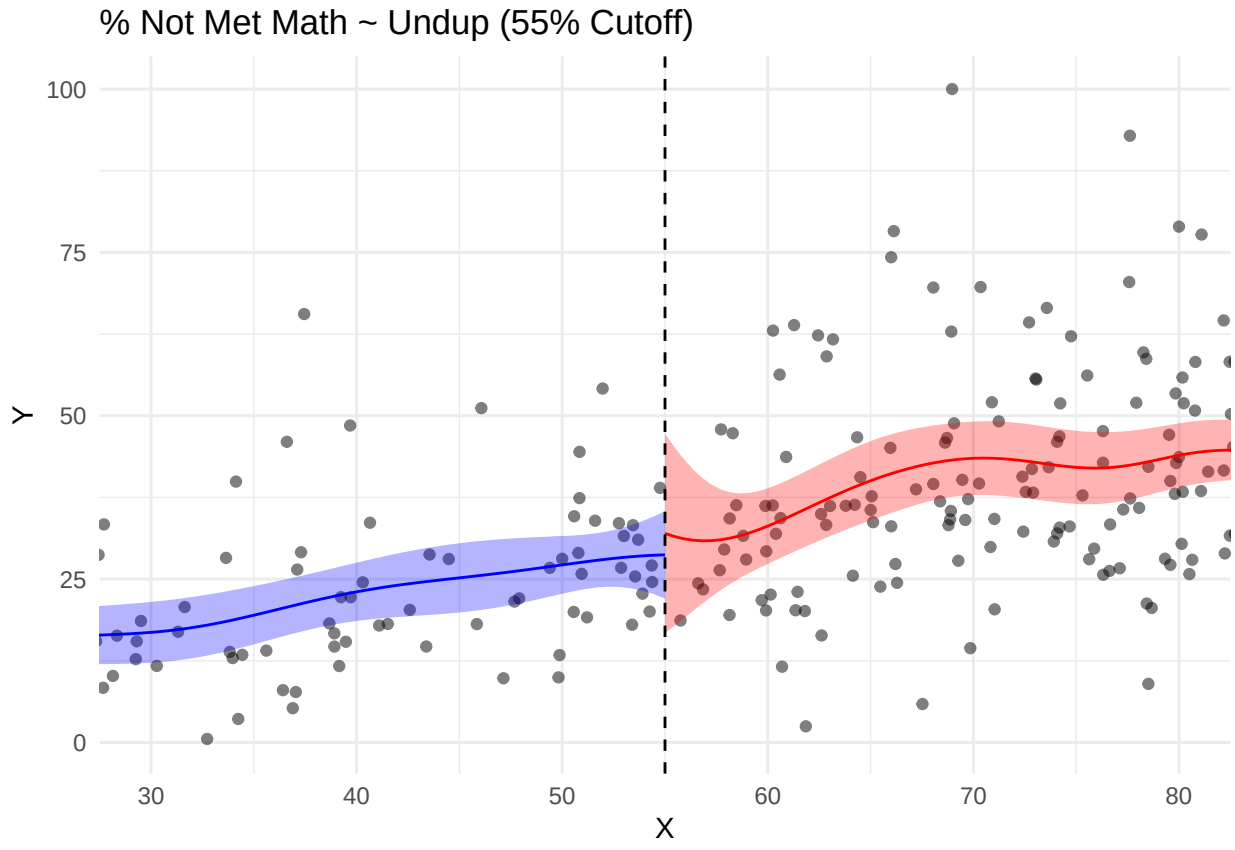
```
rdd_avg_pct_not_met_math_undup_55$se
```

```
## [1] 8.499056
```

```
rdd_avg_pct_not_met_math_undup_55$ci
```

```
##     lower     upper
## -13.37745  19.93824
```

```
rdd_plot_avg_pct_not_met_math_undup_55 <- gp_rdd_plot(rdd_avg_pct_not_met_math_undup_55) +
  geom_vline(xintercept = 55, linetype = "dashed") +
  coord_cartesian(xlim = c(30, 80)) +
  labs(title = "% Not Met Math ~ Undup (55% Cutoff)")
print(rdd_plot_avg_pct_not_met_math_undup_55)
```



GP RDD - avg_pct_not_met_Math ~ Undup % - 75 cutoff

```
rdd_avg_pct_not_met_math_undup_75 <- gp_rdd(df_clean$undup_pct, df_clean$avg_pct_not_met_Math, 75)
rdd_avg_pct_not_met_math_undup_75$tau
```

```
## [1] -3.075305
```

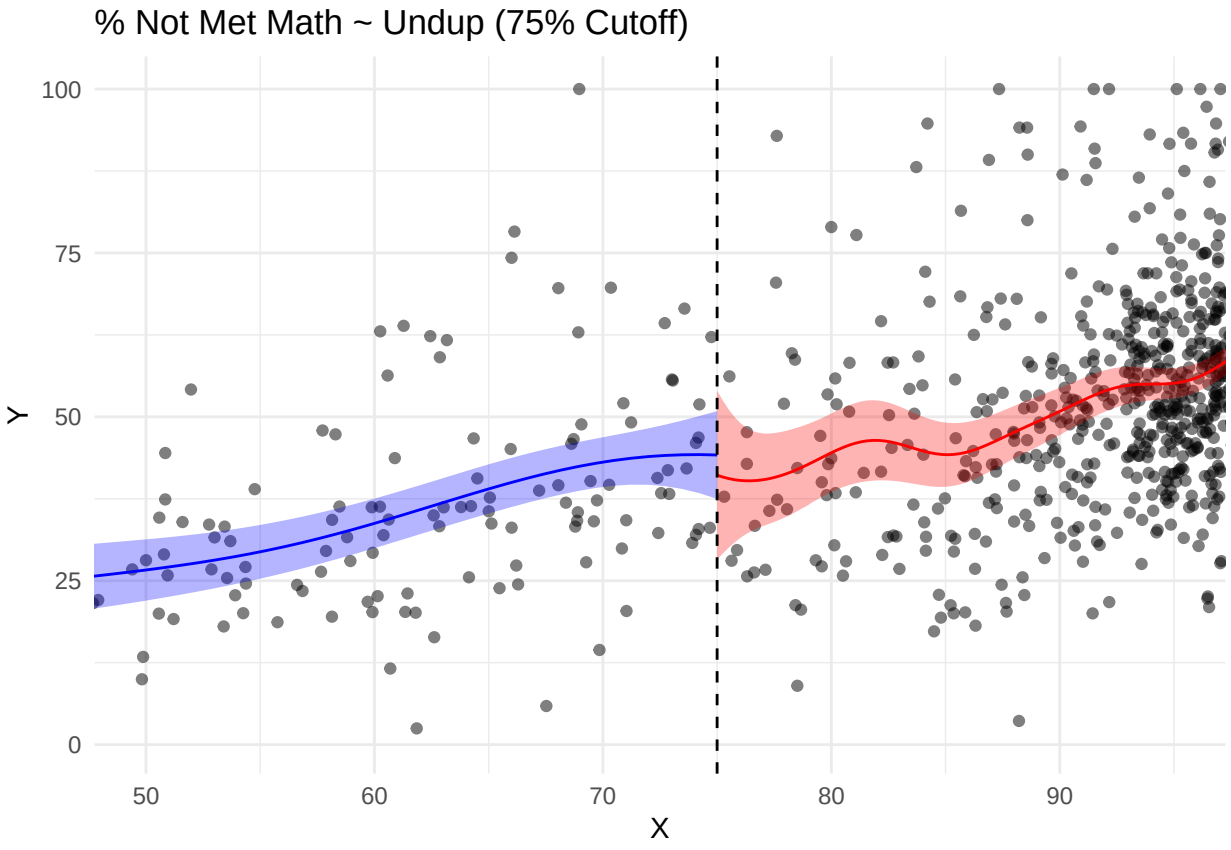
```
rdd_avg_pct_not_met_math_undup_75$se
```

```
## [1] 7.41122
```

```
rdd_avg_pct_not_met_math_undup_75$ci
```

```
##     lower     upper
## -17.60103  11.45042
```

```
rdd_plot_avg_pct_not_met_math_undup_75 <- gp_rdd_plot(rdd_avg_pct_not_met_math_undup_75) +
  geom_vline(xintercept = 75, linetype = "dashed") +
  coord_cartesian(xlim = c(50, 95)) +
  labs(title = "% Not Met Math ~ Undup (75% Cutoff)")
print(rdd_plot_avg_pct_not_met_math_undup_75)
```



GP RDD - avg_scale_score_ELA ~ FRPM % - 35 cutoff

```
rdd_avg_scale_score_ela_frpm_35 <- gp_rdd(df_clean$frpm_percent, df_clean$avg_scale_score_ELA, 35)
rdd_avg_scale_score_ela_frpm_35$tau
```

```
## [1] -26.29424
```

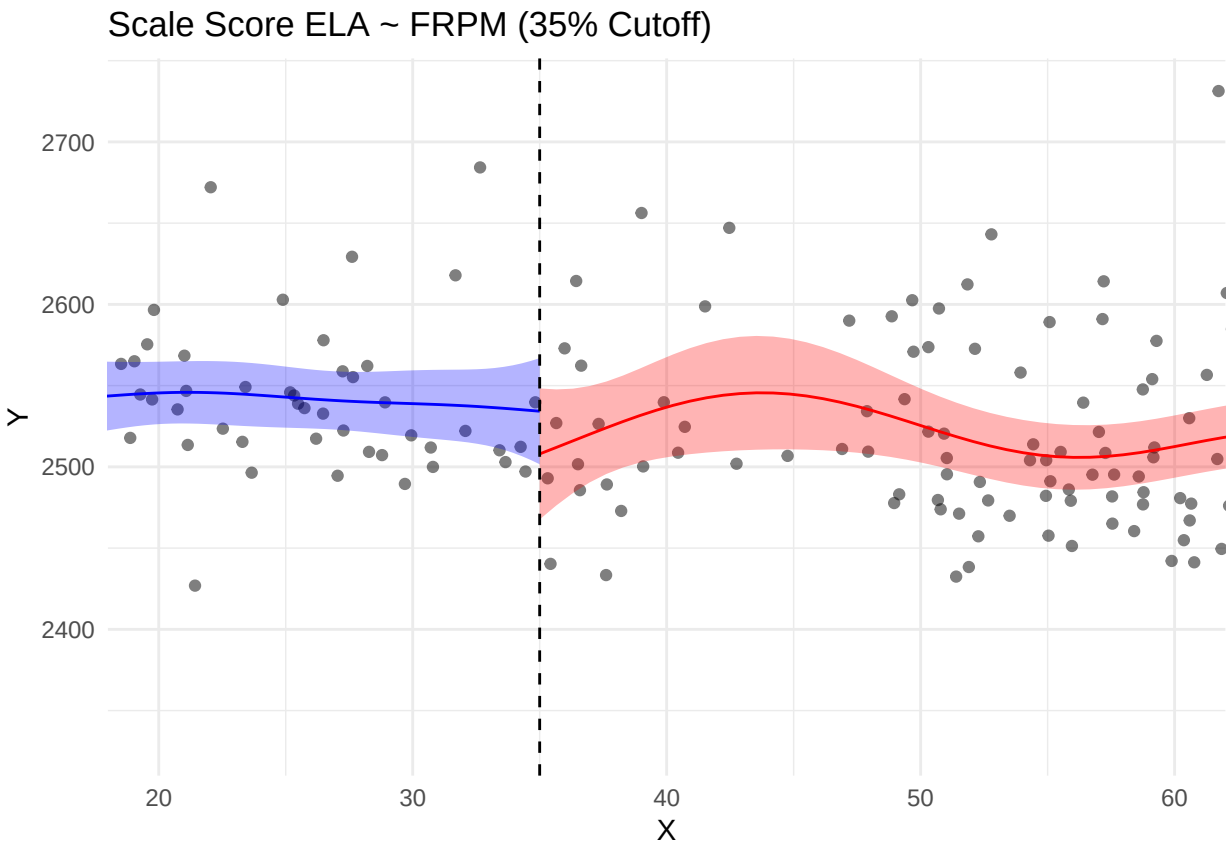
```
rdd_avg_scale_score_ela_frpm_35$se
```

```
## [1] 26.46124
```

```
rdd_avg_scale_score_ela_frpm_35$ci
```

```
##     lower     upper
## -78.15731  25.56883
```

```
rdd_plot_avg_scale_score_ela_frpm_35 <- gp_rdd_plot(rdd_avg_scale_score_ela_frpm_35) +
  geom_vline(xintercept = 35, linetype = "dashed") +
  coord_cartesian(xlim = c(20, 60)) +
  labs(title = "Scale Score ELA ~ FRPM (35% Cutoff)")
print(rdd_plot_avg_scale_score_ela_frpm_35)
```



GP RDD - avg_scale_score_ELA ~ FRPM % - 75 cutoff

```
rdd_avg_scale_score_ela_frpm_75 <- gp_rdd(df_clean$frpm_percent, df_clean$avg_scale_score_ELA, 75)
rdd_avg_scale_score_ela_frpm_75$tau
```

```
## [1] -3.876261
```

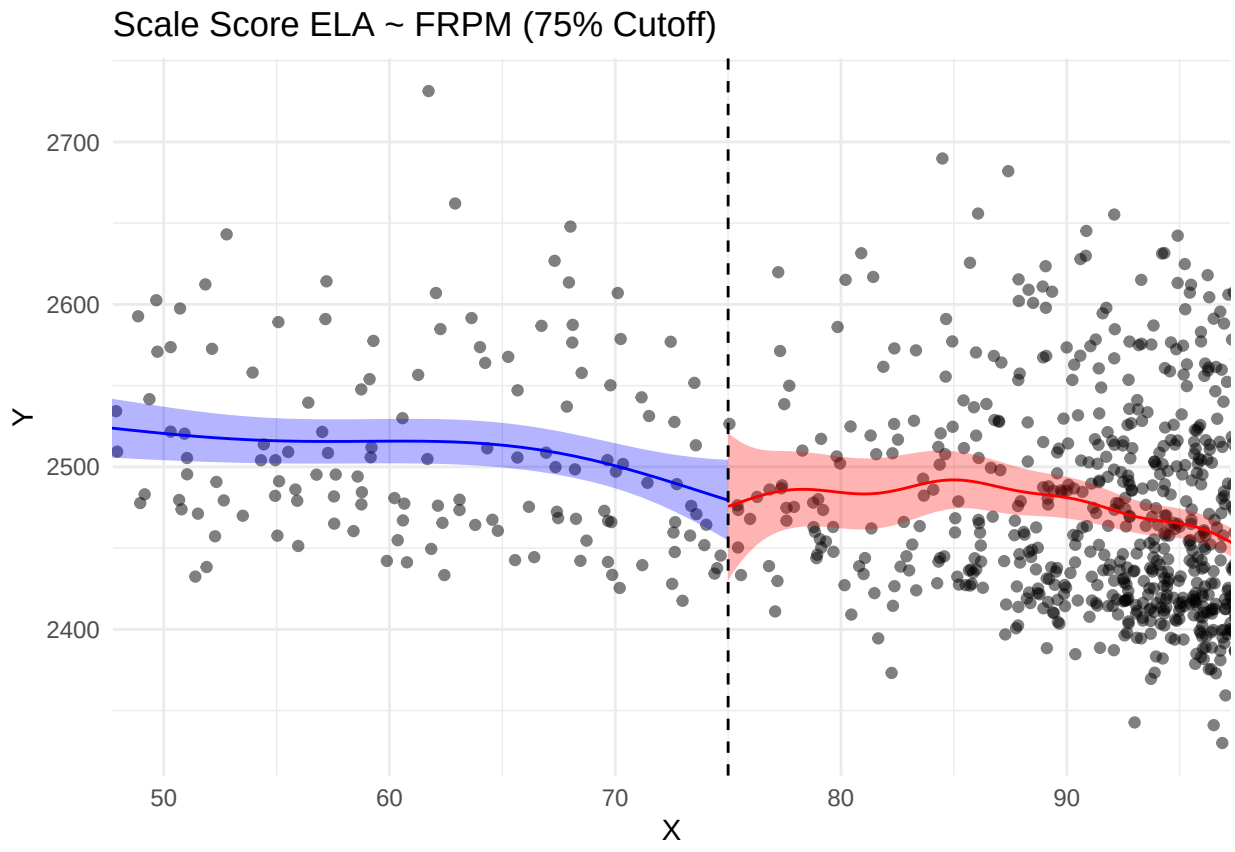
```
rdd_avg_scale_score_ela_frpm_75$se
```

```
## [1] 26.34177
```

```
rdd_avg_scale_score_ela_frpm_75$ci
```

```
##     lower     upper
## -55.50518  47.75266
```

```
rdd_plot_avg_scale_score_ela_frpm_75 <- gp_rdd_plot(rdd_avg_scale_score_ela_frpm_75) +
  geom_vline(xintercept = 75, linetype = "dashed") +
  coord_cartesian(xlim = c(50, 95)) +
  labs(title = "Scale Score ELA ~ FRPM (75% Cutoff)")
print(rdd_plot_avg_scale_score_ela_frpm_75)
```



GP RDD - avg_scale_score_ELA ~ Undup % - 55 cutoff

```
rdd_avg_scale_score_ela_undup_55 <- gp_rdd(df_clean$undup_pct, df_clean$avg_scale_score_ELA, 55)
rdd_avg_scale_score_ela_undup_55$tau
```

```
## [1] -9.839568
```

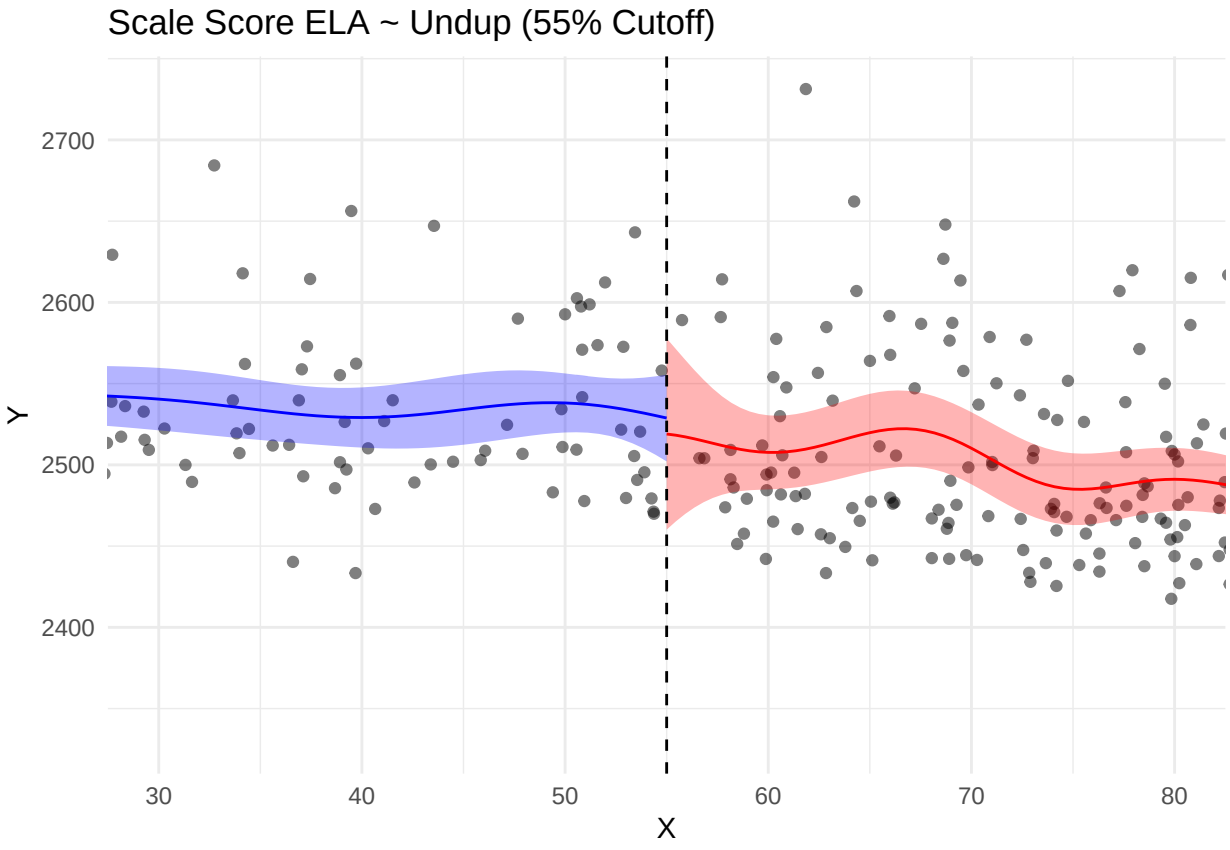
```
rdd_avg_scale_score_ela_undup_55$se
```

```
## [1] 32.97553
```

```
rdd_avg_scale_score_ela_undup_55$ci
```

```
##     lower     upper
## -74.47042  54.79128
```

```
rdd_plot_avg_scale_score_ela_undup_55 <- gp_rdd_plot(rdd_avg_scale_score_ela_undup_55) +
  geom_vline(xintercept = 55, linetype = "dashed") +
  coord_cartesian(xlim = c(30, 80)) +
  labs(title = "Scale Score ELA ~ Undup (55% Cutoff)")
print(rdd_plot_avg_scale_score_ela_undup_55)
```



GP RDD - avg_scale_score_ELA ~ Undup % - 75 cutoff

```
rdd_avg_scale_score_ela_undup_75 <- gp_rdd(df_clean$undup_pct, df_clean$avg_scale_score_ELA, 75)
rdd_avg_scale_score_ela_undup_75$tau
```

```
## [1] -25.9203
```

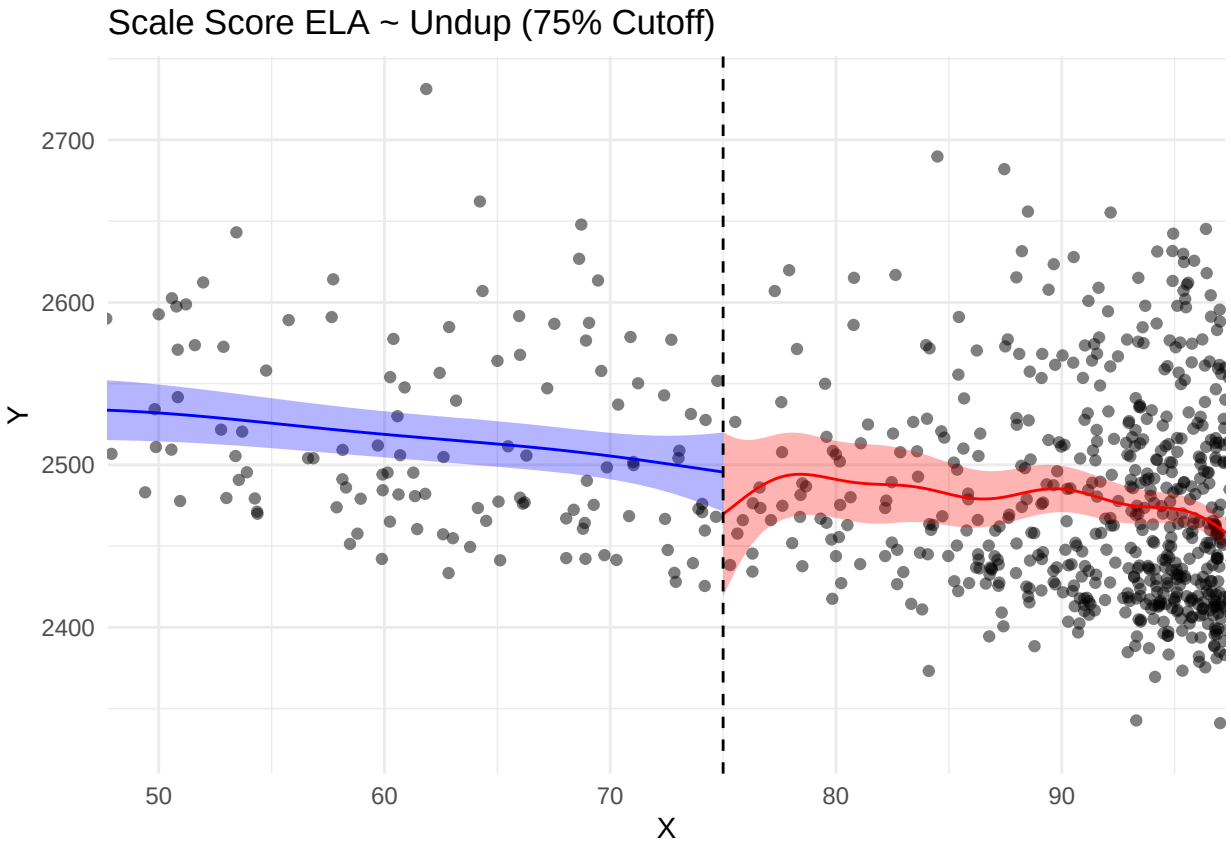
```
rdd_avg_scale_score_ela_undup_75$se
```

```
## [1] 28.64325
```

```
rdd_avg_scale_score_ela_undup_75$ci
```

```
##     lower     upper
## -82.06004  30.21944
```

```
rdd_plot_avg_scale_score_ela_undup_75 <- gp_rdd_plot(rdd_avg_scale_score_ela_undup_75) +
  geom_vline(xintercept = 75, linetype = "dashed") +
  coord_cartesian(xlim = c(50, 95)) +
  labs(title = "Scale Score ELA ~ Undup (75% Cutoff)")
print(rdd_plot_avg_scale_score_ela_undup_75)
```



GP RDD - avg_scale_score_Math ~ FRPM % - 35 cutoff

```
rdd_avg_scale_score_math_frpm_35 <- gp_rdd(df_clean$frpm_percent, df_clean$avg_scale_score_Math, 35)
rdd_avg_scale_score_math_frpm_35$tau
```

```
## [1] -42.42008
```

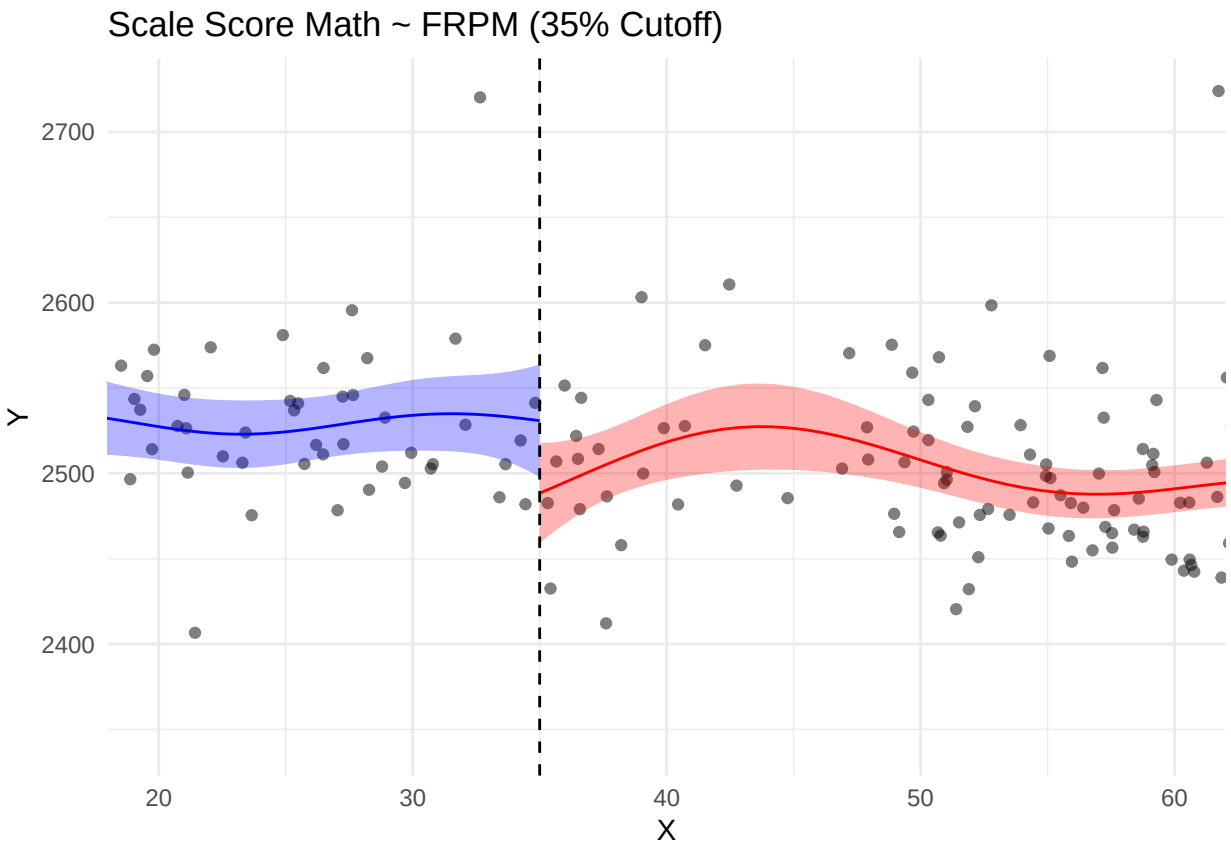
```
rdd_avg_scale_score_math_frpm_35$se
```

```
## [1] 22.44943
```

```
rdd_avg_scale_score_math_frpm_35$ci
```

```
##     lower     upper
## -86.42016   1.58000
```

```
rdd_plot_avg_scale_score_math_frpm_35 <- gp_rdd_plot(rdd_avg_scale_score_math_frpm_35) +
  geom_vline(xintercept = 35, linetype = "dashed") +
  coord_cartesian(xlim = c(20, 60)) +
  labs(title = "Scale Score Math ~ FRPM (35% Cutoff)")
print(rdd_plot_avg_scale_score_math_frpm_35)
```



GP RDD - avg_scale_score_Math ~ FRPM % - 75 cutoff

```
rdd_avg_scale_score_math_frpm_75 <- gp_rdd(df_clean$frpm_percent, df_clean$avg_scale_score_Math, 75)
rdd_avg_scale_score_math_frpm_75$tau
```

```
## [1] -0.7471646
```

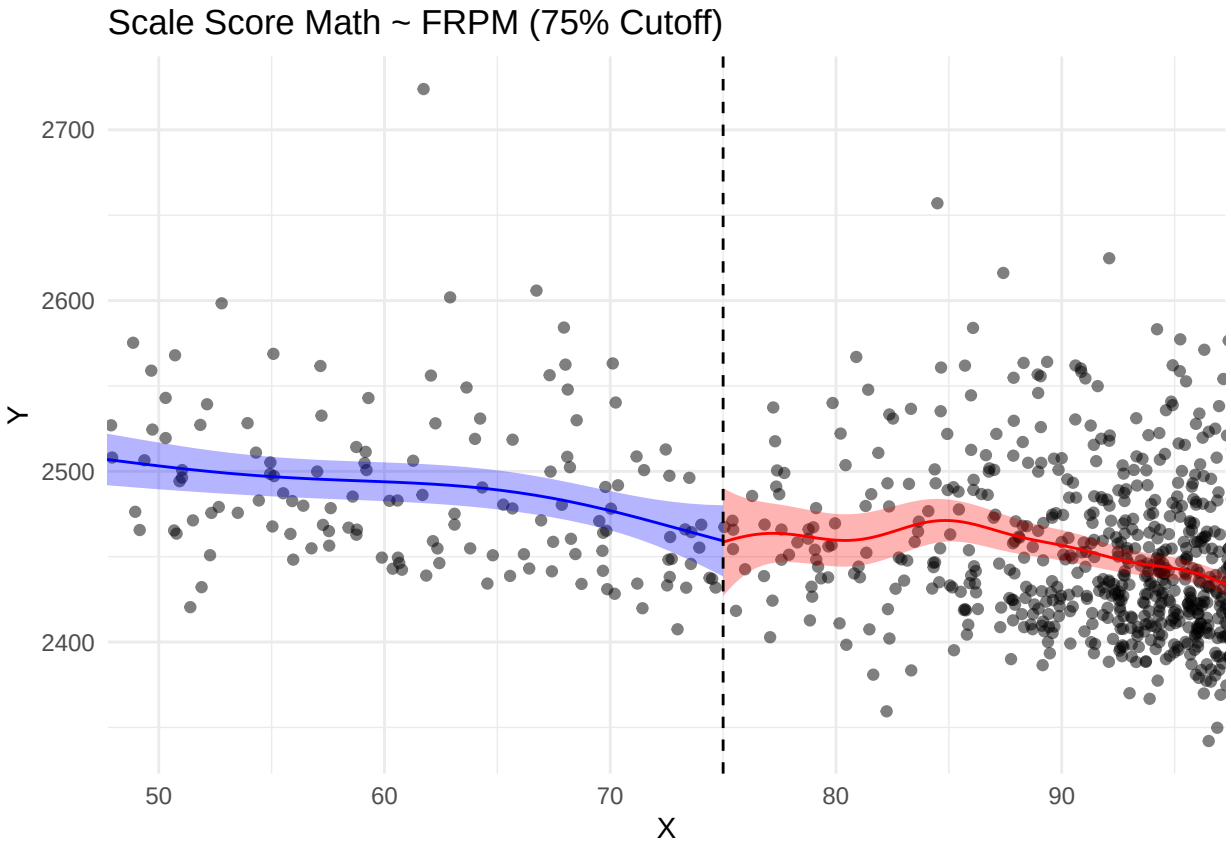
```
rdd_avg_scale_score_math_frpm_75$se
```

```
## [1] 19.36066
```

```
rdd_avg_scale_score_math_frpm_75$ci
```

```
##     lower     upper
## -38.69335  37.19902
```

```
rdd_plot_avg_scale_score_math_frpm_75 <- gp_rdd_plot(rdd_avg_scale_score_math_frpm_75) +
  geom_vline(xintercept = 75, linetype = "dashed") +
  coord_cartesian(xlim = c(50, 95)) +
  labs(title = "Scale Score Math ~ FRPM (75% Cutoff)")
print(rdd_plot_avg_scale_score_math_frpm_75)
```



GP RDD - avg_scale_score_Math ~ Undup % - 55 cutoff

```
rdd_avg_scale_score_math_undup_55 <- gp_rdd(df_clean$undup_pct, df_clean$avg_scale_score_Math, 55)
rdd_avg_scale_score_math_undup_55$tau
```

```
## [1] -7.184648
```

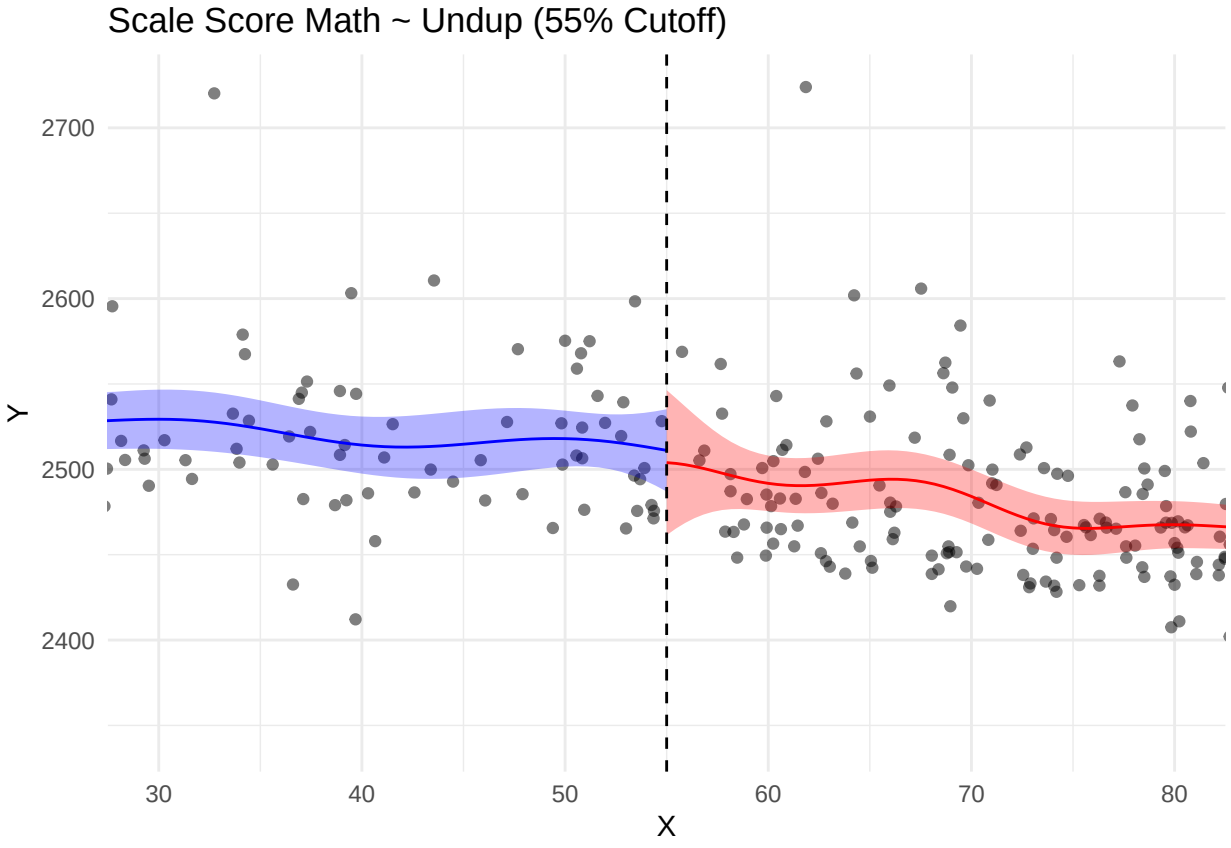
```
rdd_avg_scale_score_math_undup_55$se
```

```
## [1] 24.9183
```

```
rdd_avg_scale_score_math_undup_55$ci
```

```
##     lower     upper
## -56.02363  41.65433
```

```
rdd_plot_avg_scale_score_math_undup_55 <- gp_rdd_plot(rdd_avg_scale_score_math_undup_55) +
  geom_vline(xintercept = 55, linetype = "dashed") +
  coord_cartesian(xlim = c(30, 80)) +
  labs(title = "Scale Score Math ~ Undup (55% Cutoff)")
print(rdd_plot_avg_scale_score_math_undup_55)
```



GP RDD - avg_scale_score_Math ~ Undup % - 75 cutoff

```
rdd_avg_scale_score_math_undup_75 <- gp_rdd(df_clean$undup_pct, df_clean$avg_scale_score_Math, 75)
rdd_avg_scale_score_math_undup_75$tau
```

```
## [1] -17.77771
```

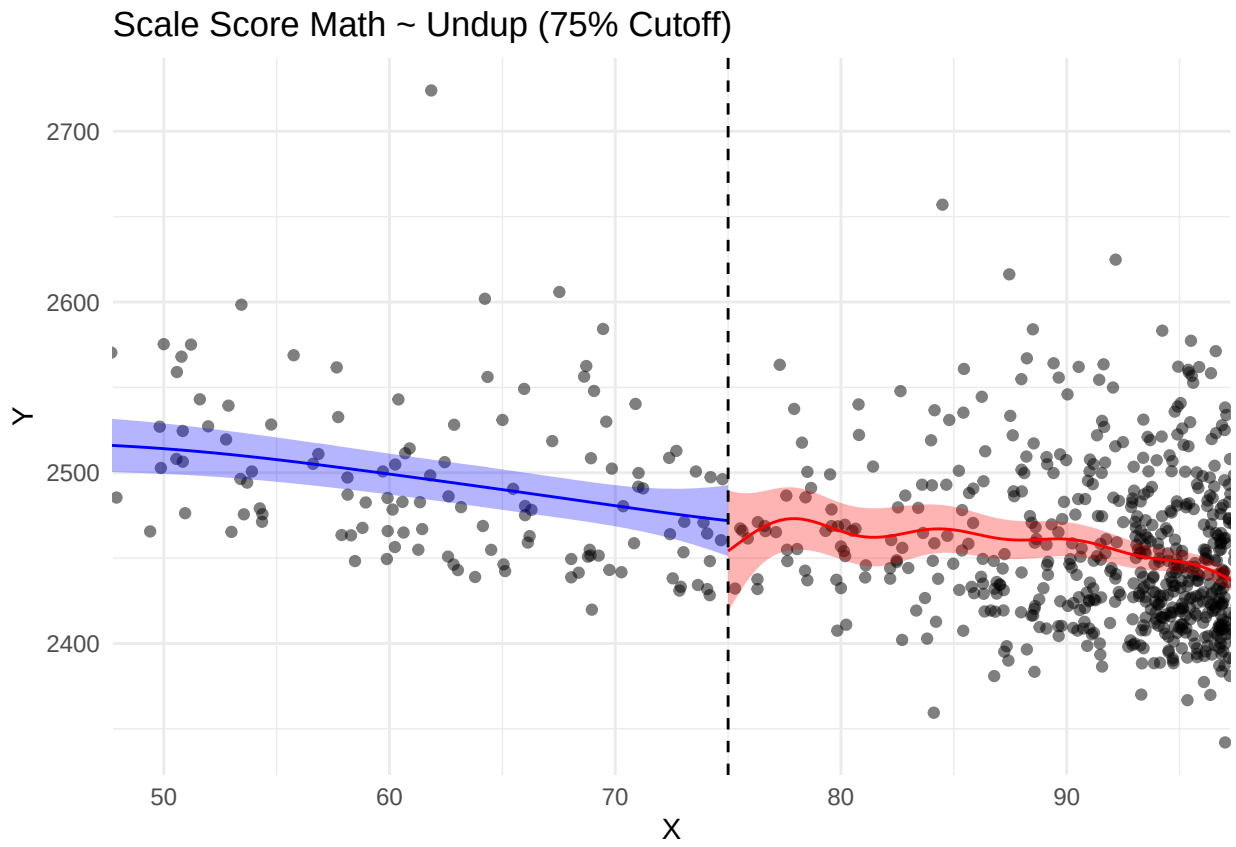
```
rdd_avg_scale_score_math_undup_75$se
```

```
## [1] 20.97702
```

```
rdd_avg_scale_score_math_undup_75$ci
```

```
##     lower     upper
## -58.89190  23.33649
```

```
rdd_plot_avg_scale_score_math_undup_75 <- gp_rdd_plot(rdd_avg_scale_score_math_undup_75) +
  geom_vline(xintercept = 75, linetype = "dashed") +
  coord_cartesian(xlim = c(50, 95)) +
  labs(title = "Scale Score Math ~ Undup (75% Cutoff)")
print(rdd_plot_avg_scale_score_math_undup_75)
```



Outcome Summary Table

```r
# Utility function to extract results from a gp_rdd object
extract_rdd_result <- function(obj, label) {
  tibble(
    model = label,
    tau = obj$tau,
    se = obj$se,
    ci_lower = obj$ci[1],
    ci_upper = obj$ci[2],
    p_value = 2 * pnorm(-abs(obj$tau / obj$se)),
    significant = ifelse(p_value < 0.05, TRUE, FALSE)
  )
}

# Combine all results into one table
rdd_summary_table <- bind_rows(
  extract_rdd_result(rdd_avg_pct_met_above_ela_frpm_35, "% MetAbove ELA ~ FRPM (35%)"),
  extract_rdd_result(rdd_avg_pct_met_above_ela_frpm_75, "% MetAbove ELA ~ FRPM (75%)"),
  extract_rdd_result(rdd_avg_pct_met_above_ela_undup_55, "% MetAbove ELA ~ Undup (55%)"),
  extract_rdd_result(rdd_avg_pct_met_above_ela_undup_75, "% MetAbove ELA ~ Undup (75%)"),
  extract_rdd_result(rdd_avg_pct_met_above_math_frpm_35, "% MetAbove Math ~ FRPM (35%)"),
  extract_rdd_result(rdd_avg_pct_met_above_math_frpm_75, "% MetAbove Math ~ FRPM (75%)"),
  extract_rdd_result(rdd_avg_pct_met_above_math_undup_55, "% MetAbove Math ~ Undup (55%)"),
  extract_rdd_result(rdd_avg_pct_met_above_math_undup_75, "% MetAbove Math ~ Undup (75%)"),
  extract_rdd_result(rdd_res_absenteeism_frpm_35_cutoff, "Chronic Absenteeism ~ FRPM (35%)"),
  extract_rdd_result(rdd_res_absenteeism_frpm_75_cutoff, "Chronic Absenteeism ~ FRPM (75%)"),
  extract_rdd_result(rdd_res_absenteeism_BTB_35_cutoff, "BTB ~ FRPM (35%)"),
  extract_rdd_result(rdd_res_absenteeism_BTB_75_cutoff, "BTB ~ FRPM (75%)"),
  extract_rdd_result(rdd_res_absenteeism_undup_55_cutoff, "Chronic Absenteeism ~ Undup (55%)"),
  extract_rdd_result(rdd_res_absenteeism_undup_75_cutoff, "Chronic Absenteeism ~ Undup (75%)"),
  extract_rdd_result(rdd_avg_pct_not_met_math_frpm_35, "% Not Met Math ~ FRPM (35%)"),
  extract_rdd_result(rdd_avg_pct_not_met_math_frpm_75, "% Not Met Math ~ FRPM (75%)"),
  extract_rdd_result(rdd_avg_pct_not_met_math_undup_55, "% Not Met Math ~ Undup (55%)"),
  extract_rdd_result(rdd_avg_pct_not_met_math_undup_75, "% Not Met Math ~ Undup (75%)"),
  extract_rdd_result(rdd_avg_scale_score_ela_frpm_35, "Scale ELA ~ FRPM (35%)"),
  extract_rdd_result(rdd_avg_scale_score_ela_frpm_75, "Scale ELA ~ FRPM (75%)"),
  extract_rdd_result(rdd_avg_scale_score_ela_undup_55, "Scale ELA ~ Undup (55%)"),
  extract_rdd_result(rdd_avg_scale_score_ela_undup_75, "Scale ELA ~ Undup (75%)"),
  extract_rdd_result(rdd_avg_scale_score_math_frpm_35, "Scale Math ~ FRPM (35%)"),
  extract_rdd_result(rdd_avg_scale_score_math_frpm_75, "Scale Math ~ FRPM (75%)"),
  extract_rdd_result(rdd_avg_scale_score_math_undup_55, "Scale Math ~ Undup (55%)"),
  extract_rdd_result(rdd_avg_scale_score_math_undup_75, "Scale Math ~ Undup (75%)")
)

print(rdd_summary_table, n = Inf)
```

```
## # A tibble: 26 x 7
##    model                        tau     se ci_lower ci_upper p_value significant
##    <chr>                      <dbl>  <dbl>    <dbl>    <dbl>   <dbl> <lgl>
##  1 % MetAbove ELA ~ FRPM ~ -13.3     6.73   -26.4    -0.0687 0.0488  TRUE
##  2 % MetAbove ELA ~ FRPM ~   4.23    5.99    -7.51   16.0    0.480   FALSE
##  3 % MetAbove ELA ~ Undup~  -1.72    7.64   -16.7    13.3    0.822   FALSE
##  4 % MetAbove ELA ~ Undup~  -1.76    6.43   -14.4    10.8    0.784   FALSE
##  5 % MetAbove Math ~ FRPM~ -20.6     7.39   -35.1    -6.09   0.00535 TRUE
```

```
##  6 % MetAbove Math ~ FRPM~   4.42    5.59    -6.53   15.4    0.429   FALSE
##  7 % MetAbove Math ~ Undu~  -2.11    7.40   -16.6    12.4    0.776   FALSE
##  8 % MetAbove Math ~ Undu~   3.74    5.99    -8.01   15.5    0.533   FALSE
##  9 Chronic Absenteeism ~ ~   7.87    5.74    -3.38   19.1    0.171   FALSE
## 10 Chronic Absenteeism ~ ~  -0.0740  6.06   -12.0    11.8    0.990   FALSE
## 11 BTB ~ FRPM (35%)         -0.231   0.224   -0.669   0.208  0.303   FALSE
## 12 BTB ~ FRPM (75%)         -0.159   0.208   -0.567   0.249  0.445   FALSE
## 13 Chronic Absenteeism ~ ~   3.06    7.58   -11.8    17.9    0.687   FALSE
## 14 Chronic Absenteeism ~ ~  -1.67    6.68   -14.8    11.4    0.803   FALSE
## 15 % Not Met Math ~ FRPM ~  17.3     6.60     4.40   30.3    0.00863 TRUE
## 16 % Not Met Math ~ FRPM ~  -6.40    6.78   -19.7     6.88   0.345   FALSE
## 17 % Not Met Math ~ Undup~   3.28    8.50   -13.4    19.9    0.700   FALSE
## 18 % Not Met Math ~ Undup~  -3.08    7.41   -17.6    11.5    0.678   FALSE
## 19 Scale ELA ~ FRPM (35%)  -26.3    26.5    -78.2    25.6    0.320   FALSE
## 20 Scale ELA ~ FRPM (75%)   -3.88   26.3    -55.5    47.8    0.883   FALSE
## 21 Scale ELA ~ Undup (55%)  -9.84   33.0    -74.5    54.8    0.765   FALSE
## 22 Scale ELA ~ Undup (75%) -25.9    28.6    -82.1    30.2    0.365   FALSE
## 23 Scale Math ~ FRPM (35%) -42.4    22.4    -86.4     1.58   0.0588  FALSE
## 24 Scale Math ~ FRPM (75%)  -0.747  19.4    -38.7    37.2    0.969   FALSE
## 25 Scale Math ~ Undup (55~  -7.18   24.9    -56.0    41.7    0.773   FALSE
## 26 Scale Math ~ Undup (75~ -17.8    21.0    -58.9    23.3    0.397   FALSE
```

Balance Tests with Xs

```r
#
# Balance Tests with GP-RDD for Two Running Variables (FRPM and UPP)
#
library(dplyr)
library(tidyr)
library(gpss)

# ------------------------------
# Continuous Covariates Balance via GP-RDD
# ------------------------------
gp_rdd_balance_test_cont <- function(df, var, running_var, cutoff) {
  df_sub <- df %>% filter(!is.na(.data[[var]]), !is.na(.data[[running_var]]))

  rdd_result <- gp_rdd(df_sub[[running_var]], df_sub[[var]], cutoff)

  tibble(
    variable = var,
    running_var = running_var,
    cutoff = cutoff,
    tau = rdd_result$tau,
    se = rdd_result$se,
    p_value = 2 * pnorm(-abs(rdd_result$tau / rdd_result$se)),
    ci_lower = rdd_result$ci[1],
    ci_upper = rdd_result$ci[2]
  )
}
```

```r
# ----------------------------
# Binary Categorical Covariates Balance via GP-RDD
# ----------------------------
gp_rdd_balance_test_binary <- function(df, var, running_var, cutoff) {
  df_sub <- df %>% filter(!is.na(.data[[var]]), !is.na(.data[[running_var]]))
  df_sub <- df_sub %>% mutate(dummy = as.numeric(trimws(.data[[var]]) == "Yes" | .data[[var]] == 1))

  rdd_result <- gp_rdd(df_sub[[running_var]], df_sub$dummy, cutoff)

  tibble(
    variable = var,
    running_var = running_var,
    cutoff = cutoff,
    tau = rdd_result$tau,
    se = rdd_result$se,
    p_value = 2 * pnorm(-abs(rdd_result$tau / rdd_result$se)),
    ci_lower = rdd_result$ci[1],
    ci_upper = rdd_result$ci[2]
  )
}

# ----------------------------
# Run All Balance Tests
# ----------------------------
continuous_covariates <- c("pct_hispanic", "pct_black", "pct_white", "pct_asian",
                           "pct_two_or_more", "pct_other", "total_enroll")
categorical_covariates <- c("Charter.School", "DASS")

cutoffs <- list(
  list(running = "frpm_rate", value = 0.35),
  list(running = "frpm_rate", value = 0.75),
  list(running = "undup_pct", value = 55),
  list(running = "undup_pct", value = 75)
)

balance_all <- purrr::map_dfr(cutoffs, function(cut) {
  cont_results <- purrr::map_dfr(continuous_covariates, ~gp_rdd_balance_test_cont(df_clean, .x, cut$runn
  cat_results  <- purrr::map_dfr(categorical_covariates, ~gp_rdd_balance_test_binary(df_clean, .x, cut$
  bind_rows(cont_results, cat_results)
})

# ----------------------------
# Print results
# ----------------------------
print(balance_all)
```

```
## # A tibble: 36 x 8
##    variable        running_var cutoff      tau      se p_value ci_lower ci_upper
##    <chr>           <chr>        <dbl>    <dbl>   <dbl>   <dbl>    <dbl>    <dbl>
##  1 pct_hispanic    frpm_rate     0.35  1.64e+1 6.82e+0  0.0162    3.04    29.8
##  2 pct_black       frpm_rate     0.35  3.49e+0 5.10e+0  0.493    -6.50    13.5
##  3 pct_white       frpm_rate     0.35 -1.17e+1 6.05e+0  0.0534  -23.5      0.171
##  4 pct_asian       frpm_rate     0.35 -7.62e+0 4.42e+0  0.0848  -16.3      1.04
```

```
##  5 pct_two_or_more frpm_rate     0.35  6.36e-1 1.77e+0  0.719    -2.83     4.10
##  6 pct_other       frpm_rate     0.35 -5.49e-1 4.83e+0  0.910   -10.0      8.92
##  7 total_enroll    frpm_rate     0.35 -2.10e+1 3.05e+2  0.945  -618.     576.
##  8 Charter.School  frpm_rate     0.35  1.53e-1 2.43e-1  0.531    -0.324    0.629
##  9 DASS            frpm_rate     0.35  7.38e-3 8.48e-2  0.931    -0.159    0.174
## 10 pct_hispanic    frpm_rate     0.75  6.27e+0 7.28e+0  0.389    -8.00    20.5
## # i 26 more rows
```

Unduplicate Peers % Balance Tests

```
# Function to run GP-RDD balance test using UPP as the running variable
gp_rdd_balance_test_upp <- function(df, var, cutoff = 55) {
  df_sub <- df %>% filter(!is.na(.data[[var]]), !is.na(undup_pct))

  rdd_result <- gp_rdd(df_sub$undup_pct, df_sub[[var]], cutoff)

  tibble(
    variable = var,
    tau = rdd_result$tau,
    se = rdd_result$se,
    p_value = 2 * pnorm(-abs(rdd_result$tau / rdd_result$se)),
    ci_lower = rdd_result$ci[1],
    ci_upper = rdd_result$ci[2]
  )
}

# List of covariates to test for balance
covariates <- c(
  "pct_hispanic", "pct_black", "pct_white", "pct_asian",
  "pct_two_or_more", "pct_other"
)

# Run tests around UPP = 55%
balance_upp_55 <- lapply(covariates, gp_rdd_balance_test_upp, df = df_clean, cutoff = 55) %>%
  bind_rows()

# Run tests around UPP = 75%
balance_upp_75 <- lapply(covariates, gp_rdd_balance_test_upp, df = df_clean, cutoff = 75) %>%
  bind_rows()

# Display results
print("GP-RDD Balance Tests around UPP 55% cutoff")
```

```
## [1] "GP-RDD Balance Tests around UPP 55% cutoff"
```

```
print(balance_upp_55)
```

```
## # A tibble: 6 x 6
##   variable            tau    se  p_value ci_lower ci_upper
##   <chr>             <dbl> <dbl>    <dbl>    <dbl>    <dbl>
## 1 pct_hispanic     16.5    8.71 0.0587     -0.606    33.5
```

```
## 2 pct_black        -1.58   7.21 0.827     -15.7      12.6
## 3 pct_white       -18.5    5.01 0.000220  -28.3      -8.70
## 4 pct_asian         5.98   3.22 0.0631     -0.325    12.3
## 5 pct_two_or_more  -0.559  1.22 0.646      -2.94      1.82
## 6 pct_other        -2.46   3.00 0.412      -8.33      3.41
```

```
print("GP-RDD Balance Tests around UPP 75% cutoff")
```

```
## [1] "GP-RDD Balance Tests around UPP 75% cutoff"
```

```
print(balance_upp_75)
```

```
## # A tibble: 6 x 6
##   variable          tau    se p_value ci_lower ci_upper
##   <chr>           <dbl> <dbl>   <dbl>    <dbl>    <dbl>
## 1 pct_hispanic    -5.81 7.56    0.442   -20.6     9.00
## 2 pct_black        1.51 6.55    0.818   -11.3    14.4
## 3 pct_white        5.55 3.97    0.162    -2.23   13.3
## 4 pct_asian        2.89 2.37    0.223    -1.76    7.54
## 5 pct_two_or_more -1.04 0.843   0.218    -2.69    0.613
## 6 pct_other       -3.50 2.31    0.129    -8.02    1.02
```

Covariate-Adjusted RD $Y \sim D \mid X$

```
#
# Covariate-Adjusted GP-RDD Models (FRPM = 35%, Undup = 55%)
#

# Helper function to run adjusted GP-RDD model
run_adjusted_rdd <- function(outcome_var, running_var, cutoff, covariates, data) {
  formula_str <- paste0(
    outcome_var, " ~ I(", running_var, " >= ", cutoff, ") + ",
    running_var, " + ",
    paste(covariates, collapse = " + ")
  )

  model <- gpss(
    formula = as.formula(formula_str),
    data = data
  )

  est <- summary(model)$coefficients
  tau_row <- est[grepl(paste0("I\\(", running_var, " >= ", cutoff, "\\)"), rownames(est)), ]

  tibble(
    model = paste(outcome_var, "~", running_var, "adj @", cutoff),
    tau = tau_row["Estimate"],
    se = tau_row["Std. Error"],
    ci_lower = tau_row["Estimate"] - 1.96 * tau_row["Std. Error"],
    ci_upper = tau_row["Estimate"] + 1.96 * tau_row["Std. Error"],
```

```
    p_value = 2 * pnorm(-abs(tau_row["Estimate"] / tau_row["Std. Error"])),
    significant = p_value < 0.05
  )
}

# Variables and cutoffs to adjust for
outcomes <- c(
  "avg_pct_met_above_ELA",
  "avg_pct_met_above_Math",
  "avg_pct_not_met_ELA",
  "avg_pct_not_met_Math",
  "avg_scale_score_ELA",
  "avg_scale_score_Math",
  "chronic_absenteeism",
  "btb"
)

covariates_to_adjust <- c("Charter.School", "DASS", "pct_hispanic", "pct_white", "pct_two_or_more")

# Generate adjusted model results
adjusted_results <- bind_rows(
  # FRPM = 35%
  purrr::map_dfr(outcomes, ~run_adjusted_rdd(.x, "frpm_percent", 35, covariates_to_adjust, df_clean)),

  # Undup = 55%
  purrr::map_dfr(outcomes, ~run_adjusted_rdd(.x, "undup_pct", 55, covariates_to_adjust, df_clean))
)
```

```
## Basic Model Information
## formula: avg_pct_met_above_ELA ~ I(frpm_percent >= 35) + frpm_percent +
##     Charter.School + DASS + pct_hispanic + pct_white + pct_two_or_more
## <environment: 0x136147af8>
## number of observations:  951
## number of covariates:  7
## mixed data (containing a categorical variable?): FALSE
##
## Hyperparrameters
## b (bandwidth): 3.740302
## s2 (noise variance): 0.3
##
## Scaling information
## scaled: FALSE
##
## Usage Example
## e.g. fit <- gpss(Y~X)to extract SEs of fitted values: sqrt(diag(fit$post_cov_orig))Basic Model Infor
## formula: avg_pct_met_above_Math ~ I(frpm_percent >= 35) + frpm_percent +
##     Charter.School + DASS + pct_hispanic + pct_white + pct_two_or_more
## <environment: 0x159c9fee8>
## number of observations:  949
## number of covariates:  7
## mixed data (containing a categorical variable?): FALSE
##
## Hyperparrameters
```

```
## b (bandwidth): 3.662685
## s2 (noise variance): 0.3
##
## Scaling information
## scaled: FALSE
##
## Usage Example
## e.g. fit <- gpss(Y~X)to extract SEs of fitted values: sqrt(diag(fit$post_cov_orig))Basic Model Inform
## formula: avg_pct_not_met_ELA ~ I(frpm_percent >= 35) + frpm_percent +
##     Charter.School + DASS + pct_hispanic + pct_white + pct_two_or_more
## <environment: 0x13fa65a58>
## number of observations:  951
## number of covariates:  7
## mixed data (containing a categorical variable?): FALSE
##
## Hyperparrameters
## b (bandwidth): 3.740302
## s2 (noise variance): 0.3
##
## Scaling information
## scaled: FALSE
##
## Usage Example
## e.g. fit <- gpss(Y~X)to extract SEs of fitted values: sqrt(diag(fit$post_cov_orig))Basic Model Inform
## formula: avg_pct_not_met_Math ~ I(frpm_percent >= 35) + frpm_percent +
##     Charter.School + DASS + pct_hispanic + pct_white + pct_two_or_more
## <environment: 0x14c629ad0>
## number of observations:  949
## number of covariates:  7
## mixed data (containing a categorical variable?): FALSE
##
## Hyperparrameters
## b (bandwidth): 3.662685
## s2 (noise variance): 0.3
##
## Scaling information
## scaled: FALSE
##
## Usage Example
## e.g. fit <- gpss(Y~X)to extract SEs of fitted values: sqrt(diag(fit$post_cov_orig))Basic Model Inform
## formula: avg_scale_score_ELA ~ I(frpm_percent >= 35) + frpm_percent +
##     Charter.School + DASS + pct_hispanic + pct_white + pct_two_or_more
## <environment: 0x12d812780>
## number of observations:  950
## number of covariates:  7
## mixed data (containing a categorical variable?): FALSE
##
## Hyperparrameters
## b (bandwidth): 3.736994
## s2 (noise variance): 0.3
##
## Scaling information
## scaled: FALSE
##
```

```
## Usage Example
## e.g. fit <- gpss(Y~X)to extract SEs of fitted values: sqrt(diag(fit$post_cov_orig))Basic Model Infor
## formula: avg_scale_score_Math ~ I(frpm_percent >= 35) + frpm_percent +
##     Charter.School + DASS + pct_hispanic + pct_white + pct_two_or_more
## <environment: 0x14c5e55c8>
## number of observations:  948
## number of covariates:  7
## mixed data (containing a categorical variable?): FALSE
##
## Hyperparrameters
## b (bandwidth): 3.659446
## s2 (noise variance): 0.3
##
## Scaling information
## scaled: FALSE
##
## Usage Example
## e.g. fit <- gpss(Y~X)to extract SEs of fitted values: sqrt(diag(fit$post_cov_orig))Basic Model Infor
## formula: chronic_absenteeism ~ I(frpm_percent >= 35) + frpm_percent +
##     Charter.School + DASS + pct_hispanic + pct_white + pct_two_or_more
## <environment: 0x14c52a7a8>
## number of observations:  1001
## number of covariates:  7
## mixed data (containing a categorical variable?): FALSE
##
## Hyperparrameters
## b (bandwidth): 4.069316
## s2 (noise variance): 0.3
##
## Scaling information
## scaled: FALSE
##
## Usage Example
## e.g. fit <- gpss(Y~X)to extract SEs of fitted values: sqrt(diag(fit$post_cov_orig))Basic Model Infor
## formula: btb ~ I(frpm_percent >= 35) + frpm_percent + Charter.School +
##     DASS + pct_hispanic + pct_white + pct_two_or_more
## <environment: 0x10ba2f288>
## number of observations:  1001
## number of covariates:  7
## mixed data (containing a categorical variable?): FALSE
##
## Hyperparrameters
## b (bandwidth): 4.069316
## s2 (noise variance): 0.3
##
## Scaling information
## scaled: FALSE
##
## Usage Example
## e.g. fit <- gpss(Y~X)to extract SEs of fitted values: sqrt(diag(fit$post_cov_orig))Basic Model Infor
## formula: avg_pct_met_above_ELA ~ I(undup_pct >= 55) + undup_pct + Charter.School +
##     DASS + pct_hispanic + pct_white + pct_two_or_more
## <environment: 0x139133488>
## number of observations:  951
```

```
## number of covariates:  7
## mixed data (containing a categorical variable?): FALSE
##
## Hyperparrameters
## b (bandwidth): 4.349589
## s2 (noise variance): 0.3
##
## Scaling information
## scaled: FALSE
##
## Usage Example
## e.g. fit <- gpss(Y~X)to extract SEs of fitted values: sqrt(diag(fit$post_cov_orig))Basic Model Inforn
## formula: avg_pct_met_above_Math ~ I(undup_pct >= 55) + undup_pct + Charter.School +
##     DASS + pct_hispanic + pct_white + pct_two_or_more
## <environment: 0x139186f20>
## number of observations:  949
## number of covariates:  7
## mixed data (containing a categorical variable?): FALSE
##
## Hyperparrameters
## b (bandwidth): 4.197812
## s2 (noise variance): 0.3
##
## Scaling information
## scaled: FALSE
##
## Usage Example
## e.g. fit <- gpss(Y~X)to extract SEs of fitted values: sqrt(diag(fit$post_cov_orig))Basic Model Inforn
## formula: avg_pct_not_met_ELA ~ I(undup_pct >= 55) + undup_pct + Charter.School +
##     DASS + pct_hispanic + pct_white + pct_two_or_more
## <environment: 0x14c5c9a50>
## number of observations:  951
## number of covariates:  7
## mixed data (containing a categorical variable?): FALSE
##
## Hyperparrameters
## b (bandwidth): 4.349589
## s2 (noise variance): 0.3
##
## Scaling information
## scaled: FALSE
##
## Usage Example
## e.g. fit <- gpss(Y~X)to extract SEs of fitted values: sqrt(diag(fit$post_cov_orig))Basic Model Inforn
## formula: avg_pct_not_met_Math ~ I(undup_pct >= 55) + undup_pct + Charter.School +
##     DASS + pct_hispanic + pct_white + pct_two_or_more
## <environment: 0x14e202a80>
## number of observations:  949
## number of covariates:  7
## mixed data (containing a categorical variable?): FALSE
##
## Hyperparrameters
## b (bandwidth): 4.197812
## s2 (noise variance): 0.3
```

```
##
## Scaling information
## scaled: FALSE
##
## Usage Example
## e.g. fit <- gpss(Y~X)to extract SEs of fitted values: sqrt(diag(fit$post_cov_orig))Basic Model Inforr
## formula: avg_scale_score_ELA ~ I(undup_pct >= 55) + undup_pct + Charter.School +
##     DASS + pct_hispanic + pct_white + pct_two_or_more
## <environment: 0x133e68fd0>
## number of observations:  950
## number of covariates:  7
## mixed data (containing a categorical variable?): FALSE
##
## Hyperparrameters
## b (bandwidth): 4.343266
## s2 (noise variance): 0.3
##
## Scaling information
## scaled: FALSE
##
## Usage Example
## e.g. fit <- gpss(Y~X)to extract SEs of fitted values: sqrt(diag(fit$post_cov_orig))Basic Model Inforr
## formula: avg_scale_score_Math ~ I(undup_pct >= 55) + undup_pct + Charter.School +
##     DASS + pct_hispanic + pct_white + pct_two_or_more
## <environment: 0x14d18ab70>
## number of observations:  948
## number of covariates:  7
## mixed data (containing a categorical variable?): FALSE
##
## Hyperparrameters
## b (bandwidth): 4.19154
## s2 (noise variance): 0.3
##
## Scaling information
## scaled: FALSE
##
## Usage Example
## e.g. fit <- gpss(Y~X)to extract SEs of fitted values: sqrt(diag(fit$post_cov_orig))Basic Model Inforr
## formula: chronic_absenteeism ~ I(undup_pct >= 55) + undup_pct + Charter.School +
##     DASS + pct_hispanic + pct_white + pct_two_or_more
## <environment: 0x158656c60>
## number of observations:  1001
## number of covariates:  7
## mixed data (containing a categorical variable?): FALSE
##
## Hyperparrameters
## b (bandwidth): 4.602024
## s2 (noise variance): 0.3
##
## Scaling information
## scaled: FALSE
##
## Usage Example
## e.g. fit <- gpss(Y~X)to extract SEs of fitted values: sqrt(diag(fit$post_cov_orig))Basic Model Inforr
```

```
## formula: btb ~ I(undup_pct >= 55) + undup_pct + Charter.School + DASS +
##     pct_hispanic + pct_white + pct_two_or_more
## <environment: 0x14c68da18>
## number of observations:  1001
## number of covariates:  7
## mixed data (containing a categorical variable?): FALSE
##
## Hyperparrameters
## b (bandwidth): 4.602024
## s2 (noise variance): 0.3
##
## Scaling information
## scaled: FALSE
##
## Usage Example
## e.g. fit <- gpss(Y~X)to extract SEs of fitted values: sqrt(diag(fit$post_cov_orig))
```

```
# Append to existing unadjusted summary table
rdd_summary_table_adj <- bind_rows(
  rdd_summary_table,
  adjusted_results
)

print(rdd_summary_table_adj, n = Inf)
```

```
## # A tibble: 26 x 7
##    model                        tau     se ci_lower ci_upper p_value significant
##    <chr>                      <dbl>  <dbl>    <dbl>    <dbl>   <dbl> <lgl>
##  1 % MetAbove ELA ~ FRPM ~ -13.3     6.73   -26.4    -0.0687 0.0488  TRUE
##  2 % MetAbove ELA ~ FRPM ~   4.23    5.99    -7.51   16.0    0.480   FALSE
##  3 % MetAbove ELA ~ Undup~  -1.72    7.64   -16.7    13.3    0.822   FALSE
##  4 % MetAbove ELA ~ Undup~  -1.76    6.43   -14.4    10.8    0.784   FALSE
##  5 % MetAbove Math ~ FRPM~ -20.6     7.39   -35.1    -6.09   0.00535 TRUE
##  6 % MetAbove Math ~ FRPM~   4.42    5.59    -6.53   15.4    0.429   FALSE
##  7 % MetAbove Math ~ Undu~  -2.11    7.40   -16.6    12.4    0.776   FALSE
##  8 % MetAbove Math ~ Undu~   3.74    5.99    -8.01   15.5    0.533   FALSE
##  9 Chronic Absenteeism ~ ~   7.87    5.74    -3.38   19.1    0.171   FALSE
## 10 Chronic Absenteeism ~ ~  -0.0740  6.06   -12.0    11.8    0.990   FALSE
## 11 BTB ~ FRPM (35%)         -0.231   0.224   -0.669   0.208  0.303   FALSE
## 12 BTB ~ FRPM (75%)         -0.159   0.208   -0.567   0.249  0.445   FALSE
## 13 Chronic Absenteeism ~ ~   3.06    7.58   -11.8    17.9    0.687   FALSE
## 14 Chronic Absenteeism ~ ~  -1.67    6.68   -14.8    11.4    0.803   FALSE
## 15 % Not Met Math ~ FRPM ~  17.3     6.60     4.40   30.3    0.00863 TRUE
## 16 % Not Met Math ~ FRPM ~  -6.40    6.78   -19.7     6.88   0.345   FALSE
## 17 % Not Met Math ~ Undup~   3.28    8.50   -13.4    19.9    0.700   FALSE
## 18 % Not Met Math ~ Undup~  -3.08    7.41   -17.6    11.5    0.678   FALSE
## 19 Scale ELA ~ FRPM (35%)  -26.3    26.5    -78.2    25.6    0.320   FALSE
## 20 Scale ELA ~ FRPM (75%)   -3.88   26.3    -55.5    47.8    0.883   FALSE
## 21 Scale ELA ~ Undup (55%)  -9.84   33.0    -74.5    54.8    0.765   FALSE
## 22 Scale ELA ~ Undup (75%) -25.9    28.6    -82.1    30.2    0.365   FALSE
## 23 Scale Math ~ FRPM (35%) -42.4    22.4    -86.4     1.58   0.0588  FALSE
## 24 Scale Math ~ FRPM (75%)  -0.747  19.4    -38.7    37.2    0.969   FALSE
## 25 Scale Math ~ Undup (55~  -7.18   24.9    -56.0    41.7    0.773   FALSE
## 26 Scale Math ~ Undup (75~ -17.8    21.0    -58.9    23.3    0.397   FALSE
```

Result comparison

```
rdd_summary_table <- rdd_summary_table %>%
  mutate(model_type = "Unadjusted")

rdd_summary_table_adj <- rdd_summary_table_adj %>%
  mutate(model_type = "Adjusted")
# Combine into long format
combined_long <- bind_rows(rdd_summary_table, rdd_summary_table_adj)

# Reshape into wide format for comparison
comparison_table <- combined_long %>%
  select(model, model_type, tau, se, p_value, significant) %>%
  pivot_wider(
    names_from = model_type,
    values_from = c(tau, se, p_value, significant),
    names_glue = "{.value}_{model_type}"
  ) %>%
  mutate(
    tau_diff = tau_Adjusted - tau_Unadjusted,
    se_diff = se_Adjusted - se_Unadjusted,
    signif_change = significant_Unadjusted != significant_Adjusted
  )

print(comparison_table, n = Inf)
```

```
## # A tibble: 26 x 12
##    model                    tau_Unadjusted tau_Adjusted se_Unadjusted se_Adjusted
##    <chr>                             <dbl>        <dbl>         <dbl>       <dbl>
##  1 % MetAbove ELA ~ FRPM ~       -13.3        -13.3           6.73        6.73
##  2 % MetAbove ELA ~ FRPM ~         4.23         4.23          5.99        5.99
##  3 % MetAbove ELA ~ Undup~        -1.72        -1.72          7.64        7.64
##  4 % MetAbove ELA ~ Undup~        -1.76        -1.76          6.43        6.43
##  5 % MetAbove Math ~ FRPM~       -20.6        -20.6           7.39        7.39
##  6 % MetAbove Math ~ FRPM~         4.42         4.42          5.59        5.59
##  7 % MetAbove Math ~ Undu~        -2.11        -2.11          7.40        7.40
##  8 % MetAbove Math ~ Undu~         3.74         3.74          5.99        5.99
##  9 Chronic Absenteeism ~ ~         7.87         7.87          5.74        5.74
## 10 Chronic Absenteeism ~ ~        -0.0740      -0.0740        6.06        6.06
## 11 BTB ~ FRPM (35%)               -0.231       -0.231         0.224       0.224
## 12 BTB ~ FRPM (75%)               -0.159       -0.159         0.208       0.208
## 13 Chronic Absenteeism ~ ~         3.06         3.06          7.58        7.58
## 14 Chronic Absenteeism ~ ~        -1.67        -1.67          6.68        6.68
## 15 % Not Met Math ~ FRPM ~        17.3         17.3           6.60        6.60
## 16 % Not Met Math ~ FRPM ~        -6.40        -6.40          6.78        6.78
## 17 % Not Met Math ~ Undup~         3.28         3.28          8.50        8.50
## 18 % Not Met Math ~ Undup~        -3.08        -3.08          7.41        7.41
## 19 Scale ELA ~ FRPM (35%)        -26.3        -26.3          26.5        26.5
## 20 Scale ELA ~ FRPM (75%)         -3.88        -3.88          26.3        26.3
## 21 Scale ELA ~ Undup (55%)        -9.84        -9.84          33.0        33.0
## 22 Scale ELA ~ Undup (75%)       -25.9        -25.9           28.6        28.6
## 23 Scale Math ~ FRPM (35%)       -42.4        -42.4           22.4        22.4
## 24 Scale Math ~ FRPM (75%)        -0.747       -0.747         19.4        19.4
## 25 Scale Math ~ Undup (55~        -7.18        -7.18          24.9        24.9
```

```
## 26 Scale Math ~ Undup (75~       -17.8        -17.8           21.0        21.0
## # i 7 more variables: p_value_Unadjusted <dbl>, p_value_Adjusted <dbl>,
## #   significant_Unadjusted <lgl>, significant_Adjusted <lgl>, tau_diff <dbl>,
## #   se_diff <dbl>, signif_change <lgl>
```