Online Appendix for Money, Reputation, and Incumbency, or Why Marginals Have Become More Expensive

This appendix addresses a number of additional technical details pertaining to "Money, Reputation, and Incumbency, or Why Marginals Have Become More Expensive". These include:

1. Full derivation of the voter utility function.

2. Robustness check of the original findings using a subset of competitive districts identified using the methodology developed by Erikson and Palfrey (2000).

3. Test of an alternative hypothesis: The increase in campaign spending in marginal districts is driven by the number of competitive districts shrinking over time.

Derivation of the Utility Mean Variance Utility for the Voter

On p. 11 of the main draft, we simply state that we derive Equation 2) from a mean variance utility function. We show the derivation explicitly in this appendix.

The full mean variance utility function we use is based on Sargent (1987).

1) $U(t) = -e^{-(\lambda(K-t))}$

Instead of obtaining greater utility from more consumption, the voter is assumed to obtain greater utility from a smaller t, or the distance between her ideal point and the perceived location of the candidate, based on the party's and the candidate's reputations as well as the candidate's campaign expenditures. As in the main draft, λ is the Arrow-Pratt index of absolute risk aversion.

After n draws, t is distributed with the following mean and variance:

2) $E(t|n) = \frac{\mu_0\pi_0 + \frac{nx}{\sigma^2}}{\pi_0 + \frac{n}{\sigma^2}}$

$$s_n^2 = \frac{1}{\pi_0 + \frac{n}{\sigma^2}}$$

After n draws, the voter's expected utility is given by the following:

3) $E(U) = -e^{-\lambda(K - E(t|n) - \frac{\lambda}{2}s_n^2)}$

Because the function $-e^{-\lambda Z}$ is strictly increasing in Z, maximizing Equation 3) requires only that Z be maximized, which permits the shorthand version of the utility function shown below that we employ in the main body of the paper. Snyder and Ting (2002) and Woon and Pope (2008) adopt the same in their argument as well, with added implicit assumption that λ=2.

4) $U_V(t) = \max(K - t - \frac{\lambda}{2}s_n^2, 0)$

While it makes sense for the voter to be either risk averse (λ>0) or risk neutral (λ=0) in the shorthand equation, it does not make sense in equation 3), the full version of this utility function. Equation 3) requires λ>0. If λ=0, the utility is always equal to -1. Therefore, had we (or other similar papers) relied on the full version of the mean-variance utility function, we could only talk about voters approaching risk neutrality.

The argument in our paper does not hinge on whether or not we make a sharp distinction between risk neutrality and risk aversion. So the problem outlined above is technical and not substantive.

Robustness Check using Erikson-Palfrey Subsample

Using the estimator from Erickson and Palfrey (2000, pg. 608), we have calculated the predicted vote-share in each district for the incumbent and then restricted our analysis to districts with a predicted vote share of less than 55% for the incumbent. Erickson and Palfrey show that for this set of districts simultaneity bias is minimal.

Restricting the sample to this group effectively requires us to only look at highly marginal districts. So we cannot look at how the effect of parties' reputation varies with district partisanship. However we can look at how the uncertainty in a party's reputation affects spending in these districts. We can also look at how an incumbent's distance from his party affects spending. Furthermore we can look at the interaction between incumbent-party distance and Uncertainty in the Party Reputation.

In Table A below, we show the results of a regression that restricts the sample to races that have a predicted vote share of less than 55% for the incumbent. The regression includes year fixed effects to account for any secular increase in campaign spending over the years. All findings, obtained using this subsample, remain consistent with those in our main article.

Table A. Effect of Party and Individual Reputations on Inflation Adjusted Incumbent Campaign Expenditures Restricted to Districts with a Predicted Vote-Share of <55% for the Incumbent, Year Fixed Effects Regression, House Elections: 1972-2008[1]

Uncertainty in Party Reputation	-20480.04*** (3776.67)
Incumbent-Party Distance	-3809.97* (1535.88)
Incumbent-Party Distance × Uncertainty in Party Reputation	19740.90* (8474.37)
N	275
R2	.37

Liang-Zeger (1986) standard errors, clustered on year, are reported below each coefficient.
* p<0.05 ** p<0.01 *** p<0.001

Test for Alternate Hypothesis with Respect to the Changing Number of Competitive Districts

Between 1972 and 2008, the period under examination in our study, the number of competitive districts has been decreasing over time and suggests that this may account for our observation that as polarization has increased, spending has increased in districts that dislike the incumbent's party[2]. One possible alternative hypothesis is that parties may concentrate their spending in a shrinking number of competitive districts, which also tend to be less favorable towards the incumbent's party.

[1] Column 1 Dependent variable = Incumbent's campaign expenditures in thousands of 1983 dollars. Column 2 Dependent variable = Incumbent's campaign expenditures in thousands of 1983 dollars divided by incumbent vote-share

[2] However, we do note that this would not explain the other hypotheses derived from our formal model, and verified by our empirical model.

We test this alternative hypothesis by interacting our measure of district partisanship (how well the incumbent's party brand is liked) with the number of competitive districts in a given year.

We identify the number of competitive districts in a given year using the following procedure:

1) To measure how close a race is, we compute the predicted vote share for the incumbent in each district, using the model developed by Erikson and Palfrey (2000, pg. 608). As Erikson and Palfrey argue, this measure captures much of the information that candidates and parties have about a particular race's competitiveness.
2) Given this measure, we use three separate thresholds to determine whether a district is competitive: 52% predicted vote share or below, 55%, or 57%.
3) For each threshold, we compute the number of districts in a given year that are at or below this threshold. As R1 suggests, this number has been mostly decreasing over time.

Table B below shows the results of 3 regressions, one for each threshold. The first variable in each regression is the interaction suggested, *Number of Competitive Districts in an Election* × *District Partisanship*[3]. This interaction is not statistically significant in any specification. Moreover, its inclusion does not affect the sign or significance of any other variable in our model. This is also noted in footnote 17 in the main draft.

[3] We do not show a main term for *Number of Competitive Districts in an Election* because this is already captured by the model's year fixed-effects.

Table B: Null Effect of the Number of Competitive Districts on the Incumbent's Campaign Expenditures, Using District and Year fixed-effects.

	≤ 52%	≤ 55%	≤ 57%
Number of Competitive Districts in an Election × District Partisanship	-.013 (.025)	-0.006 (.014)	-.003 (.011)
Uncertainty in Party Reputation	-4000.12** (1169.19)	-3984.93** (1184.34)	-3947.32** (1188.67)
District Partisanship	-12.10** (3.65)	-12.00** (3.68)	-11.86** (3.66)
District Partisanship × Uncertainty in Party Reputation	60.27** (19.60)	59.84** (19.87)	59.03** (19.86)
Incumbent-Party Distance	-1884.11*** (411.80)	-1887.33*** (412.42)	-1889.74*** (412.33)
Incumbent-Party Distance × Uncertainty in Party Reputation	7574.01*** (2086.91)	7585.59*** (2090.88)	7597.83*** (2090.69)
Incumbent-Party Distance × District Partisanship	8.86** (3.04)	8.89** (3.03)	8.90** (3.04)
Challenger's Spending (in thousands of 1983 dollars)	.62*** (.05)	.62*** (.05)	.62*** (.05)
Challenger Quality	57.78*** (10.33)	57.72*** (10.35)	57.70*** (10.35)
Freshman	13.19 (9.71)	13.20 (9.71)	13.18 (9.71)
N	5411	5411	5411
Multiple R^2	0.6778	0.6778	0.6778
Adj. R^2	0.6106	0.6106	0.6106

Liang Zenger Standard errors clustered by district * p<0.05 ** p<0.01 *** p<0.001

Bibliography

Erikson, Robert S., and Thomas R. Palfrey. 2000. “Equilibria in Campaign Spending Games: Theory and Data.” *The American Political Science Review* 94(3): 595–609.

Snyder, J. M., & Ting, M. M. (2002). An Informational Rationale for Political Parties. *American Journal of Political Science*, *46*(1), 90–110.

Woon, J., & Pope, J. C. (2008). Made in Congress? Testing the Electoral Implications of Party Ideological Brand Names. *The Journal of Politics*, *70*(03).