

The Professionalism Advantage: Attracting, Fostering or Retaining Quality? *Pre-Analysis Plan*

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Abstract

We investigate why professionalized legislators hold more accurate beliefs about their constituents' preferences. We identify three potential sources for the professionalism advantage that correspond to the three periods of legislators' careers: running for office, serving in office, and leaving office. We derive an empirical model that allows us to decompose how much of the professionalism advantage can be attributed to each of the three sources we discuss. We will conduct our analysis using data from the 2014 National Candidate Survey, which gives candidates' perceptions of public opinion (Broockman and Skovron 2018).

Motivation

The quality of substantive representation depends, in part, on legislators' abilities to represent the preferences of their voters in the policymaking process (Pitkin 1967, Mansbridge 2003). For this reason the discipline has adopted ideological congruence as a normative benchmark by which to assess the quality of representation (e.g., Lax and Phillips 2009, 2012). A vital part of being able to act on constituents' wishes is first knowing what those wishes are (Miller and Stokes 1963, Verba and Nie 1972). Further, learning constituent opinion, at least in some circumstances, causes legislators to be more likely to act in accordance with voters' preferences (Butler and Nickerson 2011). Our study is interested in understanding why professional legislatures have higher quality incumbents. While there are many features of being a high quality incumbent, we focus on legislators ability to correctly perceive public opinion in their district. We focus on this aspect because of the importance of ideological congruence for representation.

Despite the importance of knowing voters' preferences, Broockman and Skovron (2018) find that legislators consistently misperceive public opinion in their district. They also find that legislative professionalism attenuates legislators' misperceptions of district opinion. In other words, there is a professionalism advantage to knowing the district's opinion. *Why do legislators from professional legislatures know public opinion in their district better?*

We explore three sources that might explain why professional legislators better know their constituents' opinions. First, higher quality candidates may be more likely to run for office in

professionalized legislatures because it is a more attractive position. Second, the higher level of resources in professional legislatures may foster quality in legislators by allowing them to focus more on the job. Third, professionalized legislatures may be able to retain legislators longer because of the relative attractiveness of the position. Politicians in professionalized legislatures may simply be less likely to seek higher office or otherwise retire, such that more professionalized legislatures may be more likely to retain incumbent representatives (who more accurately district opinion) than less professionalized legislatures.

Research Question

What drives the professionalism advantage? The attraction of quality candidates, the fostering of incumbents in office, the retention of incumbents, or some combination of these three sources? We test how much each of these sources contribute to the observed professionalism advantage.

Hypotheses about the Professionalism Advantage

Professionalism, which describes the resources that are available to state legislators, is typically measured using the Squire Index (Squire 1992, 2007). The Squire Index weights each of three components – salary, legislative staff, and days in session – equally. We use the Squire Index as opposed to the individual components because all three components should have effects that move in the same direction.¹ The Squire Index ranges from 0 to 1, with 1 indicating that the legislature perfectly resembles the professionalism of the United States Congress and 0 indicating no resemblance. The measure thus captures the degree to which the state legislature looks like Congress versus a “citizen” legislature that is a part-time position with few resources. We test three sources for the professionalism advantage: Attracting high quality candidates, fostering quality on the job, and retaining incumbents.

First, professional legislatures are more likely to attract higher quality candidates. A variety of studies have shown that candidates use a cost-benefit analysis when they decide whether to run for office (Schlesinger 1966; Black 1972; Rohde 1979). Serving in a professional legislature is more attractive because it offers a higher salary and more resources in the form of staff and longer sessions. Individuals who are likely to be high quality legislators, are likely to also have attractive job opportunities outside of the legislature (Fiorina 1994). If the legislator job is not attractive, these high quality individuals will not run for office. In sum, greater professionalism will lead higher quality candidates to run for office.

Second, legislative professionalism may affect the degree to which legislators develop quality while in office. The higher salary means that they do not need a second job to financially support themselves so they can focus on legislating and working on behalf of their constituents (Fiorina 1994). Similarly, professional legislatures have longer sessions, which means they spend more time focusing on their job. Further, having more staff to whom they can delegate routine tasks, frees up time for legislators to engage with their constituents.

¹For example, higher salary increase the relative attractiveness of a legislative position as does having more staff members to whom a legislator can delegate undesirable parts of the job.

Spending more time on the job and focusing more on constituents should advantage these legislators in learning about their constituents' preferences. This advantage should grow the longer that legislators are in office. With the passage of time, legislators should gain more knowledge and get better at learning about constituents opinion. This learning over time should occur for all legislators. The key point is that the return for an additional year in office may be greater for those who are serving in a more professional legislature because of the disparity in resources.

Third, more professional legislatures may retain their incumbents for longer because they are a more attractive place to serve. These legislatures do not have to run for higher office to get a position with prestige. Serving in a professional legislature is also a financially sustainable career option because it provides sufficient income to legislators. Note that this assumes that time in office has a positive impact on legislator quality.

These features of professionalism can affect the quality of the incumbents serving in office. At the most basic level, it can affect legislators at all three parts of their legislative career. It can affect who runs for office, it can affect how they improve over time while in office, and it can affect when they leave office. These three stages correspond to the three sources we test as laid out in the following hypotheses.

Attracting Quality Hypothesis: Professional legislatures attract candidates who are of higher quality.

Fostering Quality Hypothesis: Resources allow incumbents to increase in quality over time. Legislators with more resources increase in quality more quickly.

Retaining Incumbents Hypothesis: Professional legislatures are more likely to retain incumbents because it is a more attractive position.

Measurement

In order to carry out the empirical tests we will use data from the 2014 National Candidate Survey (Broockman and Skovron 2018). In that survey, candidates (both incumbents and first-time candidates) were asked for their perceptions of public opinion in their district. Broockman and Skovron (2018) compare the survey answers to actual district opinion to measure which legislators better know their constituents' preferences. They study seven topics covering abortion rights, gun rights, religious exemptions for birth control under the Affordable Care Act, policies for undocumented immigrants, and same-sex marriage.

We study the legislators' knowledge of their districts' opinion. This is measured as the distance between district opinion and the legislator's perception of district opinion. We use the average distance across the seven issues in the survey as our dependent variable. We refer to this as the knowledge gap. Equation 1 gives the formula for calculating the knowledge gap with i indexing the candidate and j indexing the issue:

$$\text{Knowledge gap}_i = \frac{\sum_{j=1}^n (|\text{Perceived district opinion}_{ij} - \text{Actual district opinion}_{ij}|)}{n} \quad (1)$$

We use the Squire Index to measure legislative professionalism. The Squire Index weights each of the three legislative components – salary, legislative staff, and days in session – equally (Squire 1992, 2007). The Squire Index ranges from 0 to 1, with 1 perfectly resembling the professionalism of the United States Congress and 0 representing no resemblance.

Decomposing the Professionalism Advantage into Its Component Parts

In this section we derive an empirical model that allows us to identify how much the three sources we identified above contribute to the professionalism advantage. Our decomposition approach is similar to the Blinder-Oaxaca decomposition model. For the decomposition we will deal with two groups based on the level of professionalism in the legislature: high professionalism and low professionalism. We estimate the following regression separately for each group where the subscript g indexes the group (high versus low professionalism) and i indexes the legislator:

$$KG_{gi} = \alpha_g + \beta_g Years_{gi} + \varepsilon_{gi} \quad (2)$$

In this equation α_g gives the knowledge gap for someone who has served 0 years. In other words, this gives the knowledge gap for non-incumbent candidates, which directly relates to the *attracting quality hypothesis*. Similarly, β_g indicates how much each additional year of service in the legislature affects the knowledge gap, which directly relates to the *fostering quality hypothesis*. Finally, $Years_{gi}$ gives the number of years that each legislator has served, which relates to the *retaining incumbents hypothesis*.² We look at these three hypotheses by using a decomposition approach that allows us to see how much of the professionalism advantage in knowledge can be attributed to each of these three sources. The next step in our decomposition approach, Equation 3, follows directly from Equation 2 where the bar over the variables indicates the average value of the variable for group g :

$$\overline{KG}_g = \alpha_g + \beta_g \overline{Years}_g \quad (3)$$

We use this information to decompose the professionalism advantage in the knowledge gap. The professionalism advantage is simply the difference between the average level of knowledge in the low professionalism states versus the high professionalism states, i.e., Professionalism Advantage = $\overline{KG}_L - \overline{KG}_H$. If the high professionalism states have a smaller knowledge gap as Broockman and Skovron find (2018), then the Professionalism Advantage will take a positive value. Equation 4 then uses Equation 3 as a starting point to decompose the professionalism advantage into the three factors.

²This is equal to the days between entering the legislature and October 15, 2014 (the time of the survey), divided by 365.

Professionalism Advantage =

$$\begin{aligned}
\overline{KG}_L - \overline{KG}_H &= (\alpha_L + \beta_L \overline{Years}_L) - (\alpha_H + \beta_H \overline{Years}_H) \\
&= (\alpha_L - \alpha_H) + \beta_L \overline{Years}_L - \beta_H \overline{Years}_H \\
&= (\alpha_L - \alpha_H) + \beta_L \overline{Years}_L - \beta_H \overline{Years}_H + (\beta_L \overline{Years}_H - \beta_L \overline{Years}_H) \\
&= (\alpha_L - \alpha_H) + (\beta_L \overline{Years}_H - \beta_H \overline{Years}_H) + (\beta_L \overline{Years}_L - \beta_L \overline{Years}_H) \\
&= (\alpha_L - \alpha_H) + (\beta_L - \beta_H) \overline{Years}_H + \beta_L (\overline{Years}_L - \overline{Years}_H)
\end{aligned} \tag{4}$$

Line 1 of Equation 4 follows directly from Equation 3. The second line simply rearranges the terms. The third line of Equation 4 adds and subtracts the exact same term ($\beta_H \overline{Years}_L$) from the right hand side of the equation. The fourth line simple rearranges terms. The final line of Equation 4 pulls the common terms out. This final line identifies the three sources of the professionalism advantage that we are testing.

Attracting Quality: The quantity $(\alpha_L - \alpha_H)$ gives the knowledge gap among the non-incumbent candidates running for office. If professional legislatures attract higher quality candidates than $\alpha_H < \alpha_L$.

Fostering Quality: The quantity $(\beta_L - \beta_H) \overline{Years}_H$ gives the amount of the professionalism advantage that is explained by the differences in the returns to years in office. If incumbents increase their knowledge while in office, then the coefficient β should be negative (because the knowledge gap would decrease with years of experience). If high professionalism legislatures are better at fostering quality in incumbents, then the knowledge gap should decrease faster with years of experience in the higher professionalism states (i.e., $\beta_H < \beta_L$). Multiplying this by the average number of years served in low professionalism legislatures, gives the amount of the professionalism advantage that is attributable to high professionalism states fostering quality more quickly among incumbents.

Retaining Incumbents: The quantity $\beta_L (\overline{Years}_L - \overline{Years}_H)$ gives the amount of the professionalism advantage that is explained by the differences in how long incumbents serve in high professionalism states relative to low professionalism states (i.e., $\overline{Years}_L - \overline{Years}_H$). If high professionalism states are better able to retain incumbents, then $\overline{Years}_H > \overline{Years}_L$.

Main Empirical Test: Implementing the Decomposition

We will analyze the data from Broockman and Skovron (2018). We will divide the sample into two groups based on the level of professionalism using the same cutoff between high and low professional legislatures as Broockman and Skovron (2018), which is Squire Index = 0.2.

We will run a regression corresponding to Equation 2 for each of the two groups. We will then use the information from that regression to carry out the decomposition given by Equation 4. This will tell us how much each of the three sources contributes to the professionalism advantage. We can see if they all equally contribute or if one of the three mechanisms is a stronger contributor. The decomposition will be the primary test for understanding how these mechanisms contribute to the professionalism advantage.

Additional Tests

In addition to the decomposition, we will conduct tests on each of the three sources individually.

Empirical Test 2: Attracting Quality

We will look at the *Attracting Quality Hypothesis* on its own by estimating a regression that includes only the non-incumbent candidates. The dependent variable will be the knowledge gap of the candidate. The primary independent variable will be the Squire Index (as a continuous variable). If the *Attracting Quality Hypothesis* is correct, the coefficient on the Squire Index will be negative, meaning that candidates who run for seats in a professional legislature have smaller knowledge gaps (more knowledge accuracy) than candidates who run for seats in less professional legislatures. We include the controls used in Broockman and Skovron (2018).

Sample: Non-incumbent candidates

Dependent Variable: Knowledge gap

Primary Independent Variable: Squire Index

Prediction: Negative coefficient on the Squire Index

Control variables: Competitiveness, Split party control state, Unified Republican state, Upper chamber, Male, Number of Polls, Hispanic, African American, Age, Republican.

Empirical Test 3: Fostering Quality

We will test the *Fostering Quality Hypothesis* by restricting the sample to sitting state legislators. The dependent variable will be the knowledge gap. The primary independent variables will be the Squire Index, the years in office, and an interaction between the two. If the *Fostering Quality Hypothesis* is correct, the coefficient on the interaction term should be negative, meaning that time in office does more to decrease the knowledge gap for higher professionalism legislatures. We include the controls used in Broockman and Skovron (2018).

Sample: Incumbent candidates

Dependent Variable: Knowledge gap

Primary Independent Variables: Squire Index, Years in office, and Squire Index*Years in office

Prediction: Negative coefficient on Squire Index*Years in office

Control variables: Competitiveness, Split party control state, Unified Republican state, Upper chamber, Male, Number of Polls, Hispanic, African American, Age, Republican.

Empirical Test 4: Retaining Incumbents

The final test will look at whether incumbents are more likely to stay in office in higher professionalism states. We will test this by creating a new dependent variable for whether or not the legislator is in office on August 1, 2018. This will be a dummy variable that is coded as 1 for everyone who is in office on August 1, 2018, and 0 otherwise. The sample will be all incumbents in the dataset and also the first time candidates who won in 2014.

We will use the Squire Index as the main independent variable. If incumbents in more professional states are more likely to stay in office, then we should observe a negative coefficient on the the Squire Index. We include the controls used in Broockman and Skovron (2018) and will also control for years of service at the time of the 2014 survey.

Sample: Incumbent candidates and first time candidates who won in 2014

Dependent Variable: In office in 2018

Primary Independent Variables: Squire Index

Prediction: Negative coefficient on Squire Index

Control variables: Competitiveness, Split party control state, Unified Republican state, Upper chamber, Male, Number of Polls, Hispanic, African American, Age, Republican, Years of Service at time of 2014 survey, Incumbent Candidate in 2014.

Works Cited

- Aldrich, J.H., & Thomsen, D.M. (2017). "Party, Policy, and the Ambition to Run for Higher Office." *Legislative Studies Quarterly*, 42(2), 321-343.
- Arnold, R.D. (1990). *The Logic of Congressional Action*. Yale University Press.
- Berry, W.D., Berkman, M.B., & Schniederman, S. (2000). "Legislative Professionalism and Incumbent Reelection: The Development of Institutional Boundaries." *American Political Science Review*, 94(4), 859-874.
- Black, G.S. (1972). "A Theory of Political Ambition: Career Choices and the Role of Structural Incentives." *American Political Science Review*, 66, 144-159.
- Broockman, D.E., & Skovron, C. 2018. "Bias in Perceptions of Public Opinion among Political Elites." *American Political Science Review*, 1-22.
- Butler, D.M., & Dynes, A.M. (2016). "How Politicians Discount the Opinions of Constituents with Whom They Disagree." *American Journal of Political Science*, 60(4), 974-989.
- Butler, D.M., & Nickerson, D.W. (2011). "Can Learning Constituency Opinion Affect How Legislators Vote? Results from a Field Experiment." *Quarterly Journal of Political Science*, 6, 55-83.
- Fenno, R. (1977). "U.S. House Members in their Constituencies: An Exploration." *American Political Science Review*, 71, 883-917.
- Fiorina, M. 1994. "Divided Government in the American States: A Byproduct of Legislative Professionalism?" *American Political Science Review* 88: 304-316.
- Fiorina, M., & Prinz, T. (1994). "Legislative Incumbency and Insulation," *Encyclopedia of the American Legislative System*, Joel H. Silbey, ed., (New York: Charles Scribner's Sons, 1994): 513-527.
- Gaddie, R. K. (2004). *Born to Run: Origins of the Political Career*. Lanham: Rowman and Littlefield.
- Gerber, Alan S., and Donald P. Green. 2012. *Field Experiments: Design, Analysis, and Interpretation*. New York: W.W. Norton & Company.
- Jacobson, G., & Kernell, S. 1983. *Strategy and Choice in Congressional Elections*. Yale University Press.
- Kingdon, J. (1967). Politicians' Beliefs about Voters. *American Political Science Review*, 61(1), 137-145.

- Krimmel, K., Lax, J.R., & Phillips, J.H. (2016). "Gay Rights in Congress: Public Opinion and (Mis)Representation." *Public Opinion Quarterly*.
- Lax, J.R., & Phillips, J.H. 2009. "Public Opinion and Policy Responsiveness: Gay Rights in the States." *American Political Science Review*, 103(3): 367-385.
- Lax, J.R., & Phillips, J.H. (2012). "The Democratic Deficit in the States." *American Journal of Political Science*, 56(1), 148-166.
- Maestas, C. 2000). "Professional Legislatures and Ambitious Politicians: Policy Responsiveness of State Institutions." *Legislative Studies Quarterly*, 25(4), 663-690.
- Maestas, C. (2003). The Incentive to Listen: Progressive Ambition, Resources, and Opinion Monitoring among State Legislators. *The Journal of Politics*, 65(2), 439-456.
- Mansbridge, J. (2003). "Rethinking Representation." *American Political Science Review*, 97(4), 515-528.
- Miler, K. (2007). "The View from the Hill: Legislative Perceptions of the District." *Legislative Studies Quarterly*, 32(4), 597-628.
- Miller, W.E., & Stokes, D.E. (1963). "Constituency Influence in Congress." *American Political Science Review*, 57(1), 45-56.
- Moncrief, G.F., Niemi, R.G., & Powell, L.W. (2004). "Time, Term Limits, and Turnover: Trends in Membership Stability in U.S. Legislatures." *Legislative Studies Quarterly*, 29(3), 357-381.
- Pitkin, H.F. (1967). *The Concept of Representation*, Berkeley: University of California.
- Rohde, D. (1979). Risk-Bearing and Progressive Ambition: The Case of Members of the United States House of Representatives. *American Journal of Political Science*, 23(1), 1-26.
- Schlesinger, J.A. (1966). *Ambition and Politics: Political Careers in the United States*. Rand McNally Publishing.
- Squire, Peverill. (1992). "Legislative Professionalism and Membership Diversity in State Legislatures." *Legislative Studies Quarterly*, 17, 69-79.
- Squire, Peverill. (2007). "A Squire Index Update." *State Politics and Policy Quarterly*, 7(2), 211-227.

Squire, Peverill. (2017). "A Squire Index Update." *State Politics and Policy Quarterly*, 17(4), 361-371.

Verba, S., & Nie, N.H. (1972). *Participation in America: Political democracy and social equality*. New York: Harper and Row.

```

## Creating or Attracting Quality
## Dan Butler + Zoe Nemerever

## August 9, 2018
## Pre-Analysis Plan Code

rm(list=ls())

library(doBy)
library(plyr)
library(dplyr)
library(ggplot2)
library(grid)
library(coefplot)
library(stargazer)
library(broom)
library(scales)

## Set Working Directory
setwd("~/Dropbox/Broockman-Skovron/Elite perceptions 2/Replication-
materials/")

## Get the Survey Dataset
original <- read.csv('../2014 NCS/1_Analysis - CCES and MRP/4_NCS/
2014-NCS-cleaned.csv')

original <- read.csv('../2014 NCS/1_Analysis - CCES and MRP/4_NCS/
2014-NCS-cleaned.csv',
                      stringsAsFactors = FALSE)
original$incumbent <- with(original, current_office_officename ==
'State House' | current_office_officename == 'State Assembly' |
                          current_office_officename == 'State
Senate')

# load in state partisan control
partisan.control = read.csv("~/Dropbox/Broockman-Skovron/Elite
perceptions 2/2014 NCS/1_Analysis - CCES and MRP/4_NCS/state-leg-
party-control-2014.csv")
names(partisan.control) = c('state',"party.control")

original = left_join(original, partisan.control, by = 'state')

# Join presidential election returns to megapoll and pstrat
presvote = read.csv('../2014 NCS/1_Analysis - CCES and MRP/2_Census

```

```
Data and Pres Results and Poststrat File/Pres election results by SLD/  
SLD-pres-results-2012.csv', stringsAsFactors = FALSE)  
original = join(original, presvote, by = "modgeoid" )
```

```
original$bamavs.rescaled = scale(original$bama.2012.twoparty)  
original$competitiveness = -1 * abs(original$bama.2012.twoparty -  
0.5)  
original$competitiveness.rescaled = scale(original$competitiveness)
```

```
##### ADDED FROM 1_mrp_analysis.R
```

```
# original$error.imm.policequestion <- -1 *  
original$error.imm.policequestion  
# original$error.religexempt <- -1 * original$error.religexempt  
#  
# # outcomes  
# original$cons.overest.across.issues <-  
rowMeans(original[,paste0('error.',issues$issue)], na.rm=TRUE)  
# original$mean.error.across.issues <-  
rowMeans(abs(original[,paste0('error.',issues$issue)]), na.rm=TRUE)
```

```
# Load in region  
library(datasets)  
original$state.region <-  
as.character(state.region[match(original$state, state.abb)])  
original$state.division <-  
as.character(state.division[match(original$state, state.abb)])  
original$already_holds_office <- original$title != ""
```

```
# OLS models  
# clean up covariates  
# number of polls  
class(original$number_of_polls)  
original$number_of_polls = as.numeric(original$number_of_polls)  
original$number_of_polls[original$number_of_polls > 10]<-10  
original$number_of_polls_imputed[is.na(original$number_of_polls)]<-1  
original$number_of_polls_imputed[!is.na(original$number_of_polls)]<-0  
  
original$number_of_polls[is.na(original$number_of_polls)]<-  
mean(original$number_of_polls,na.rm=TRUE)  
  
original$age[original$age=='18-25']<-.2  
original$age[original$age=='26-34']<-.4  
original$age[original$age=='35-44']<-.6
```

```

original$age[original$age=='45-54']<-.8
original$age[original$age=="65 or over"]<-1
original$age = as.numeric(original$age)
original$age_imputed[is.na(original$age)]<-1
original$age_imputed[!is.na(original$age)]<-0
original$age[is.na(original$age)]<-mean(original$age,na.rm=TRUE)

original$squire_rescaled = scale(original$state_squire_index)
original$number_of_polls_rescaled = scale(original$number_of_polls)

original$gender = as.factor(original$gender)
original$gender[original$gender==""]<-NA

original$black = original$race.African.American
original$black[original$black=='African American']<-1
original$black[original$black=='']<-0
original$black = as.numeric(original$black)

original$white = original$race.White.Caucasian
original$white[original$white=='White/Caucasian']<-1
original$white[original$white=='']<-0
original$white = as.numeric(original$white)

original$hispanic = original$race.Hispanic.or.Latino.a
original$hispanic[original$hispanic=='Hispanic or Latino/a']<-1
original$hispanic[original$hispanic=='']<-0
original$hispanic = as.numeric(original$hispanic)

original$obamavs.rescaled = scale(original$obama.2012.twoparty)
original$competitiveness = -1 * abs(original$obama.2012.twoparty -
0.5)
original$competitiveness.rescaled = scale(original$competitiveness)

## Name of survey issues
issues <- read.csv('./Analysis 2014/1_Analysis - CCES and MRP/4_NCS/
issue.names.titles.csv',
stringsAsFactors = FALSE)

## Auxillary data on years of service and whether still in office
aux <-read.csv('./butler-replication/
butler_nemerever_auxillary_data.csv')

## Merge new information and original dataset
original <- merge(original, aux, by='NCSserial')

```

```

## Replace tenure variable for non-incumbent candidates
original$survey_tenure[which(original$incumbent=='FALSE' &
is.na(original$survey_tenure))]<-0

## Create knowledge gap score for each candidate
for(issue in issues$issue) {
  original[paste0('error.',issue)] <- original[paste0('mrp.',issue)] -
original[paste0(issue,'.perc')]
}

original$mean.error.across.issues <-
rowMeans(abs(original[,paste0('error.',issues$issue)]), na.rm=TRUE)

## Code the high and low professionalism groups
original$prof_high <- ifelse(original$state_squire_index >= 0.2, 1,
0)

##Frequency Table of observations for high and low professionalism
groups
prof_freq <- table(Professionalism=original$prof_high,
Incumbent=original$incumbent)

ftable(prof_freq)

#####
## Main Test: Decomposition of Professionalism Advantage ##
#####

# Subset (based on professionalism) the dataset (Also only keep
those who have information for both the DV and IV)
prof_high <- original[which(original$prof_high=='1' & !
is.na(original$mean.error.across.issues) & !
is.na(original$survey_tenure)), ]
prof_low <- original[which(original$prof_high=='0' & !
is.na(original$mean.error.across.issues) & !
is.na(original$survey_tenure)), ]

## Find the average number of years served for the groups
years_prof_high <- mean(prof_high$survey_tenure, na.rm=TRUE)
years_prof_high
years_prof_low <- mean(prof_low$survey_tenure, na.rm=TRUE)
years_prof_low

## Calculate the Knowledge Gap for high and low professionalism
legislatures
KG_high <- mean(prof_high$mean.error.across.issues, na.rm=TRUE)
KG_high
KG_low <- mean(prof_low$mean.error.across.issues, na.rm=TRUE)
KG_low

```

```

## Regressions corresponding to Equation 2 in Pre-Analysis Plan.
summary(model.prof_high <- lm(mean.error.across.issues ~
survey_tenure, data = prof_high))
  alpha_high <- model.prof_high$coefficients[1]
  beta_high <- model.prof_high$coefficients[2]
summary(model.prof_low <- lm(mean.error.across.issues ~ survey_tenure,
data = prof_low))
  alpha_low <- model.prof_low$coefficients[1]
  beta_low <- model.prof_low$coefficients[2]

## Decomposition Calculation
## Total Professionalism Advantage
prof_advantage<- KG_low - KG_high
## Advantage from Attracting Quality
perc.attract.hypothesis<-(alpha_low-alpha_high) / prof_advantage
## Advantage from Fostering Quality
perc.fostering.hypothesis<- (beta_low-beta_high)/prof_advantage
## Advantage from Retaining Incumbents
perc.retaining.hypothesis<-beta_low*(years_prof_low-
years_prof_high)/prof_advantage

#####
## Additional Tests ##
#####

#Empirical Test 2: Attracting Quality
candidatesonly <- original[which(original$incumbent=='FALSE'), ]

m2 = lm(mean.error.across.issues ~ state_squire_index +
  competitiveness.rescaled +
  party.control +
  level +
  gender +
  number_of_polls +
  number_of_polls_imputed +
  hispanic +
  black +
  age +
  party, data = candidatesonly)
summary(m2)

#Empirical Test 3: Fostering Quality
incumbentonly <- original[which(original$incumbent=='TRUE'), ]
m3 = lm(mean.error.across.issues ~ state_squire_index +
  survey_tenure +
  survey_tenure*state_squire_index +
  competitiveness.rescaled +

```

```

party.control +
level +
gender +
number_of_polls +
number_of_polls_imputed +
hispanic +
black +
age +
party, data = incumbentsonly)
summary(m3)

# Empirical Test 4: Retaining Quality
inc_winners <- original[which(original$incumbent=='TRUE' |
klarner.won.2014==1), ]

m4 = lm(inoffice_aug1 ~ state_squire_index +
competitiveness.rescaled +
splitparty +
gopcontrol +
levelU +
genderMale +
number_of_polls_imputed +
hispanic +
black +
age +
republican +
survey_tenure+
incumbent, data = inc_winners)
summary(m4)

# Print results

stargazer(m2, m3, m4, type="text", out="m2m3.txt")

### End of File ###

```