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ABSTRACT

Run For Your Life? The Effect of Close Elections on the Life Expectancy of Politicians*

We use a regression discontinuity design to estimate the causal effect of election to political office on natural lifespan. In contrast to previous findings of shortened lifespan among US presidents and other heads of state, we find that US governors and other political office holders live over one year longer than losers of close elections. The positive effects of election appear in the mid-1800s, and grow notably larger when we restrict the sample to later years. We also analyze heterogeneity in exposure to stress, the proposed mechanism in the previous literature. We find no evidence of a role for stress in explaining differences in life expectancy. Those who win by large margins have shorter life expectancy than either close winners or losers, a fact which may explain previous findings.

JEL Classification: I10, M12, J14

Keywords: mortality, stress, regression discontinuity

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Recent research finds that losing candidates in elections for head of state outlive winners by large margins, suggesting a deleterious effect of political service on longevity.[1] The finding of harmful effects of service on life expectancy carries immediate, but largely unexplored implications for both the selection of officeholders and optimal incentives for politicians. In so far as these effects apply to other individuals in similar executive leadership positions, such as CEOs, managers of large organizations, and lesser political officeholders, they may explain patterns in inequality and the compensation of superstars. And yet, despite the potential wide-ranging significance of a loss of life expectancy from service as head of state, the robustness, external validity, and mechanisms behind these estimates remain unexplored. In particular, studies of US presidents and other heads of state necessarily rely on small sample sizes, limiting more extensive analysis.

Aside from the implications for politicians and executives, findings in this area engage with a long-standing medical and social science literature that hypothesizes a role for stress arising from one's relative position in social hierarchies in creating health and lifespan differences.[2] Theories of stress and life expectancy associate decreased control over work tasks and surroundings with shorter life ex-

[1] US presidents die of natural causes around four years earlier than losing candidates (Link et al. 2013 and Borgschulte 2014); effects are somewhat smaller for a pooled sample of heads of state in Olenski et al. (2015). See also Olshansky (2011). The first comparison of winning and losing presidential candidates we are aware of is Weyl (1973).

[2] Stress activates "fight or flight" physiological responses, which are understood to damage health with repeated exposure. For overviews of evidence on work-related stress and accelerated aging, see McEwen (1998), Marmot (2004), Lupien et al. (2009), and Kivimaki et al. (2012). Work-related stress has been proposed as an explanation for countercyclical mortality (Ruhm 2000, Ruhm 2005). Cutler et al. (2006) and Cutler et al. (2008) discuss stress-related theories of mortality and their relationship to economic factors.

pectancy. While exposure to this type of stress is usually thought to be negatively correlated with rank in social hierarchies, a refinement of the theory suggests a U-shaped exposure to stress, in which those at the top of a hierarchy may experience a similar loss of health, particularly in response to instability in their position.[3] A related literature in corporate finance points out that executives may use their autonomy to live a "quiet life," reducing their exposure to stress (Yen and Benham 1986, Bertrand and Mullainathan 2003). Despite the wide reach of these theories, quasi-experimental evidence on the effects of prestige and stress is limited.[4]

In this paper, we estimate the causal effect of election to political office on longevity, using a regression discontinuity (RD) model applied to a newly collected dataset on winning and losing candidates for the offices of US governor and senator, and representatives standing for re-election.[5] A primary contribution of the paper is the creation of a dataset that includes the dates of birth and death and some biographical details on 100% of winning candidates and over 96% of losing candidates in US history who fall within the appropriate RD bandwidth.[6] The combined sample is over 100 times larger than that of presidents, with over

[3]Evidence on this theory largely comes from animal studies (Sapolsky, 2005).

[4]Two quasi-experimental papers stand out: Anderson and Marmot (2012) finds a protective effect of civil servant promotions induced by retirements, which they interpret as the effect of rank; and Rablen and Oswald (2008) finds that Nobel prize winners outlive nominees, a protective effect of prestige. Quasi-experimental evidence on the effects of stress specifically appears to be more limited.

[5]We thank Ernesto Dal Bo for providing the representatives portion of the data. Data collection for candidates who never serve as representatives would be far more difficult than for governors or senators.

[6]The rates we find candidates decline with the bandwidth, but we did find over 90% of candidates within 20% of the margin of victory, and pass covariate and density tests at the threshold (McCrary, 2008).

50 times the sample within the RD bandwidth. The much larger sample size in our dataset allow us to exclude candidates far from the margin of victory, greatly limiting the scope for selection. In addition, we can use supplementary information to test for heterogeneity in survival consistent with a role for stress.

Contrary to previous work on heads of state, we find that candidates who narrowly win election experience an *increase* in natural life expectancy. The RD model estimates that election is associated with 2.2 years of additional life, and the result is significant at $p < 0.01$. When we add controls to the RD model, suggested by Calonico et al. (2016) to improve efficiency, the effect falls to just above a year of life gained. The effects are larger in both magnitude and significance after the mid-1800s.[7] The RD design allows us to interpret our estimates as the average causal effect of election to these offices for candidates who are close to the margin of victory. The point estimates are similar across the three offices, with larger and more significant effects for governors than representatives; standard errors are too large to infer much about senators on their own.

Although our main estimates do not correspond with previous findings for heads of state, we can use our larger sample size to test for heterogeneity consistent with an effect of stress on life expectancy. It may be that the job of head of state is considerably more stressful than the offices we study, however, if the results from heads of state generalize to any group, we would expect to find some evidence of differential survival among those who serve in the most stressful sit-

[7] Our primary cut to the later era is post-1908, as this was the year popular election of senators began. However, we also provide a non-parametric Lowess estimate of the difference between winners and losers by year for our entire sample.

uations. We focus this analysis on US governors. As chief executives of their state, governors are the most similar officeholders to US presidents; governors are also the most likely individuals to win election as president.[8] To proxy for especially stressful periods of service, we identified a number of state characteristics that would introduce challenges or uncertainty into the job.[9] We also divide candidates into different groups based on their likely vulnerability to stress.[10] We then fit interacted RD models that allowed differential effects of election in more stressful situations.

We find no evidence that links stress experienced in office to the patterns of life expectancy observed in the data. We take these results as suggestive, as most of these characteristics reflect long-run trends in the states, and may induce selection of more or less healthy individuals into candidacy. Despite this concern, it is noteworthy that none of the characteristics we use to test for a role of stress shows a significant negative effect on life expectancy. The evidence suggests that if there is an important role for stress in explaining the lifespans of heads of state, the effects are not experienced by similar executive officeholders, US governors. For those who win close elections as governor, the effect of additional prestige and income earned as a result of election appear to offset any loss of health due to

[8] An additional motivation for focusing on governors is practical — we could find biographical information on a large number of both winning and losing candidates.

[9] The state characteristics we use in the main text are: the state population, total budget (revenues plus expenditures; we analyze these variables separately in the Appendix), a decrease in the state population, and an indicator for divided government (i.e. the state legislature is controlled by a different party than the governor).

[10] The governor characteristics we use are indicators for being above age 50, first-time governors, a change in party control in the governor's office, no term limits, and the governor elected after 1900.

service in office, even in the most stressful times.

We conclude with an analysis and discussion of reasons for the difference between our results and those for heads of state. Patterns in survival away from the margin of victory call into question the assumption in previous work of an electoral advantage for healthy candidates. Instead, we find that candidates who win by a large margin have shorter life expectancy than those who win or lose close elections. The negative relationship between vote share and survival is statistically significant with and without controls, and is of similar magnitude to the (statistically insignificant) relationship between vote share and survival for US presidents. This relationship could reflect selection and/or heterogeneity in the treatment effect. Selection would imply an electoral preference for less healthy candidates, presumably due to a correlation with other desirable characteristics. Treatment effect heterogeneity would imply that winning by large margins is worse for the candidates' health than a narrow victory; for example, this may occur if large-margin victories predict longer careers, and career length is harmful. As the RD model cannot inform us about these mechanisms, we leave detailed exploration of these issue to future work.

1 Background and Data

1.1 Counterfactuals and Empirical Strategy

Our interest is in estimating the causal effect of winning a close election to political office on survival. The effect should be thought of as the combined conse-

quences of electoral victory, including not only the direct effects of service on the health of the candidate (e.g. increased work and stress), but also the possibility of future elections, promotion to higher political office, and increased prestige. The election is treated as the randomization device, and survival is measured from the date of the election. In the counterfactual, the candidate loses election, and experiences the combined effects of this treatment.

Previous literature has relied on either life tables or losers to estimate the counterfactual.[11] The older literature compares the survival of presidents to statistical life tables. This counterfactual likely understates the negative effects of service, as elected officials are drawn from a wealthy, educated class of men with longer life expectancy than the average. A more recent literature has attempted to estimate the counterfactual through the comparison of winners and losers. This will generate a lower bound on the negative effect of service under a "healthy winners" assumption, wherein those with ex ante better health have an electoral advantage, either through the direct preferences of the electorate or via their stamina during the campaign.

In our analysis, we utilize a much larger sample of political candidates relative to previous research to estimate a more compelling (and precise) counterfactual by focusing on candidates who were close to victory or defeat.[12] In our primary

[11] See Olshansky (2011) as a recent example of the life table method, and Link et al. (2013), Borgschulte (2014), Olenski et al. (2015), and Deuchert and Liebert (2016) as examples of the comparison to losers. Deuchert and Liebert compares the survival of incumbent governors standing for re-election in a regression discontinuity framework. See Appendix Section A for a longer summary and Appendix Table A1a and Appendix Table A1b for a list of papers dating back to 1946.

[12] The RD design has been frequently employed to study close elections, as in Lee et al. (2004)

specification, we estimate a sharp regression discontinuity (RD) model for candidates who have died before 2016. The model is:

$$Survival_{it} = \beta_0 + \beta_1 Winner_{it} + f(Margin_{it}) + g(Margin_{it})Winner_{it} + \varepsilon_{it}.$$

The outcome variable we consider is years of survival for candidate i following election at date t. The running variable, $Margin_{it}$, is defined as the difference in vote share between what candidate i actually received and what was required to win the election. $Winner_{it}$ is our treatment variable, an indicator for winning the election, and ε_{it} represents the error term. The main coefficient of interest is β_1, which we interpret as the causal impact of winning close political election on life expectancy.

We implement local-linear regression for f and g, allowing for the slope of the regression to be different on either side of the cutoff for victory. Robust, bias-corrected standard errors are clustered at the state level to correct for likely correlations across candidates and we use inference procedures developed by Calonico et al. (2014) and Calonico et al. (2016). The sample included in our primary analysis is composed of gubernatorial, senate, and congressional candidates, as opposed to individuals, who receive a share of the vote within 20% of the margin of victory. In our primary specification, we pool candidates from all three offices together and exclude candidates that died of accidents, assassinations, and other violent causes.[13]. We assume these causes of death are random and likely

and Dal Bo et al. (2009).

[13]We include candidates that committed suicide, as this cause of death may reflect stress brought

unrelated to theories of the stress-induced aging. We also present results from specifications where we focus separately at candidates from each office type.

The RD framework uses a common Mean Square Error (MSE) optimal bandwidth for candidates on either side of the cutoff for victory. A triangular kernel weighting function is used to construct the point estimators. The results are robust to alternative bandwidth selections and kernel choices.[14] Following the literature, our preferred specification estimates the model without including covariates, although we also present estimates with controls that include quadratics in election age and year, sex, state, political party, and both an indicator for previous service in office and the total years served.[15]

To test for a role for stress on governors, we re-run our baseline RD model with interactions between $Winner_{it}$ and characteristics of the state that would require governors to exert more effort to govern, and candidate characteristics that suggest greater susceptibility to stress. We set the bandwidth to be the same as the baseline RD analysis using only the sample of governors, for reasons discussed in the introduction. While the regression discontinuity model delivers unbiased estimates (Lee and Lemieux (2010)), it comes at the cost of an increase in the variance of the estimates relative to a model that utilizes all of the data in the sample. Therefore, we compliment the RD results with estimates obtained from a

about from holding office

[14] In particular, we experimented using Epanechnikov and uniform kernel functions, as well as separate MSE-optimal bandwidth choices below and above the cutoff for victory.

[15] Higher-order terms in age and year are not significant. The party variable takes 3 values, for Democrat, Republican, and other party (such as Whig or Populist).

Tobit model specified as follows:

$$Survival_{it} = \beta_0 + \beta_1 Winner_{it} + \beta_2 Z_{it} + \beta_3 Winner_{it} \times Z_{it} + X_{it}B + \tilde{\varepsilon}_{it}.$$

Here, Z_{it} represents a stressful state or candidate characteristic and we interpret β_3 as the causal effect of candidate i winning a close election and being exposed to the stressful characteristic on survival. We treat candidates who are still alive or died of violent and accidental causes as censored observations, and assume the error follows the normal distribution, with the variance permitted to depend on the age of the candidate at election. The sample includes all gubernatorial candidates who receive a share of the vote within 20% of the margin of victory. In practice, both the RD and Tobit models yield similar results when we test for the role of stress.[16]

1.2 Data and Summary Statistics

Data on election results and the lives of US governors comes from Glashan (1979) for candidates in elections from 1789-1960. Election data from later years is taken from Congressional Quarterly. Election results for US senators and representatives is gathered from ICPSR 3331: *Database of Congressional Historical Statistics*. Senate election data includes the years 1908-1994 while data on representatives is available from 1823-1994. The most challenging sourcing was data on the birth and death dates (or whether the candidate is still living) of the losing

[16] A survival analysis yielded similar results to the RD and Tobit analysis.

gubernatorial and senate candidates. Biographical information for these candidates comes from a variety of sources, including individual searches of historical records. All biographical information were verified using as many sources as possible and checks to identify incorrect data entries were performed throughout the data collection process.[17] In sum, biographical information was found for 100% of winning candidates and over 96% of losing candidates within the MSE-optimal RD bandwidth.[18]

Summary statistics on age at election and age at death for candidates within the optimal bandwidth of each sample are reported in Table 1. The table is restricted to candidates that died of natural causes, and are nearly identical for the sample including all candidates. In the pooled sample we find that winners and losers are effectively balanced on age at election, with a statistically insignificant difference of approximately .11 years between the groups. When looking specifically across each office-type, we find a statistically insignificant difference in age at election for both gubernatorial and congressional candidates. For senate candidates, the average winner is 1.85 years older at election than the loser. This difference is significant at the .05 level.

Turning to age at death, winning and losing candidates in the pooled sample both survive about 23 years after the election, with the average age at death be-

[17]Online encyclopedias such as *wikipedia.org* proved useful starting points in the searches but were not allowed to be used as the primary source. Any biographical information obtained from similar resources were required to be verified using other sources. The Online Appendix provides more information on the sources and construction of the dataset.

[18]Table C1 reports the percentages of candidates found within the pooled RD bandwidth. Appendix Table C2 reports the percentages of found candidates within the 20% margin required for victory, i.e. the total sample included in the RD analysis.

tween 73 and 74 years of age. There are no remarkable differences when examining average survival after election across office-types, however senate candidates in the sample live about 5 to 6 years longer than gubernatorial and congressional candidates. By comparison, US presidents stand for election, on average, at 56 years of age, and survive about 18 years when death is due to natural causes (Borgschulte, 2014). The pooled sample size of 5711 candidates within the RD bandwidth is also vastly larger than the total sample of 112 US presidential candidacies (counting only winners and runners-up) to date.

2 Survival of Political Candidates

We begin this section by discussing the estimated "first-stage" relationship between winning close political election and number of years served in office. When we pool candidates in our sample, Figure 1a shows winners of close political elections serve an average of 3.5 more years in office, with increasing slopes being found on both sides of the cutoff for victory. This finding suggests a positive relationship between number of votes received and total years of service. In Figure 1b, we find a similar upward sloping pattern on both sides of the cutoff when we estimate the relationship between winning close political election and previous years of service, though there is no detectable discontinuity.

Table 2 reports the results of the main RD longevity analysis for candidates in the pooled sample. In Panel A we include all candidates that ran for office between 1789 and 2000. Column 1 presents baseline estimates without the inclusion

of covariates. We find winners in close elections live on average 2.22 years longer than losers. This estimate is significant at the .01 level. The MSE-optimal bandwidth includes candidates within 3.0% of the margin of victory, which is about one-third of the nearly 21,000 candidates in our total pooled sample. Figure 2 depicts the estimated discontinuity in years of survival from Column 1. The local linear functions show similar negative slopes on either side of the discontinuity, and appear smooth.[19]

In Column 2 we add the full set of controls for age at election, year of election, sex, party, state and previous service. The estimate of 1.18 years of longer life for winners is smaller in magnitude than the baseline estimate, but remains significant at the .05 level. The bandwidth also increases to include candidates within 3.5% of the vote margin for victory. In Column 3, we remove controls and add candidates who have died of violent or accidental causes, such as assassination or automobile accidents. Excluding these individuals is especially important for analyses of heads of state, as this is a unique risk faced by high-profile politicians, and unrelated to the broader question of the effects of executive service on health. Here, only a small fraction of individuals have died of these causes, and the estimated 2.15 years of longer natural life for winners is very similar to results in Column 1. In Column 4, we include both controls and candidates that died of non-violent and accidental causes. The estimated 1.08 of additional years of life for winners

[19] Becker et al. (2008) find that retired players who narrowly miss election to the Major League Baseball Hall of Fame have shorter survival than winners or those who do not approach the threshold for induction. We find no such "dip" in survival, once we account for the effect at the threshold for victory.

is marginally significant. In sum, we strongly reject the estimates in previous literature of significant loss of life due to service as head of state. Taken together, our results suggest winners of close political races outlive losing candidates by between 1 and 2 years after the election.[20]

When considering the implications of our findings for modern theories of life expectancy, it may be more informative to focus on candidates who appear later in our sample. In addition, our results in Panel A pool together our entire sample of candidates, even though we have differing periods of coverage across the three offices. With these concerns in mind, we re-estimate the model for candidates that ran for election after 1908, the first year in which senators were popularly elected and after which we have a nearly complete sample of all three offices. The results appear in Panel B of Table 2. We find statistically significant estimates that range between 2.0 and 3.4 years of longer life for winners in the post-1908 sample. The magnitude of the estimates in each specification are approximately one year larger than the corresponding estimates in Panel A. Although it appears the effect of winning a close election has increased over time, we cannot reject the equality of the coefficients between the two panels.

To better understand how survival between winning and losing candidates has evolved over time, Figure 3 presents the average difference in survival between winners and losers, by year of election, for candidates within the pooled sample

[20]By design, the RD specification does not differentiate between candidates that are still alive and candidates that we were unable to find a date of death for. We might be concerned that the point estimates are capturing some bias due to ignoring this difference. However, if election prolongs life, we would have slightly fewer candidates to the right of the cutoff. This would likely cause a downward bias on our point estimates.

MSE-optimal bandwidth. The non-parametric Lowess curve in the figure is fitted to all of the data in sample, with 10-year binned markers scaled by the number of observations within each bin. There are two important points to make here. First, the figure shows losing candidates that ran prior to 1850 had longer average life expectancies relative to winning candidates. However, for elections after 1850, the average life expectancy for winners was consistently longer by approximately one year. (Note that we do not include the RD polynomials here.) Second, the size of the markers indicates that a large proportion of candidates in the sample died after 1908, when candidates from each office type appear together. This further motivates our restricting the sample in Panel B of Table 2.[21]

Considering the majority of candidates in our sample are representatives, we might also be concerned that the main RD results are somehow biased as a result of over-saturation of congressional candidates. We check the robustness of the findings in Table 2 by restricting the sample to only gubernatorial and senate candidates. Across all specifications, we again find statistically significant evidence that winning candidates outlive losing candidates by between 1.5 and 2.5 years after the election.[22]

In Table 3, we extend the RD analysis by focusing separately on specific office types. Columns 1 to 3 report results for gubernatorial candidates.[23] In Column 1 the estimate suggests winning candidates live 1.15 years longer than losing candi-

[21] Figures C4, C5 and C5 depict the average difference in survival between winners and losers separately by office-type.

[22] Results are presented in Appendix Table C3.

[23] RD figures by office type appear in the Online Appendix.

dates, though the estimate is insignificant. When we include controls in Column 2 the estimated effect of winning increases to 1.63 years and becomes significant at the .10 level. Including the few candidates that died of violent or accidental causes in Column 3 does little to change the estimates. Overall, we find no evidence of shorter lifespans for governors. Rather, the direction and magnitude of the point estimates are in-line with our estimates using the pooled sample presented in Table 2.

Columns 4 to 6 of Table 3 report results for candidates running for the office of U.S. senator. In Column 4 the estimate suggests winners live 1.42 years longer than losing candidates. This estimate is measured very imprecisely, with the standard error much larger than the point estimate. This is not necessarily surprising considering the overall sample size used to construct the RD is only 1784 candidates, of which only 687 observations lie within the MSE-optimal bandwidth. The point estimate increases to 1.37 years of longer life for winners when we include controls in Column 5 but remains insignificant. Including candidates that died of violent or accidental causes reduces the size of the point estimate, although the small sample size does not allow us to draw strong conclusions. In any case the estimate is measured imprecisely with a standard error that is similar in magnitude to Columns 4 and 5.

We present results for congressional representatives who stand for re-election in Columns 7 and 8. The baseline estimate in Column 7 suggests winners outlive losing incumbents by 1.86 years after the election. This estimate is marginally significant. When we add controls to regression in Column 8, the point estimate

drops to three-quarters of an additional year of natural life for winners, and is no longer statistically significant. Overall, we again find no evidence when examining representatives that winning close election to office decreases life expectancy relative to losers. Rather, our estimates provide support for the opposite conclusion, that winning a close election increases life expectancy.

2.1 RD Validity Tests

The validity of the estimates obtained using the RD design rest on the key assumption that assignment to treatment near the cutoff for victory is essentially random. If this assumption is true, then we can be confident that candidates who barely lost an election are appropriate counterfactuals to candidates that barely won. A potential threat to this assumption is if the construction of our sample generates differences at the margin of victory threshold, in particular as winning candidates are more likely to appear in the final dataset than losers. Another potential threat to identification is if candidates can manipulate their treatment status. One example of this would be if incumbent candidates in close elections have a systematic advantage over their opponent.[24] Importantly, both data construction and incumbency advantages would suggest excess mass to the right of the threshold.

With these potential threats in mind, we first test for evidence of violations of the identifying assumption using the nonparametric test developed by McCrary

[24]Previous work has found evidence of manipulation in 20th century elections for representatives due to an apparent incumbency advantage. However, recent work by Eggers et al. (2015) suggests the potential for candidates to manipulate outcomes in close U.S. elections does not pose a threat to the validity of RD designs in other electoral settings.

(2008). The general idea of the test in the context of our study is to examine the density of observations near the cutoff for victory. If there is a discontinuity in the density, then this may open the door to systematic differences between narrow winners and losers, and biased estimates.[25] Looking across all samples, we find no evidence of discontinuities in the density. This greatly limits any potential biases due to the construction of the data or the manipulation of close elections.

We further explore the validity of our RD design by testing whether the covariates included in relevant specifications are smooth through the cutoff. This exercise is done for two main reasons. First, considering the RD design assumes candidates that barely won are the same as candidates that barely lost, intuition suggests that the candidates should not significantly differ based on observable characteristics. Any discontinuity in survival that occurs as a result of assignment to treatment, i.e. winning a close election, should not be explained by a discontinuity in other observable characteristics. Second, if the observable covariates are smooth throughout the cutoff, then inclusion of the these variables in the regression can be justified as simply increasing the precision of our estimates.

With this in mind, we conducted an additional RD analysis where the outcome variable include pre-election measures, such as age at election, year of election, gender, the number of previous years served, and and indicator for previous service.[26] Among all the estimates, we find only one marginally significant difference between winners and losers near the cutoff, for age at election in the pooled

[25] Appendix Table C4 provides results from the density test.

[26] See Appendix Table C5.

sample. This is consistent with the reduction in magnitude of around 1 year when we add controls to the regressions; age is naturally quite predictive of remaining life expectancy. However, we argue this finding to be relatively inconsequential to our main results considering the difference is only marginally significant and the point estimate in the pooled RD analysis is robust to including age at election as a control. We do not find evidence of significant differences in incumbency, the most problematic variable identified by the previous literature. Overall, results from the covariate test suggest discontinuities in observable characteristics do not pose a major concern.

2.2 Heterogeneity by State and Governor Characteristics

The comparison of winning and losing candidates may differ from the effects for presidents because of statistical issues in previous comparisons, or because the jobs of these politicians are fundamentally different than that of heads of state. The previous literature has pointed to an important role of stress in explaining the apparently shortened lifespans of heads of state. We test for that channel by examining heterogeneity in survival among governors based on the characteristics of states and candidates.

To carryout this test, data was collected on a wide range of state and candidate characteristics likely to be associated with higher levels of stress. For states, we look at: state population with the idea being that larger states more closely resemble the countries that are governed by heads of state and are therefore more stressful to govern; size of the state government; percent change in the state population,

since decreasing populations likely signal a decline in state fortunes, therefore being more stressful to govern; and an indicator for there being a divided government, i.e. when the state legislature is controlled by a different party than the governor. For candidates, we examined: those above the age of 50 at election (the mean election age) with stress predicted to be more harmful to older candidates; those elected after 1900 as it is likely that serving in this period more closely resembles the jobs performed by heads of state; those elected to their first term of service; those elected from a different party than the previous governor; and those elected that are not restricted to run again for re-election due to term limits.[27]

Panel A in Table 4 reports results for heterogeneity by stressful state characteristics using the RD and Tobit models described in section 1.1.[28] Columns 1 and 2 present results from the RD and Tobit specifications, respectively. Overall, we find no evidence of shorter life expectancy for candidates elected to more stressful positions. In the first two rows, we find larger states and larger government size appear to *increase* the life expectancy of winners. The point estimates are similar across both the RD and Tobit specifications. Larger states presumably present the most comparable challenges to those faced by presidents and other heads of state, so it is noteworthy that the estimated effect is of the opposite patterns as suggested by the previous literature. In fact, this evidence is more consistent with a positive prestige effect uncovered by previous researchers, than with an negative stress effect (Rablen and Oswald 2008, Liu et al. 2015). The size of the state popula-

[27] See Appendix B for a detailed discussion of the data sources and construction of these variables.

[28] Appendix Tables C6, C7 and C8 report the full results of the stress analysis.

tion and state budget are highly correlated, motivating us to examine a regression including both terms. Results in the third row reveal that we cannot distinguish whether population or size of government explains the larger-government effect. In the fourth row, we find states with shrinking populations have governors who live longer while estimates in last row of Panel A suggests governors who experience divided governments survive fewer years; none of these results are statistically significant. None of these results support the hypothesis that stressful states harm their governors.

A similar pattern appears in Panel B of Table 4. In row 1 candidates elected above the age of 50 show no evidence of shorter survival. In rows 2 and 3, the point estimates for candidates serving in their first term and those elected from a new party show the opposite pattern than hypothesized. In row 4, we find candidates that are not restricted from running again due to term limits live slightly less, though both the RD and Tobit estimates are far from significant. Estimates in row 5 shows candidates elected in the years after 1900 demonstrate superior survival to winners in earlier periods, despite the growing populations and challenges across history. Consistent with the post-1908 analysis for all candidates, estimates from the RD and Tobit specification range from 1.75 to 2.20 years of longer life for winners elected after 1900. In sum, we find no evidence of shorter lifespans among those who we theorize should be most vulnerable to the stresses of holding office.

2.3 Revisiting the Evidence from US Presidential Candidates

We next turn to the question of why previous studies have found a shorter life expectancy for presidents and other heads of state. In Figure 4 we plot the relationship between vote margin and survival for both US governors and presidents, controlling for for age at election, year of election, and previous service. Both presidents and governors exhibit a strong, negative relationship between the share of the vote they receive and their subsequent survival. The slopes are nearly identical: an increase in vote margin by 10% is associated with 0.62 years reduced life expectancy for presidential candidates, and 0.64 years reduced life expectancy for gubernatorial candidates. The local linear RD terms are also negative for senators and representatives. It appears the previous literature comparing election winners to losers may have reached conclusions of a negative effect of service due to the pooling of candidates near the margin of victory, who have similar survival to those who narrowly lose, with candidates who win by large margins, who have shorter survival.

As it is unlikely that the electorate prefers shorter-lived candidates, a natural hypothesis is that candidates who win by large margins possess other characteristics which make them especially electable, but are correlated with shorter lifespans. Indeed, as Figure 1a and Figure 1b illustrate, not only do winners of close political elections serve more years in office, but the increasing slopes on both sides of the cutoff for victory suggest that candidates that win by large margins tend to serve even longer.

We further investigated the possible sources of this negative selection on life

expectancy using the full set of covariates in our governors dataset, including controls for state and party. The relationship between survival and vote margin weakened to a slope of -0.50. We also found the change in slope was statistically significant for a number of covariates, including years of previous service (estimate = -0.034) and age at election (estimate = -0.086). It appears age and experience at least partially explain the issue of selection for governors, which is not unexpected as many voters may prefer candidates that are older and more experienced to younger and inexperienced candidates. Still, we cannot fully account for the life expectancy gradient in margin of victory. We surmise that there are likely a host of other observable and unobservable characteristics that explain the issue of selection on life expectancy.

3 Conclusion

Previous research finds that presidents and other heads of state suffer a loss of health from their service, and assigns blame to the stress associated with the uncertainty created by high-stakes decision-making and shifting political support. This result has wide-ranging implications, should these effects be experienced by other executives. We use the much larger sample sizes in our dataset of US gubernatorial, senate, and congressional candidates to test whether these effects extend to other, seemingly similar individuals. In contrast with the estimates of 4 years or more of lost life found for presidents and other heads of state, we find that winning close elections significantly increases life expectancy. As well, our larger dataset

allows for explicit tests for a role for stress among US governors, for which we find no evidence along any of the dimensions we test. We conclude that the results for presidents do not extend to other, similar individuals, and may reflect selection rather than a causal effect of service.

We have focused our investigation of mechanisms on the role of stress in explaining life expectancy differences, as this channel may affect a wide range of other individuals, and is relatively unexplored in the literature. However, alternative mechanisms may be at work. One possibility is that losing exerts a negative effect on survival, if narrow losers experience profound disappointment or anxiety from the experience. It is also possible that health losses to winning candidates are offset by increases in prestige or income associated with service. While both negative effects of losing and positive effects of increased prestige would presumably also be experienced by heads of state examined in previous studies, it is nevertheless independently interesting to examine the evidence for among winning political candidates. On the effects of losing, we find no "dip" in survival for losing candidates near the discontinuity, but concede that losing may play an important role in explaining our results. On the other hand, governors elected in larger states and later in US history show signs of longer lives. These governors presumably face increased job duties, but also may have more important roles in the lives of their constituents and appointees. Taken together, our findings suggest that prestige and other benefits of promotion to high offices more than offset any health costs, even in the most stressful times.

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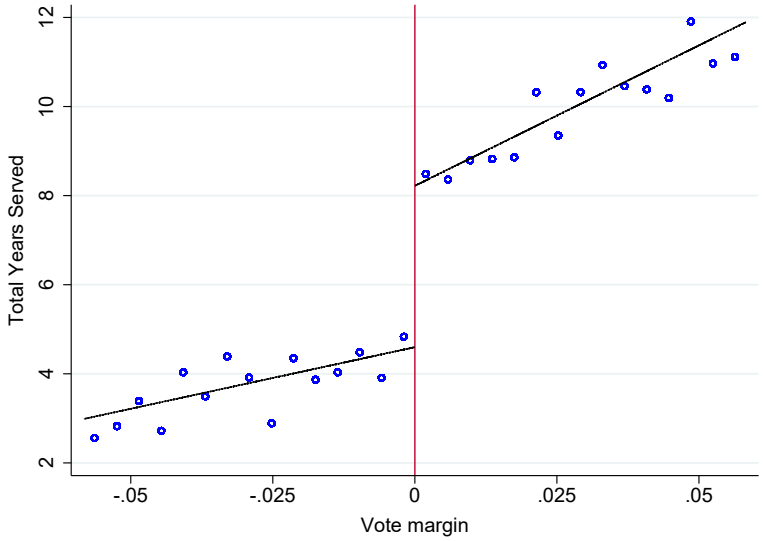
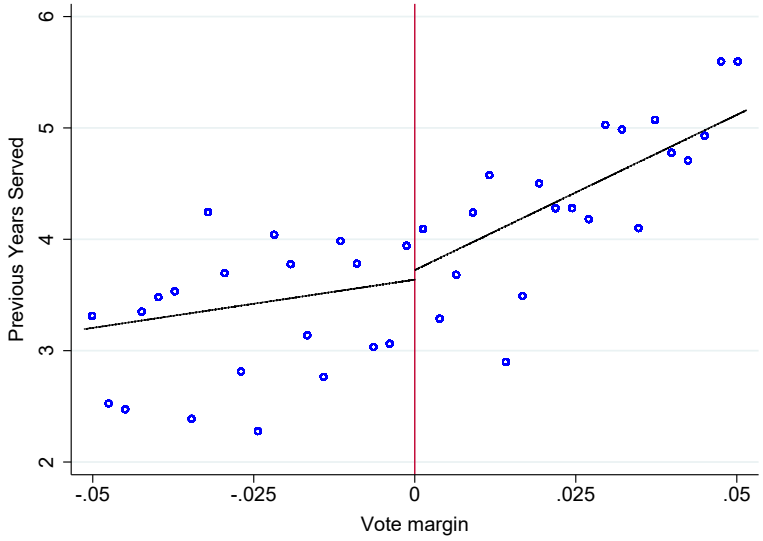
Figure 1: Vote Margin and Years of Political Service

(a) Vote Margin and Total Years Served

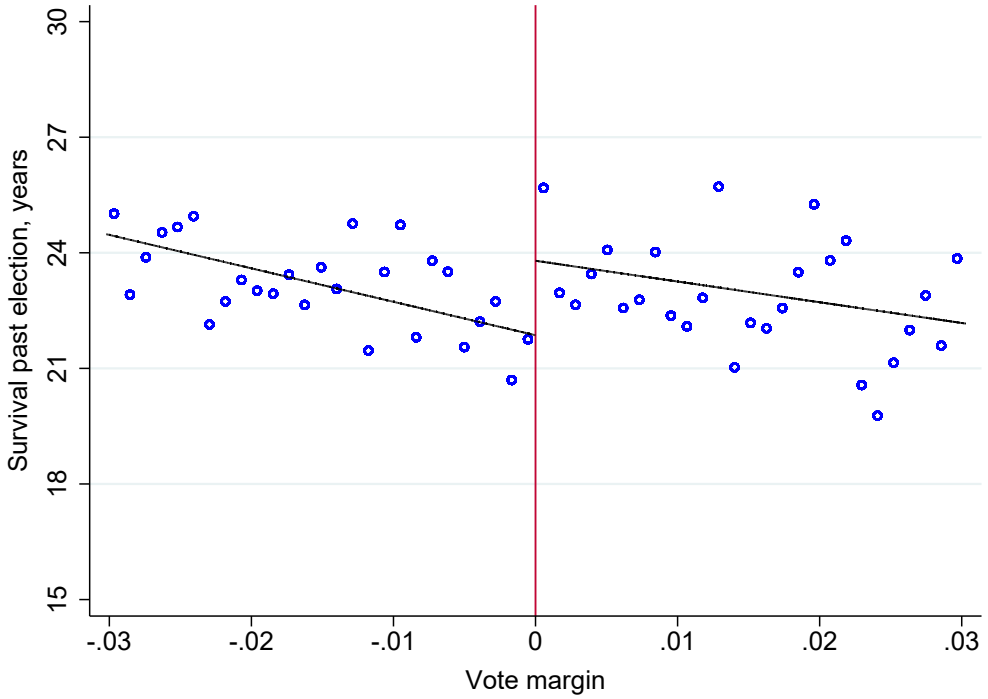


(b) Vote Margin and Previous Years Served



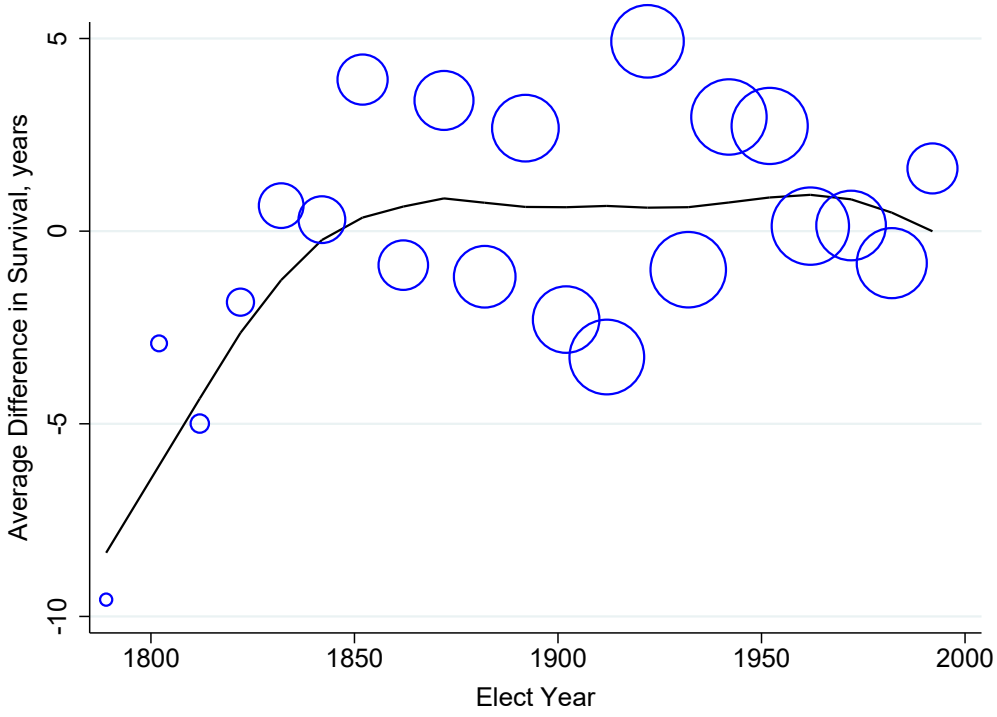
Notes: RD analysis using pooled sample of gubernatorial, senate, and congressional candidates from 1789-2000. The outcome in (a) is defined as total years served in office. The outcome in (b) is defined as previous years served in office.

Figure 2: Survival Past Election: Pooled Sample RD Analysis



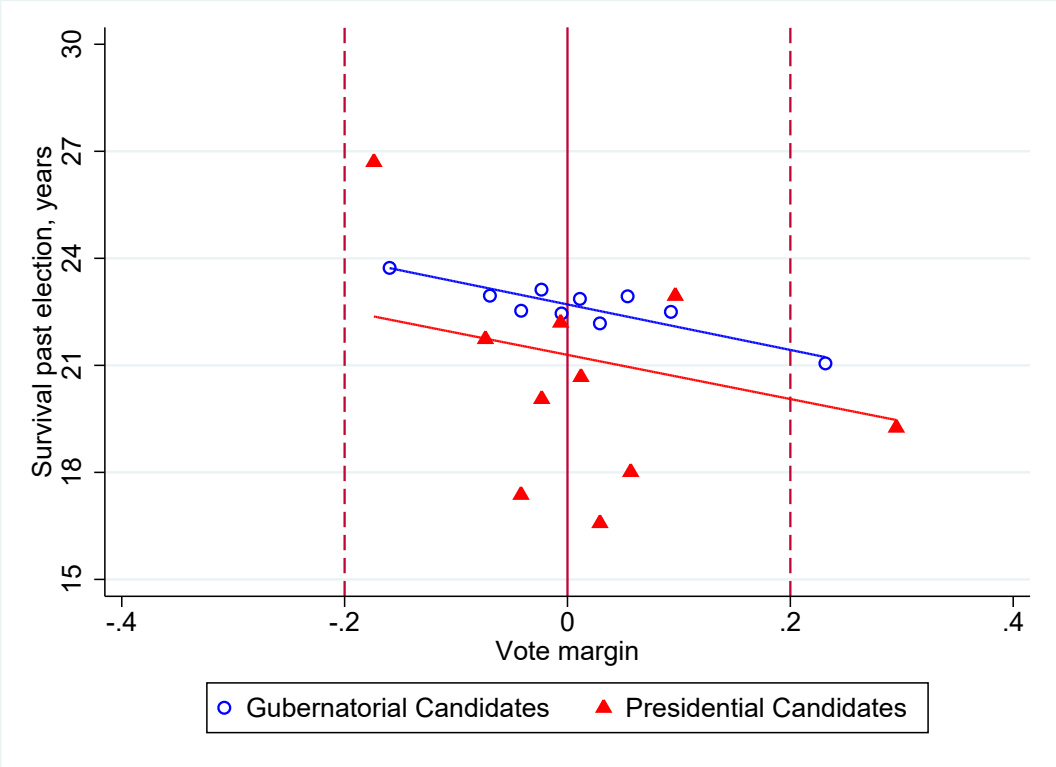
Notes: RD analysis using pooled sample of gubernatorial, senate, and congressional candidates from 1789-2000. MSE-optimal bandwidth = 0.030.

Figure 3: Average Difference in Survival: Pooled Sample



Notes: Figure presents the average difference in survival between winning and losing gubernatorial, senate, and congressional candidates within 3.0% of the margin of victory. Line fit to entire range of data. Markers binned at 10 years and scaled by the size of the underlying sample.

Figure 4: Vote Margin and Survival



Notes: Deceased presidential and gubernatorial candidates from 1789-2000 elections. Dashed lines identify sample used in primary analysis. Lines fit to entire range of data; slope is -6.19 (s.e.=7.23) for presidents and -6.38 (se=1.75) for gubernatorial candidates; s.e. clustered by state.

Table 1: Summary Statistics: Age at Election and Death

	Average	SD	N
Pooled			
Age At Election	50.31	9.77	5711
Winners Age At Election	50.27	9.75	3326
Losers Age At Election	50.38	9.81	2385
Difference between winners and losers: 0.11 (p-value: 0.68)			
Age At Death	73.32	11.89	5711
Winners Age At Death	73.30	11.81	3326
Losers Age At Death	73.36	12.01	2385
Governors			
Age At Election	50.24	9.02	2532
Winners Age At Election	50.46	8.88	1290
Losers Age At Election	50.00	9.16	1242
Difference between winners and losers: 0.46 (p-value: 0.20)			
Age At Death	73.44	11.88	2532
Winners Age At Death	73.46	11.98	1290
Losers Age At Death	73.41	11.79	1242
Senators			
Age At Election	54.97	9.52	687
Winners Age At Election	55.89	9.28	346
Losers Age At Election	54.03	9.69	341
Difference between winners and losers: 1.85** (p-value: 0.01)			
Age At Death	78.48	10.95	687
Winners Age At Death	78.72	10.94	346
Losers Age At Death	78.24	10.96	341
Representatives			
Age At Election	49.90	10.04	4523
Winners Age At Election	49.83	9.93	2923
Losers Age At Election	50.02	10.25	1600
Difference between winners and losers: 0.19 (p-value: 0.55)			
Age At Death	72.73	11.88	4523
Winners Age At Death	72.85	11.69	2923
Losers Age At Death	72.51	12.23	1600

Notes: Summary statistics of age at election and death for gubernatorial, senate, and congressional candidates who are within the relevant MSE-optimal bandwidth of each sample. Candidates that are still alive or who died of accidents, assassinations, and other violent causes treated as censored observations. *, **, *** indicate significance levels of .10, .05, and .01, respectively.

Table 2: Effect of Winning Election on Survival: Pooled RD Analysis

	(1)	(2)	(3)	(4)
Panel A: Pooled Candidates 1789-2000				
Win Election	2.22***	1.18**	2.15***	1.08*
	(0.84)	(0.59)	(0.83)	(0.58)
Sample Size	20702	20702	20772	20772
Effective Observations	5711	6398	5731	6422
Clusters	50	50	50	50
MSE-Optimal Bandwidth	0.030	0.035	0.030	0.035
Panel B: Pooled Candidates Post 1908				
Win Election	3.39***	2.20**	3.23**	2.02**
	(1.27)	(0.89)	(1.27)	(0.90)
Sample Size	12814	12814	12869	12869
Effective Observations	2608	3114	2612	3007
Clusters	(49, 50)	(49, 50)	(49, 50)	(49, 50)
MSE-Optimal Bandwidth	0.026	0.031	0.026	0.030
Controls		X		X
All Deaths			X	X

Notes: Difference between winners and losers in years survived post-election. Columns (1)-(4) report results from an RD analysis using a pooled sample of gubernatorial and senate candidates within 20% of the vote margin required for victory, as well as congressional candidates within 20% of the vote margin who stand for re-election. Panel A includes candidates elected from 1789-2000. Panel B restricts the sample to candidates elected after 1908 as this is when candidates from each office type appear together in our data. The analysis uses an MSE-optimal bandwidth procedure with a robust variance estimator. Column (2) includes controls for gender, party, state, previous years of service, previous service, and quadratics for age at election and year of election. Column (3) adds candidates who died of accidents, assassinations, and other violent causes. Column (4) includes controls and adds candidates who died of accidents, assassinations, and other violent causes. Standard errors clustered at the state level. *, **, *** indicate significance levels of .10, .05, and .01, respectively.

Table 3: Effect of Winning Election on Survival: RD Analysis by Office Type

	Governors (*1789-2000*)			Senators (*1908-1994*)			Representatives (*1823-1994*)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Win Election	1.15	1.63*	1.45*	1.42	1.37	-0.02	1.86*	0.77
	(1.08)	(0.85)	(0.83)	(2.25)	(1.97)	(2.04)	(1.00)	(0.80)
Sample Size	4393	4393	4429	1784	1784	1818	14525	14525
Effective Observations	2532	1987	2126	687	712	733	4523	5803
Controls		X	X		X	X		X
All Deaths			X			X		
Clusters	50	50	50	48	48	48	(49, 50)	(49, 50)
MSE-Optimal Bandwidth	0.056	0.041	0.044	0.039	0.041	0.041	0.040	0.052

Notes: Difference between winners and losers in years survived post-election. Columns (1)-(3) report results for gubernatorial candidates in 1789-2000 within 20% of the margin required for victory. Columns (4)-(6) report results for senate candidates in 1908-1994 within 20% of the margin required for victory. Columns (7)-(8) report results for representatives who stand for re-election in 1823-1994. Each specification uses a MSE-optimal bandwidth with a robust variance estimator. Columns (2), (3), (5), (6), and (8) include controls for gender, party, state, previous service, and quadratics for age at election and year of election. Columns (3) and (6) adds candidates who died of accidents, assassinations, and other violent causes. *, **, *** indicate significance levels of .10, .05, and .01, respectively.

Table 4: State and Candidate Stress: RD and Tobit Specifications

	RD (1)	*N*	*Tobit* (2)	*N*
Panel A: State Characteristics				
Winner x Revenues + Expenditures	0.63**	1460	0.44***	2983
	(0.24)		(0.16)	
Winner x Population	1.05***	2526	0.88***	4869
	(0.36)		(0.24)	
Winner x Revenues + Expenditures	0.69	1458	0.18	2978
and	(0.38)		(0.25)	
Winner x Population	-0.16		0.83	
	(0.75)		(0.55)	
Winner x % Decrease in Population	0.16	2434	0.18	4720
	(0.38)		(0.23)	
Winner x Divided Government	-0.42	2532	-0.52	4880
	(0.96)		(0.90)	
Panel B: Candidate Characteristics				
Winner x Above Age 50	-0.85	2532	-0.96	4880
	(0.97)		(0.70)	
Winner x First-Time Governor	1.00	2532	0.93	4880
	(1.24)		(0.84)	
Winner x New Party	0.68	2532	0.08	4880
	(1.19)		(0.89)	
Winner x No Term Limits	-0.23	2532	-0.20	4880
	(1.38)		(0.98)	
Winner x Post 1900	2.20**	2532	1.76***	4880
	(1.04)		(0.63)	

Notes: Column (1) presents results from a regression discontinuity analysis using gubernatorial candidates in 1789-2000 who are within the MSE-optimal bandwidth of .056. Column (2) presents results from a Tobit analysis using gubernatorial candidates in 1789-2000 who are within 20% of the margin of victory. Each row corresponds to a separate regression. The number of observations are presented next to estimate. candidates who died of accidents, assassinations, and other violent causes treated as censored observations. Standard errors clustered at the state level. *, **, *** indicate significance levels of .10, .05, and .01, respectively.

APPENDIX: FOR ONLINE PUBLICATION

A Previous Literature on Life Expectancy of Political Candidates

The first article formalizing the study of the life expectancy of politicians appeared in *Metropolitan Statistical Bulletin* in 1946. The *Bulletin* continued this line of research for the next 4 decades, beginning a 1976 article on the longevity of US presidents:

> This year, as is usual in an election year, there has been renewed interest in the question of the effect on longevity of the burdens of office in what has been described as the world's most demanding job — President of the United States.

Here, we discuss the literature on politicians who served as president, governor or head of government.[29] The methods and conclusions of this research are summarized in Tables 1a and 1b.

Early articles in this area, written between 1946 and 1980 and summarized in Table 1a, generally compared presidents or governors to historical life tables. In other words, adjustment was made for the expected survival of the candidate for

[29] We should note that pre-1980 articles were somewhat difficult to uncover. Additional papers may exist, especially in these earlier years.

their cohort of birth and age at election.[30] This method often found that presidents experienced shorter lives than expected. The first mention of the use of losing candidates as the counterfactual appears in a 1973 *Perspectives in Biology and Medicine* letter to the editor written by economist, journalist and author Nathaniel Weyl. This was followed by several other comparisons of presidents (and sometimes vice-presidents, too) to unsuccessful candidates. This line of work concluded that losing candidates outlived presidents, except in the case of the 1980 MetLife paper, which first adjusted for expected survival using a life table. Standard errors or confidence intervals are not reported in any of these papers.

More recently, the literature on the longevity of political executives has taken a turn through the pages of the *Journal of the American Medical Association*, *American Sociological Review*, and *British Medical Journal*; these papers are summarized in Table 1b. Shavelle et al. (2008) and Olshansky (2011) update the previous strategy of the MetLife Bulletin, using historical lifetables to compare the longevity of US presidents to other men of their age and cohorts. Olshansky (2011) finds that deceased presidents have survived slightly fewer years than expected; however, all surviving presidents have exceeded expected survival. On the basis of this evidence, he concludes that presidential service does not reduce life expectancy. Borgschulte (2014) points out that presidents are highly selected, and the comparison to the general population ignores many factors which would predict a longer life. Borgschulte uses a counterfactual of losing presidential can-

[30] In general, it is unclear exactly which life tables were used in most of the papers. Presumably, the MetLife papers use tables maintained by the company for actuarial purposes.

didates, and find that presidents suffer a lost year of life for each year of service, a difference which is statistically significant in most specifications. Link et al. (2013) performs a similar analysis, combining presidents and vice-presidents in their analysis of deaths from natural causes, finding that losing candidates exhibit lower mortality risk than successful candidates. Most recently, Olenski et al. (2015) compares the longevity of heads of state to losing electoral candidates, finding similar, large losses to executive service. In sum, recent work using unsuccessful candidates to estimate counterfactuals has found negative and significant effects associated with service, with most estimates in the range of 1 year of life lost for each year of service.

The study of the health effects of executive service is closely related to a broader set of papers documenting the life expectancy of other groups of prominent people. This literature is discussed in Borgschulte (2014) and Link et al. (2013). Interested readers are referred to those papers.

A.1 Relationship to the Current Study

The primary problem in the identification of the causal effect of executive service on longevity is the estimation of the counterfactual — how long would the candidate have lived, absent election to office. The naive comparison of elected executives to members of the unelected population—as in the life tables method—combines the causal effect of service with the bias inherent in the non-random selection into candidacy. As discussed by a number of papers in this literature, the natural assumption is that elected executives are healthier than the general popu-

lation, given the robust findings of a large socio-economic gradient in health and mortality for the last several hundred years.[31] We can "solve" this problem (or at least, greatly reduce the bias) by estimating counterfactual life expectancy using a population of other privileged individuals drawn from the same time period and social standing as the politicians. With this in mind, previous research has focused on losing candidates as representative of the counterfactual population.

Despite the apparent improvement represented by the use of unsuccessful candidates to estimate the counterfactual, the comparison of winning and losing candidates may replace rather than resolve the selection problem. The selection question now becomes whether electoral success, conditional on nomination to the final round of balloting, is effectively unrelated to the life expectancy of the candidates. Borgschulte (2014) discusses this issue in terms of "class versus grit": general election voters may prefer the candidate with some connection to the common man (grit), rather than the candidate with the highest social status (class). If this is the case, then the comparison of winners to losers is biased towards a negative effect of service. However, as healthier candidates possess many direct advantages in campaigning, and research has documented a preference for healthy leaders, previous work has proceeded with the assumption of an electoral bias for healthier candidates.

A specific variation of the class versus grit issue emerges when comparing incumbent or experienced candidates to electoral runners-up. If voters give sig-

[31] This bias is likely to grow with age, as older candidates will be evaluated for predictors of shorter life expectancy in ways that younger candidates will not. This problem is discussed in Borgschulte (2014), and calls into question the use of life tables, even in a supplementary role.

nificant positive consideration to experience, then the weight placed on the candidate's health may decline; experience may "crowd-out" health in the electorate's preferences.[32] This issues is particularly salient in Olenski et al. (2015), which includes only the final electoral victory of heads-of-state in the sample, effectively selecting a sample of politicians who are likely to have a non-longevity characteristic (experience) which may crowd out the electoral preference for health. One solution to this problem is the inclusion of controls for previous service. Controlling for previous service will be an imperfect solution if what is preferred by voters is not experience, but a willingness to sacrifice health and longevity in the process of service (i.e. voters prefer a certain "type" of experienced candidate). However, it is certainly preferable to control for previous experience, and dubious to remove from the sample all but the final appearance or victory of the successful candidates.

Behind these methodological issues lies a central obstacle: previous studies have suffered from small sample sizes, preventing the direct assessment of their assumptions and robustness to alternatives. Thus, the first contribution of this paper to the literature is the sample size to test various assumptions.

B Data Appendix

A great deal of the biographical information for each candidate was found with valuable help provided by research assistants (RAs). The RAs were given di-

[32] This re-phrases the class versus grit issue to one of youth versus experience. Consider, for example, the quite ill FDR, who was re-elected in 1944 on the basis of his experience in office.

rections to find birth and death dates for each candidate, gender, cause of death (coded as violent/accidental or non-violent/non-accidental), primary occupation, and birth state. Ideally, exact birth and death dates (day/month/year) were to be coded. If the day of birth/death could not be found, we imputed the middle day of the month of birth/death. If the day and month of birth/death could not be found, we imputed the month and day to be July 2, the middle day of the year. For members of congress we use only birth and death year. This was the format in which we obtained the data and the large sample size prevented us from finding exact birth/death dates for these candidates.

The RAs were instructed to use only creditable online or text resources. If the candidate was found to still be alive, the RAs were instructed to note this under a separate alive variable as well as indicate and cite the most recent date that the candidate was known to still be living. For instances where cause of death was not found, which in most cases occurred when searching for candidates who ran for governor or senator in early years, we code the cause of death as being non-violent/non-accidental.

By far the most challenging sourcing was data on the birth and death dates of the losing candidates. Each of these candidates required an individual search, with a research assistant instructed to record the source of the (usually online) information. Dubin (2010) and Dubin (2013) provide first names for gubernatorial candidates. In the best cases, the losing candidate was already in the dataset as the winner of another election, in which case they could be either matched to their biographical information in Glashan, or found on the webpage of the National

Governors' Association. Similarly, candidates who served in the U.S. congress appear in the Biographical Directory of the United States Congress, accessible at bioguide.congress.gov. After these convenient sources were exhausted, a more diverse set of online sources was used.

Political Graveyard is a website that tracks the life and death of US politicians, and appears frequently in the sources. Find A Grave (findagrave.com) is a website which photographs tombstones, and allows family members to enter biographical information about their loved ones. Google Books contains many books that detail the history of individual states, such as "A History of Kentucky and Kentuckians," written by E. Polk Johnson and published in 1912. In some cases, family genealogical records were required, accessible on the public portions of Ancestry.com and Genealogy.com. In many cases, newspaper or election records could supply crucial identifying information, such as the candidate's wife's name, an unusual middle name or a date of birth, which could then be used to locate and verify information regarding the candidate's death. In a number of cases in early US history, only a year or year and month of birth is available. In these cases, the midpoint of the missing values is assumed.[33]

One concern with this type of project is that candidates who cannot be located in the search have different life expectancies than those who are located. For this sample, the potential bias is quite small. As well, the estimates are very similar when using a more narrow window (i.e. 40-60%), where we found almost all candidates.

[33]The data and sources used in the paper will be posted at the time of publication.

The following presents details on the sources of supplementary state-level data and variable construction:

State Population

The majority of the state population data was obtained from *Population of States and Counties of the United States: 1790-1990* (Forstall, 1996). Published in 1996 by the US Census Bureau, this report provides the populations of states according to the twenty-one decennial U.S. censuses conducted from 1790 to 1990. Population data for the years 1990 and 2000 were obtained from individual decennial censuses from the US Census Bureau. Population data is not available for a very small number of observations where a gubernatorial election decided by popular vote had taken place prior to there being an official state census. The population variable used in our analysis is divided by 100,000 and logged. To construct the variable for percent-change in population, we calculate the percent change in population for each state using the state population 10 years prior.

Term Limits

Term Limit data was obtained from multiple sources, including Beasley and Case (1995), Alt et al. (2011), and www.ballotpedia.org. Beasley and Case provide governor term limits for each state for the years 1950 through 1986. Alt et al. provide similar data that has been updated to include the years 1950 through 2000. The web resource www.ballotpedia.org proved very useful for obtaining

term limit data for the years prior to 1950. The website provides term limits for each state along with citations from each state's constitutional amendment that was created when a term limit was introduced or changed. The variable for term limits is constructed as an indicator that takes the value 1 if a candidate is prevented from running during the following Governor election due to state term limit laws, and 0 otherwise. We then construct an interaction variable between the term limit variable and the indicator variable for the winner of each election.

Expenditures and Revenues

State expenditure and revenue data was obtained from 3 sources. For early years, we used the compiled dataset *Sources and Uses of Funds in State and Local Governments, 1790-1915* (Sylla et al., 1991). This dataset is available through ICPSR. Total nominal revenue and expenditure data is available for the majority of years and states from 1790 through 1915 (in some states the data is provided past 1915). For later years, we combine data obtained directly from the US Census Bureau as well as through the Urban Institute (available at taxpolicycenter.org). We adjust the data to real terms ($ 2015) using the annual Consumer Price Index (available at www.measuringworth.com).

A challenge was presented in creating relevant variables from the expenditure and revenue data due to the candidate data being constructed at the election-year level. Our strategy was to create variables that take into account revenue and expenditure information over the course of all the years of a term, as opposed to aggregate variables at the term level. To create a size of government variable

for each candidate, we sum annual real expenditures with annual real revenues for each year of a particular term and average that amount across those years. This gives us an approximate measure of the size of government for each year a governor was in office. We then log this variable for our analysis. The variable for fiscal deficits is constructed as a binary variable that takes the value 1 if over the course of the years of a term, average annual total expenditures exceed average annual total revenues, and 0 otherwise.

Divided Governments

We construct the variable for whether the governor experienced a divided government using data obtained from *Historical Party Affiliations of State Legislatures, 1796-2006*, Dubin (2007). This resource contains state by state listings of the party makeup for each state's legislature for every year since partisan contests began and party affiliations were listed. The variable for divided government is constructed as a binary variable that, for each candidate, takes the value 1 if at least one of the state's legislative body (House or Senate) was controlled by a party that differs from the candidate's own party for the term years under consideration, and 0 otherwise. Cases where control in a single legislative body is split between two or more parties were coded as being divided. We then construct an interaction variable between the divided government indicator and the indicator variable for the winner of each election.

Table A1a: Selected Previous Literature

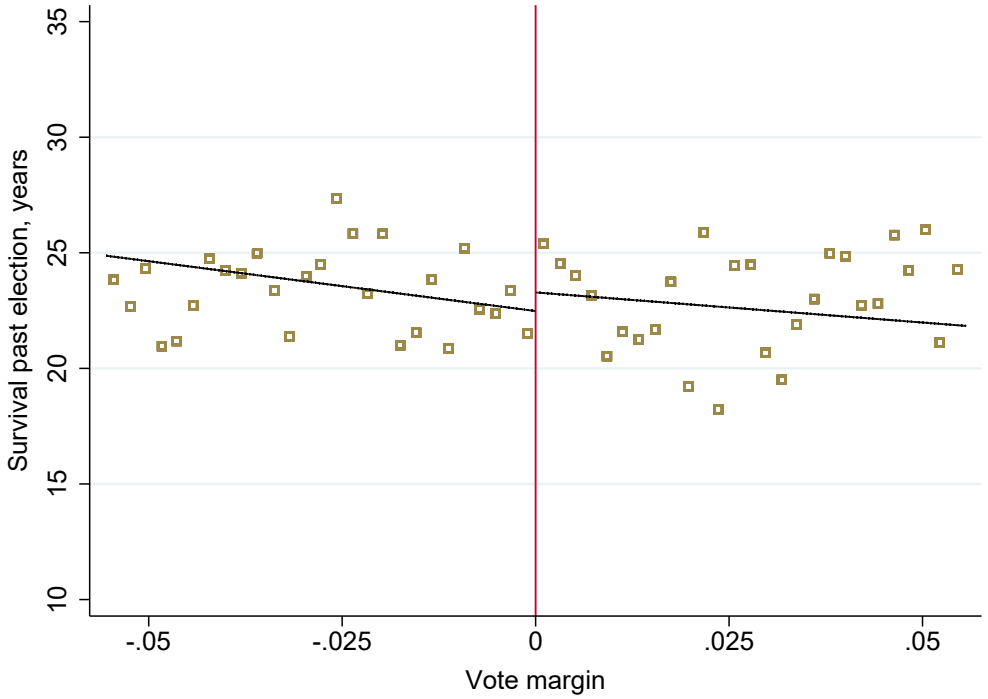
Date	Authors, Journal	Title	Population	Comparison	Finding	Notes
1946	(none), MetLife Stat Bull	Does the Presidency Shorten Life?	Presidents, 1789-1946	General Population, Age/Cohort Adjusted	Shorter Life: +2.9 years in 1789-1850, -2.9 years in 1850-1900, -8 years in 1900-1946[a]	Largest effects in 1900-1946
1971	(none), MetLife Stat Bull	Longevity of US State Governors	State Governors, 1901-1968	General Population, Age/Cohort Adjusted	No (or small) effect: Governors live 0.6 years longer[a]	Effects of +0.5 in 1900-1930 and +0.7 years in 1900-1968
1973	Weyl, Prsp in Biology and Medicine	Letter to the Editor: Life Expectancy of Modern US Presidents	Presidents, 1789-1972	Runner-up Candidates	Shorter life: Losers outlive winners by 5.0 years (dropping assassinated)[a]	First example of use of losers as counterfactual
1977	Gibert, Il Politico	Death and the American President	Presidents, 1789-1976	Vice-presidents and Losing candidates	Shorter Life[a]	
1977	Riccards, Pres Studies Qtrly	The Presidency: In Sickness and in Health	Presidents, 1789-1976	General Population, Age/Cohort Adjusted	Shorter life: Standardized mortality ratio of 1.29 for all ages[a]	Effects drive by deaths under the age of 70, and post-Civil War Presidents
1980	(none), MetLife Stat Bull	Longevity of Presidents, Vice-Presidents and Unsuccessful Candidates for the Presidency	Presidents, 1789-1979	Vice-presidents and Losing Candidates	Shorter life: Standardized mortality ratio of 1.18 for presidents, 1.1 for vice-presidents and 1.32 for losing candidates[a]	Includes all unsuccessful candidates with at least 1 electoral vote

[a] Study did not include margin of error in estimates

Table A1b: Selected Previous Literature

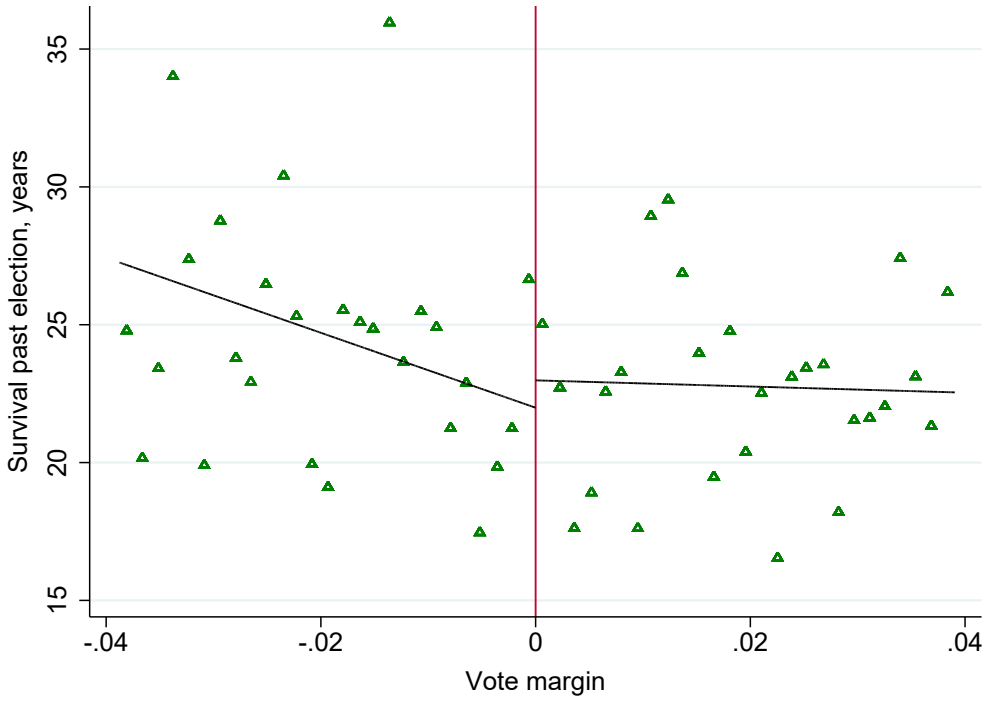
Date	Authors, Journal	Title	Population	Comparison	Finding	Notes
2008	Shavelle, J Insurance Med	Underwriting the Presidents	Presidents, 1789-2007	General Population, Age/Cohort Adjusted	No effect: Standardized mortality ratio of 1.07 (95% CI: 0.76, 1.47)	Significantly shorter life for presidents elected in 1845-1929 period
2011	Olshansky, J of Amer Med Assoc	Aging of US Presidents	Presidents, 1789-2009	General Population, Age/Cohort Adjusted	No effect: Deceased presidents die 0.3 years earlier[a]	Notes that living presidents have all exceeded expected survival
2014	Borgschulte, Unpub Mimeo	The Effect of Presidential Service on Life Expectancy	Presidents, 1789-2012	Runner-up Candidates	Shorter life: Censored Tobit effect of -3.8 years (95%CI: -0.1, 7.5)	
2014	Link et al, Amer Socio Review	Can Honorific Awards Give Us Clues about the Connection between Socioeconomic Status and Mortality?	Pres and VPs, 1789-2013	Runner-up Candidates	Shorter life: Hazard model effect of 1.53 ($p < 0.1$) for natural causes, 1.66 for all causes ($p < 0.05$)	Combined sample of presidents and vice-presidents
2015	Olenski et al, Brit Med Journal	Do heads of government age more quickly? Observational study comparing mortality between elected leaders and runners-up in national elections of 17 countries	Heads of gov't, 1740-2015	Runner-up Candidates	Shorter life: Hazard model effect of 1.23 (95% confidence interval 1.00 to 1.52) for all; loss of 2.7 years of life (95% CI from 0.6 to 4.8) for deceased	Does not drop assassinated subjects; drops all but last election for winners

Figure C1: Survival Past Election: Gubernatorial Candidates



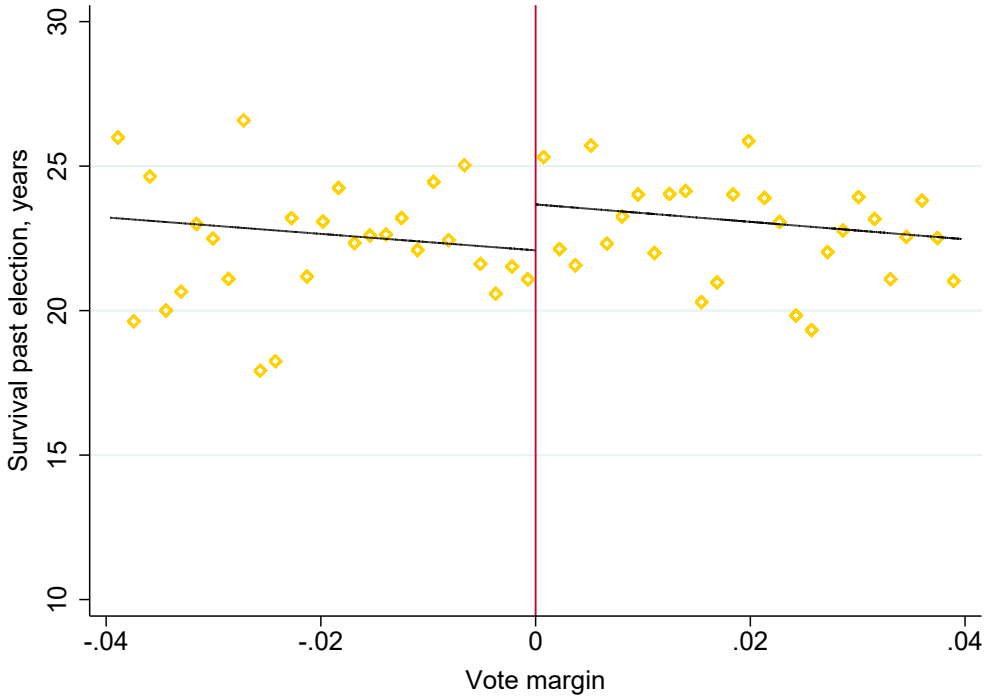
Notes: RD analysis using sample of gubernatorial candidates from 1789-2000. MSE-optimal bandwidth = 0.056.

Figure C2: Survival Past Election: Senate Candidates



Notes: RD analysis using sample of senate candidates from 1908-1994. MSE-optimal bandwidth = 0.039.

Figure C3: Survival Past Election: Congressional Candidates

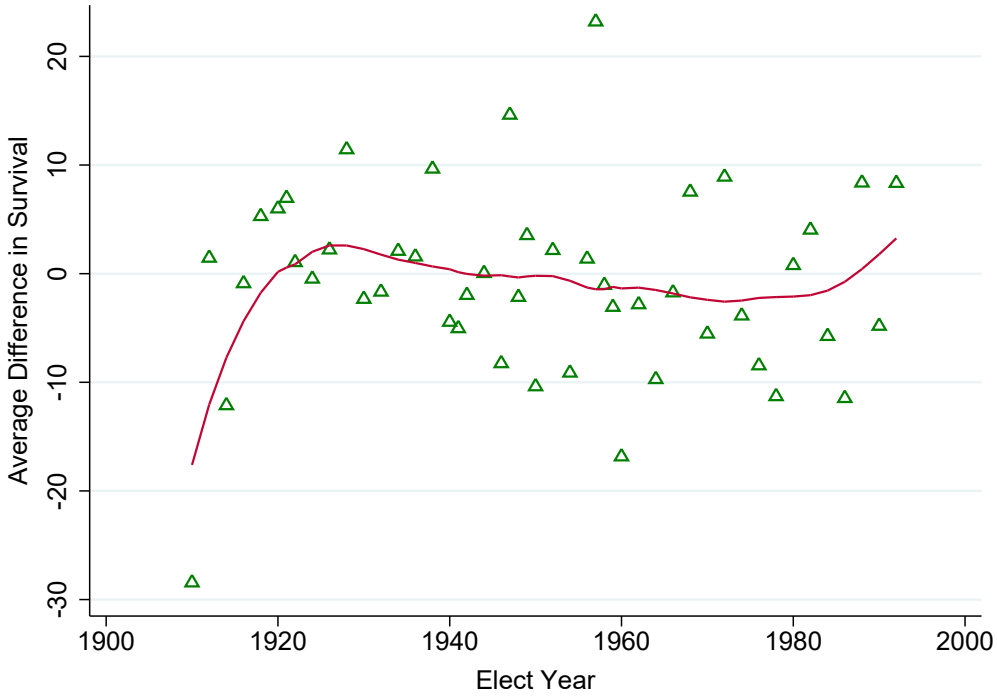


Notes: RD analysis using sample of congressional candidates from 1823-1994. MSE-optimal bandwidth = 0.040.

Figure C4: Average Difference in Survival: Gubernatorial Candidates

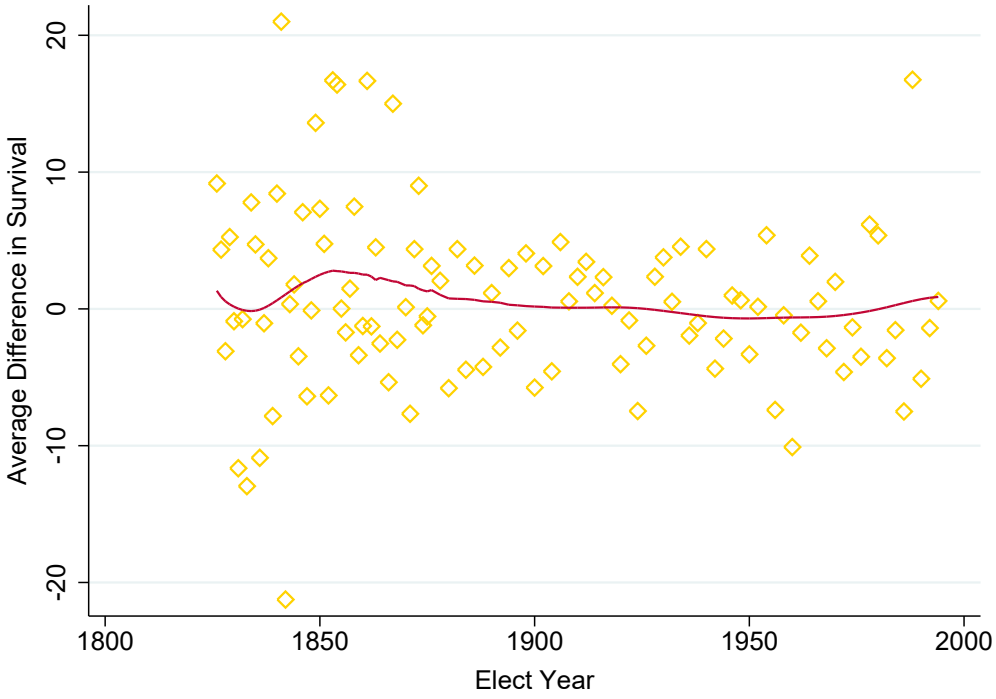
Notes: Figure presents the average difference in survival between winning and losing gubernatorial candidates within 5.6% of the margin of victory.

Figure C5: Average Difference in Survival: Senate Candidates



Notes: Figure presents the average difference in survival between winning and losing senate candidates within 3.9% of the margin of victory.

Figure C6: Average Difference in Survival: Representatives



Notes: Figure presents the average difference in survival between winning and losing congressional candidates within 4.0% of the margin of victory.

Table C1: Found Candidates within Pooled Bandwidth

	Observations	Percent
Governors		
Total Candidates	1769	
Winning Candidates	883	
Losing Candidates	886	
Found Winner Birth and Deathdates/Alive	883	100.00%
Found Losing Birth and Deathdates/Alive	853	96.28%
Senators		
Total Candidates	672	
Winning Candidates	334	
Losing Candidates	338	
Found Winner Birth and Deathdates/Alive	334	100.00%
Found Losing Birth and Deathdates/Alive	329	97.34%
Representatives		
Total Candidates	3590	
Winning Candidates	2253	
Losing Candidates	1337	
Found Winner Birth and Deathdates/Alive	2253	100.00%
Found Losing Birth and Deathdates/Alive	1337	100.00%

Notes: Summary of found winning and losing gubernatorial, senate, and congressional candidates within MSE-optimal bandwidth of .030.

Table C2: Found Candidates within 20% Margin

	Observations	Percent
Governors		
Total Candidates	5155	
Winning Candidates	2513	
Losing Candidates	2642	
Found Winner Birth and Deathdates/Alive	2513	100.00%
Found Losing Birth and Deathdates/Alive	2396	90.69%
Senators		
Total Candidates	2367	
Winning Candidates	1185	
Losing Candidates	1182	
Found Winner Birth and Deathdates/Alive	1185	100.00%
Found Losing Birth and Deathdates/Alive	1042	88.16%
Representatives		
Total Candidates	16113	
Winning Candidates	13523	
Losing Candidates	2590	
Found Winner Birth and Deathdates/Alive	13523	100.00%
Found Losing Birth and Deathdates/Alive	2590	100.00%

Notes: Summary of found winning and losing gubernatorial, senate, and congressional candidates who are within 20% of the margin of victory.

Table C3: Effect of Winning Election on Survival: Governors and Senators

	(1)	(2)	(3)	(4)
Win Election	2.42**	1.95**	2.20*	1.59**
	(1.23)	(0.80)	(1.21)	(0.81)
Sample Size	6177	6177	6247	6247
Effective Observations	2234	2305	2254	2330
Controls		X		X
All Deaths			X	X
Clusters	50	50	50	50
MSE-Optimal Bandwidth	0.032	0.033	0.032	0.033

Notes: Difference between winners and losers in years survived post-election. Columns (1)-(4) report results from an RD analysis using a pooled sample of gubernatorial and senate candidates within 20% of the vote margin required for victory. The analysis uses an MSE-optimal bandwidth selection procedure with a robust variance estimator. Column (2) includes controls for gender, party, state, previous years of service, previous service, and quadratics for age at election and year of election. Column (3) adds candidates who died of accidents, assassinations, and other violent causes. Column (4) includes controls and adds candidates who died of accidents, assassinations, and other violent causes. Standard errors clustered at the state level. *, **, *** indicate significance levels of .10, .05, and .01, respectively.

Table C4: RD Density Test

	Pooled (1)	*Governors* (2)	*Senators* (3)	*Representatives* (4)
	1.11	0.22	-0.43	0.48
P-value	[0.26]	[0.83]	[0.67]	[0.63]
Sample Size	20702	4393	1784	14525
Effective Observations	7326	1984	1432	4949

Notes: Each column presents results for manipulation testing using local-polynomial density estimators. The running variable is defined as the vote margin required for victory with a cutoff value set at zero. In each column, the test statistic is shown with the robust, bias-correct p-value in brackets. Columns (1), (2), (3) and (4) report results for the pooled, governor, senator, and representative samples, respectively. *, **, *** indicate significance levels of .10, .05, and .01, respectively.

Table C5: RD Covariate Test

	Elect Age (1)	*Elect Year* (2)	*Gender* (3)	*Prev. Years* (4)	*Prev. Served* (5)
		Pooled			
	-1.08*	-0.59	-0.00	0.15	0.02
	(0.62)	(3.79)	(0.00)	(0.31)	(0.04)
Sample Size	20702	20702	20702	20702	20702
Effective Observations	6528	9186	7323	8982	8526
MSE-Optimal Bandwidth	0.038	0.053	0.040	0.051	0.049
		Governors			
	-0.94	1.74	0.00	-0.24	-0.05
	(0.99)	(5.86)	(0.00)	(0.24)	(0.06)
Sample Size	4393	4393	4393	4393	4385
Effective Observations	1973	2415	2143	2192	2175
MSE-Optimal Bandwidth	0.040	0.052	0.045	0.046	0.046
		Senators			
	0.49	-0.53	-0.02	-0.26	-0.00
	(1.56)	(3.61)	(0.01)	(0.95)	(0.07)
Sample Size	1784	1784	1784	1784	1784
Effective Observations	739	848	880	880	909
MSE-Optimal Bandwidth	0.042	0.050	0.053	0.052	0.055
		Representatives			
	-1.13	0.79	-0.00	0.19	
	(0.72)	(3.76)	(0.01)	(0.37)	
Sample Size	14525	14525	14525	14525	
Effective Observations	4981	4644	4597	5545	
MSE-Optimal Bandwidth	0.044	0.040	0.040	0.050	

Notes: Each column presents bias-corrected RD estimates using a robust variance estimator. In Column (1), the outcome variable is defined as age at election. In Column (2), the outcome variable is defined as the year of election. In Column (3), the outcome variable is defined as an indicator for gender. In column (4) the outcome variable is defined as the previous number of years served in office. In column (5), the outcome variable is an indicator for having previously served. Standard errors clustered at the state level. *, **, *** indicate significance levels of .10, .05, and .01, respectively.

Table C6: Stressful State Characteristics: RD Analysis

	Rev + Exp	*Population*	*Rev/Exp + Pop*	*Decrease in Pop*	*Divided Govt.*
	(1)	(2)	(3)	(4)	(5)
Winner	0.81	-0.20	0.78	0.08	0.05
	(1.03)	(0.84)	(1.04)	(0.84)	(1.03)
Win X Revenues + Expenditures	0.63**		0.69		
	(0.24)		(0.38)		
Win X Population		1.05***	-0.16		
		(0.36)	(0.75)		
Win X % Decrease in Population				0.16	
				(0.38)	
Win X Divided Government					-0.42
					(0.96)
Observations	1460	2526	1458	2434	2532
Controls	X	X	X	X	X
Clusters	50	50	50	50	50

Notes: Results from RD analysis using Gubernatorial candidates in 1789-2000 who are within the MSE-optimal bandwidth of .056. Candidates who died of accidents, assassinations, and other violent causes are treated as censored observations. Column (1) includes an interaction between winner and the sum of state revenues and expenditures. Column (2) includes an interaction between winner and logged state population. Column (3) includes an interaction between winner and the sum of state revenues and expenditures, and an interaction between winner and logged state population. Column (4) includes an interaction between winner and percent change in state population. Column (5) includes an interaction between winner and an indicator for whether the winner experienced a divided government during a term in office. Standard errors clustered at the state level. *, **, *** indicate significance levels of .10, .05, and .01, respectively.

Table C7: Stressful Candidate Characteristics: RD Analysis

	Above Age 50 (1)	*First Time Gov* (2)	*New Party* (3)	*No Term Limit* (4)	*Post 1900* (5)
Winner	0.09	-1.04	-0.54	- 0.11	-1.33
	(0.89)	(1.08)	(1.15)	(1.37)	(0.96)
Win X Above Age 50	-0.85				
	(0.97)				
Win X First Time Governor		1.00			
		(1.24)			
Win X New Party			0.68		
			(1.19)		
Win X No Term Limits				-0.23	
				(1.38)	
Win X Post 1900					2.20**
					(1.04)
Observations	2532	2532	2532	2532	2532
Controls	X	X	X	X	X
Clusters	50	50	50	50	50

Notes: Results from RD analysis using Gubernatorial candidates in 1789-2000 who are within the MSE-optimal bandwidth of .056. Candidates who died of accidents, assassinations, and other violent causes are treated as censored observations. Column (1) includes an interaction between winner and an indicator for whether the candidate is above 50 years of age at election. Column (2) includes an interaction between winner and an indicator for whether the winner is a first time Governor. Column (3) includes an interaction between winner and an indicator for whether the previous governor was of a different party. Column (4) includes an interaction between winner and an indicator for whether the candidate can run for another term. Column (5) includes an interaction between winner and an indicator for whether the candidate served after 1900. Standard errors clustered at the state level. *, **, *** indicate significance levels of .10, .05, and .01, respectively.

Table C8: State and Candidate Stress: Tobit Analysis

	(1)	(2)	(3)	(4)	(5)
	Panel A: State Heterogeneity				
	Rev + Exp	*Population*	*Rev/Exp + Pop*	*Decrease in Pop*	*Divided Govt.*
Winner	-0.03	-0.06	-0.08	0.09	0.63
	(0.46)	(0.34)	(0.46)	(0.37)	(0.67)
Win X Revenues + Expenditures	0.44***		0.18		
	(0.16)		(0.25)		
Win X Population		0.88***	0.83		
		(0.24)	(0.55)		
Win X % Decrease in Population				0.18	
				(0.23)	
Win X Divided Government					-0.52
					(0.90)
Observations	2983	4869	2978	4720	4880
Clusters	50	50	50	50	50
	Panel B: Candidate Heterogeneity				
	Above Age 50	*First Time Gov*	*New Party*	*No Term Limit*	*Post 1900*
Winner	0.57	-0.66	0.07	0.13	-1.01**
	(0.47)	(0.69)	(0.63)	(0.91)	(0.46)
Win X Above Age 50	-0.96				
	(0.70)				
Win X First Time Governor		0.93			
		(0.84)			
Win X New Party			0.08		
			(0.89)		
Win X No Term Limit				-0.20	
				(0.98)	
Win X Post 1900					1.76***
					(0.63)
Observations	4880	4880	4880	4880	4880
Clusters	50	50	50	50	50
Controls	X	X	X	X	X

Notes: In Panel A, Column (1) includes an interaction between winner and total state revenues and expenditures. Column (2) includes an interaction between winner and logged state population. Column (3) includes an interaction between winner and total state revenues and expenditures and an interaction between winner and logged state population. Column (4) includes an interaction between winner and percent change in state population. Column (5) includes an interaction between winner and whether the winner experienced a divided government during term in office. In Panel B, Column (1) includes an interaction between winner and whether the candidate is above 50 years of age at election. Column (2) includes an interaction between winner and whether the winner is a first time governor. Column (3) includes an interaction between winner and whether the previous governor was of a different party. Column (4) includes an interaction between winner and and whether the candidate can run for another term. Column (5) includes an interaction between winner and an whether the candidate served after 1900. Standard errors clustered at the state level. *, **, *** indicate significance levels of .10, .05, and .01, respectively.