Online Appendix for for "(A)political Constituency Development Funds: Evidence from Pakistan"

A Additional Empirical Results

A.1 Alternative Dependent Variable Measurements

Table 1 in the main paper indicated that there are some observations where *Fund Access %* is greater than 100%. Since these indicate cases where more money was allocated than was 'allowed,' including these observations in the analysis is important for studying political motivations for resource distribution. However, this section presents two sets of robustness checks on the dependent variable. First, I recode the allocations that are greater than 100% to 100%, which artificially constrains the dependent variable to be within the official bounds of the development fund. Table A1 replicates the three main RD specifications from the paper; only one out of the six coefficients loses significance and that too with a p-value of just over 0.1. The treatment effect is, unsurprisingly, smaller in size but substantively still meaningful, ranging from 1.4 million PKR a year to almost 4.5 million PKR a year. The latter is about half the size of the total fund, representing a sizable amount.

The second alternative measurement of the dependent variable involves using the Pakistani Rupee (PKR) amounts for each observation, rather than the percentage of fund allocation, with results summarized in Table A2. Though this way of measuring the dependent variable is perhaps unfair because it involves comparing observations where the maximum possible allocation in PKR was different, the average effect still remains. Interestingly, the substantive sizes of the coefficients across all six specifications are quite similar to Table A1, with the increased

Table A1: Constraining Dependent Variable to 100%

	Standard	Robust	Standard	Robust	Standard	Robust
Ruling Party Legislator	28.1**	43.6**	16.8**	14.3	20.4***	20.4**
	(11.4)	(17.2)	(7.43)	(8.69)	(6.81)	(8.46)
N	290	290	534	534	1099	1099
RD Bandwidth	0.05	0.05	0.101	0.101	-	-
Specification	Local Linear	Local Linear	CCT	CCT	Cubic	Cubic

***p < .01; **p < .05; *p < .1
Standard errors reported in parentheses.
Note: In columns 1 and 3, standard specifications provide 'Conventional' estimates while robust specifications in columns 2 and 4 report 'Bias-Corrected' estimates with robust standard errors; all four use the RDRobust Package in R. For the last pair of columns, Robust reports robust standard errors, clustered at the administrative district level.
CCT uses the optimal bandwidth calculation suggested by Calonico et al. (2018).

access to development resources for a *Ruling Party Legislator* varying from approximately 1.8 million PKR to an advantage of over 4 million PKR. Thus, these two results together further ensure that the main findings of the paper are not driven by the choice of specifying the dependent variable as the percentage of the total possible allocation that was actually granted.

Table A2: Dependent Variable in Pakistani Rupees (Millions)

	Standard	Robust	Standard	Robust	Standard	Robust
Ruling Party Legislator	2.55**	4.04**	1.92**	1.71*	1.79**	1.79***
	(1.10)	(1.59)	(0.87)	(1.03)	(0.81)	(0.50)
N	290	290	411	411	1099	1099
RD Bandwidth	0.05	0.05	0.078	0.078	-	-
Specification	Local Linear	Local Linear	CCT	CCT	Cubic	Cubic

***p < .01; **p < .05; *p < .1
Standard errors reported in parentheses.
Note: In columns 1 and 3, standard specifications provide 'Conventional' estimates while robust specifications in columns 2 and 4 report 'Bias-Corrected' estimates with robust standard errors; all four use the RDRobust Package in R. For the last pair of columns, Robust reports robust standard errors, clustered at the year level.
CCT uses the optimal bandwidth calculation suggested by Calonico et al. (2018).

A.2 RD Estimate Robustness

As Figure A1 indicates, a range of different bandwidths can be defined for the local linear regression and the LATE remains large and statistically significant for virtually the entire range.[1]

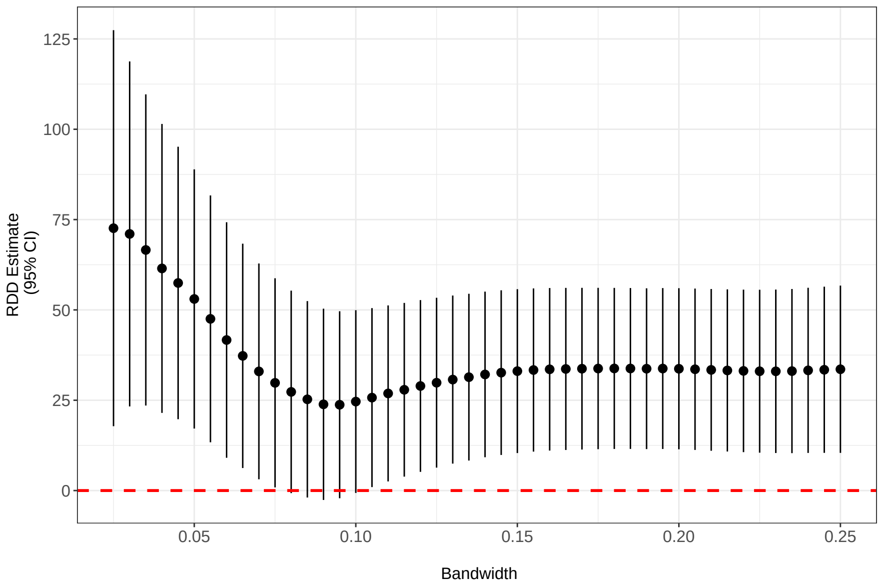


Figure A1: RD Estimate with Different Bandwidths

Note: This figure summarizes the treatment effects from a range of RD estimations, all conducted using the *rdrobust* package, similar to the main specifications in the paper. Each point estimate and corresponding 95% CI is calculated for the bandwidth indicated by the x-axis, with these bandwidths ranging from 0.025 to 0.25.

Table A3, and Figures A2 and A3 further establish robustness of the RD estimate. In Table A3, each cell reports the treatment effect from a separate RD specification, with the bandwidth given by the column heading and the polynomial order of the control function given by the row heading, similar to the approach taken in Meyersson (2014). The polynomial control function refers to the polynomial order of the forcing variable. The treatment effect loses significance in just

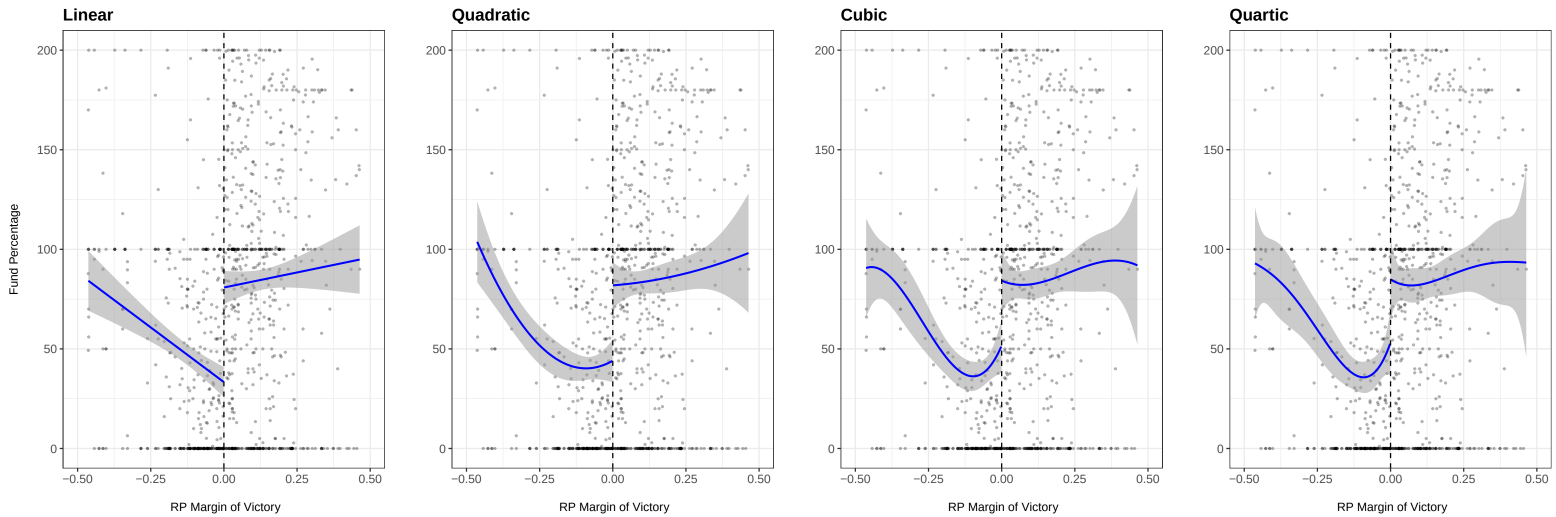
[1] There are some marginal cases between a bandwidth of 0.080 and 0.1 but these are all significant with a 90% confidence interval.

two out of 25 specifications, indicating that being a *Ruling Party Legislator* has a statistically significant and substantively meaningful effect. Similarly, Figures A2 and A3 plot the main RD graph but use a different bandwidth in each panel, and a different local polynomial smoother for the forcing variable in sub-figures within each panel.

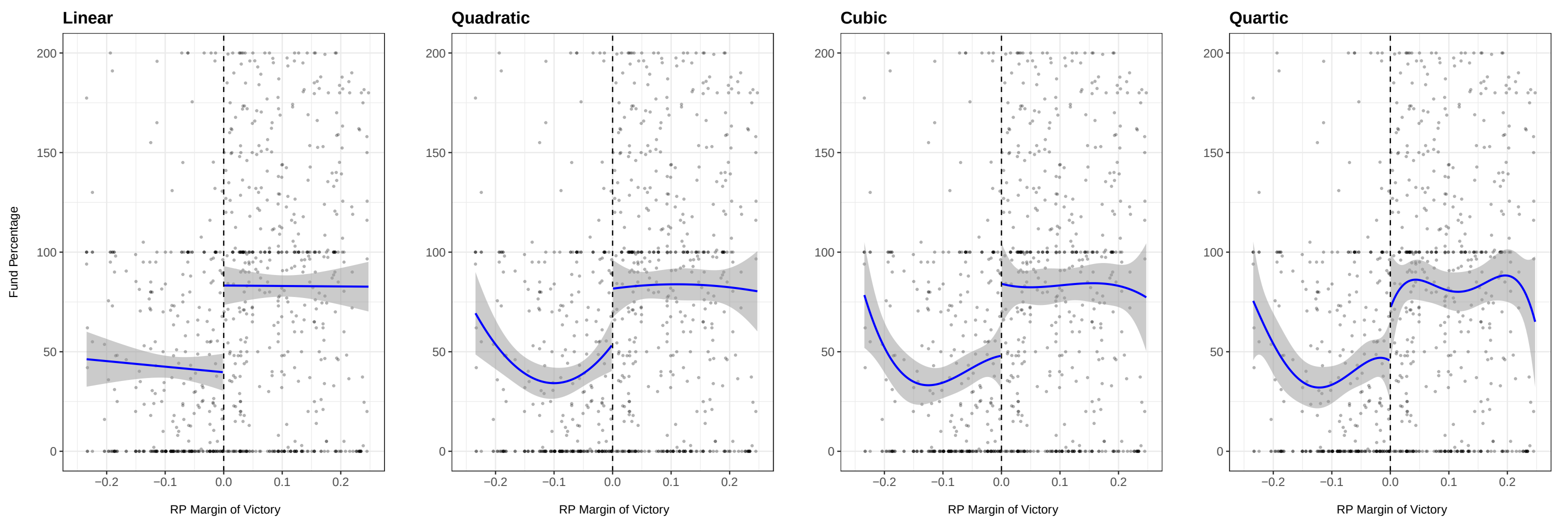
Table A3: Alternative RD Specifications (varying BWs and polynomial control functions)

	Bandwidth				
	1	0.50	0.25	0.10	0.05
Polynomial Order:					
None	50.9***	50.9***	55.0***	53.7***	38.2***
	(4.46)	(4.49)	(4.81)	(6.04)	(8.26)
Linear	58.4***	59.3***	49.9***	34.0***	33.3*
	(6.64)	(6.91)	(8.31)	(11.6)	(17.2)
Quadratic	61.5***	59.8***	50.5***	32.5***	32.6*
	(6.74)	(6.89)	(8.55)	(11.7)	(17.4)
Cubic	50.5***	46.1***	35.0***	13.7	70.2***
	(7.85)	(8.60)	(10.8)	(16.0)	(23.0)
Quartic	48.1***	46.7***	33.0***	14.7	72.2***
	(8.61)	(8.69)	(11.1)	(15.9)	(23.4)
N	1099	1087	946	530	290

***p < .01; **p < .05; *p < .1
Standard errors reported in parentheses.
Note: Each cell is the treatment effect from a separate RD specification, where the bandwidth is given by the column heading and the polynomial order of the control function given by the row heading.



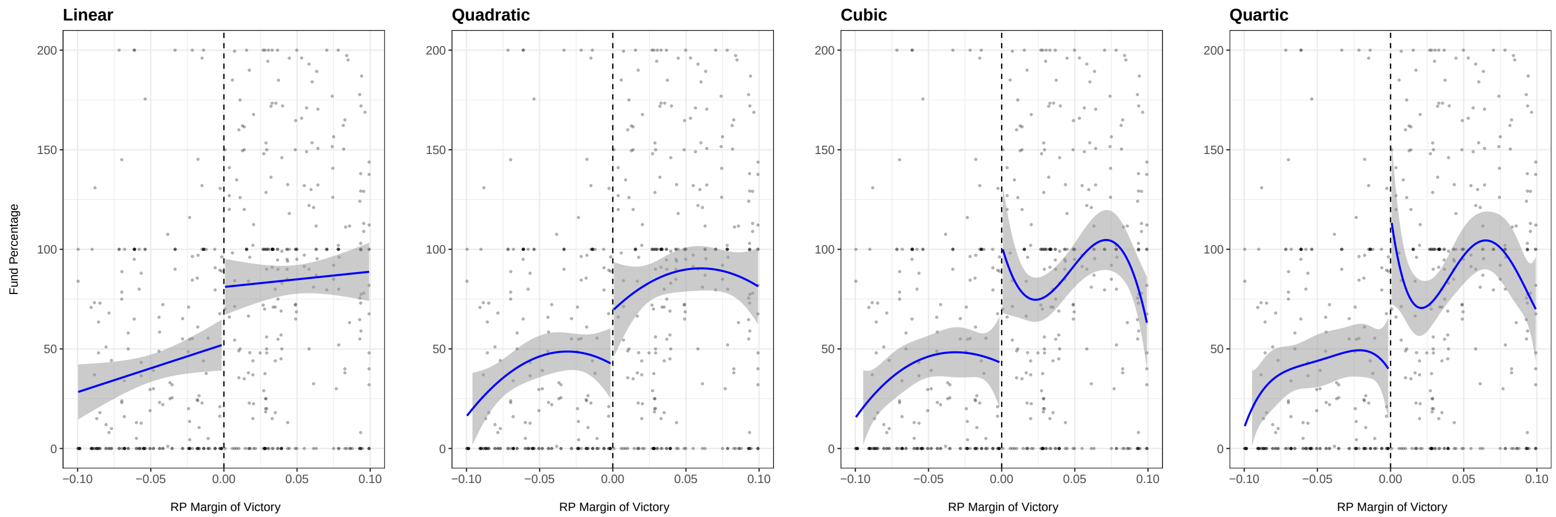
(a)



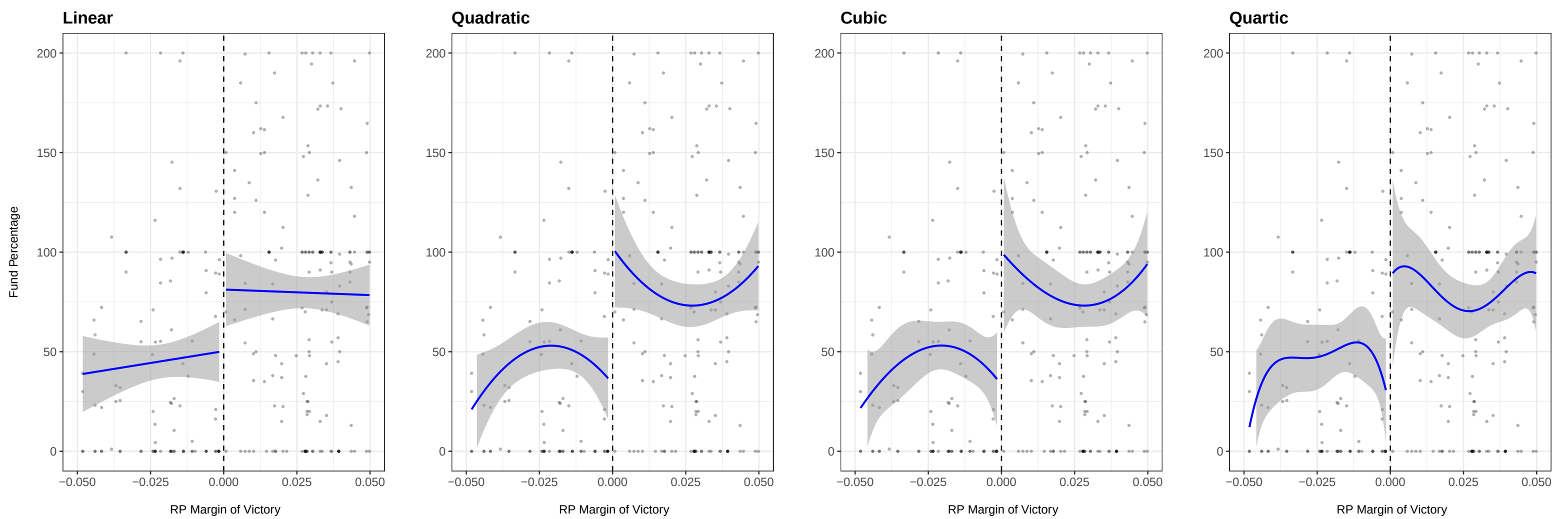
(b)

Figure A2: Polynomial smoother graphs for different Bandwidths
(a) BW=0.5 (b) BW=0.25

Note: Each panel shows figures using a different bandwidth for the Ruling Party Margin of Victory. Within panels, each figure plots the local polynomial smoother and 95% confidence interval using a different power for the polynomial, as specified by the header. The next figure is a continuation.



(a)



(b)

Figure A3: Polynomial smoother graphs for different Bandwidths (continued)
(a) BW=0.10 (b) BW=0.05
Note: Each panel shows figures using a different bandwidth for the Ruling Party Margin of Victory. Within panels, each figure plots the local polynomial smoother (with 95% CI for Panel (a) and 90% CI for Panel (b) due to a smaller n) using a different power for the polynomial, as specified by the header.

A.3 Continuity and Sorting Tests

A.3.1 Density of Forcing Variable

I present the density of the forcing variable in two ways. First, Figure A4 plots the density of this variable for its entire range, aggregated in to bins of 0.02 (that is, each bin corresponds to a 2% vote margin); the dashed line indicates the 0 cutoff that separates ruling parts and opposition winners. Next, Figure A5 present a series of figures using the McCrary (2008) test for different bandwidths. This test formally checks for a discontinuity in the forcing variable at the cutoff. As the figure notes summarize, for a range of bandwidths from 0.025 to 0.108—which is the optimal CCT bandwidth used in the main paper—the p-value is insignificant indicating that there is no discontinuity. The only exception is the last sub-figure with a bandwidth of 0.15, which is much larger than the optimal bandwidth in any case and is therefore not used in any of the analyses. These results increase the plausibility of the assertion that there is no evidence of strategic sorting in close electoral races.

A.3.2 Covariate Tests

Next, I present three sets of tests related to various covariates that could potentially be correlated with victory margins and with the amount of development funds released to individual legislators or constituencies. In particular, the concern is that if ruling party legislators are more experienced, for instance, or are elected from more competitive constituencies on average, then a higher release of funds may be driven by those factors rather than by their affiliation with the ruling party itself. Tables A4, A5 and A6 summarize results from difference-in-mean tests, regressions that use covariates as the dependent variable, and RD estimations that include covariates to show that these variables are well-balanced close

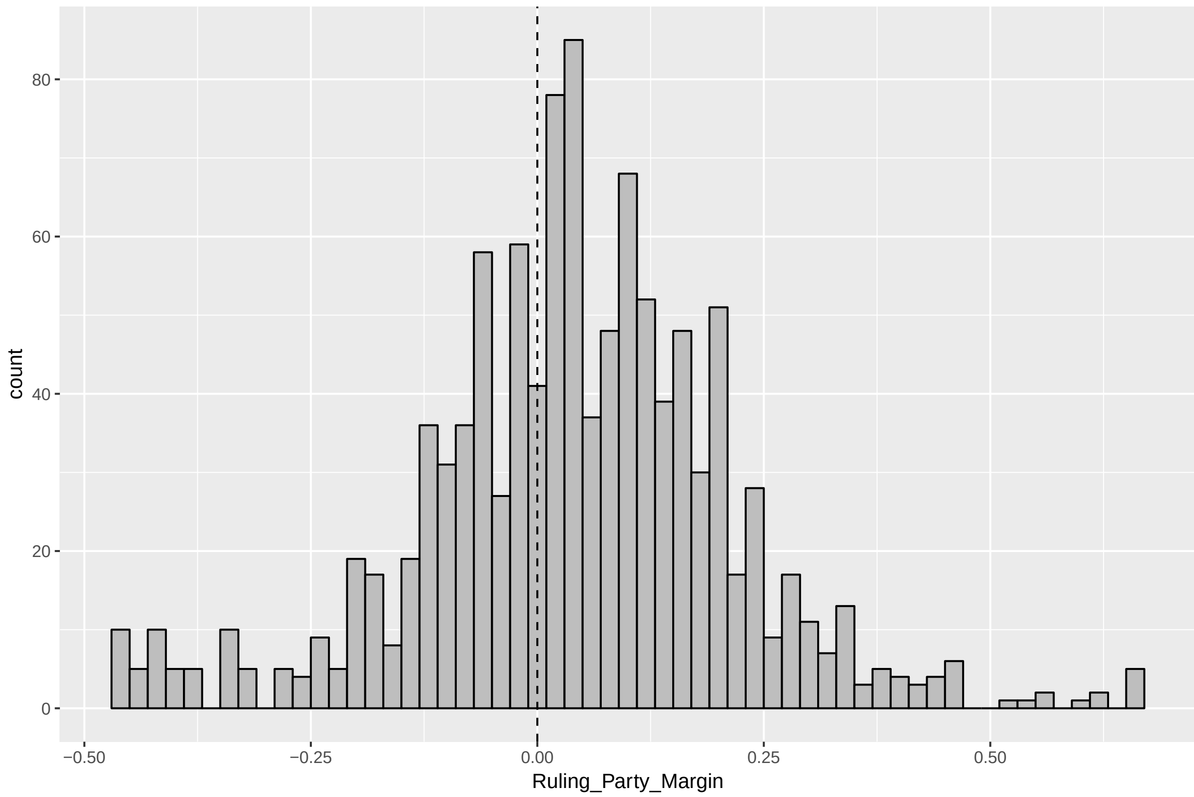


Figure A4: Global Histogram of forcing variable in 2 percent bins to show density

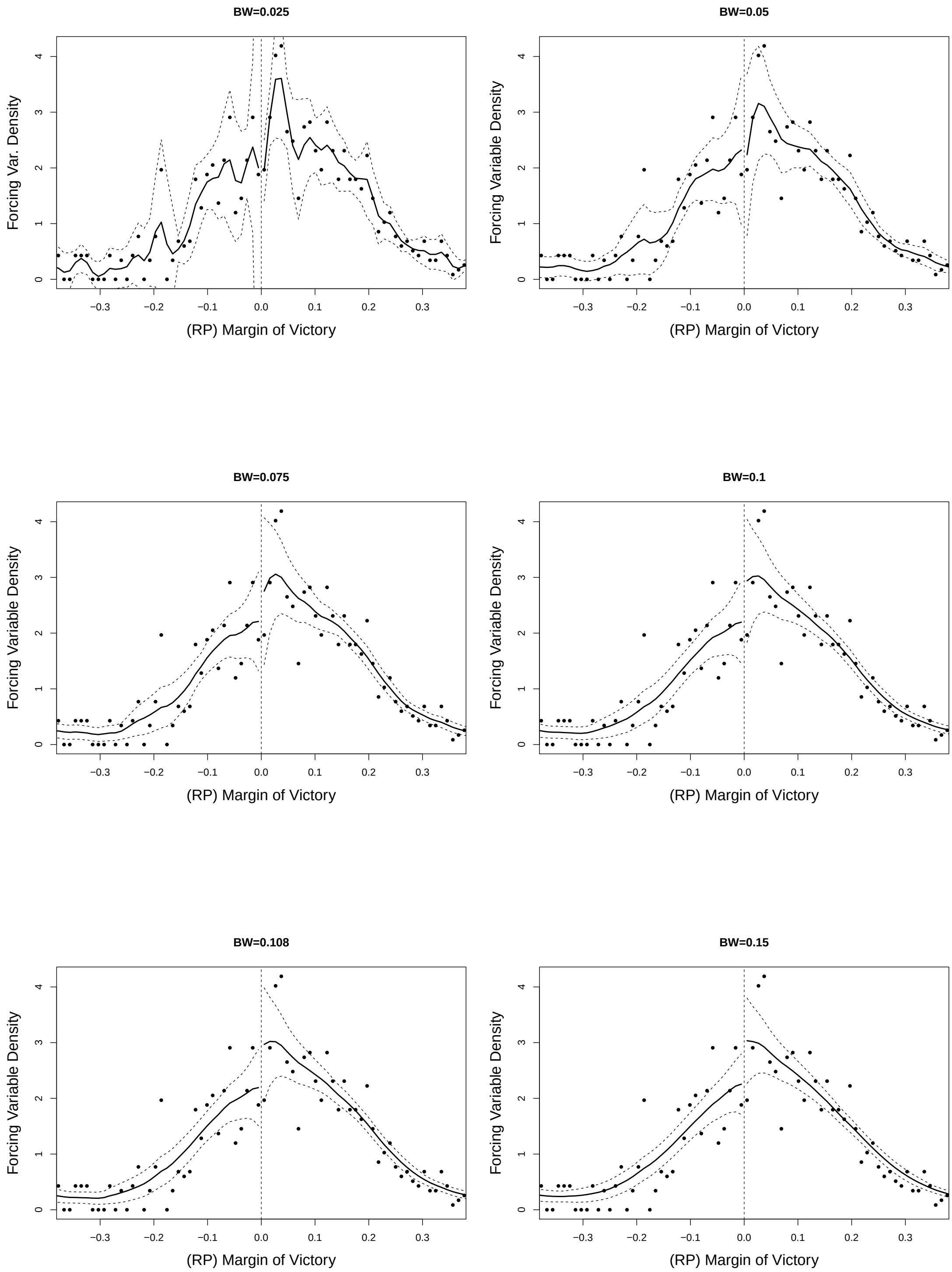


Figure A5: McCrary (2008) test for various bandwidths of the forcing variable to check whether there is a discontinuity in the density of the Ruling Party's Margin of Victory. Note that the p-value of the density test is not significant for any of the bandwidths except for the last one (BW=0.15), which is also a bandwidth much larger than the optimal one (BW=0.108).

to the cutoff.

Table A4: Difference-in-mean tests on covariates

Variable	Mean (left of cutoff)	Mean (right of cutoff)	Bandwidth	N
Previous MNA	0.55	0.46	0.05	290
Previous MNA Terms	0.84	0.66	0.05	290
Federal Minister	0.02	0.05	0.05	290
Effective # Parties	2.47	2.52	0.05	290
Turnout	*52.1*	*48.1*	0.05	290
Rejected Votes	2374	2456	0.05	290
Previous MNA	*0.60*	*0.42*	0.108	562
Previous MNA Terms	*1.07*	*0.55*	0.108	562
Federal Minister	0.08	0.07	0.108	562
Effective # Parties	*2.61*	*2.46*	0.108	562
Turnout	49.8	48.8	0.108	562
Rejected Votes	2656	2360	0.108	562

Italicized means are significantly different with $p \leq 0.05$
Note: The bandwidths for this comparison are chosen based on the main empirical analysis.

Table A5: Covariates as Outcomes

Dependent Variable	Coefficient on *Ruling Party Legislator*	Std Error
Previous MNA	0.27	0.34
Previous MNA Terms	0.13	0.15
Federal Minister	0.06	0.06
Effective # Parties	0.03	0.09
Turnout	-5.17***	1.02
Rejected Votes	-441*	255

***p < .01; **p < .05; *p < .1

Note: Each row presents the RD estimate from a separate linear regression. The specifications used are the same as Equation 1, except the outcome of interest is as indicated in the first column of the table.

Table A4 presents difference-in-means tests for observable covariates close to the cutoff, for the two bandwidths from the main analysis. Next, Table A5 summarizes results from the same cubic regression as before, using Equation 1, but with the dependent variable being a different covariate instead of *Fund Access %*. The reasoning here is that a significant treatment effect would indicate that ruling party legislators are perhaps different for that dependent variable. The results from both tables are fairly similar, in that *Turnout* at the constituency level is different in some specifications, while a few of the other factors are different in one specification each. I ensure that these small differences are not cause for concern in two ways.

First, Table A6 explicitly controls for all the covariates listed in these tables; taking them in to account for various bandwidths and specifications does not affect the *Ruling Party Legislator* treatment effect. Second, none of these covariates appear to be unbalanced consistently, indicating that there is little cause for concern since they are not systematically different between the two groups I am comparing. Finally, the variables that are nonetheless significantly different, this difference runs in the opposite direction from what would pose a substantive concern. In other words, ruling party legislators are slightly *less* experienced and from constituencies with slightly *lower* turnout. The expectation based on intuition and existing literature is that higher turnout induces greater responsiveness from representatives and greater legislative experience leads to more development funds, whereas here opposition legislators are from constituencies with the higher turnout and have slightly more experience so, if anything, we should expect them to have a higher share of development funds being released to their constituencies, which is clearly not the case.

Table A6: RD estimates controlling for covariates

RD Estimate	Std Error	Bandwidth	N	Specification
51.0***	19.1	0.050	286	Local linear
33.9***	12.6	0.108	556	Local linear/CCT
34.8***	11.8	-	1099	Cubic

***p < .01; **p < .05; *p < .1

Note: Each row represents a separate regression. Local linear/CCT runs a local linear regression (with triangular kernel) for the optimal bandwidth calculated using the procedure from Calonico, Cattaneo and Titiunik (2014). Covariates included in each regression are: *Previous MNA*, *Previous MNA Terms*, *Federal Minister*, *Effective # of Parties*, *Turnout*, and *# Rejected Votes*.

A.4 RD Placebo Tests

Finally, I conduct a set of placebo tests to further establish the robustness and relevance of the main RD results. First, Table A7 presents treatment effect estimates from local linear regressions using bandwidths selected by the same procedure as before. However, the cutoff is varied at equal intervals for the entire range of the forcing variable. In other words, the threshold for being treated is changed systematically, allowing observations to count as 'treated' if the *Margin of Victory* was above -0.3 (instead of 0), above -0.2, above -0.1, and so on. The idea here is that if the discontinuity observed in the fund allocation data occurs "randomly," we expect to see similar jumps in the dependent variable for other levels of the victory margin. As can be seen, however, none of the estimates are significant with one exception. The RD estimate for the -0.2 cutoff appears significant here but this is not a robust result; the coefficient is not consistently significant when calculated for a range of bandwidths.[2] Thus, overall, it is not the case that there are clear jumps in fund distribution; rather, it is the closest races where winning

[2]Results available upon request.

legislators belong to either the ruling party or an opposition party that incentivize strategic allocation by the ruling party.

Table A7: **Placebo Test 1:** RD estimates for the effect of being a Ruling Party Legislator using 'fake' cutoffs for treatment threshold

RD Estimate	Std Error	Cutoff	Bandwidth	N
107	118	-0.3	0.06	24
68.7***	25.1	-0.2	0.04	54
-6.21	15.0	-0.1	0.09	258
0.56	14.9	0.1	0.07	397
-14.4	18.5	0.2	0.16	506
18.8	31.2	0.3	0.12	181
-26.8	86.8	0.4	0.10	55

***p < .01; **p < .05; *p < .1
Note: Each row represents a separate local-linear regression. Optimal bandwidths are calculated using the same procedure as the main specifications, based on Calonico et al. (2018). The estimates are bias-corrected with robust standard errors.

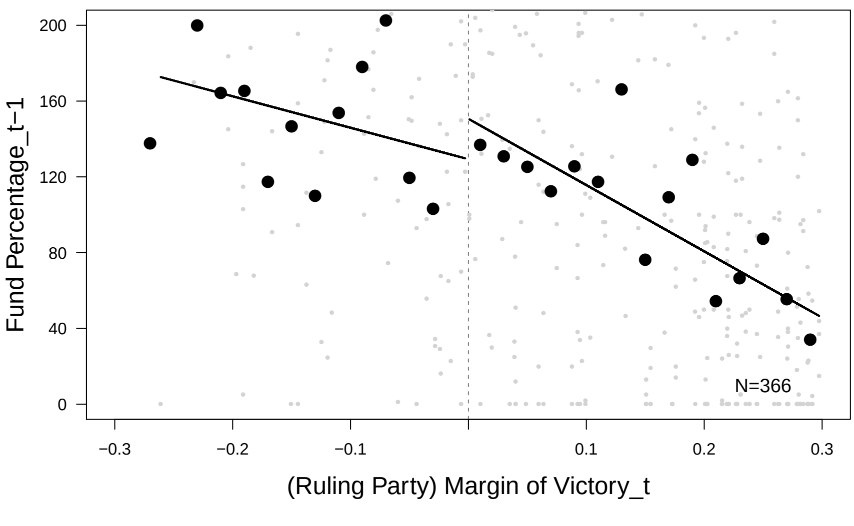


Figure A6: Lagged Dependent Variable: No Discontinuity

A second placebo test is conducted by lagging the dependent variable by one

Table A8: **Placebo Test 2:** RD Robustness Estimates with Lagged Dependent Variable for the effect of being a Ruling Party Legislator on Development Fund Access in the previous administration

	RDD Estimate		
Ruling Party Legislator	-27.2	-0.81	-5.10
	(50.9)	(37.5)	(38.8)
N	68	136	82
RD Bandwidth	0.05	0.108	0.063
Specification	Local Linear	Local Linear	CCT

***p < .01; **p < .05; *p < .1
Standard errors reported in parentheses.
Note: Results reported have bias-corrected estimates and robust standard errors.
CCT uses the optimal bandwidth calculation suggested by Calonico et al. (2018).

administration. That is, each year's development fund allocation is 'explained' using the next period's election results. This test helps to verify that the discontinuity discussed here is not a random occurrence. Table A8 presents discontinuity estimates from 0.05 and 0.108 bandwidths (bandwidths taken from main analysis) and the optimal bandwidth calculation, similar to before. The results confirm no discontinuity in this case. This can also be seen from Figure A6, which is similar to the original RD plot shown in Figure 1 but uses the lagged dependent variable on the y-axis.

References

Calonico, Sebastian, Matias D. Cattaneo, Max H. Farrell and Rocio Titiunik. 2018. "Package 'rdrobust'." *R reference manual* pp. 1–17.

Calonico, Sebastian, Matias D Cattaneo and Rocio Titiunik. 2014. "Robust Nonparametric Confidence Intervals for Regression-Discontinuity Designs." *Econometrica* 82(6):2295–2326.

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