Voting in Taiwan and China:

*A Comparative Analysis on the Impact of Educational Attainment*

*on Voter Turnout in Taiwan and China*


By


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# Table of Contents

**Introduction**

From Merriam and Gosnell (1924) to current day, there has been extensive literature produced on the relationship between education levels and voter turnout. These cross-sectional surveys have indicated that voter turnout increases with years of formal education. Many researchers argue that this is true because, as people become more educated, they become more politically aware. With this awareness, people are more likely to form their own political opinions and want to voice that opinion with their vote. This is to say that people understand political issues more thoroughly and are more interested in which politician supports their views, turning out to vote for them in elections.

Interest in this correlation and the literature surrounding it exists because, even if citizens have the right to vote in their nation, they do not always take advantage of the opportunity and many researchers have attempted to understand why. Lassen (2005) explains that unequal participation in elections has important repercussions: "first and foremost, political participation is an instrument of representation and, therefore, unequal participation can distort the pattern of representation necessary for democratic responsiveness," which could influence policy. Even with possible implications, this pattern remains consistent regardless if the election is local or national, or if the analysis is done with control variables or without (Sondheimer and Green 2010).

Although the relationship between education and voter turnout is one of extensively documented correlations in American research, there is not much literature to prove the same correlation in East Asia. The most prominent topic related to voter turnout in East Asia is addressed at local level elections in China. Shi (1999) evaluates the influence of education on voter turnout at the local level, for specific positions in December 1990 and January 1991. The

analysis is divided into elections for unit leaders (noncompetitive), unit leaders (semi-competitive), and the People's Congress (semi-competitive); finding that the relationship varies based on the election type. Shi performs the analysis right after the switch from plebiscitary elections to limited-choice elections at the local level, and finds that many people began voting more after the switch in order to punish the incumbent politicians and show approval for the move to democracy. I will be utilizing the same logistic regression model that Shi runs and apply it to modern data acquired from China to see if the twenty years between the switch to a more democratic system at the local level has changed the strategic voting methods of the villagers. I will also look at elections in China at the national level to see if the correlation between education and voter turnout produces the same results as the modern local level outcomes. I address not only the relationship between educational attainment and voter turnout for China, but Taiwan as well, and compare the findings in order to turn Shi's local level approach into a comparative study of nations in East Asia.

Denmark and Canada have similar voting procedures related to their governing system, where everyone is registered as voters. In both nations, there is no significant correlation between education levels and voter turnout (Lassen 2005). Lassen says that it is because of their similar systems that this result exists in both. If Lassen is correct, we would find that Taiwan would show a similar association between education and voter turnout as the United States because they have parallel governing systems. China, however, does not have the same governing system as Taiwan and thus, could have little to no relationship between the two variables.

I address previous literature related to the relationship between education levels and voter turnout in more detail and provide information on the specific data in my analysis. I utilize a

4

logistic regression model to evaluate the correlation of educational attainment and voter turnout for Taiwan and China. After running my analyses, I compare the results for both nations and discuss possible explanations for the outcome of the outcomes.

## Literature Review

### Voter Turnout and Education

This paper does not set out to explain *why* educational attainment is important to voter turnout, which is discussed in depth in previous research (Jackson 1995, Burden 2009).[1]  Rather, it addresses what the relationship between education and voter turnout is in Taiwan and China. The effects of education on voter turnout have produced the same positive relationship through years of literature conducted on the United States' voting patterns (Dee 2003, Milligan, Moretti, & Oreopulos 2004).  However, existing literature on other nations have not always show the same results. Before we can test the relationship between voter turnout and educational attainment in Taiwan and China, we need to take a closer look at the variables in a broad sense, and also specifically how they apply to each nation.

*Voter Turnout*

A broad definition of voter turnout can be found as, "the percentage of eligible voters who cast a ballot in an election" (Voting Behavior n.d.).  Eligible voters can vary between countries and cannot simply refer to the entire adult population.  The eligible voters are often determined by the form of government that exists in each nation.  In China, the Communist

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[1] Jackson's analysis compares four possible explanations for the importance of education on voter turnout.  The four possibilities stem from literature previous to his. His research can be located at http://apr.sagepub.com/content/23/3/279.short
Burden discusses three possible ways that education is connected to voter turnout. His literature can be found at http://www.sciencedirect.com/science/article/pii/S0261379409000626

Government controls the country with executive elections every five years and a legislature of 2,987 members. Although there are eight smaller independent parties in China, all are considered under the control of the Chinese Communist Party (CCP) (FindTheData 2015). China's Communist government is formed as a hierarchical electoral system, which involves nominations and voting. In this system, villages and small local governments are directly elected by the people in those villages or districts; those local governments then elect the National People's Congress (NPC), or legislature; the legislature then elects the President, who is nominated by the Chair of the NPC, and the Premier, who is nominated by the President and performs as the President's right-hand man. Although this system makes it easier to elect national leaders in China, with its over 1.3 billion people, it eliminates the people's ability to remain involved in who their leaders are through the process (How China's National People's Congress is Elected 2015). Also, because members running for positions are all CCP members and a portion of the election system is based on nominations, Chinese voters have only the option to vote for a CCP member and, regardless of the results, both members usually end up winning a position; the loser of the election is simply nominated to hold another position of similar or equal power.

In comparison, Taiwan has a republic that provides options for voters during elections. The Democratic Progressive Party (DPP) and Kuomintang (KMT) are the two leading parties in Taiwan and have traditionally taken opposing sides of political issues (FindTheData 2015). Similar to the United States, at least one member from both parties runs for each position during elections in Taiwan and voters are given the choice of which ideals they would like to support, using their vote to voice their opinion. Mirroring the United States again, Taiwan holds elections on a specific day, from 8:00a.m. to 4:00p.m., for people to vote; the election is for the President

and members of the legislature during this time.  The President then has the ability to appoint their Premier, which is also a power given to the President in China.  The legislature in Taiwan is referred to as the Legislative Yuan and contains 113 total seats.  Of those seats, 73 are elected by simple majority and 34 are "at large" members.  Within the "at large" members, six are reserved for the aboriginal population, and the others are distributed evenly between parties.  In comparison to China, Taiwan allows for equal representation in government and for the public to be involved in each level of the election process (Reuters 2015).

*Educational Attainment*

As stated before, education is a socioeconomic factor (such as age, gender, etc.) that has been found to have significant impact on voter turnout (Voting Behavior n.d.).  Wolfinger and Rosenstone (1980) wrote one of the first books that produced a positive correlation between education and voter turnout in the United States.  Literature following their book often cites them as proof that there is statistical significance between the two variables, however, there is not much data reflecting the relationship between the two variables in East Asia.  It is possible that because of the different education systems and socioeconomic levels within the world, we may see different relationships between education and voter turnout in Taiwan and China.

*Expectations*

As stated before, Lassen (2005) presents the conclusion that Denmark and the United Kingdom have similar outcomes of the effect of education on voter turnout because of their voting systems.  I suspect that because the system in Taiwan is similar to that of the United States we will see similar outcomes between the relationships of the variables.  However, because China does not have a voting system similar to the United States or Taiwan, we will see a negative relationship between educational attainment and voter turnout at the local and national

levels.  To test my expectations, we will fit a basic model, which looks at the total relationship

between education and voter turnout in both nations, at the local and national levels

*Voter Turnout ~ Education*

**Other Socioeconomic Variables**

Milbrath and Goel (1997) introduce the term "twilight years" to the evaluation of the

effects of age on voter turnout.  They explain, "In the twilight years, physical infirmities

probably account for a modest decline in participation" (1997).  Milbrath and Goel go on to

explain that women often reach their "twilight years" much earlier in life then men and thus, we

should determine the turnout for men separately from that of women (1997).  Age and gender

have more implications on voter turnout and education then explained by "twilight years," and in

order to address these, we must look at each in depth.

*Age*

Though scholars have adopted many definitions of age, the description that is most

appropriate for my research is defined by Boundless as the "mature stage; especially, the time of

life at which one attains full personal rights and capacities" (Voting Behavior n.d.).  This

definition is the most concise and descriptive version of age that relates to voter turnout because

voting can be included in the concept of personal rights, which in turn allows me to control for

age when looking at education and voter turnout.  Age also pertains to the education level

someone may achieve; typically, the higher the age, the more likely the person is to have

obtained a higher education level; because of this, when controlling for age, we may see a

change in the overall results of the analysis due to voting age being eighteen and the different

voting patterns that may exist at different ages. Persson (2013) performed a study on 37 countries, determining whether the effects of education on voter turnout are relative or absolute. His study tested age as a control in his experiment and the results projected that age has a positive effect on overall voter turnout but that the quadratic effect shows that the probability of voting decreases in old age (Persson 2013). In 1980, Wolfinger and Rosenstone found similar results in their analysis and explain that typically in the United States, there are low voting rates in the early years of people's lives, middle age is when people hit their peak voting levels, and voting declines with old age. However, File (2014) provides a modern look into the voting age pattern produced by Wolfinger and Rosenstone and does not find the same results. File provides research from 1996 to 2012 on the voting rates over time for the voting-age population between these years. Consistent patterns through his research show that young people, defined as people 18 to 29 years old, vote less than any other age group; similar to Wolfinger and Rosenstone's outcome. However, people 65 and older also show a steady increase in voting turnout from 1996 to 2012, passing voters ranging in age from 30 to 64 (File 2014). It is possible that one of these two patterns will exist in the results from Taiwan and China. Although, it is also possible that gender could influence the control for age and a new pattern will exist in one or both countries.

*Gender*

There are a few questions that are addressed by controlling for gender in the relationship between education and voter turnout in Taiwan and China. First, do men or women typically vote more in elections? Results from previous literature show that men typically vote more than women in elections but this does not constitute for every country in the world (Persson 2013). The next question is whether more men or women obtain higher levels of education? Wolfinger and Rosenstone (1980) point out that women live longer than men. Although this does not

specifically address the question, it is possible that because women live longer then men, they are able to attain higher education levels in the long run and live through more elections to vote then men. Addressing the question more specifically, although men and women have equal access to education in Taiwan and China, Lee (2006) explains that women did not always have equal educational opportunities in China. Before, women were given education on the basis of how to be a proper housewife and fit the 'mother role.' Now, with the switch to equal education for women, they are struggling to balance education and the expectations of taking care of the family that is set for them by their culture. Due to this struggle, many women do not pursue higher education levels, which may effect the overall analysis. Other questions may stem from the possible impact of gender on the relationship between education and voter turnout but controlling for gender will address these.

Overall, socioeconomic factors have shown to be significant in the relationship between educational attainment and voter turnout. I will address these factors in my analysis to answer questions like the ones stated above, and provide insight into how they pertain to outcomes in Taiwan and China. With an analysis in countries that do not have much literature on the effects of socioeconomic factors, it is uncertain if we will see the same results as those produced in previous texts.

**Voter Registration Laws and the Importance of Politics**

*Registration Laws and the Importance of Politics*

Wolfinger and Rosenstone (1980) find that education has a prevalent influence on voter turnout and that age and gender are important to the overall relationship of the two. What they are missing, however, is the effect of registration laws. Nations like Belgium, Australia, Greece, and Italy use legal sanctions to encourage voters to turnout for elections. Powell (1986)

compares several democracies around the world and finds that in sixteen of them, the government takes the initiative to urge citizens to register to vote. Australia and New Zealand require the citizens to take the initiative but if they fail to do so, there are fines and penalties. Powell explains that of the twenty-one democracies studied, France and the United States are the only ones that have no legal ramification for citizens and it is the citizen's responsibility to voluntarily register to vote (1986). However, France does require their citizens to register in their communities to receive identification cards, simplifying voter registration.

In the United States, most states require citizens to register to vote at least thirty days in advance (Powell 1986). This can be burdensome for many residents, especially those that are younger. Some neglect to register on time as first-time voters and others are not old enough to vote until closer to election day (Pomante II and Schraufnagal 2014). File (2014) supports this point and explains that voting rates among young adults can vary based on geography and other factors, like the one Pomante and Schraufnagal present. Regardless of geography or age, however, all citizens in the United States who have already registered to vote must re-register if they change their address before an election, creating another obstacle to voting in the United States.[2]

Taiwan has similar voter registration processes as the United States, including absentee ballots. People from Taiwan who are currently in another nation can send in a ballot to vote in their national elections. Their laws require registration in order to vote in an election and the elections are monitored to ensure that the people who vote are registered properly. Conversely, China does not have strict registration laws. The corruption in their elections allows people to

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[2] A 1980 census in the United States showed that 47% of the population had moved within the past five years. This means that about half of the voter-eligible citizens must make twice the effort to vote in a Presidential election (Powell 1986).

assign others to vote for them in local elections without proper documentation, which I discuss later in this paper. These differences in voter registration laws, or lack there of, appear significant, however, I do not expect these differences to have an important effect on my overall results after controlling for interest in politics.

Although literature exists about the importance of voter registration laws and there has been much speculation as to whether they are the main element of voter turnout, Calvert and Gilchrist (1993) test the argument and find that there is actually no major significance to voter registration laws in voter turnout. Calvert and Gilchrist argue that, "these ecological correlations are fully consistent with the notion that election-day registration, rather than pushing the disadvantaged to the polls, appears to simply provide further convenience for those already inclined to vote by virtue of their social class position." In accordance with Calvert and Gilchrist's findings, I will account for the importance of politics in my analysis of Taiwan and China, rather than voter registration laws.

*Expectations*

For the control variables I will be testing, I expect to see a positive correlation between the partial relationship of education and voter turnout and age, gender, and the importance of politics in Taiwan because of the similarities in their election process to that of the United States. However, the election process in China is very different to that of Taiwan and the United States. It allows for more corruption and does not give people a completely free choice on who they want to election. As education increases in China, I believe the Chinese people become more aware of the corruption that exists in their elections and begin to believe their vote does not matter, thus resulting in a negative correlation in China. I will assess whether the total relationship of education and voter turnout changes when controlling for age, gender, and the

12

importance of politics by fitting a multivariate model for Taiwan and China in both levels of elections.

## Data and Methods

**Data**

My analysis is comprised of the expectation models discussed above. I will prove the difference in effect of educational attainment on voter turnout between Taiwan and China by using data in the main analysis that is based on a common questionnaire of citizens in Taiwan and China, conducted from 1981 to 2014. The World Values Survey was presented by The World Values Association to almost 100 countries, which include about 90 percent of the world's population. It currently consists of around 400,000 respondents and is the largest survey of its kind, studying human beliefs and values in a full range of global variations, from very rich countries to very poor counties in all of the major cultural areas (World Values Association 2012). The World Values Survey was carried out to understand the values, motivations, and changes in beliefs of people around the world. The individual citizen was the primary sample for the survey and the questions presented were repeated in waves of four years in order to study the change in people's opinion; I utilize the wave from 2010 to 2014, where Taiwan and China were both sampled in 2012.

**Measurements**

*Voter turnout*

My dependent variable will measure whether respondents vote at the local and national level elections. In order to address this, I use the World Values Survey questions, "When elections take place, do you vote always, usually, or never?" (World Values Association 2012).

This question is asked for both, local and national elections. I have grouped the responses to both survey questions from 0-2, with 2 representing respondents who marked that they always vote in the election, 1 as those who responded that they usually vote, and 0 for respondents that say they never vote. I will accept answers that are not applicable, no answer, or do not know as never voted.

*Education level*

To measure my independent variable, I use a question from the World Values Survey that specifically asks for the highest education level attained by the respondent. I have divided the education levels into four categories that will be coded because Chinese respondents included any incomplete education into their complete education, whereas Taiwan's respondents answered incomplete and completed education separately. If they responded with no formal education, they are coded as no education. If the respondents answered with incomplete primary school or complete primary school, they are coded as having primary education. I have grouped both types of secondary schools together so for those that responded with incomplete secondary school: technical/vocational type, incomplete secondary school: university/preparatory type, complete secondary school: technical/vocational type, or complete secondary school: university/preparatory type, they are coded as secondary education. If the response was some university-level education without a degree or university-level education with a degree, the respondents are coded as university education. This way of measuring education levels captures the overall goal of the analysis and allows for the results of the two nations to be examined equally.

Each model includes a control for *age,* which represents people 18 and older, and *gender*; the binary variable for gender will be 0 for males and 1 representing females. Finally, I will control for the *importance of politics* in respondent's lives. I utilize a question from the World Values Survey that asks respondents to rank the *importance of politics* from very important to not at all. These controls will provide insight into the level of respondents who participated in The World Values Survey and specify what type of people voted and attained education in Taiwan and China during the wave from 2010-2014.

| | Min. | 1st Qu. | Median | Mean | 3rd Qu. | Max. | NA's | sd |
|---|---|---|---|---|---|---|---|---|
| TWNvoteLocal | 0.00 | 0.00 | 1.00 | 0.67 | 1.00 | 1.00 | 119.00 | 0.47 |
| TWNvoteNat | 0.00 | 1.00 | 1.00 | 0.75 | 1.00 | 1.00 | 79.00 | 0.43 |
| TWNedulevel | 0.00 | 4.00 | 6.00 | 5.65 | 8.00 | 8.00 | 1.00 | 2.45 |
| TWNfemale01 | 0.00 | 0.00 | 1.00 | 0.52 | 1.00 | 1.00 | 0.50 | 0.00 |
| TWNage | 18.00 | 30.00 | 46.00 | 45.48 | 58.00 | 85.00 | 8.00 | 17.29 |
| TWNimptpolit | 0.00 | 1.00 | 1.00 | 1.21 | 2.00 | 3.00 | 28.00 | 0.84 |

Table 1: Univariate Summaries of Voter Turnout, Education, Gender, Age, and Importance of Politics in Taiwan

| | Min. | 1st Qu. | Median | Mean | 3rd Qu. | Max. | NA's | sd |
|---|---|---|---|---|---|---|---|---|
| CHNvoteLocal | 0.00 | 0.00 | 0.00 | 0.30 | 1.00 | 1.00 | 272.00 | 0.46 |
| CHNvoteNat | 0.00 | 0.00 | 0.00 | 0.08 | 0.00 | 1.00 | 301.00 | 0.27 |
| CHNedulevel | 0.00 | 2.00 | 4.00 | 4.34 | 6.00 | 8.00 | 2.37 | 0.00 |
| CHNfemale01 | 0.00 | 0.00 | 1.00 | 0.51 | 1.00 | 1.00 | 0.50 | 0.00 |
| CHNage | 18.00 | 31.00 | 43.00 | 43.92 | 56.00 | 75.00 | 14.95 | 18.00 |
| CHNimptpolit | 0.00 | 1.00 | 1.00 | 1.46 | 2.00 | 3.00 | 190.00 | 0.80 |

Table 2: Univariate Summaries of Voter Turnout, Education, Gender, Age, and Importance of Politics in China

**Analysis**

*Taiwan Local Results*

I utilize a logistic regression model to produce a multivariate regression table of the coefficients and statistical significance of my results from Taiwan's local elections in Table 3 below. We see that, although the relationship between educational attainment and voter turnout is initially negative (Model 1), controlling for gender, age, and importance of politics causes it to

shift to a positive result (Model 3). In looking at Model 3 more narrowly, the negative results

from Model 1 are significantly impacted by the control for age; Model 5 shows this as it controls

for gender and importance of politics, and still provides a negative coefficient on educational

attainment. Possible explanations for the significant coefficient on age and the ambiguity of the

results presented will be discussed later in this paper.

The plot below displays Model 3 from Table 3 above. We see the insignificant positive

correlation between educational attainment and voter turnout, initially displayed in Model 3.

| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
|---|---|---|---|---|---|
| (Intercept) | 1.52*** | 0.93** | −1.72*** | −2.71*** | 1.05*** |
| | (0.17) | (0.30) | (0.42) | (0.54) | (0.22) |
| Education | −0.14*** | | 0.02 | | −0.14*** |
| | (0.03) | | (0.04) | | (0.03) |
| Primary Sch | | 0.67 | | 1.16** | |
| | | (0.37) | | (0.41) | |
| Secondary Sch | | −0.10 | | 1.07** | |
| | | (0.32) | | (0.38) | |
| University | | −0.57 | | 1.06** | |
| | | (0.32) | | (0.41) | |
| Female | | | 0.14 | 0.17 | 0.05 |
| | | | (0.14) | (0.14) | (0.13) |
| Age | | | 0.04*** | 0.05*** | |
| | | | (0.01) | (0.01) | |
| Impt of Polit | | | 0.22* | 0.19* | 0.35*** |
| | | | (0.09) | (0.09) | (0.08) |
| AIC | 1390.74 | 1384.85 | 1282.62 | 1278.72 | 1351.90 |
| BIC | 1400.78 | 1404.93 | 1307.58 | 1313.67 | 1371.89 |
| Log Likelihood | -693.37 | -688.42 | -636.31 | -632.36 | -671.95 |
| Deviance | 1386.74 | 1376.85 | 1272.62 | 1264.72 | 1343.90 |
| Num. obs. | 1118 | 1118 | 1089 | 1089 | 1094 |

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$

Table 3: Statistical models

Looking at education levels more closely, the box plot below displays Model 4 from

Table 3 above, which divides education into four subcategories. We see that the results increase

from no education to primary education and then slightly decrease from primary education to secondary education, staying almost consistent from secondary education to university education.
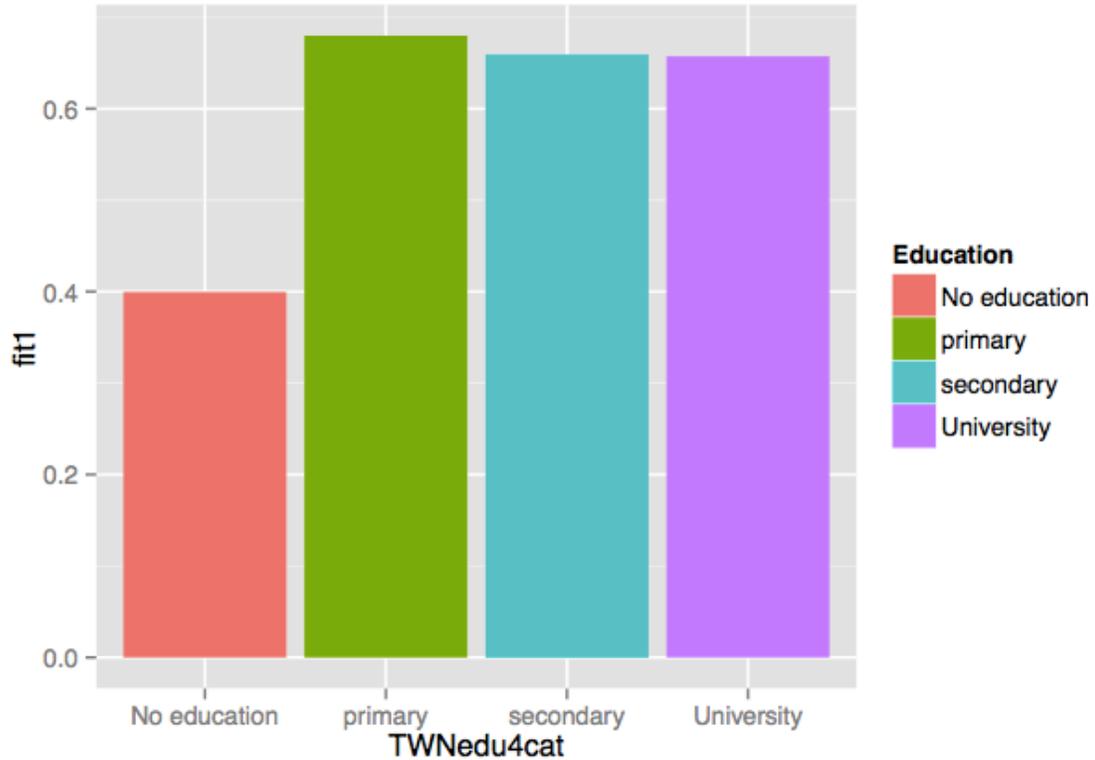


*China Local Results*

The multivariate regression table for local elections in China shows the expected negative correlation between educational attainment and voter turnout that I predicted. Although Model 4 shows an increase in voter turnout from no education to primary education, it is not significant. We can also see in Model 4 that controlling for age had a significant impact on the results, as did the importance of politics (Model 5).

|                | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
|----------------|---------|---------|---------|---------|---------|
| (Intercept)    | −0.34*** | −0.90*** | −1.17*** | −1.68*** | −0.46** |
|                | (0.10)  | (0.18)  | (0.27)  | (0.32)  | (0.15)  |
| Education      | −0.12*** |         | −0.12*** |         | −0.16*** |
|                | (0.02)  |         | (0.03)  |         | (0.02)  |
| Primary Sch    |         | 0.41*   |         | 0.15    |         |
|                |         | (0.20)  |         | (0.22)  |         |
| Secondary Sch  |         | 0.05    |         | −0.04   |         |
|                |         | (0.19)  |         | (0.22)  |         |
| University     |         | −0.61** |         | −0.65*  |         |
|                |         | (0.23)  |         | (0.27)  |         |
| Female         |         |         | −0.03   | −0.00   | −0.05   |
|                |         |         | (0.10)  | (0.10)  | (0.10)  |
| Age            |         |         | 0.01**  | 0.01*** |         |
|                |         |         | (0.00)  | (0.00)  |         |
| Impt of Polit  |         |         | 0.18**  | 0.17*   | 0.20**  |
|                |         |         | (0.07)  | (0.07)  | (0.07)  |
| AIC            | 2437.87 | 2438.06 | 2232.05 | 2238.20 | 2240.53 |
| BIC            | 2449.10 | 2460.52 | 2259.72 | 2276.95 | 2262.68 |
| Log Likelihood | -1216.94 | -1215.03 | -1111.02 | -1112.10 | -1116.27 |
| Deviance       | 2433.87 | 2430.06 | 2222.05 | 2224.20 | 2232.53 |
| Num. obs.      | 2028    | 2028    | 1873    | 1873    | 1873    |

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$

Table 4: Statistical models

The plot below displays Model 3 from Table 4 above; the negative correlation between educational attainment and voter turnout with controls.



Voting in Local Elections in China
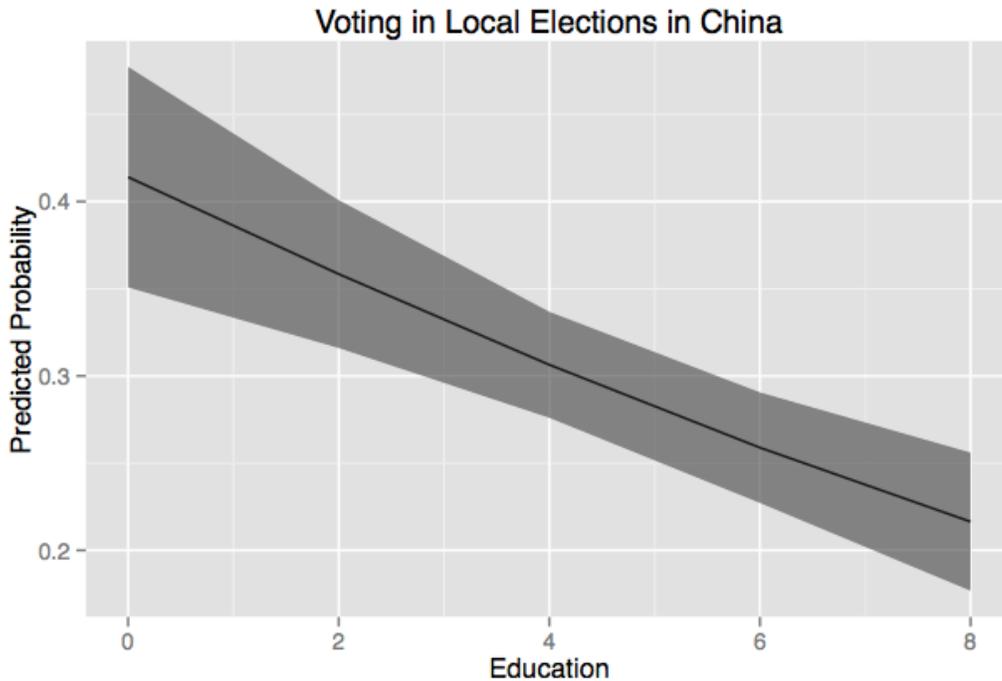
The box plot below provides a visual of Model 4 from Table 4 above. We can see the insignificant increase from no education to primary education, but we also see the predicted decrease that occurs from primary education to university education.
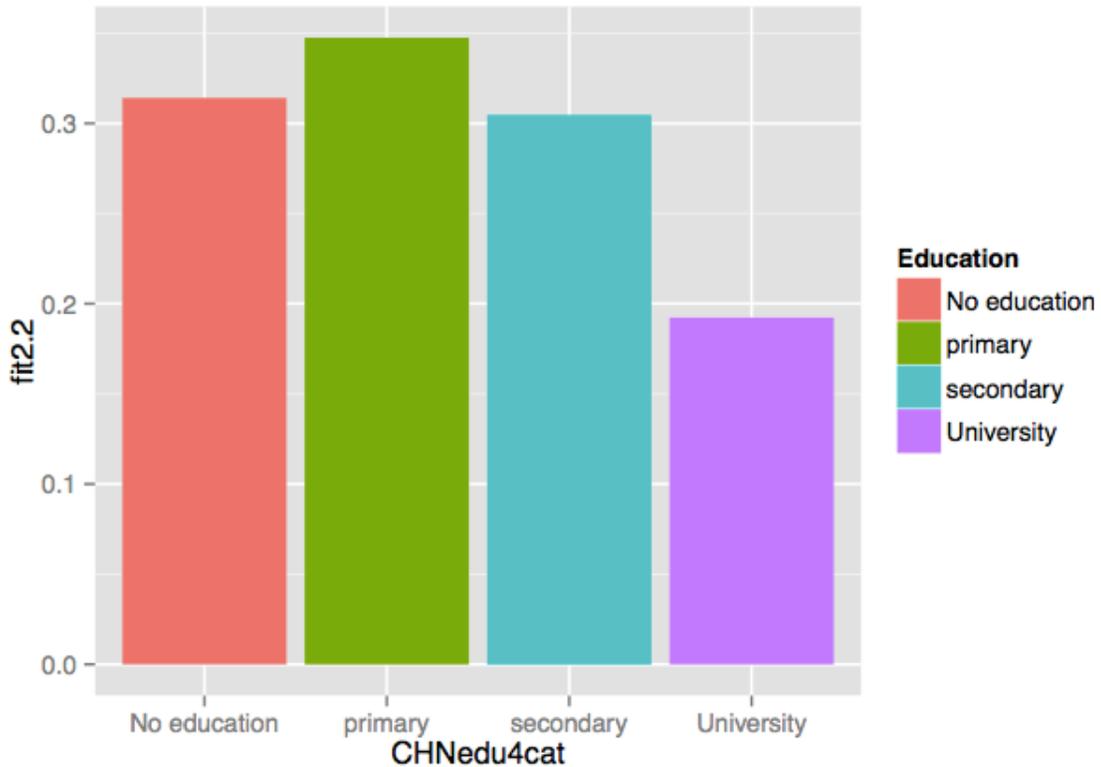


*Taiwan National Results*

Again, as we saw in the local elections in Taiwan, there is an initial negative correlation between educational attainment and voter turnout in Table 5 below. However, the coefficient on education is insignificant, unlike the coefficient on education for the local elections, and is easily manipulated by the controls. As we can see in Model 4, each of the control variables have a significant impact on the relationship between educational attainment and voter turnout but age continues to have the most significant impact on the shift from a negative to a positive

correlation. We also see that the increase in voter turnout within the four education categories is significant as well.

| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
|---|---|---|---|---|---|
| (Intercept) | 1.37*** | 0.93** | −1.71*** | −2.61*** | 0.69** |
| | (0.18) | (0.30) | (0.43) | (0.55) | (0.23) |
| Education | −0.04 | | 0.11** | | −0.03 |
| | (0.03) | | (0.04) | | (0.03) |
| Primary Sch | | 0.75* | | 1.23** | |
| | | (0.37) | | (0.41) | |
| Secondary Sch | | 0.15 | | 1.29*** | |
| | | (0.32) | | (0.39) | |
| University | | 0.08 | | 1.70*** | |
| | | (0.32) | | (0.42) | |
| Female | | | 0.36* | 0.39** | 0.29* |
| | | | (0.14) | (0.15) | (0.14) |
| Age | | | 0.04*** | 0.04*** | |
| | | | (0.01) | (0.01) | |
| Impt of Polit | | | 0.29** | 0.27** | 0.41*** |
| | | | (0.09) | (0.09) | (0.09) |
| AIC | 1296.03 | 1293.04 | 1199.30 | 1195.24 | 1249.03 |
| BIC | 1306.14 | 1313.26 | 1224.45 | 1230.45 | 1269.16 |
| Log Likelihood | -646.01 | -642.52 | -594.65 | -590.62 | -620.51 |
| Deviance | 1292.03 | 1285.04 | 1189.30 | 1181.24 | 1241.03 |
| Num. obs. | 1158 | 1158 | 1130 | 1130 | 1134 |

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$

Table 5: Statistical models

The significant positive correlation between educational attainment and voter turnout at national elections in Taiwan can be seen in the plot below.

Voting in National Elections in Taiwan
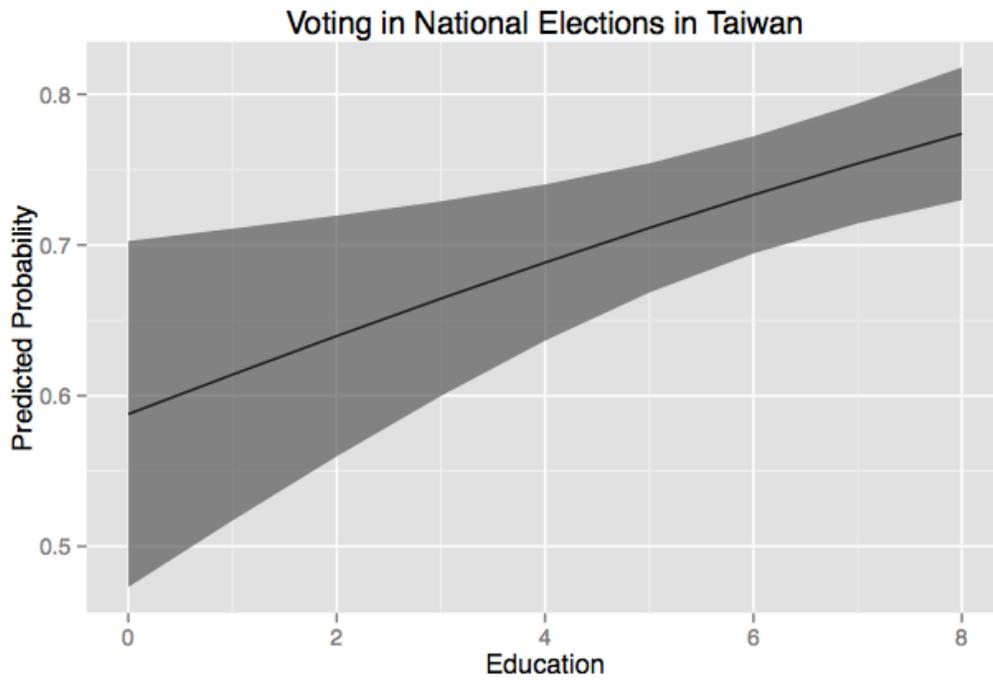
The box plot below represents the four education categories and their voter turnout at national elections in Taiwan. We see that those with no education rarely turnout for voting compared to the other three categories, showing the significant increase that is initially displayed in Table 5 above.
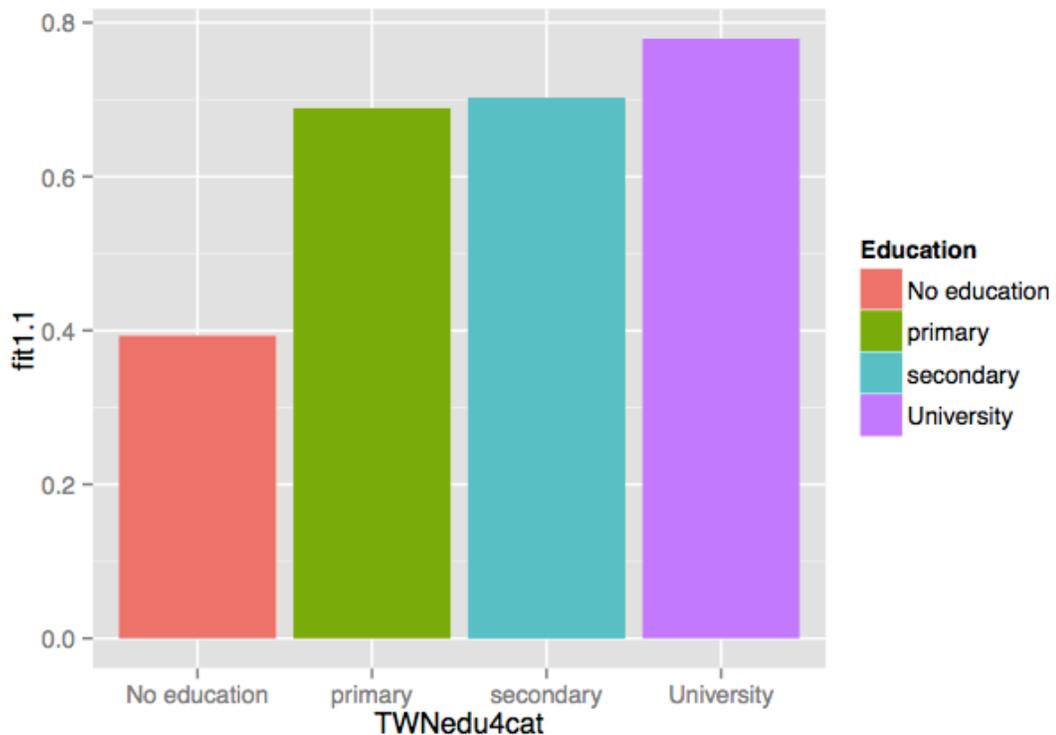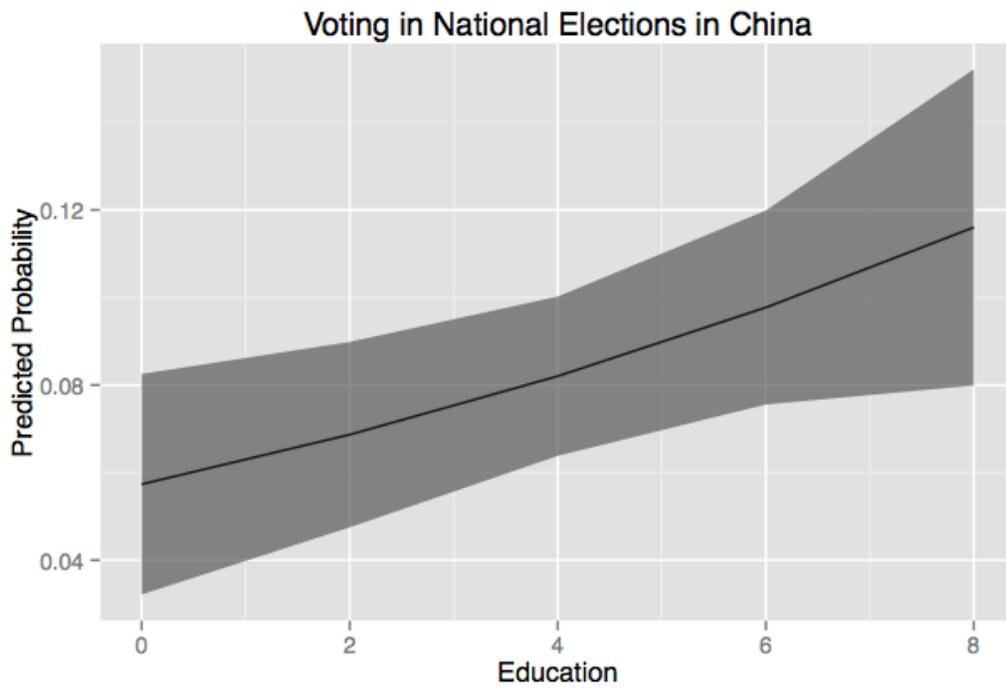
*China National Results*

Unexpectedly, we see a positive correlation between educational attainment and voter turnout at national elections in China, in Table 6 below. Although the logistic regression model did not produce a significant coefficient for education, it still goes against my initial prediction as to the relationship between educational attainment and voter turnout in Chinese national elections.

| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
|---|---|---|---|---|---|
| (Intercept) | −2.76*** | −3.35*** | −4.27*** | −4.65*** | −2.96*** |
| | (0.19) | (0.45) | (0.47) | (0.63) | (0.27) |
| Education | 0.06 | | 0.10* | | 0.03 |
| | (0.04) | | (0.04) | | (0.04) |
| Primary Sch | | 0.97* | | 0.66 | |
| | | (0.48) | | (0.49) | |
| Secondary Sch | | 0.76 | | 0.73 | |
| | | (0.47) | | (0.49) | |
| University | | 1.23* | | 1.29* | |
| | | (0.49) | | (0.52) | |
| Female | | | −0.36* | −0.36* | −0.39* |
| | | | (0.18) | (0.18) | (0.18) |
| Age | | | 0.02*** | 0.02*** | |
| | | | (0.01) | (0.01) | |
| Impt of Polit | | | 0.30** | 0.30** | 0.35** |
| | | | (0.11) | (0.11) | (0.11) |
| AIC | 1081.66 | 1078.64 | 995.92 | 996.05 | 1006.75 |
| BIC | 1092.86 | 1101.04 | 1023.54 | 1034.73 | 1028.85 |
| Log Likelihood | -538.83 | -535.32 | -492.96 | -491.03 | -499.37 |
| Deviance | 1077.66 | 1070.64 | 985.92 | 982.05 | 998.75 |
| Num. obs. | 1999 | 1999 | 1854 | 1854 | 1854 |

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$

Table 6: Statistical models

The plot below represents Model 4 from Table 6 above.

## Voting in National Elections in China



The box plot below displays the four education categories and their voter turnout in Chinese national elections. The increase from no education to university education is minimally significant but shows surprising results for China's national elections.
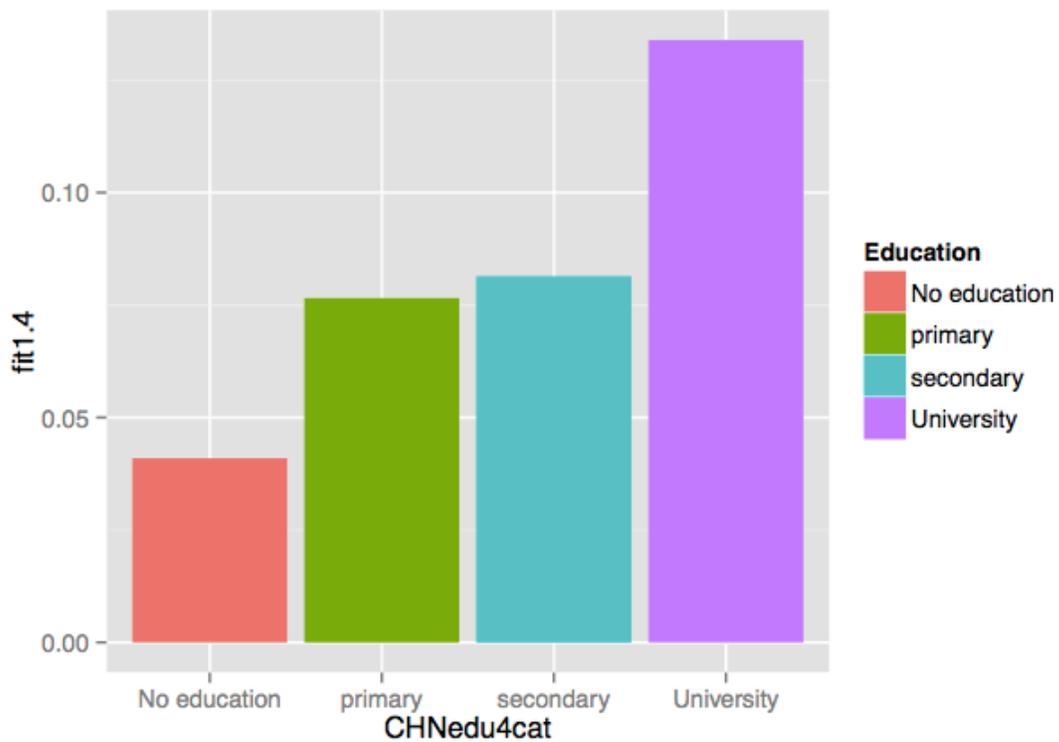
**Discussion**

**Local Elections in Taiwan**

Taiwan is a democracy similar to the United States and possesses a similar voting system, a single non-transferrable voting system. In this system, voters cast one vote for one candidate during the one-day election period and the votes are then counted by election officials to determine the winner. Due to the similarities between the United States and Taiwan in their electoral process, I expected to see the same positive correlation between educational attainment and voter turnout in elections in the United States for those in Taiwan. My initial expectations proved to be somewhat wrong, however, as we see a slightly positive correlation between education as a whole and voter turnout but when looking at the educational categories, there is a slight drop in turnout from voters with primary education to those with secondary education. This is to say that education both increases and decreases the likelihood of voting in local elections in Taiwan and there may be something else effecting voter turnout more drastically then education, such as *guanxi* or factions.

*Guanxi*

In Taiwan, the concept of *guanxi* represents the connections, networks, and relationships created that influence people's way of life. Bosco (1992) explains that "Taiwanese think of themselves as tied to other persons in a web of social relations rather than as free individuals." The most common of these is kin connections, which vary from parental ties to distant relative relations; but there are also neighbor, classmate, coworker, and coreligionist connections. As any personal bond, each connection must be built up and maintained and in the political realm, politicians must be able to reach out to individuals to build these ties. *Guanxi* has distinct political influence in Taiwan, especially at the local level because, according to *guanxi*, voting based on these relations is expected. This often causes complications for local elections because

24

if a person has *guanxi* bonds with multiple political figures, he or she may find it difficult to choose between them without damaging any relationship, causing the person not to vote at all (1992). To the same extent, if a person finds themselves without any *guanxi* connections in the election, he or she may not feel obligated to vote or feel strongly enough for one candidate in order to place a vote.

*Guanxi* has an effect on socioeconomic factors as well, specifically age and gender. Adults are typically aware of other villagers' friendships or kin and can use that information to assume whom others will vote for. Women have relatives in other villages and socialize more with their neighbors, creating groups of women who know the voting tendencies of each other. Men have similar connects but on a larger scale because they typically live in the same village they were raised and have strong connections with old classmates and a deeper knowledge of the village voting patterns then women typically have (1992). These affiliations may explain the significant effect age and gender have on the results and part of the reason the results are obscure. It is possible that if people know whom others are voting for and it is in their favor, they may not think they need to vote to seal the election. In the same context, if people are aware that there is strong opposition to their vote in their local are, they may not vote because they either believe their vote is not going to change anything or they do not want to hurt relationships with people who are voting differently.

*Guanxi* may also explain the negative correlation between educational attainment and voter turnout for local elections in Taiwan. It is possible that as education levels increase; students are introduced to more classmates bonds and gain education related to the importance of *guanxi*. If this is the case, *guanxi* would take a more important role in those more highly educated and have a greater influence on their voting patterns; meaning more opportunities

where highly educated people can run into *guanxi* ties in politics and be forced to abstain from voting to protect those bonds. *Guanxi* is significant to voters but many core members of factions in local Taiwanese villages do not usually put as much importance on it and only talk to members of their faction, whereas faction leaders typically reach out to neighbors from opposing factions to build *guanxi* ties.

*Factions*

The factions in Taiwan are distinct from those found around the world. Factions are commonly believed to lack formal organization, concern about leadership that might corrupt ideology, and an uncertain length of existence. In Taiwan however, factions have permanent names, sense of identity, and stable leadership (Bosco 1992). These factions exist because of the less competitive party system that exists in Taiwan's local villages. With less competitive systems, there are more factions within the party because the party is able to place multiple candidates on the ballot at one time and not worry about splitting the vote and losing to an opposing party. Factions play a crucial role in voter turnout at local elections because it is the responsibility of the faction to mobilize its members. The stronger the faction, the easier it is to sway its members to get involved in voting. Factions also, typically, use perks to buy votes from the local people; money and gifts are common but factions also use their ties to local elected officials to request that roads be fixed or things around the local community be changed to please the voters (1992). However, many Taiwanese do not view factions positively because they appear to represent social division, instability, and struggles within the community. Most people are reluctant to admit their involvement in these factions, which sometimes discourages them from voting. As people in these local villages become more educated, they gain more knowledge about the essence of factions and the negative representation they possess. This

26

education may cause people to stray from voting in local elections in order to avoid supporting a

faction, causing the negative correlation between education levels and voter turnout we see.

| Republic of China on Taiwan | | | | |
|---|---|---|---|---|
| Province *sheng* (i.e., Taiwan) (Governor appointed by central government) | | | | Municipality (city) *shi* (Taipei & Gaoxiong) (Mayor appointed) |
| County *xian* | | | City *shi* (e.g., Taizhong City) | District *qu* |
| Township (rural) *xiang* | Township (urban) *zhen* | City *shi* | | |
| Village *cun* | Community *li* | Community *li* | Community *li* | Community *li* |
| Neighborhood *lin* | Neighborhood *lin* | Neighborhood *lin* | Neighborhood *lin* | Neighborhood *lin* |

The chart above shows the administrative levels used in Taiwan. The three types of units under county
are identical and vary only by urbanization (Bosco 1992).

**Local Elections in China**

As predicted, local elections in China display an opposite result with a negative

correlation between educational attainment and voter turnout. The local election system in China

is plagued by corruption and cause voters to voice their vote in unique ways, in order to send a

message to the Chinese Communist Party (CCP). Although China has similar results at the local

level as Taiwan, the reasons that cause these results vary.

*Corruption*

There are no laws in China at the local level to establish a voting system, leaving it up to

each provincial people's congress to decide. Some villages allow for a proxy vote, which

authorizes voters to authorize another eligible voter to cast a vote in their name if he or she cannot make it to the polling location. This may provide a larger voting turnout, but there are no regulations in place to say how the proxy votes should be carried out and there is no written authorization required, causing corrupted voting results (Zhong and Chen 2002). There is also only one central polling location for each province and in order to vote, people have to get to the central voting location regardless of how far it is from their village; this is for the convenience of the CCP instead of the people. This creates limited access to information involving the candidates because candidates are only allowed to campaign at the central voting location, immediately before voting begins. If the people have no way of making it to the central voting location or cannot make it on time, there is no way to hear what the candidates' views are on the issues that matter to the voters. Typically, the only media information that the local villages receive are controlled by the CCP, thus making any information the villagers could receive about the candidates without seeing their speech, corrupt and bias.

The ballot is also corrupted by the CCP because it is a semidemocratic system run by one party. Semidemocratic systems are ones that have limited power, restricted candidate competition, and do not align with the popular preferences of the public (2002). Village elections in China are very limited by the choice of candidates, lack or absence of electoral campaigns, and pressure from CCP officials at the election location during the voting period. The ballot itself is created under the one-party-system, meaning that each candidate is from the CCP. The CCP does not have many requirements set in place for choosing a candidate but require that the candidate be in good moral standing, a vague concept that is often used by the CCP to disqualify candidates they do not like (2002). Thus, regardless if the local people can make it to the central voting location or access accurate information about the candidates, they

are still given a corrupted ballot with limited options to vote for. As the local villagers gain more education, they become more aware of the corruption that exists within their local elections, turning them away from any interest in expressing their political opinion.

*Rational Actor Model*

The rational actor model is used to study voting behaviors in democratic societies but when used to study noncompetitive or Semicompetative elections in Communist countries, shows that political actors abstain from voting to express their disapproval of the system the regime is using to legitimize their rule (Shi 1999). This opposition to voting requires extensive knowledge by the voter to understand when it is beneficial to abstain from voting and when it is not. It also requires education about the politics occurring in the area to make sure that a nonvoter statement would benefit the voter and not the regime. However, many peasants do not have the education to perform such a strategic political move, which undermines this as the reasoning for a negative correlation between educational attainment and voter turnout at national elections in China. It does though, bring to light the concept of the lack of education in villages where peasants make up the majority of the population. There are no educational opportunities in these villages, thus leading to peasants leaving the local villages for better educational opportunities. As they are increasing the educational level, they are no longer in their local area to vote in local elections, possibly causing the results we see in the regression model.

**National Elections in Taiwan**

We see a much stronger positive correlation between educational attainment and voter turnout in the national elections in Taiwan, compared to the local elections. Although it is possible that *guanxi* and factions are present in the voting atmosphere of national elections, they clearly do not have as large of an impact. This is most likely because factions are stronger at the

local level, as local candidates have stronger *guanxi* connections with locals, causing them to have more personal investment in whether they vote at local level elections as opposed to national elections. With national elections, it is less about the relationships and more about the politics of who is able to handle the country. People typically gain more education about politics as they age and go through formal schooling, which possibly explains why voter turnout increases as education increases. The focus on politics instead of personal connections may allow people to vote regardless of their local ties and vote based off of their political education. It is also true that education can provide people with the understanding of how important their vote is for the leaders of their country, thus, as education of this importance increases the voter turnout increases.

**National Elections in China**

The national elections in China go against my initial expectations, displaying a positive correlation between educational attainment and voter turnout, similar to the results we see in both Taiwanese elections. The question here is not why people did not vote, but why they did, and why there are opposite results between the local and national levels. Mainland China has experienced a procedure shift in recent years and shifted the balance so that the positive of voting outweighs the negative and allows people to be more strategic with their vote.

*Election Procedure Shift*

The election process in China transitioned from a plebiscitary system to limited-choice elections at the national level with the creation of the Constitution of the People's Republic of China of 1954. The plebiscitary election process was utilized by the CCP to nominate one person for a position and the people either agreed with the nomination by voting for that person or did not vote at all, as that was the only way for people to express their opinion against the

candidate. However, in a limited-choice election process, voters are presented with a few options to vote for are given a choice. It is considered limited because the choices are still all from the CCP and typically share the same view on issues. Although the limited choices may discourage some voters from participating in national elections, there is an increase in voter turnout for strategic reasons.

*Strategy*

Semicompetative elections gave hope to many people in Mainland China because it was a step towards democratization. The shift may not have been to complete democracy but providing options for voters means there is a chance that democracy could be in the future for China. Sophisticated voters are using their vote to show their support for electoral competition and promote increased changes in the political system (Shi 1999). Some voters are also using their vote to punish corrupt leaders and promote development towards a clean system of government by voting for the candidate who is not favored by the CCP. Although the CCP will simply move the loser to another position of similar power, the prospect of people having a say is increasing voter turnout at these national elections. This is opposite of the Rational Actors Model discussed for the local level elections in China but is somewhat similar in the use of strategy. Educated people strategically do not vote in order to express their disproval of the candidates and corruption in local level elections but strategically vote in national elections to express their approval of the shift towards democracy. As stated before, voting strategically requires the knowledge of how a vote can manipulate the limited-choice system newly set in place. More highly educated voters in China are using strategy in contrasting ways for the different levels of elections, resulting in the opposite correlation between education and voter turnout at the local and national level.

## Conclusion

As is the case in many research studies, the results challenged my initial expectations and our current understanding of how education and turnout relate. Although my initial predictions for the national elections in Taiwan and the local elections in China were correct, the results for national elections in China were very surprising, as were the obscure results found at the local level in Taiwan. The control variables, specifically age, had a large impact on the results that were produced by the logistic regression models and should be addressed more thoroughly in future studies. It is possible that additional control variables may cause the results to shift further and could provide supplementary information related to educational attainment and voter turnout in China and Taiwan.

It is also possible that the system of government in the countries has an impact on voter turnout and could be addressed by adding other nations to compare results found in democracies versus authoritarian regimes. This is not to suggest that the results produced in these models did not provide any beneficial information, but rather, opens the door for further investigation into possible additional factors that effect voter turnout in Taiwan and China. Taking into account, these results coupled with existing models and knowledge, we can provide a more complete understanding of the impact of educational attainment on voter turnout in Taiwan and China, and further increase our awareness of these two nations at a comparative level.

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## Code Appendix

```
#######################

## Data and Variables Section

# Taiwan Dataset

load(url("https://raw.github.com/PTesta/PS230/master/data/WVtaiwan2012.rda"))


#China Dataset

load(url("https://raw.github.com/PTesta/PS230/master/data/china.rda"))


[TAIWAN CODING]

# Create local voter turnout variable

taiwan.df$TWNvoteLoc<-taiwan.df$V226-3

taiwan.df$TWNvoteLoc<-taiwan.df$TWNvoteLocal*-1

prop.table(table(taiwan.df$V248))

taiwan.df$TWNvoteLocal<-ifelse(taiwan.df$TWNvoteLoc>1,1,0)

with(taiwan.df,table(TWNvoteLocal,TWNvoteLoc))


# Create national voter turnout variable

taiwan.df$TWNvoteNation<-taiwan.df$V227-3

taiwan.df$TWNvoteNation<-taiwan.df$TWNvoteNation*-1

taiwan.df$TWNvoteNat<-ifelse(taiwan.df$TWNvoteNation>1,1,0)

with(taiwan.df,table(TWNvoteNat,TWNvoteNation))
```

```
# Create education variable

taiwan.df$TWNedulevel<-taiwan.df$V248-1

table(taiwan.df$TWNedulevel)

sum(table(taiwan.df$V240))


# Create 4 category education variable

taiwan.df$TWNedu4cat<-recode(taiwan.df$V248, "

                1='No education';2:3='primary';4:7='secondary';8:9='University'")


# Create control for gender

taiwan.df$TWNfemale01<-ifelse(taiwan.df$V240==2,1,0)

table(taiwan.df$TWNfemale01)


# Create control for age

taiwan.df$TWNage<-taiwan.df$V242


# Create control for importance of politics

taiwan.df$TWNimptpolit<-taiwan.df$V7-4

taiwan.df$TWNimptpolit<-taiwan.df$TWNimptpolit*-1

table(taiwan.df$TWNimptpolit)



table(taiwan.df$TWNedu4cat,taiwan.df$TWNedulevel,
```

```
taiwan.df$TWNfemale01,taiwan.df$TWNage,taiwan.df$TWNimptpolit)


summary(taiwan.df$TWNvoteLocal)

sd(taiwan.df$TWNvoteLocal,na.rm=TRUE)

summary(taiwan.df$TWNvoteNat)

sd(taiwan.df$TWNvoteNat,na.rm=TRUE)

summary(taiwan.df$TWNedulevel)

sd(taiwan.df$TWNedulevel,na.rm=TRUE)


library(xtable)

TWNlocalvote.tab<-

c(round(summary(taiwan.df$TWNvoteLocal,na.rm=TRUE),2),sd=round(sd(taiwan.df$TWNv
oteLocal,na.rm=TRUE),2))

TWNnatvote.tab<-

c(round(summary(taiwan.df$TWNvoteNat,na.rm=TRUE),2),sd=round(sd(taiwan.df$TWNvot
eNat,na.rm=TRUE),2))

TWNedu.tab<-

c(summary(taiwan.df$TWNedulevel,na.rm=TRUE),sd=sd(taiwan.df$TWNedulevel,na.rm=TR
UE))

TWNgender.tab<-

c(summary(taiwan.df$TWNfemale01,na.rm=TRUE),sd=sd(taiwan.df$TWNfemale01,na.rm=T
RUE))

TWNage.tab<-
```

c(**summary**(taiwan.df$TWNage,na.rm=TRUE),sd=**sd**(taiwan.df$TWNage,na.rm=TRUE))

TWNimptpolit.tab<-

c(**round**(**summary**(taiwan.df$TWNimptpolit,na.rm=TRUE),2),sd=**sd**(taiwan.df$TWNimptpolit,

na.rm=TRUE))


desc.tab<-

**rbind**(TWNvoteLocal=TWNlocalvote.tab,TWNvoteNat=TWNnatvote.tab,TWNedulevel=TWN

edu.tab,TWNfemale01=TWNgender.tab,TWNage=TWNage.tab,TWNimptpolit=TWNimptpolit.

tab)

thextab1<-**xtable**(desc.tab,caption="Univariate Summaries of Voter Turnout, Education, Gender,

Age, and Importance of Politics in Taiwan", label="tab:univardesc")


**print**(thextab1,comment=F)


*[CHINA CODING]*

*# Create local voter turnout variable*

china.df$CHNvoteLoc<-china.df$V226-3

china.df$CHNvoteLoc<-china.df$CHNvoteLoc*-1

**prop.table**(**table**(china.df$V248))

china.df$CHNvoteLocal<-**ifelse**(china.df$CHNvoteLoc>1,1,0)

with(china.df,table(CHNvoteLocal,CHNvoteLoc))


*# Create national voter turnout variable*

```
china.df$CHNvoteNation<-china.df$V227-3

china.df$CHNvoteNation<-china.df$CHNvoteNation*-1

china.df$CHNvoteNat<-ifelse(china.df$CHNvoteNation>1,1,0)

with(china.df,table(CHNvoteNat,CHNvoteNation))


# Create education variable

china.df$CHNedulevel<-china.df$V248-1

table(china.df$CHNedulevel)

sum(table(china.df$V240))


# Create 4 category education variable

china.df$CHNedu4cat<-recode(china.df$V248, "1='No

education';2:3='primary';4:7='secondary';8:9='University'")


# Create control for gender

china.df$CHNfemale01<-ifelse(china.df$V240==2,1,0)

table(china.df$CHNfemale01)


# Create control for age

china.df$CHNage<-china.df$V242


# Create control for importance of politics

china.df$CHNimptpolit<-china.df$V7-4
```

```
china.df$CHNimptpolit<-china.df$CHNimptpolit*-1

table(china.df$CHNimptpolit)


table(china.df$CHNedu4cat,china.df$CHNedulevel,

china.df$CHNfemale01,china.df$CHNage,china.df$CHNimptpolit)


summary(china.df$CHNvoteLocal)

sd(china.df$CHNvoteLocal,na.rm=TRUE)

summary(china.df$CHNvoteNat)

sd(china.df$CHNvoteNat,na.rm=TRUE)

summary(china.df$CHNedulevel)

sd(china.df$CHNedulevel,na.rm=TRUE)


library(xtable)

CHNlocalvote.tab<-

c(round(summary(china.df$CHNvoteLocal,na.rm=TRUE),2),sd=round(sd(china.df$CHNvote

Local,na.rm=TRUE),2))

CHNnatvote.tab<-

c(round(summary(china.df$CHNvoteNat,na.rm=TRUE),2),sd=round(sd(china.df$CHNvoteNa

t,na.rm=TRUE),2))

CHNedu.tab<-

c(summary(china.df$CHNedulevel,na.rm=TRUE),sd=sd(china.df$CHNedulevel,na.rm=TRUE)

)
```

CHNgender.tab<-

c(summary(china.df$CHNfemale01,na.rm=TRUE),sd=sd(china.df$CHNfemale01,na.rm=TRUE))

CHNage.tab<-

c(summary(china.df$CHNage,na.rm=TRUE),sd=sd(china.df$CHNage,na.rm=TRUE))

CHNimptpolit.tab<-

c(round(summary(china.df$CHNimptpolit,na.rm=TRUE),2),sd=sd(china.df$CHNimptpolit,na.rm=TRUE))


desc.tab<-

rbind(CHNvoteLocal=CHNlocalvote.tab,CHNvoteNat=CHNnatvote.tab,CHNedulevel=CHNedu.tab,CHNfemale01=CHNgender.tab,CHNage=CHNage.tab,CHNimptpolit=CHNimptpolit.tab)

thextab2<-xtable(desc.tab,caption="Univariate Summaries of Voter Turnout, Education, Gender, Age, and Importance of Politics in China", label="tab:univardesc2")

print(thextab2,comment=F)


#######################

## Analysis and Results Section


*[TAIWAN CODING]*

*#Logistic regressions (outcome is 0 or 1)*

m1<-glm(TWNvoteLocal~TWNedulevel,data=taiwan.df,family=binomial("logit"))

m2<-glm(TWNvoteLocal~TWNedu4cat,data=taiwan.df,family=binomial("logit"))

```
m3<-glm(TWNvoteLocal~TWNedulevel+TWNfemale01+TWNage+TWNimptpolit,data=taiwa
n.df,family=binomial("logit"))
m4<-glm(TWNvoteLocal~TWNedu4cat+TWNfemale01+TWNage+TWNimptpolit,data=taiwan
.df,family=binomial("logit"))
m5<-glm(TWNvoteLocal~TWNedulevel+TWNfemale01+TWNimptpolit,data=taiwan.df,family
=binomial("logit"))


m.age<-lm(TWNedulevel~TWNage,data=taiwan.df)



m1.35under<-glm(TWNvoteLocal~TWNedulevel,data=taiwan.df[taiwan.df$TWNage<35,],fami
ly=binomial("logit"))
summary(m1.35under)


m1.35over<-glm(TWNvoteLocal~TWNedulevel,data=taiwan.df[taiwan.df$TWNage>=35,],fami
ly=binomial("logit"))
summary(m1.35over)


#Table of regression outputs, using texreg and changing names
texreg(list(m1,m2,m3,m4,m5),
    custom.coef.names = c("(Intercept)",
                "Education",
                "Primary Sch",
```

```
                    "Secondary Sch",

                    "University",

                    "Female",

                    "Age",

                    "Poltical Interest"))
```

*#Prediction data frames to interpret model*

pred.df<-**with**(taiwan.df,expand.grid(TWNedulevel=sort(unique(TWNedulevel)), TWNfemale0

1=0, TWNage=mean(TWNage,na.rm=T), TWNimptpolit=mean(TWNimptpolit,na.rm=T)))

*# Predicted probability*

pred.df$fit1<-**predict**(m3,newdata = pred.df,type = "response")

pred.df$fit1

*#Confidence intervals*

pred.df$ll<-**predict**(m3,newdata = pred.df,type = "response")-1.96*

  predict(m3,newdata = pred.df,se.fit = T,type = "response")$se.fit

pred.df$ul<-**predict**(m3,newdata = pred.df,type = "response")+1.96*

  predict(m3,newdata = pred.df,se.fit = T,type = "response")$se.fit

*#Load library for plots*

**library**(ggplot2)

```
pTWNlocal01<-ggplot(pred.df,aes(x=TWNedulevel,y=fit1))+geom_line()+geom_ribbon(aes(y
min=ll,ymax=ul,alpha=.3))+labs(list(title="Voting in Local Elections in Taiwan",x="Education",
y="Predicted Probability"))+scale_alpha_continuous(guide=F)
pTWNlocal01


mean(taiwan.df$TWNvoteLocal,na.rm=T)


#Plot for categorical
pred.df2<-with(taiwan.df,expand.grid(
  TWNedu4cat=sort(unique(TWNedu4cat)), TWNfemale01=0, TWNage=mean(TWNage,na.rm=
T), TWNimptpolit=mean(TWNimptpolit,na.rm=T)))


# Predicted probability
pred.df2$fit1<-predict(m4,newdata = pred.df2,type = "response")
pred.df2$fit1


#Confidence intervals
pred.df2$ll<-predict(m4,newdata = pred.df2,type = "response")-1.96*
  predict(m4,newdata = pred.df2,se.fit = T,type = "response")$se.fit
pred.df2$ul<-predict(m4,newdata = pred.df2,type = "response")+1.96*
  predict(m4,newdata = pred.df2,se.fit = T,type = "response")$se.fit


pTWNloc4cat<-ggplot(pred.df2,aes(x=TWNedu4cat,y=fit1,fill=TWNedu4cat))+
```

```
  geom_bar(stat="identity")+scale_fill_discrete(name="Education")
```

pTWNloc4cat


*#Logistic regressions (outcome is 0 or 1)*

m1.1<-**glm**(TWNvoteNat~TWNedulevel,data=taiwan.df,family=binomial("logit"))

m2.1<-**glm**(TWNvoteNat~TWNedu4cat,data=taiwan.df,family=binomial("logit"))

m3.1<-**glm**(TWNvoteNat~TWNedulevel+TWNfemale01+TWNage+TWNimptpolit,data=taiwan

.df,family=binomial("logit"))

m4.1<-**glm**(TWNvoteNat~TWNedu4cat+TWNfemale01+TWNage+TWNimptpolit,data=taiwan.

df,family=binomial("logit"))

m5.1<-**glm**(TWNvoteNat~TWNedulevel+TWNfemale01+TWNimptpolit,data=taiwan.df,family

=binomial("logit"))


m1.1.35under<-**glm**(TWNvoteNat~TWNedulevel,data=taiwan.df[taiwan.df$TWNage<35,],fami

ly=binomial("logit"))

**summary**(m1.1.35under)


m1.1.35over<-**glm**(TWNvoteNat~TWNedulevel,data=taiwan.df[taiwan.df$TWNage>=35,],fami

ly=binomial("logit"))

**summary**(m1.1.35over)


*#Table of regression outputs, using texreg and changing names*

**texreg**(list(m1.1,m2.1,m3.1,m4.1,m5.1),

```
        custom.coef.names = c("(Intercept)",

                    "Education",

                    "Primary Sch",

                    "Secondary Sch",

                    "University",

                    "Female",

                    "Age",

                    "Poltical Interest"))
```

*#Prediction data frames to interpret model*

pred.df<-with(taiwan.df,expand.grid(

  TWNedulevel=sort(unique(TWNedulevel)), TWNfemale01=0, TWNage=mean(TWNage,na.rm

=T), TWNimptpolit=mean(TWNimptpolit,na.rm=T)))


*# Predicted Probability*

pred.df$fit1.1<-**predict**(m3.1,newdata = pred.df,type = "response")

pred.df$fit1.1


*#Confidence intervals*

pred.df$ll.1<-**predict**(m3.1,newdata = pred.df,type = "response")-1.96*

  predict(m3.1,newdata = pred.df,se.fit = T,type = "response")$se.fit

pred.df$ul.1<-**predict**(m3.1,newdata = pred.df,type = "response")+1.96*

  predict(m3.1,newdata = pred.df,se.fit = T,type = "response")$se.fit

```
pTWNnat01<-ggplot(pred.df,aes(x=TWNedulevel,y=fit1.1))+geom_line()+geom_ribbon(aes(y
min=ll.1,ymax=ul.1,alpha=.3))+labs(list(title="Voting in National Elections in Taiwan",x="Educ
ation",y="Predicted Probability"))+scale_alpha_continuous(guide=F)
pTWNnat01


mean(taiwan.df$TWNvoteNat,na.rm=T)


#Plots for categorical
pred.df2<-with(taiwan.df,expand.grid(TWNedu4cat=sort(unique(TWNedu4cat)), TWNfemale01
=0, TWNage=mean(TWNage,na.rm=T), TWNimptpolit=mean(TWNimptpolit,na.rm=T)))


#Predicted Probability
pred.df2$fit1.1<-predict(m4.1,newdata = pred.df2,type = "response")
pred.df2$fit1.1


#Confidence intervals
pred.df2$ll.1<-predict(m4.1,newdata = pred.df2,type = "response")-1.96*
  predict(m4.1,newdata = pred.df2,se.fit = T,type = "response")$se.fit
pred.df2$ul.1<-predict(m4.1,newdata = pred.df2,type = "response")+1.96*
  predict(m4.1,newdata = pred.df2,se.fit = T,type = "response")$se.fit


pTWNnat4cat<-ggplot(pred.df2,aes(x=TWNedu4cat,y=fit1.1,fill=TWNedu4cat))+
```

geom_bar(stat="identity")+scale_fill_discrete(name="Education")

pTWNnat4cat


*[CHINA CODING]*

*#Logistic regressions (outcome is 0 or 1)*

m1.2<-**glm**(CHNvoteLocal~CHNedulevel,data=china.df,family=binomial("logit"))

m2.2<-**glm**(CHNvoteLocal~CHNedu4cat,data=china.df,family=binomial("logit"))

m3.2<-**glm**(CHNvoteLocal~CHNedulevel+CHNfemale01+CHNage+CHNimptpolit,data=china.
df,family=binomial("logit"))

m4.2<-**glm**(CHNvoteLocal~CHNedu4cat+CHNfemale01+CHNage+CHNimptpolit,data=china.d
f,family=binomial("logit"))

m5.2<-**glm**(CHNvoteLocal~CHNedulevel+CHNfemale01+CHNimptpolit,data=china.df,family=
binomial("logit"))

m1.2.35under<-**glm**(CHNvoteLocal~CHNedulevel,data=china.df[china.df$CHNage<35,],family
=binomial("logit"))

**summary**(m1.2.35under)


m1.2.35over<-**glm**(CHNvoteLocal~CHNedulevel,data=china.df[china.df$CHNage>=35,],family
=binomial("logit"))

**summary**(m1.2.35over)


*#Table of regression outputs, using texreg and changing names*

**texreg**(list(m1.2,m2.2,m3.2,m4.2,m5.2),

```
        custom.coef.names = c("(Intercept)",

                    "Education",

                    "Primary Sch",

                    "Secondary Sch",

                    "University",

                    "Female",

                    "Age",

                    "Poltical Interest"))
```

*#Prediction data frames to interpret model*

pred.df2.1<-with(china.df,expand.grid(CHNedulevel =sort(unique(CHNedulevel)),CHNfemale0

1=0,CHNage=mean(CHNage,na.rm=T),CHNimptpolit=mean(CHNimptpolit,na.rm=T)))

*#Predicted probability*

pred.df2.1$fit2<-**predict**(m3.2,newdata = pred.df2.1,type = "response")

pred.df2.1$fit2

*#Confidence intervals*

pred.df2.1$ll.2<-**predict**(m3.2,newdata = pred.df2.1,type = "response")-1.96*

 predict(m3.2,newdata = pred.df2.1,se.fit = T,type = "response")$se.fit

pred.df2.1$ul.2<-**predict**(m3.2,newdata = pred.df2.1,type = "response")+1.96*

 predict(m3.2,newdata = pred.df2.1,se.fit = T,type = "response")$se.fit

```
pCHNlocal01<-ggplot(pred.df2.1,aes(x=CHNedulevel,y=fit2))+geom_line()+geom_ribbon(aes(
ymin=ll.2,ymax=ul.2,alpha=.3))+labs(list(title="Voting in Local Elections in China",x="Educati
on",y="Predicted Probability"))+scale_alpha_continuous(guide=F)
pCHNlocal01


mean(china.df$CHNvoteLocal,na.rm=T)


#Plot for categorical
pred.df2.2<-with(china.df,expand.grid(CHNedu4cat=sort(unique(CHNedu4cat)),CHNfemale01=
0,CHNage=mean(CHNage,na.rm=T),CHNimptpolit=mean(CHNimptpolit,na.rm=T)))


#Predicted probability
pred.df2.2$fit2.2<-predict(m4.2,newdata = pred.df2.2,type = "response")
pred.df2.2$fit2.2


#Confidence intervals
pred.df2.2$ll.3<-predict(m4.2,newdata = pred.df2.2,type = "response")-1.96*
 predict(m4.2,newdata = pred.df2.2,se.fit = T,type = "response")$se.fit
pred.df2.2$ul.3<-predict(m4.2,newdata = pred.df2.2,type = "response")+1.96*
 predict(m4.2,newdata = pred.df2.2,se.fit = T,type = "response")$se.fit


pCHNloc4cat<-ggplot(pred.df2.2,aes(x=CHNedu4cat,y=fit2.2,fill=CHNedu4cat))+
 geom_bar(stat="identity")+scale_fill_discrete(name="Education")
```

pCHNloc4cat

*#Logistic regressions (outcome is 0 or 1)*

m1.3<-**glm**(CHNvoteNat~CHNedulevel,data=china.df,family=binomial("logit"))

m2.3<-**glm**(CHNvoteNat~CHNedu4cat,data=china.df,family=binomial("logit"))

m3.3<-**glm**(CHNvoteNat~CHNedulevel+CHNfemale01+CHNage+CHNimptpolit,data=china.df, family=binomial("logit"))

m4.3<-**glm**(CHNvoteNat~CHNedu4cat+CHNfemale01+CHNage+CHNimptpolit,data=china.df, family=binomial("logit"))

m5.3<-**glm**(CHNvoteNat~CHNedulevel+CHNfemale01+CHNimptpolit,data=china.df,family=binomial("logit"))

m1.3.35under<-**glm**(CHNvoteNat~CHNedulevel,data=china.df[china.df$CHNage<35,],family= binomial("logit"))

**summary**(m1.3.35under)

m1.3.35over<-**glm**(CHNvoteNat~CHNedulevel,data=china.df[china.df$CHNage>=35,],family= binomial("logit"))

**summary**(m1.3.35over)

*#Table of regression outputs, using texreg and changing names*

**texreg**(list(m1.3,m2.3,m3.3,m4.3,m5.3),

    custom.coef.names = c("(Intercept)",

                "Education",

                "Primary Sch",

                "Secondary Sch",

```
                "University",

                "Female",

                "Age",

                "Poltical Interest"))


#Prediction data frames to interpret model

pred.df2.3<-with(china.df,expand.grid(

  CHNedulevel=sort(unique(CHNedulevel)),CHNfemale01=0,CHNage=mean(CHNage,na.rm=T

),CHNimptpolit=mean(CHNimptpolit,na.rm=T)))


#Predicted probability

pred.df2.3$fit1.3<-predict(m3.3,newdata = pred.df2.3,type = "response")

pred.df2.3$fit1.3


#Confidence intervals

pred.df2.3$ll.4<-predict(m3.3,newdata = pred.df2.3,type = "response")-1.96*

  predict(m3.3,newdata = pred.df2.3,se.fit = T,type = "response")$se.fit

pred.df2.3$ul.4<-predict(m3.3,newdata = pred.df2.3,type = "response")+1.96*

  predict(m3.3,newdata = pred.df2.3,se.fit = T,type = "response")$se.fit


pCHNnat01<-ggplot(pred.df2.3,aes(x=CHNedulevel,y=fit1.3))+geom_line()+geom_ribbon(aes(

ymin=ll.4,ymax=ul.4,alpha=.3))+labs(list(title="Voting in National Elections in China",x="Educ

ation",y="Predicted Probability"))+scale_alpha_continuous(guide=F)
```

```
pCHNnat01


mean(china.df$CHNvoteNat,na.rm=T)


#Plot for categorical

pred.df2.4<-with(china.df,expand.grid(CHNedu4cat=sort(unique(CHNedu4cat)),CHNfemale01=

0,CHNage=mean(CHNage,na.rm=T),CHNimptpolit=mean(CHNimptpolit,na.rm=T)))


#Predicted probability

pred.df2.4$fit1.4<-predict(m4.3,newdata = pred.df2.4,type = "response")

pred.df2.4$fit1.4


#Confidence intervals

pred.df2.4$ll.5<-predict(m4.3,newdata = pred.df2.4,type = "response")-1.96*

  predict(m4.3,newdata = pred.df2.4,se.fit = T,type = "response")$se.fit

pred.df2.4$ul.5<-predict(m4.3,newdata = pred.df2.4,type = "response")+1.96*

  predict(m4.3,newdata = pred.df2.4,se.fit = T,type = "response")$se.fit

pCHNnat4cat<-ggplot(pred.df2.4,aes(x=CHNedu4cat,y=fit1.4,fill=CHNedu4cat))+geom_bar(sta

t="identity")+scale_fill_discrete(name="Education")

pCHNnat4cat
```