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The Journal of Undergraduate Research (JUR) is dedicated to providing the student body with intellectual perspectives from various academic disciplines. JUR serves as a forum for the presentation of original research, thereby encouraging the pursuit of significant scholarly endeavors.

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Letter from the Editors

As we finish compiling yet another issue of JUR, we find ourselves reflecting on the interdisciplinary nature of research. We are constantly reminded that research does not exist in a vacuum, but rather as a facet of the discourses and events of the outside world. These ideas are featured prominently in the papers published in this issue, and we are excited to showcase such a diverse array of scholarly work.

Year after year, we are committed to presenting the interconnected network of academic disciplines. Fortunately, the submissions from our fellow peers and students do this job for us. The wide range of research interests continues to inspire us as we progress through each publication cycle. These submissions remind us of the important work we do at JUR by offering an outlet to all types of research from the humanities to the engineering sciences.

Professor Trigilia echoed these beliefs during his interview. While currently a professor of finance, he has academic experience in political science and sociology as well. His wide range of studies helps him as he researches and analyzes financial choices of everyday people - a true testament to the benefits of diverse thought. We would like to highlight his advice to undergraduate students; "discuss [ideas] with other students and with faculty members." The strengths of interdisciplinary work come from the development of ideas with others. While it is not always easy, we hope to carry his advice of diplomacy with us in our individual research and in our collective publications.

Before we end, we would like to note that JUR is in a period of change. While many of our new ideas will be making an appearance in upcoming issues, one to mention now is that this is the Fall 2018 issue, rather than the Spring 2018 issue. We hope that our change in naming scheme will alleviate confusion of publication dates to readers, and that it signifies the beginning of many positive changes to come.

Finally, we would like to thank the editorial staff for bringing this issue together. We hope you, the reader, enjoy this journey through gender dynamics in college workshops, the effects of campaign spending, state power as a determinant of sexual violence, and how escaped slaves find community as much as we did. Here's to our latest escapade into the wonders of interdisciplinary research!

Sincerely,

Victor Zhang and Michelle Klein

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Journal of Undergraduate Research

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Giulio Trigilia, PhD

Assistant Professor of Finance
Simon Business School
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JUR: Tell us about your professional background and how you got started in research.

Trigilia: I started as a political science student in Bologna, Italy, focusing mostly on sociology theory. In September 2008, while I was choosing a topic for my Master's dissertation, the investment bank Lehman Brothers defaulted, triggering a global financial crisis. Everybody around the world was frightened by the events; you would read on the newspapers about trillions of dollars of losses, day in and day out. So, I decided to write on something that was related to the financial crises. The problem was that, as a political science student, I had little technical background. I barely understood the difference between debt and equity, for instance. I still decided to write about the credit rating agencies - among the major culprits for spreading misinformation at the time. I got in touch with professor Paolo Manasse, a macroeconomics professor who was previously at the International Monetary Fund. He agreed to supervise me, and encouraged me to pursue graduate studies in economics to improve my knowledge. That's when I drifted from political science to economics. Then, I got excited about the field and I decided to complete a PhD in economics. While a PhD student, I kept being interested in financial and information economics, especially the application of game theory and contract theory to finance. That's how I ended up as a finance professor.

I always had the idea that research is a cool job; I thought you would get paid to learn stuff - the perfect deal. It turns out that is not quite accurate: you should actually produce knowledge rather than consuming it. But, I kept enjoying this profession ever since I started. When I moved into graduate studies, I was wondering whether there was any space for me to say something new. Over time, I learned that the opposite is true; there's little definite knowledge in almost any area and a lot of scope for new research. That's exciting to me. Here's the advice I would give students: you shouldn't think of graduate studies as a process of learning a lot of notions that are already there. Actually, they are the beginning of a path toward figuring out how little we know about our world, and how we can improve to the best of our capabilities.

JUR: During your Master's/PhD process, were you involved in research in anyway?

Trigilia: Yes, I think that it is very important to start working with other, more senior researchers early on. I wrote columns for an online newspaper called Voxeu as a Master's student, which involved some basic statistical inference and data collection. In addition, I always worked as a research assistant while I was a PhD student. I would mostly be responsible for basic data work, cleaning datasets and running some tests, but I did find it a great gateway to figure out how academics work. Unfortunately, there is little advertising for these positions. Students must be proactive, find researchers they like who work on interesting topics, and ask them if they need help.

JUR: What is your favorite part of doing research in your field?

Trigilia: There is recent empirical literature that documents frequent instances of strategic

default by borrowers, who choose not to repay debts that could be honored. One reason why borrowers strategically default is that their lenders often do not force them into bankruptcy. Instead, they reach some kind of agreement, an exit strategy, without going to bankruptcy courts. Strategic default was massive in the aftermath of the financial crisis, for instance, when homeowners saw the value of their houses dropping and often decided not to pay their mortgages, despite having sufficient income. They would just stop paying the loans and hand the house as collateral to the lender, as that was cheaper than paying for it. My research is trying to understand to what extent should strategic default be thought of as a problem or whether it may serve a purpose in credit markets. My most recent paper shows that if the lenders don't observe the value of an asset, and if they cannot commit to bankrupt defaulting borrowers, then strategic default is indeed efficient, even if all parties anticipate that it will happen and price it correctly. Basically, strategic default is the solution to a problem, as opposed to being the problem itself. Currently, I am looking at the implication this finding has across economies and societies. For instance, there seems to be both a legal and cultural difference between the US and Europe. In the US, bankruptcy is considered to be relatively normal. If you happen to have bad luck and become insolvent, you are given the opportunity of a fresh start, especially if you did not commit any wrongdoing. In Europe, bankruptcy is often perceived

to be a sin, so if you go through bankruptcy you hardly have any chance of borrowing again in the future. This may have negative or positive effects on investment, which is what I am studying right now.

JUR: From Europe to the US, is the research process different in any way?

Trigilia: I think that there is no difference in terms of methodology. Most researchers in the economics or finance professions share a common set of tools and try to apply them to similar questions. The main difference, in my opinion, is that the US is the place where most of the cutting edge research in my field is being produced so, on average, you are more likely to be exposed to new ideas than you would be in Europe. The seminars' quality is also high, especially in top schools such as the University of Rochester. US universities also seem to be less bureaucratic, as compared to continental Europe, which facilitates researchers in their work.

JUR: When people mention research, most will think about the hard sciences. What do you think are the major differences between research in the social sciences or your field in particular?

Trigilia: I'm sure in some subfields of hard science this is not the case. However, an important difference between an experiment in the hard sciences and an experiment in the social sciences is that in hard sciences you can repeat identical experiments multiple times, setting the initial conditions the same. In the social

sciences, you can hardly repeat experiments, because people are 'weird.' They have heterogeneous beliefs, thoughts, and experiences from which they draw their information about the world around them. This is one of the main differences. Another important difference is that in the social sciences the methodology is part of a research question. In the hard sciences, I have the impression that often the methodology is not so frequently under discussion. In the social sciences, if I choose to work with a specific model about the world, this choice contains already important value judgements. Therefore, we debate both the results that we obtain and the means by which they are obtained. I find it very interesting, but it also makes doing research complicated, and progress less linear than in some of the hard sciences.

JUR: How can you be certain that your research conclusions are accurate if you cannot replicate the experiment and get the same outcomes?

Trigilia: You can rarely be one hundred percent sure about a result in social sciences. The way that we progress is by finding some patterns that are widely observed, and we try to make inferences from them. Times change, cultures change, people change, and so there is no fundamental law that will remain valid forever.

JUR: What do you think are the biggest challenges working in this type of research?

Trigilia: I think the biggest challenge is always trying to break into something new, which often

is not technically the hardest part, but it requires you to think outside the box. Academic incentives often push you toward trying to publish early in your career. That may or may not be conducive to more creative research, because it is easier to publish research that builds very closely on work that already exists, rather than trying to come up with something completely new, something that other academics may not be prepared to see, and which you may be less confident about proposing as well. Especially for my field, which is finance, from the 1980s onwards there have been few disruptive papers that really changed the way we think, so writing such papers is the hardest challenge.

JUR: Where do you draw inspiration for research?

Trigilia: You need to follow closely what is going on in financial markets, among institutions, and be aware of new regulations. Personally, my main source of inspiration has always come from combining recent trends with the reading of classic academic work. I have this tendency of looking at a newspaper article, and then jumping back, maybe 200 years back, to find out what somebody had said about similar problems. I am especially interested in the ideas that were disruptive and controversial when they were proposed. A good example comes from the story of a famous economist of the last century, called Ronald Coase. In the 1930s, he came up with a theory of why a firm exists. His contemporaries did not think about this question - they mostly thought that firms would exist because of economies

of scale. The way in which Coase came up with his theory of the firm is interesting, because it was mostly based on some field experience he acquired going around factories, which would be quite uncommon for theorists. His story teaches us how important it is to combine abstract thinking with the facts.

JUR: What kind of long term implications or applications do you see for your work?

Trigilia: That is hard to say. The most likely practical application would probably be to inform policy makers about whether certain regulations alleviate problems in the financial system or not, and how. For example, my research on strategic default highlights a potential benefit of offering firms and individuals a fresh start, as well as the implications for investment and economic growth. In terms of teaching, I face the important task of training new generations in finance. When undergrads get exposure to some of the classic methods of modern finance, I feel that I am not only teaching them tools, but also influencing their view of how financial markets work. This is a major practical application of my work, which goes beyond the research I conduct, and which I find very rewarding.

JUR: Do you have any advice for undergraduates who are interested in getting into research, especially in similar fields as you?

Trigilia: My first piece of advice would be to try to understand what you are interested in. Once you find out that there are certain topics you like, get in touch with

researchers working on these topics, either at the Simon School or in the economics department or wherever they might be. Talking to faculty members is important; often students don't show up to office hours, they don't write emails to faculty, and this is a missed opportunity because ultimately we are here for you. You are not here to accumulate notions passively. The best way to avoid forgetting those notions is to discuss them with other students and with faculty members. When I read something that I find interesting, if I never talk about it with anyone I tend to forget it. If I talk about it with somebody else, then I have more chances of remember it.

JUR: Do you have any general advice for undergraduates?

Trigilia: The most important thing in my view is to not feel stressed or pressured. I feel that some undergrads might be overwhelmed by the expectations and pressures that are on them, maybe also aggravated by their student loans. The pressure can sometimes be hard to handle, and college can turn into a really stressful period of your life. My advice is to always remember that if you are here, it means that you have good chances of making it. You should try not to think too much about your result, and enjoy every day the best you can. Despite being potentially quite stressful, college is one of the best periods of your life. You will remember it. Also, if you feel like you are overwhelmed, you shouldn't hesitate to seek help and talk to somebody. Never feel that you are left all by yourself.

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Sordid Spoils of War: Does State Weakness Cause Sexual Violence?

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When do state security forces commit sexual violence? When, in other words, do the guardians abuse their power to fundamentally betray those they are sworn to protect? While the existing literature poses this question in the context of civil war, the phenomenon is wider; security forces also commit sexual violence in times of civil peace. I propose that sexual violence is caused by a government's lack of ability to subjugate, control, and monitor its officers, who commit such acts because of their expectation of punishment. To test this hypothesis, I investigate sexual violence data collected by Butler 2016 for 170 countries over a period of 13 years. In accordance with the literature on state weakness, I use a variety of measures, including data on general census frequency. I find that lower levels of sexual violence and frequent administration of a general census are highly correlated. These findings suggest that state weakness is a good indicator of where sexual violence occurs, regardless of the occurrence of civil war.

Introduction

Does state weakness cause sexual violence committed by security forces? Even today, sexual violence remains as one of the most violent ways in which a perpetrator attacks its victim with brute force, often being cited as a "weapon of war" by the United States' Department of State. Moreover, occurrences of sexual violence often go unreported and thus unnoticed, as the victim often perceives the violence as inherently shameful. This is especially the case when the perpetrator of its violence is someone of higher social standing than the victim, such as with a member of a government's security forces.

Since the 1980s, when the term "sexual violence" was first introduced, the literature on sexual violence within the field of political science has focused on its occurrence during periods of war, when sexual violence is said to become more frequent, as it is used as a "weapon of war" (Krug 2002). Various types of perpetrators have since been identified, including, but not limited to, terrorist and insurgent organization leaders and officers, but also government-sponsored militias, as well as a country's own military and security forces. This last variety of perpetrator committing sexual violence against civilians during a period of war goes strictly against the trust placed into the hands of the government and its forces being able to uphold social security and its ability to protect its citizens and their rights. Because the government is the only legitimate security bracket within the country's border, misuse of the citizens' trust through its forces committing sexual violence is often associated with shame. Violence of this sort is not only harmful in the instance in which it is committed against the victim, but the damage that the victim has to face is exacerbated with the inability to stop its potential reoccurrence.

Although existing political science research has offered insight into sexual violence during war, we know little about sexual violence during peacetime. Therefore, to understand this topic more generally, the occurrence of sexual violence during peacetime is vitally important information for the study of sexual violence.

I propose that the levels of sexual violence committed by security forces are higher when the state is relatively weak, and that the levels of sexual violence are relatively low when the state is relatively strong. This is because when the state is strong, the government not only monitors its citizens' actions, but in turn is able to monitor the actions of its security force as well. Thus when sexual violence is committed by a member of the security force, this will be known and thus that individual committing the crime will be punished. It is assumed that the punishment is enforced heavily enough to deter those

that have committed sexual violence from doing so again, as well as deter those from doing so in the future. However, punishment for a crime cannot be enforced when the occurrence of the crime cannot be proven, and so cases in which uncertainty may exist, such as when the government cannot fully monitor its security force's actions, I would expect to see more sexual violence occur.

To test whether this is actually the case, I use data on the level of sexual violence committed by government security forces gathered by Butler and Jones for a sample of 170 countries for the time period 1999-2011. I will merge this data with data on state weakness measured through GDP per capita, relative political capacity data, literacy rates, education attainment data, and census frequency for the same time period. Controlling for a variety of variables, I will use the data to see how well my argument holds up.

This paper is divided in the following sections. First, I outline the already existing literature on sexual violence within the field of political science. Then, I will outline what this paper contributes to the conversation. Second, I will discuss the research design. In this section I will talk about the data for the independent and dependent variables, as well as other control variables. Third, I present the results of my analysis. The fourth and final section concludes.

Literature Review

Sexual Violence

Unlike its occurrence, the literature on sexual violence is fairly recent, starting around 1980. Until today, the main focus of the literature on sexual violence is spreading awareness about, as well as arguing the importance of, studying sexual violence. The literature was spearheaded first and foremost by reports published by international organizations such as the World Health Organization (WHO) (see Krug 2002). These publications, while effective in explaining the significance of studying sexual violence to its audience, do little to explain what causes sexual violence, and in turn state little on how the occurrence of sexual violence may be reduced.

In Political Science

The general literature on sexual violence currently splits roughly into two strands of research. The first, mainly in political science, focuses on sexual violence during times of conflict, internal or international. The second strand looks at the phenomenon in a broader context, mainly focusing on sexual violence in general.

In political science, the literature on sexual violence's main focus is the investigation into what causes sexual violence during a time of conflict. The two most prominent political scientists in this literature are Dara K. Cohen and Elisabeth J. Wood. Their research suggests that war is not necessarily accompanied by sexual violence; sexual violence is not confined to a specific region, or specific to ethnic conflicts.

Research also suggests that sexual violence is more often committed by state armed groups than rebel groups, and that the role of perpetrator is not synonymous with being male, amongst others (Cohen, Green, Wood 2013).

Cohen argues that the amount of sexual violence occurring during times of war is a result of combatant socialization. Because it is often necessary for groups of state armed forces to trust one another, committing acts such as gang rape may be sanctioned by higher-ups, as the occurrence of sexual violence functions to build team spirit (Cohen 2013a, 2013b, 2014, 2015).

On the other hand, Wood emphasizes a more top-down approach. She argues that the occurrence of sexual violence, and lack thereof, is best explained by the behavior of government leadership. If a group's leadership feels that committing sexual violence goes against its credo, the leadership will adequately punish those that committed the crime, assuming that the group can exercise enough power through its hierarchical structure (Wood 2006, 2009).

Both Wood and Cohen briefly discuss alternative explanations. The first of these is known as "the substitution argument," arguing that security forces commit less sexual violence against civilians when they have taken prisoners that may "satisfy their needs" (Wood 2006, 37). This argument suggests that sexual violence would be more prevalent in a civil war, or any situation where potential predators can easily capture, imprison, control and rape vic-

tims. In her 2015 article, Cohen finds that states often commit sexual violence as a complement to, rather than a substitute for, violence perpetrated by militias, and so it is that the substitution argument does not adequately explain the positive correlation between acts of sexual violence and other atrocities committed by militias.

Another argument relies on the presence of female officers in the higher ranks. Supposedly, women officers function as role models, who will punish sexual violence against women and thus deter (the implied male) lower ranking officers from committing sexual violence. Following this argument, more women in the higher ranks would reduce sexual violence. What this argument does not account for, however, is the fact that sexual violence can be, and in fact is, committed by female government officers. The presence of women in such positions thus does not prevent the occurrence of sexual violence.

Gap in Literature

So far the literature on sexual violence within political science has focused almost exclusively on sexual violence during a time of war. Reports published by the WHO, such Krug 2002, state that the occurrence of sexual violence "is often used as a weapon of war [;] as a form of attack on the enemy." These publications are problematic because they imply that sexual violence by government security forces is exclusively found in countries engaged in internal and international war.

Butler et al is the first article to investigate if this is truly the case. The researchers find that data in this scope of the field is limited, and thus create their own dataset measuring the level of sexual violence cross-nationally, over a range of years, from 1999 to 2011. The article finds that contrary to common assumption, a country's level of sexual violence does not change significantly when the country is engaged in fighting a war compared to when it is not. This suggests that previous studies of sexual violence committed by government security forces during times of war only ever studied a limited sample of sexual violence committed by government security forces.

Focusing exclusively on sexual violence during civil war biases the study of sexual violence committed by government security forces. If the occurrence of sexual violence during war cannot be compared appropriately to its occurrence during peacetime, how can we credibly say that sexual violence is often used as a means of attack against the enemy?

So far, few articles have been written comparing the occurrence of sexual violence internationally and independently of a country's engagement in war on a domestic or international level. Of the few articles, Butler 2007 argues that for government security forces as perpetrators, committing sexual violence may be for its own rewards. Security forces may use their authority and power in order to extract additional benefits for themselves, and this is even more so the case when the government does not appropriately reward the officers for their work.

Kalra 2013 proposes an alternative argument. The article suggests that sexual violence occurs more often in cultures that foster beliefs of male superiority and social and cultural inferiority of females, and thus argues that the occurrence of sexual violence likely stems from cultural norms, as opposed to inadequate rewards for government security forces.

Alesina 2013 argues similarly. Although the article does not specifically investigate sexual violence, the study considers the role of women in societies worldwide, and finds that women's relative roles to that of men can be explained by traditional agricultural practices. Thus, like Kalra 2013, this article argues that the role of women in a society contributes to the level of sexual violence that occurs within a country's borders.

My contribution to the literature on sexual violence thus starts where many others' research has not gone before, specifically looking at what causes the occurrence of sexual violence committed by government security forces. Although Kalra et al. 2013 and Alesina et al. 2013 make an interesting argument suggesting that cultural norms cause sexual violence, both Cohen and Wood have found suggested that the occurrence of sexual violence during war might lie in a principal-agent problem, although up to this point, their studies were limited to the occurrence of sexual violence by government security forces during times of civil war.

Theoretical Framework

In this paper I plan to examine the level of sexual violence committed by government security forces cross-nationally for 13 years, independent of whether a country is engaged in internal or international conflict. In doing so, this paper will be the first to examine cross-country data on sexual violence perpetrated by government security forces both during and in absence of civil conflict. I rely on the data gathered by Butler 2016, which previously has only been used to investigate the existence of a significant difference in the level of sexual violence in a country during a time of peace versus during a time of war.

Although Wood finds that sexual violence is caused by the government leadership's inability to adequately control and in return punish soldiers for their crimes, her finding is limited to samples of sexual violence during times of war. As suggested by Butler 2016, there is no significant change in the level of sexual violence committed by government security forces depending on the state of conflict a country is currently engaged in. Inferentially, this could mean that although Wood's argument has only been investigated in the context of a limited sample of data, her argument may continue to hold up if the sub-sample of conflict data is indeed not different from the larger sample also including peaceful years.

Thus, I examine whether government security forces commit sexual violence as a result of state weakness by looking at a global sample of data on sexual violence between the years of 1999 and 2011. This allows me to see whether Wood's argument holds up when we broaden her sample to include more countries and more years, including years of peace.

Secondarily, I aim to contribute to the conversation of how to effectively measure state weakness. As outlined in further detail below, state weakness has been measured in a variety of ways. For this study, I am particularly interested by those measures of state weakness which attempt to measure the degree to which the government has information over, and in turn is able to control, its citizen population. To date, there is no direct way in which to measure these concepts; therefore, I rely on indicators that are likely highly positively correlated with these concepts.

I try to approximate the measure of state weakness by looking at data on:

1. GDP per capita
2. Relative Political Capacity data
   a. Relative Political Extraction
      - Relative Political Extraction, accounting for agricultural revenue
   b. Relative Political Reach
      - Relative Political Reach, accounting for the working population
      - Relative Political Reach, accounting for what the working population could be
3. Literacy Rates
   a. Youth Literacy calculated for total population
   b. Youth Literacy calculated for females
4. Education Attainment
   a. The level of education attained within the first 15 years or schooling
5. Census Frequency

All of these variables have been used as a measure of state weakness prior to this paper, but some are more frequent than others. I provide a short overview of the variables used in this paper here, but each variable's merits and demerits are further discussed in the next section below.

GDP per capita has perhaps been used most widely as a measure for state weakness in the literature, and is on this basis mentioned here. I would expect to find higher levels of sexual violence to correlate with lower levels of GDP per capita.

The data on relative political capacity is a recent attempt at creating an aggregate variable for state weakness, and has first been suggested by Hendrix 2010. As these variables measure state capacity, I would expect to find high levels of sexual violence correlating with low levels of state capacity.

I have rarely seen data on literacy and education used as a measure of state weakness. As I believe these measures have been undervalued by political science research, I choose to use the measures of literacy and education level, with the hope to bring wider attention to the existence and potential use of such measures. For these variables, I would expect to find higher levels of sexual violence correlated

with lower levels of literacy and education within countries. My reasoning is as follows: the higher the level of education or rate of literacy within a country, the better the government is able to record and enforce the United Nation's education policy. Alternatively, when a government does not have enough resources to record and gather information on which parents send their children to school and which do not, or when the government is unable to punish such parents, the government is also unlikely to note and ultimately punish its own security forces for committing crimes such as sexual violence. When a government cannot control, and in turn does not punish, its security forces for committing crimes, security forces are more likely to commit these crimes.

I have seen census frequency used as a measure of state weakness only twice, in Hanson 2013 and Hanson 2018. Nevertheless, I believe it may be very valuable to assess state weakness. Like for the youth literacy and education attainment variables, I hope to bring the use of census frequency to wider attention as a measure of state weakness. In this paper I expect to find high levels of sexual violence correlating with low census frequency. This is because the ability to conduct a thorough census directly translates into the government's ability to gather, record, and archive a trove of information over a period of time, including the conduct and behavior of its security officers.

Data Set Up

Dependent Variable

The main focus of interest in this paper is on the level of sexual violence committed, worldwide during the years 1999-2011, by government security forces. The data on sexual violence by government security force comes from Butler et al. 2016. In order to record the levels of sexual violence committed by government security forces in a country, Butler et al. used the information provided by the country reports published by the United States' Department of State.

Butler 2016 categorizes the information presented by the Department of State into one of five categories, ranging from "0" to "4", with "0" being no mention of sexual violence in the country report, "1" corresponding to "isolated reports of sexual violence", "2" corresponding to "some reports of sexual violence", "3" corresponding to "widespread reports of sexual violence", and "4" mentioning "sexual violence used as a weapon of war" in a country report.

The difficulty with this measure of sexual violence is that even though sexual violence by government security forces might occur, the occurrence is often remains unrecorded. Thus "no mention" of sexual violence in a country report might mean that no sexual violence by government security forces occurred, or that sexual violence did occur, but that it was not reported. The occurrence of a "0" level of sexual violence can suggest one of two things: either the absence of sexual violence by government security forces in a country, or the presence of violence, but the absence of a record

of that violence.

There could be various reasons for the absence of records. The literature on sexual violence often cites one reason in particular: stigmatization. Kalras & Bhugra 2013 gives a good overview of the argument, and argues that when crimes of sexual violence are committed, victims do not report them as such because of current social norms. Social norms frequently shame the victim of the crime, rather than the perpetrator, and in extreme cases even exclude and outcast the victim from their community. As such victims may find themselves in situations in which reporting the crime may harm their wellbeing, rather than help them. This is especially the case when the perpetrator is a government officer, and the victim must rely on the perpetrator to adequately record and report the crime.

Another reason why sexual violence by security forces may be underreported could be government decision to deliberately withhold or destroy any information or records suggesting misconduct of government officers. It may be that the government is pushing an agenda of national pride, or that it is in negotiations with potential international donors; in all such cases the government might information regarding security officers committing sexual violence to be harmful, and for that reason may prevent such from being declared and recorded. It is also possible that "0" may indicate a government's inability to collect or record information such as sexual violence committed by its

security forces all together.

It is thus important to note that most data on sexual violence is likely underestimated, or even incomplete.

Independent Variables

The main independent variable for this experiment is state weakness. State weakness is a concept that is difficult to measure, mostly because there is no one set way in which to assess how "strong" or "weak" a state is. Like any kind of strength, a government's power is not limited to a particular aspect of government—instead, the very word "state weakness" implies numerous aspects of governance.

It is this multiplicity of aspects that functions both as strength and a weakness to measure state weakness. The advantage of state weakness as a variable involving various aspects is that there are as many ways to measure, as there are aspects to it. This allows researchers to choose which aspects of governance that they want to target, each aspect shedding light on a slightly different aspect of the large question. The downside to this is that it is the fact of its various aspect that makes measuring state weakness so difficult. There is no general aggregate measure for state weakness that research has created. It is this that can make measuring weakness so difficult.

In this article I try to play to the advantages of measuring state weakness, although I recognize that it is these very strengths that also work as the measure's disadvantages. As there is no aggregate measure of state weakness, I resort to the practice of using a variety of

measures as a means to measure state weakness. These different measures are outlined below. The use of various measures allows me to hone in on specific aspects of a government's state weakness, as each variable outlined below measures something slightly different. It is because of this that my article serves as a unique lens to the measure of state weakness.

The disadvantage of using a variety of measures in order to capture the effects of state weakness is that for each individual variable that I use, alternative effects may affect the dependent variable. Thus it could be that when measuring the rate of youth literacy, what truly affects the level of sexual violence is not whether children can read, but rather their opportunity to do so; thus it may be the case that sexual violence is not influenced by students' ability to read, but rather that low rates of youth literacy may be brought about by the low value attributed to reading by that society. Although this may very well be the case, I hope that the inclusion of other methods of measuring state weakness renders these side effects negligible.

GDP and GDP per capita

Frequently, political scientists will use GDP per capita to measure state weakness. GDP per capita is in itself a composite variable, and has been found to correlate closely to levels of democracy and economic development. High development is highly correlated with high levels of education and literacy, and thus it is not surprising that we find high levels of GDP per capita in countries that have high rates of literacy, female

literacy, and education.

The problem is the measure of GDP per capita captures a variety of other things. One such thing is the level of economic development and economic performance. Apart from the fact that research has already been done into the relationship between sexual violence and economic performance, what GDP per capita captures precisely is the total of all goods and services provided by the country in a year per person. Although this may be of interest to some, the total sum of all goods and services provided by a country is not necessarily indicative of state weakness. This is to say that a high level of state weakness might correlate to a low GDP per capita, it is important to remember that measuring a country's economic performance does not in any way indicate a government's ability to monitor or punish its officers, and record their offences. Thus GDP per capita is not the best way to measure state weakness for this article.

Relative Political Capacity data (RPE, RPR, RPA)

One way in which data on state weakness has been gathered and collected is through the Relative Political Capacity dataset. The dataset attempts to measure the effectiveness and efficiency of governments, as well as the overall government performance. The dataset cites that it specifically attempts to account for the presence of the non-monetized economy, such as the black market, subsistence economy, and volunteer work. The three components of political performance that the dataset highlights are Extraction,

Reach, and Allocation. Extraction attempts to measure the government's ability to use specific parts of the national output to further public goals. Reach approximates a government's ability to govern the population or populations. Allocation investigates "the share of public revenues provided to competing national priorities contrasted to the optimal allocation based on maximizing economic growth."

Within the three different types of measures, there are further differentiations. The dataset records three different rates that serve as proxies to measure relative political extraction, two different rates to measure relative political reach, and two different rates that measure relative political allocation. Relative political extraction is measured in two different ways, the first accounting for agricultural revenues per GDP, also known as RPE Agri. This measure is specifically useful in accounting for relative political extraction in societies in which revenue from agricultural activities is contributes significantly to the country's economic output. Thus this measure is highly relevant for societies that rely on agricultural goods as a large portion of GDP. The second variable measured for extraction is RPE GDP, which does not account for a country's revenue from agricultural activity. Instead, this measure excludes agricultural revenue entirely and instead includes the variable of GDP per capita in 2005, presumably to account for services sold, rather than goods. The final measure for extraction is RPE GDP OECD. This measure is that

of RPE GDP, but is adjusted for OECD country data.

Relative political reach is measured by the variables RPR Work and RPR EAP. These variables gage the capacity of governments to mobilize the population under their control. RPR Work estimates this by considering the population percentage of those that able to work and are currently working, whereas RPR EAP considers the economically active population and those that are currently unemployed. The difference between the two variables is thus that RPR Work measures the population that is currently adding to economic performance, whereas RPR EAP measures the population that could contribute to the country's economic performance.

Relative Political Allocation is a composite indicator which attempts to measure how public expenditure are prioritized in the government budget. As these two measures do not contribute any information on how government security officers may or may not be recorded or punished for committing sexual violence, these variables are not of importance to this article.

Overall, the Relative Political Capacity dataset provides a variety of country-year measurements that can be useful when measuring state weakness. The variables most useful are those measuring relative political reach, RPR Work and RPR EAP, as well as RPE Agri, accounting for revenue from agricultural activities.

Youth Literacy

Other measures for state

weakness used in this paper that capture the "reach" aspect of a government mentioned above is data on national literacy. Data on this is published by the UNESCO Institute of Statistics, and collected in all countries worldwide. The UNESCO Institute of Statistics not only measures the average rate of literacy of a nation, but conducts its measuring with more detail, such as youth literacy rate, adult literacy rate, and elderly literacy rate. For all rates, data is also measured for each gender, thus within each age category, the literacy rate for males, females, and the average is recorded. In order to measure the reach of government accurately, I restrict myself to using the youth literacy rate, as I believe this measure investigates how effective the government is by enforcing all children to go to school. For this measure, I use the average youth literacy rate, as well as the youth literacy rate for females, as a way of accounting for the argument that sexual violence is caused by gender roles.

The disadvantage to using youth literacy rates as a measure of state weakness is its infrequent recordings, as well as its growing irrelevance. Youth literacy is in itself difficult to measure, and requires a lot of survey and data collection on behalf of governments as well as international organizations. This means that data for this measure is only recorded every five to ten years, making the sample size available for this measure incredibly small, as the smaller the sample size the less accurate the results one can derive. Another limitation placed

on the investigation by using national literacy data is the fact that since the declaration of literacy as a human development goal by the United Nations, literacy rate has been steadily increasing, many countries thus becoming completely literate. As the percentage of literacy has been on a steady rise, variation in data has been decreasing, thereby reducing its value as a means of capturing state weakness.

Rates of Education Attainment

A third way in which I measure state weakness is through the Cline Center's Educational Attainment measures. There are two different rates of education attainment, EdScale15 measures the average rate of education among 15 year-olds, whereas EdScale25 measures the average rate of education among 25 year-olds. These two rates can act as a proxy for state capacity, much like the average literacy rates described above. The Cline Center for Advanced Social Research has yearly records for both of these rates for 175 countries save for nine, starting from as early as 1950 until 2010. Assuming to play a similar role in measuring state capacity as the average literacy rates by the World Bank described above, using the Cline Center's Education Attainment data has an advantage in that average rates are recorded for almost all countries in almost all years.

One of the limitations in education attainment data is the lack of categorization. Whereas data on youth literacy is further divided into youth literacy for males and females, the education attainment data does not make such a distinction. Although this is perhaps not a limitation per se, the differentiation of education attainment of the different genders would have been valuable data for a gender argument. It is in this way that data on education attainment could be improved.

Census Frequency

Finally, I also try to capture state weakness by considering census frequency. Collected by Hanson 2015, this measure of how frequently a general census is collected by a state's government records how "well the state is able to extend its power throughout its territory, [and] serves as the basis for state's ability [to] tax its population," (Hanson 2015, 314-5). Constructed from data collected by the United Nations, the measure looks forward and backward to the country's most proximate censuses, "summing up and rescaling them such that regularly held censuses every 10 years produces a score of 1" (Hanson 2015, 314-5). Scores thus range from values "0" to "2.26". This measure is incredibly useful for this article in two distinct ways. On one hand, the census frequency measure serves as a way to capture state weakness, as conducting a thorough census is vital for a state's ability to tax its population, and thus to assure its survival. The other way in which this measure is vital lies in its ability to provide accurate information on how well the state keeps its records, and thus how accurate the state's information is. This is valuable as it accounts not only for differences in record-keeping, but also in its variation of census quality.

Correlation Matrix

Thus the correlation matrix for the independent variables used in this article is as follows:

The matrix above shows that although these variables are often

	GDP per capita	RPE Agriculture	RPR Work	RPR EAP	Youth Literature	Youth Literature (f)	Education Scale (15)	Census Frequency
GDP per capita	1.0000							
RPE Agriculture	0.1476	1.0000						
RPR Work	0.0808	-0.0620	1.0000					
RPR EAP	0.0413	0.0523	0.6320	1.0000				
Youth Literature	0.3003	-0.0272	0.0511	-0.0659	1.0000			
Youth Literature (f)	0.3063	-0.0243	0.0754	-0.0422	0.9944	1.0000		
Education Scale (15)	0.3725	-0.0812	0.0510	-0.0400	0.8560	0.8610	1.0000	
Census Frequency	0.2715	0.0886	0.1096	0.0961	0.3591	0.3751	0.3514	1.0000

used to measure state weakness interchangeably, they do not pick up on the exact same components. The most overlap of two variables is that of GDP per capita and the rate of Education, Education Scale (15), followed by the overlap of census frequency and Education Scale (15), as well as the overlap between GDP per capita and census frequency. This suggests that these variables, particularly GDP per capita, Education Scale (15), and census frequency, do indeed pick up on some common component or components of state weakness.

Control Variables

The first of the variables for which I will control is the occurrence of civil war, as well as lower levels of civil conflict. As previously mentioned, the level of sexual violence committed by government security forces is said to increase when a country is currently fighting a civil war, or finds itself in a civil conflict. The way in which I control for this is by constructing a binary variable for both civil war and civil conflict, which will be marked with "1" if civil war or civil conflict persists in a country for a given year, and with "0" if this is not the case. Thus my data will be adjusted for the occurrence of civil conflict and civil war.

Other measures for which adjustment is necessary are population size and population density. This is important, as a larger population not only makes the frequency of sexual violence committed by a government security officer more likely, it also affects state weakness in that conducting a census and measuring rates of literacy and education attainment becomes more labor-intensive. Increased population density produces a similar effect for the dependent variable: the denser the population of a country, the likelier it is for one human to come into contact with another, and thus the likelihood of a crime to occur increases as well. Population density has the opposite effect on state capacity, however: the denser a country's population, the easier it is for a government to control and monitor its population, as one officer or one camera now captures information on a greater number of citizens.

Another control variable is a country's polity2 score. This score measures the country's political orientation through a variety of components, ranging from "-10" (indicating autocracy) to "10" (indicating democracy). Although the measure of state capacity does not conform to the standards of the polity2 score, meaning that both an autocratic state and a democratic state can score low or high on a state weakness scale, it is important to adjust for political orientation, as other articles have previously argued for an increased occurrence of sexual violence in one or the other.

Finally, I also control for a difference in gender and thus the potential of sexual violence stigmatization. I use traditional plough methods data gathered by Alesina 2013, which measures beliefs and values regarding the role of women in society. The plough methods in question are centuries old, and thus these remain the same for all countries in the years 1999-2011. A country can have any measure between and including "0" and "1", "0" meaning that nowhere in that country traditional plough methods were used, whereas a "1" indicates that traditional plough methods were used everywhere within that country. The article finds that countries in which traditional plough methods were used suggest that the roles of women and men in society are less equal.

Results

Table 1 shows the first set of results, where the dependent variable is the level of sexual violence committed by government security forces, examined through the independent variables of the relative political capacity of extraction with a focus on agriculture (RPE Agri), census frequency (CensFreq) and the rate of education of the first

Table 1

| VARIABLES	(1) SV Level	(2) SV Level	(3) SV Level	(4) SV Level	(5) SV Level	(6) SV Level
RPE Agriculture	-0.63*** (0.21)	-0.56*** (0.21)	-0.49** (0.20)	-0.20 (0.24)	-0.19 (0.24)	-0.04 (0.27)
Census Frequency		-0.81 *** (0.23)	-0.20 (0.24)		-1.66*** (0.42)	-2.16*** (0.49)
Education Scale (15)			-0.18*** (0.03)			0.20 (0.11)
Fixed Effects	No	No	No	Yes	Yes	Yes
Observations	2,067	2,067	1,752	2,067	2,067	1,752

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

15 years (EdScale15). For the first three models, clusters were created according to country code, whereas for the second three models, fixed effects were taken into account.

Considering the first three models, we see that the relative political capacity for extraction is highly negatively correlated with the level of sexual violence: as the relative political capacity for agriculture increases by 1 percentage point, the level of sexual violence decreases by 0.63 percentage points, on average. Adding the variables of census frequency in Models 2 and 3, as well as the rate of education for Model 3, we see that RPE Agri continues to make a significant contribution to the level of sexual violence. Model 2 suggests that this also occurs for census frequency, which Model 3 then rectifies with accounting for the rate for the first 15 years of education. For Models 4 through 6, fixed effects are taken into account. We see that for all fixed effect models, the RPE Agri variable becomes insignificant, whereas we observe a reversal for census frequency: for every increase of 1 percentage point in census frequency, the level of sexual violence decreases in a range from 1.5 of to almost double. This is especially the case for when we control for the rate of education: for every increase of 1 percentage point in census frequency, the level of sexual violence decreases by 2.16 percentage points!

Perhaps it is wise to use a visual aid to demonstrate the effect of census frequency in model 6, in comparison to that of agricultural

relative political capacity and the rate of education. Below is a graph that illustrates this. The red line is drawn at x = 0, and both variables *RPE Agri* and *EdScale15* are placed closely around this line. The only outlier is *CensFreq*, the confidence intervals extend as close as 1 whole percentage point
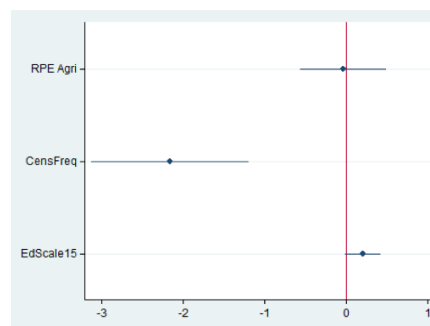
away from x = 0.

Next I collapse the different levels of sexual violence into a dummy variable, signifying "high" and "not high" sexual violence. The distinction is made for levels "3" and "4" of sexual violence, corresponding to "widespread reports of sexual violence" and "sexual violence used as a weapon of civil war". Levels "0", "1", and "2" thus correspond to "not high" sexual violence. By just using this dummy variable as a measure of sexual violence, we observe the following:

The only difference between model 1 and model 2 lies in the accounting of fixed effects: model 1 uses clusters by country code, whereas model 2 models fixed effects by including a dummy variable for each country (not shown in the Tables). As I regress on the dummy variable, the number of observations shrinks drastically, and yet we see that when including fixed effects, census frequency continues to be highly significant and with high substantive effect. As in the case above, I demonstrate this finding visually below:
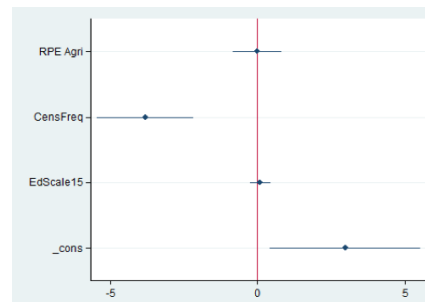
I expect this "high" sexual violence dummy variable – especially in light of the lack of previous research in the literature – to be highly correlated with civil war. This is because some argue that civil war is caused by high state weakness. I would thus not be surprised to find that high levels of sexual violence coincide with

VARIABLES	(1) High SV	(2) High SV
RPE Agriculture	-0.29 (0.25)	-0.02 (0.42)
Census Frequency	-0.41 (0.28)	-3.81*** (0.83)
Education Scale (15)	-0.16*** (0.03)	0.10 (0.18)
Fixed Effects	No	Yes
Observations	1,752	624

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

high levels of civil war, or perhaps civil conflict. I investigate this below. Models 1 and 2 use the variable of Butler (2016) for sexual violence, whereas models 3 and 4 use the dummy variable of "high" sexual violence that I created earlier. In addition to the variables used above, I account for the presence of civil war, the presence of civil conflict, and a country's polity2 score. Models 2 and 4 include fixed effects for each country, whereas models 1 and 3 are clustered by country code.

fixed effects, the variables for civil conflict and civil war lose all significance.

As is present in the other tables, I see that as soon as fixed effects are included, the measure of census frequency shows a high correlation to the level of sexual violence for both measures, the original Butler 2016 measure as well as my dummy variable. Model 4 is again visually demonstrated in a graph below, which suggests that the occurrence of civil war and civil conflict has a very limited correlation when considering that of

violence committed by its government security forces. Specifically, I find that census frequency significantly – both statistically and substantively – predicts the level of sexual violence in a country, rather than the occurrence of civil war or civil conflict. This is important evidence that suggests avenues for further study of sexual violence levels globally, regardless of the occurrence of civil war or civil conflict. Recent datasets measuring the occurrence of sexual violence before, during, and after civil conflict thus provide incomplete data, and instead an effort should be made to collect more and better data on sexual violence committed by government security forces.

VARIABLES	(1) SV Level	(2) SV Level	(3) High SV	(4) High SV
RPE Agriculture	-0.50**	-0.19	-0.13	-0.04
	(0.20)	(0.31)	(0.23)	(0.43)
Census Frequency	-0.06	-1.82***	-0.31	-4.17***
	(0.25)	(0.59)	(0.26)	(0.86)
Education Scale (15)	-0.13***	0.23*	-0.11***	0.13
	(0.04)	(0.14)	(0.04)	(0.18)
Civil Conflict	0.78***	-0.20	0.94***	0.64***
	(0.19)	(0.20)	(0.19)	(0.22)
Civil War	0.80**	-0.51	1.09***	0.25
	(0.35)	(0.38)	(0.33)	(0.33)
Polity2	-0.02	-0.02	-0.02	-0.05*
	(0.01)	(0.03)	(0.02)	(0.03)
Fixed Effects	No	Yes	No	Yes
Observations	1,729	1,103	1,729	599

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

As expected, civil conflict and civil war are highly correlated with "high" sexual violence. When comparing models 1 and 3, I see that civil conflict and civil war have a higher correlation with "high" sexual violence as a dummy variable than with the original measure for the level of sexual violence. This is also the case when considering the presence of civil conflict in models 2 and 4, when country fixed effects are taken into account, whereas this does not apply for the measure of civil war. When including

census frequency.

Conclusion

My findings suggest that the level of state weakness successfully predicts the level of sexual
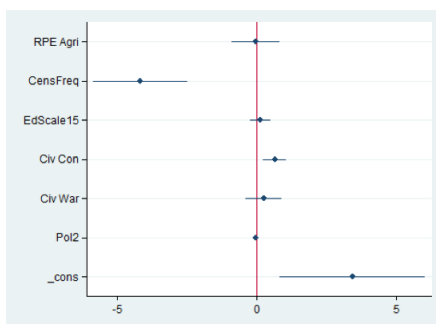
This finding suggests that the principal-agent argument, which suggests that government security forces commit crimes of sexual violence frequently in situations in which they believe they will remain unconnected to, or go unpunished for, their crime, holds across the globe, during times of peace and during times of civil war. Consequently, I conclude that <u>sexual violence should be considered a symptom of state weakness, like civil war, rather than a symptom of civil war</u>. The existence of literature on sexual violence is thus an important addition to the literature on state weakness, and further study is thus not only justified, but also necessary.

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Appendix

abbrev	isoshnm	Years	Civil conflict	Civil war	Rpe agri	Ed scale15	plow	gdp pc	pop	Pop dens	Census freq	polity2
AFG	AFGHANISTAN	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	2001-2011	1999-2011	1999-2011	1999-2011	1999-2000
ALB	ALBANIA	1999-2011	1999-2011	1999-2011	1999-2011		1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
ALG	ALGERIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
ANG	ANGOLA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
ARG	ARGENTINA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
ARM	ARMENIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
AUL	AUSTRALIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
AUS	AUSTRIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
AZE	AZERBAIJAN	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
BHM	BAHAMAS	1999-2011	1999-2011	1999-2011	1999-2011		1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	
BAH	BAHRAIN	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
BNG	BANGLADESH	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
BAR	BARBADOS	1999-2011	1999-2011	1999-2011	1999-2011		1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	
BLR	BELARUS	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
BEL	BELGIUM	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
BLZ	BELIZE	1999-2011	1999-2011	1999-2011	1999-2011		1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	
BEN	BENIN	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
BHU	BHUTAN	1999-2011	1999-2011	1999-2011	1999-2011		1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
BOL	BOLIVIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
BOS	BOSNIA AND HERZEGOVINA	1999-2011	1999-2011	1999-2011	1999-2011		1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	
BOT	BOTSWANA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
BRA	BRAZIL	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
BRU	BRUNEI DARUSSALAM	1999-2011	1999-2011	1999-2011			1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	
BUL	BULGARIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
BFO	BURKINA FASO	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
BUI	BURUNDI	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
CAM	CAMBODIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
CAO	CAMEROON	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
CAN	CANADA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
CAP	CAPE VERDE	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
CEN	CENTRAL AFRICAN REPUBLIC	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
CHA	CHAD	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
CHL	CHILE	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
CHN	CHINA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
COL	COLOMBIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011

COM	COMOROS	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
CON	CONGO	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
DRC	CONGO, THE DEMOCRATIC REPUBLIC	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
COS	COSTA RICA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
CRO	CROATIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
CDI	CTE D'IVOIRE	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
CUB	CUBA	1999-2011	1999-2011	1999-2011		1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
CYP	CYPRUS	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
CZR	CZECH REPUBLIC	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
DEN	DENMARK	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
DJI	DJIBOUTI	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
DOM	DOMINICAN REPUBLIC	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
ECU	ECUADOR	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
EGY	EGYPT	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
SAL	EL SALVADOR	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
EQG	EQUATORIAL GUINEA	1999-2011	1999-2011	1999-2011	1999-2011		1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
ERI	ERITREA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
EST	ESTONIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
ETH	ETHIOPIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
FIJ	FIJI	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
FIN	FINLAND	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
FRN	FRANCE	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
GAB	GABON	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
GAM	GAMBIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
GRG	GEORGIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
GMY	GERMANY	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
GHA	GHANA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
GRC	GREECE	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
GUA	GUATEMALA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
GUI	GUINEA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
GNB	GUINEA-BISSAU	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
GUY	GUYANA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
HAI	HAITI	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
HON	HONDURAS	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
HUN	HUNGARY	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
ICE	ICELAND	1999-2011	1999-2011	1999-2011	1999-2011		1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	
IND	INDIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011

INS	INDONESIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
IRN	IRAN, ISLAMIC REPUBLIC OF	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
IRQ	IRAQ	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	2004-2011	1999-2011	1999-2011	1999-2011	1999-2002, 2010-2011
IRE	IRELAND	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
ISR	ISRAEL	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
ITA	ITALY	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
JAM	JAMAICA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
JPN	JAPAN	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
JOR	JORDAN	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
KZK	KAZAKHSTAN	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
KEN	KENYA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
PRK	KOREA, DEMOCRATIC PEOPLE'S REP	1999-2011	1999-2011	1999-2011			1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	
ROK	KOREA, REPUBLIC OF	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
KUW	KUWAIT	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
KYR	KYRGYZSTAN	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
LAO	LAO PEOPLE'S DEMOCRATIC REPUBL	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
LAT	LATVIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
LEB	LEBANON	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	2005-2011
LES	LESOTHO	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
LBR	LIBERIA	1999-2011	1999-2011	1999-2011		1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
LIB	LIBYAN ARAB JAMAHIRIYA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
LIT	LITHUANIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
LUX	LUXEMBOURG	1999-2011	1999-2011	1999-2011	1999-2011		1999-2011	1999-2011	1999-2011	2000-2011	1999-2011	1999-2011
MAC	MACEDONIA, THE FORMER YUGOSLAV	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
MAG	MADAGASCAR	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
MAW	MALAWI	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
MAL	MALAYSIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
MAD	MALDIVES	1999-2011	1999-2011	1999-2011	1999-2011		1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	
MLI	MALI	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
MLT	MALTA	1999-2011	1999-2011	1999-2011	1999-2011		1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	
MAA	MAURITANIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
MAS	MAURITIUS	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
MEX	MEXICO	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
MLD	MOLDOVA, REPUBLIC OF	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
MON	MONGOLIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011

MOR	MOROCCO	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
MZM	MOZAMBIQUE	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
MYA	MYANMAR	1999-2011	1999-2011	1999-2011		1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
NAM	NAMIBIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
NEP	NEPAL	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
NTH	NETHERLANDS	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
NEW	NEW ZEALAND	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
NIC	NICARAGUA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
NIR	NIGER	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	
NIG	NIGERIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
NOR	NORWAY	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
OMA	OMAN	1999-2011	1999-2011	1999-2011	1999-2011		1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
PAK	PAKISTAN	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
PAN	PANAMA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
PNG	PAPUA NEW GUINEA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
PAR	PARAGUAY	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
PER	PERU	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
PHI	PHILIPPINES	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
POL	POLAND	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
POR	PORTUGAL	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
QAT	QATAR	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
ROM	ROMANIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
RUS	RUSSIAN FEDERATION	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
RWA	RWANDA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
SAU	SAUDI ARABIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
SEN	SENEGAL	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
SIE	SIERRA LEONE	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
SIN	SINGAPORE	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
SLO	SLOVAKIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
SLV	SLOVENIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
SOL	SOLOMON ISLANDS	1999-2011	1999-2011	1999-2011			1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2002, 2004-2011
SOM	SOMALIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	
SAF	SOUTH AFRICA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
SPN	SPAIN	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
SRI	SRI LANKA	1999-2011	1999-2011	1999-2011		1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
SUD	SUDAN	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
SUR	SURINAME	1999-2011	1999-2011	1999-2011	1999-2011		1999-2011	1999-2011	1999-2011	1999-2011	1999-2011

SWA	SWAZILAND	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
SWD	SWEDEN	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
SWZ	SWITZERLAND	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
SYR	SYRIAN ARAB REPUBLIC	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2007	1999-2011	1999-2011	1999-2011	1999-2011
TAW	TAIWAN, PROVINCE OF CHINA	1999-2011	1999-2011	1999-2011		1999-2005	1999-2011			1999-2011	1999-2011	
TAJ	TAJIKISTAN	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
TAZ	TANZANIA, UNITED REPUBLIC OF	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
THI	THAILAND	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
ETM	TIMOR-LESTE	2002-2011	2002-2011	2002-2011				2002-2011	2002-2011	2002-2011	2002-2011	
TOG	TOGO	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
TRI	TRINIDAD AND TOBAGO	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
TUN	TUNISIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
TUR	TURKEY	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
TKM	TURKMENISTAN	1999-2011	1999-2011	1999-2011		1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
UGA	UGANDA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
UKR	UKRAINE	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
UAE	UNITED ARAB EMIRATES	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
UKG	UNITED KINGDOM	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
URU	URUGUAY	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
UZB	UZBEKISTAN	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
VEN	VENEZUELA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
DRV	VIET NAM	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
YEM	YEMEN	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
YUG	Yugoslavia	1999-2011	1999-2011	1999-2011		1999-2010	1999-2011					
ZAM	ZAMBIA	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011
ZIM	ZIMBABWE	1999-2011	1999-2011	1999-2011	1999-2011	1999-2010	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011	1999-2011

Now What: Cimarronaje and Contextual Identity in Spanish South America

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For an enslaved person in colonial South America, running away and becoming a *cimarrón* was a daunting possibility. To mitigate the dangers inherent to *cimarronaje*, escaped slaves often formed communities in the regions beyond Spanish dominion. Success in providing protection was by no means a guarantee; in order for these communities to survive long-term, their members needed to negotiate individual and group identities in relation to the Spanish, Indigenous, and other surrounding Afro-American groups. Analysis of *cimarrón* accounts reveals patterns of strategic employment of diplomatic, military, and rhetorical tactics when negotiating identity in this fashion. A community's skill and priorities when employing these tactics—as well as which groups it chose to engage with—would ultimately determine its success or failure in attaining safety for its members.

Such tactics of intentional self-representation are on full display in the 1586 letter to the Crown written by *cimarrón* leader Alonso de Illescas. De Illescas uses a variety of rhetorical strategies to encourage the recipient to employ his services in pacifying the region. De Illescas simultaneously dances around both veiled threats of military resistance and continued rebellion against the Crown should his "requests" not be met. The letter, which references contemporary events in the *Audiencia* of Quito, indicates a much higher degree of political awareness than one might ordinarily expect given de Illescas' position of relative isolation from Spanish American society. In fact, between his command of the Spanish language, knowledge of colonial proceedings, and concentration on himself over other members of his community, it reads very much like any contemporary Spanish appeal to the Crown, rather than a missive drafted in the jungles of the Esmeraldas region of what is now Ecuador.

Some of these conventions are likely the work of the Trinitarian friar Alonso de Espinosa, who was sent on a military mission to conquer the *cimarrón* population in 1583, but later partially defected. He developed sympathies for the rebels and stayed with them for years.[1] Regardless of who actually wrote the letter, it serves as an excellent piece of evidence for de Illescas' understanding of not only the sociopolitical realities of the world with which he was communicating, but also the man's (or his group's) ability to situationally construct a persona to achieve a specific purpose—in this case, to gain the favor of the Crown.

In creating this rhetorical persona, the author of the letter employs a variety of strategies. Of these, the most notable is a language of religious submission and loyal supplication which de Illescas uses in order to emphasize both his willingness to serve the Spanish monarchs and the appeal of the offer he is presenting to them. This rhetorical strategy can be seen in the Maroon's demands of the Crown. In exchange for doing "all in [his] power" ("*todo cuanto en [su] fuse*") to "bring peace to" ("*traer de paz*") the natives of the region, de Illescas wanted several things. First, and probably most intuitively, he wanted a pardon for the illicit activities he undertook while resisting colonial rule. Second, he wanted to oversee the two indigenous villages he would establish in the name of the Crown. Third, and most notably, he requested that a priest be sent "to preach to us the Holy Gospel and teach our women and children" ("*que nos predicase el Santo Evangelio y enseñase [a] nuestros hijos y mujeres*").[2] On the surface, this request is a simple one: de Illescas expressing a desire that his community—specifically the women and children—gains access to religious education and materials. This understanding is complicated by the fact that by the time this letter was penned, de Illescas

and his fellow Maroons had had a priest living among them for years. This would certainly have been enough time for the women and children in the community to have been instructed in the catechism and even, if they so desired, to have received sacraments. As a result, this request ought not to be read simply as an expression of a sincere desire to acquire an education in the teachings of Christ. It can instead be seen as an attempt to gain political legitimacy through conversion to Christianity. By performatively subscribing to the religion of the Spanish Empire, de Illescas would have been able to present himself as an evangelizing—and therefore civilizing—influence in the yet to be tamed region of Esmeraldas.

Such understanding of the political connotations of conversion to Christianity is notable in several ways. First, it shows diplomatic ability. De Illescas was not the leader of this Maroon group due solely to dumb luck or brute force (although those absolutely could have been factors in de Illescas' ascent to power). Rather, he was the group's leader because he had a decent understanding of the political climate in which the Maroons found themselves in addition to an adaptability to changing circumstances. This fact is illustrated by the sheer existence of this letter. Second, and more importantly, it suggests that modes of discourse in Spanish America were spread broadly across the continents spanned by the empire. This discursive diffusion can be seen by the influences of the *probanza* genre on this letter. In other cases, *probanzas*

de mérito (literally, proofs of merit) were letters written to the Crown "to petition for rewards in the form of offices, titles, and pensions."[3] One of the best examples of the form can be seen in the first letter that Christopher Columbus sent to the Crown upon his arrival in the Americas. Columbus frequently ascribes the actions of a group to himself, as in his description of his trip across the Atlantic:

> "I crossed [to the indies] in thirty-three days after departing from your kingdoms; for fourteen of those thirty-three I was becalmed and made little progress. I found people without number and very many islands, of which I took possession in Your Highnesses' name…"[4]

While Columbus' description of events is no doubt technically true, he did not cross an ocean by himself. Rather, he had a crew of sailors who crossed with him, were becalmed with him, and helped in the "finding" of people and islands in the New World. Columbus' omission of the details of their contribution is not accidental; he is focusing on himself in order to gain a personal reward from the Crown.

Similar usage of the self-glorifying first-person singular can be seen throughout de Illescas' letter as well: from his description of his own role in the production of the letter (it is described as having been delivered "for me and in my name") to his description of the role other Esmeraldas Maroons will play once he has bent the knee to

Spanish authority ("I will settle them near the sea in the best place possible").[5] In both of these phrases, as in the rest of the letter, de Illescas is characterized as the sole decision-maker in his community. Without context, a reader would likely assume that he alone determines where the members of his community can live and that he wrote this letter himself, without outside aid or consulting his community. This self-interest serves a dual purpose; it provides an easy figure with whom the Crown can negotiate and emphasizes the power of that figure.

In studying Columbus' letter to the Crown beside that of de Illescas, familiar phrases begin to emerge. The words "I" and "my," for example, appear repeatedly in both of their writings, where they are generally used to condense the actions or decisions of a group into those of one man. While Columbus' use of the form was a rhetorical effort to gain a personal reward from the Crown, de Illescas' goal in employing this format was almost certainly less self-serving. It seems as though his centering of himself was more a nod to convention: when one writes to the Crown, one opens with *"Muy Poderoso Señor"*; when one asks a favor, they do so on behalf of themselves, not their community. The idea that de Illescas was writing to the Crown in order to secure a personal reward at the detriment of his community can be discarded by a look at his requests; he asks for a suspension of hostilities and does not ask for a specific title (in contrast with Columbus, who at one point asks that his son be made a

Cardinal).[6] This is not to say that the projection of power was not a consideration in the composition of the letter, but rather that such a projection was likely intended to benefit the community as a whole, rather than simply the man whose power was being projected. The fact that de Illescas' letter focused more on community benefit than Columbus' did makes sense given the different structures of governance between the two groups. For Columbus and his crew, their relationship was clear: the Crown had given Columbus a mandate, and they were to obey his orders or be considered criminals. On the other hand, the power structures for the Esmeraldas Maroons were almost certainly more ambiguous.

Among Maroon communities, there were always questions of leadership that needed to be resolved. Lacking predetermined rulers or existing political structures, there were often attempts to recreate those of the central or west African societies from which members of a given community had been forcefully taken.[7] The issue with organizing Maroon society in this way was that it was inherently a mosaic culture. The people who would be constituting such a society came from different tribes and disparate regions of Africa and, as such, did not have any one unifying justice system or structure of government.[8] To further complicate the matter, *cimarrones* would often occupy similar spaces as Amerindians, who could be integral to the structure of *cimarrón* society (as seems to have been the case in Esmeraldas). Ultimately, though,

political leadership among *cimarrones* in what would become Gran Colombia (and most likely elsewhere in Latin America) was largely constituted as a function of skill and, to a lesser but not insignificant degree, of popular support.

The vital importance of such popular support can be seen by studying the *palenque* of Limón, located outside Cartagena, in the first half of the seventeenth century. Started around 1580 by runaway slaves, it had become a significant disruption to the Spanish system in Cartagena by the early 1630s. A warlike community, Limón would frequently launch raids on nearby ranches. In the words of Kathryn Joy McKnight, the community's soldiers "stole livestock, burned buildings, killed Spaniards, and attacked and killed many of the residents of the Indian town of Chambacú."[9] The colonial administration, naturally, did not take kindly to this. McKnight continues, "on December 9, 1633, Spanish soldiers responded with an assault on the *palenque* and eventually captured eighty or more community members whom they put on trial and punished." The testimony of these captured Maroons, thirteen of whom were executed, provides an engaging account of the political happenings of the Limón *palenque*, its interactions with other *cimarrón* communities, and its attitudes towards military power. The words of one Maroon in particular, Juan de la Mar, stand out due to his elucidation of the power structure of the *palenque*. In it, he describes the queen of the community at the time of the

attacks as having had

"some devil [put] into her head, because from then on she began to command. And everyone obeyed her, even the captain and the commander, because something happened to her…that made her walk like a crazy woman, falling down and beating about her before she spoke…"

(*"algún diablo en la cabeza, porque desde entonces empezó a mandar. Y todos le obedecían, hasta el capitan y mandador porque le daba una cosa…que le hacía como loca, dando caídas y golpes primero que hablase…"*)[10]

This segment of his testimony is revealing for a number of reasons. First, it alludes to the presence of separate military and civilian authorities, each with their own hierarchies. The captain, Francisco *Criollo*, and the commander, Simón, seem to have been at the top of the military chain of command, while Queen Leonor seems to have been more of a civilian authority figure. This can be deduced from de la Mar not recounting her having a weapon like he does the other two. As the queen, however, Leonor was an authority above either the captain or the commander. De la Mar's testimony makes it seem as though this state of civilian governance was unusual for the *palenque*; he comments on both the captain and the commander having obeyed Leonor's commands as something noteworthy rather than simply the standard operating procedure. It also alludes to a history of dissent and

rebellion within the *palenque.* The implicit possibility of their disobedience towards Leonor indicates a possibility of meaningful dissent against authority in Maroon communities that, while technically present, would have been more difficult to engage within the much more strictly regimented Spanish American society. Indeed, it seems likely from this quote that, had the queen not been seemingly possessed by a higher power, her rule would have been contested significantly and that de la Mar would have been one of those contesting it.

One factor contributing to this possibility for dissent was likely the relatively small size of these communities: according to one estimate, the combined population of all the *palenques* outside Cartagena in the mid-17th century was only about 3,000 people, indicating that the population of Limón was likely only a fraction of that.[11] Similarly, in Esmeraldas, population estimates circa 1600 counted only around 207 people in the de Illescas clan's sphere of influence.[12] It is unsurprising, given these numbers, that a semi-democratic form of governance developed. For the leader of a *palenque* to make unilateral decisions in the same manner as the Spanish Crown was to risk being overthrown and replaced by someone more willing to accede to group demands.

In addition to showing a possibility for dissent, de la Mar's testimony is revealing in its use of religious rhetoric. His use of the word *diablo* (devil) in his description of the source of Leonor's legitimacy as a ruler, for instance, serves as evidence of his engagement in the process of contextual identity formation in response to his capture by Spanish authorities. By using this word, he is creating a narrative of a community wherein a cruel tyrant has seized power by demonic possession. In this narrative, the *palenque*'s negative or violent actions during Leonor's rule become the work of Satan; the attack on Chambacú ceases to be about increasing manpower or replenishing resources and instead becomes a random attack inspired by the devil. Similarly, the act of human sacrifice de la Mar recounts is framed not as honoring an alternative God to that of Catholicism but rather as worshipping the devil. By placing himself in opposition to Leonor's rule, de la Mar is thus emphasizing his own Catholicism. Through his framing of the *palenque* as a demonic space and of himself as a devout Christian, helpless to oppose the evils being enacted, he displays an understanding on his part of the dire situation he is in as a captive of the colonial government as well as an apparent desire to survive his interrogation.

By cooperating and giving his captors the information they desire while simultaneously placing himself in opposition to the actions he describes, Juan de la Mar is creating an identity for himself as a silent objector to the atrocities committed by Leonor and the other inhabitants of the *palenque.* Now that he has been captured, he can finally give voice to his qualms about the way the community was run—or so he would have the Spanish believe.

The purpose of this instance of self-fashioning differs significantly from that embodied by de Illescas' letter, but the means of doing so are similar; de la Mar and de Illescas both tell the Spanish what they think the latter wants to hear in the pursuit of a specific goal. Neither man ultimately succeeded in his goal; De Illescas' letter was essentially discarded, while de la Mar was sentenced to death following the collection of his testimony. This failure, however, does not necessarily speak to the efficacy of their efforts at self-fashioning as a whole because Maroons also engaged in identity creation in relation to groups other than the Spanish.

Whenever a Maroon community engaged with an external group, the community and the members within it needed to determine how to present themselves. Both de Illescas' group in Esmeraldas and the Limón *palenque* underwent this process, and the results can be viewed through their documented interactions with other Afro-American and indigenous communities in their respective regions. Both cases, while very different, reveal a significant amount about each community's attitudes towards and understanding of their positions in relation to outside groups. For Limón, this relationship was simple; they were the dominant *palenque* in terms of military force, and they were willing to expand their power by raiding other communities indiscriminately for resources and slaves. This intentionally created an identity as a predatory expan-

sionist power that was expressed not through rhetorical choices, but rather through action, as can be seen in their interactions with local Spanish and indigenous groups. The *palenque*'s specific attitude is expressed through their choice of individuals to ritually sacrifice: "the steward and his son and the Indian man and woman" ("*el mayordomo y a un niño hio suyo y a un [i]ndio y [a] una india.*")[13] In capturing two white Spaniards as well as two indigenous individuals, the warriors of the *palenque* were not showing a preference for either as sacrifices. The lack of partiality seen here also applied to their choice of targets for broader attacks: in addition to Spanish-owned properties like the one where they found their sacrifices, they were also willing to raid Amerindian villages such as Chambacú.

This sort of lumping together of the two groups could be due to any of a multitude of factors, but a likely explanation is that the Spanish and the specific indigenous groups the *palenque* attacked were closely linked. This linkage is visible in the fact that the people of Chambacú were in a village at all. It is also evidenced by the readiness of the town's *encomendero*—the man who held the right to direct the village's labor—to pay the village to attack *Limón*.[14] Thus, in this specific attack, we see a strategic element to the killing of Amerindians. There seems to have been, however, no significant documented resistance to the idea of attacking the indigenous village on the grounds of the residents not identifying as Spaniards. Thus,

the potentially strategic aspect of the attack serves to complicate, but not invalidate, the idea that the *palenque* of Limón did not differentiate between the Spanish and local indigenous groups when choosing a target for an assault.

This lack of differentiation, however, did not extend to other Afro-American communities. This is visible in the testimony of Sebastián Anchico, a black servant in the Limón *palenque.* Anchico describes warriors from Limón as having snuck into the Polín *palenque* while those of Polín were sleeping "to bring them to their *palenque.* And because they did not want to go, they took away their arrows and wounded them, and tied them up and carried them to Limón to work" (*para llevarlos a su palenque. Y porque no querían ir, les quitaban flechas, y los hicieron, y amararon, y los llevaron al Limón para que trabajaran*).[15] This military operation, in short, was undertaken to acquire captive workers (like Anchico himself), rather than human sacrifices. Juan de la Mar adds detail to Sebastián's words, establishing that the *palenque* distinguished between "*negros*" (blacks) who joined the community willingly and those who, like Anchico, were taken and put to work unwillingly.[16] This shows a degree of image-consciousness on the part of the *palenque*'s leadership; they wanted to encourage people to run away and join their community, but they were also not afraid to profit from the human spoils of their military victories over other Afro-American communities.

Thus, there appears to have been no significant sense of pan-Afro-American nationalism among the *palenques* surrounding Cartagena at this time. There was instead a great degree of micro-patriotism in which each community was loyal to its own and competed with the others for resources and members. The strong, like Limón, conquered the weak, like Polín.

This was not the case in Esmeraldas, where there existed two distinct dominant Afro-American communities who seem to have lived in relative harmony. The first group in the region, as we have seen, is that of de Illescas. The second (although chronologically marooned first around the year 1545) was led by Andrés Mangache, an African man who escaped slavery in a similar way as de Illescas; he was shipwrecked on the northern coast of what is today Ecuador.[17] The groups founded by these two men interacted many times during the remainder of the century, often working together to accomplish similar goals. Indeed, Mangache himself went with Fray Espinosa to Quito to deliver de Illescas' 1586 letter.[18] That Mangache, rather than de Illescas, risked his life traveling into Spanish territory seems to indicate that, of the two, de Illescas was accepted as the one incharge: a fact which can likely be attributed to his greater understanding of and degree of experience with Spanish society rather than to any kind of broader claims to monarchical right to power. The absence of a hereditary monarchical authority governing both groups is clarified by the fact that, once peace was finally made

and the second generation of Esmeraldas Maroons went to Quito to have their portraits painted, it was not de Illescas' son who took center stage in the picture. Rather, the painting depicts Mangache's son, Francisco de Arobe, flanked by two sons of his own: the de Illescas family nowhere to be seen.[19]

This separation of the two communities was not necessarily unusual; there are numerous accounts of both the Mangache-Arobe and the de Illescas tribes existing independently of one another. The Mangache-Arobes, for example, appear to have offered aid to would-be Esmeraldas governor Diego Lopez de Zuñiga's expedition independently of the de Illescas clan.[20] Similarly, de Illescas initially spoke to Mercedarian friar Miguel Cabello de Balboa separately from the Mangache-Arobes.[21] To further complicate matters, there seems to have been more than just these two groups present in the region; Kris Lane recounts Lopez de Zuñiga's meeting with a "mulatto man" who spoke through an interpreter and seemed to control a settlement of "nine or ten thatch-roofed dwellings."[22] The fact that he required an interpreter shows that he was neither Mangache nor de Illescas, both of whom seem to have been able to speak Spanish (albeit at different skill levels). The two men were not the totality of African leadership in Esmeraldas, only its best-documented instances.

Ultimately de Illescas and Mangache's acquaintance seems to have been one of political convenience; they came together to project strength to the Spanish, but they were ultimately a part of different communities. In stark contrast with Limón's relationship with its neighboring *palenques*, the default state of the two communities was polite, respectful separation. There is no evidence of serious conflict ever arising between the two Maroon groups of the Esmeraldas region.

Such positivity also seems to have characterized their relations with the local Nigua indigenous population. De Illescas married and had children with the daughter of a Nigua cacique, creating a space for himself and his fellow Maroons within the pre-existing indigenous power structure.[23] This space was quite a powerful one; the aforementioned friar Miguel de Cabello Balboa recalls being "sensed by the natives" who then "gave notice of [him and his group] to the blacks, who then came to us from a river below in a great canoe and three rafts filled with many Indians outfitted for war…"[24] Cabello Balboa goes on to describe his encounter with de Illescas, "the black man who was captain of the rest." This account makes it very clear that de Illescas' relationship with the Nigua people was positive; he had enough authority over them to lead a large group of warriors into a potential combat situation. This indicates that, on some level, de Illescas had been accepted into Nigua society as an important figure.

With Cabello Balboa, de Illescas appears to have very intentionally used the power lent to him by his status to portray an image of a unified front of black and indigenous Americans willing, despite their strength, to accept Spanish authority and the Catholic faith. He agreed to the establishment of a Spanish settlement and even "donated almost one hundred pesos worth of gold dust for the adornment of the new chapel."[25] This display of strength served to underscore the importance of the submission that accompanied it. It was not some defeated cacique bowing down before his conqueror but rather a strong leader choosing to allow himself and his people to be incorporated into Spanish society.

This kind of intentional construction of identity and image was vital for *cimarrón* communities. As mosaic societies, they were constantly relitigating not only their own identities but also their relationships with external groups. The choices made by *cimarrones* on both the individual and the group level could have far-reaching consequences; Leonor's decision to position herself and her community in opposition not only to Spanish rule but also to local indigenous communities ultimately led to a raid that culminated in Limón's dissolution, although she and the other leaders managed to escape. De Illescas (and his descendants), on the other hand, established good relations with the local Nigua community and as a result, had the means to resist Spanish attempts to "pacify" them.

These contrasting examples—one ending in disaster, the other in the maintenance of autonomy—show, first and foremost, the degree of agency possessed by *cimarrones*. Their survival

depended almost entirely upon their own choices. From Sebastián Anchico giving testimony to the Spanish authorities to the *Esmeraldas* Maroons submitting before Spanish Catholicism, every choice was intentional and meaningful. Sometimes their choices did not determine the outcome of events; Anchico's execution, for instance, was the result of a draconian slave code that had him marked for death before he ever took the stand. However, the way *cimarrones* used this agency with regard to external groups overall was the fundamental factor in a community's success or failure in ensuring safety for its members. It was this agency that led to both Leonor's violent rule and the Esmeraldas community's close relationship with the native people of the region. While both communities were defined by their relationships with and actions towards the nearby indigenous populations, the agency required to form such relationships and undertake such actions was foundational for such a definition. Thus, the manner in which a community employed its agency throughout the process of forming relationships with surrounding groups—especially indigenous groups—determined its ability to effectively resist Spanish domination.

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Experiential Motifs at the Interface of Gender and Workshop

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Introduction

Gender inequality has dominated human civilization since its emergence, affecting familial and religious life, the workplace, and education. Throughout years of research, the source of this imbalance has been a subject of continued inquiry. Sax and Harper report that most behavioral inconsistencies and differences in experience across gender result from pre-college factors. Among those most relevant to educational experience, they showed that women demonstrate greater anxiety over GPA-maintenance (despite having higher GPAs than men on average), more consistently feel overwhelmed, have lower self-reported emotional health, and identify less strongly with the roles of leader and scholar as compared to men of the same peer group.[1] These differences in expectation and self-image manifest in a "chilly climate" of iniquity toward women in collaborative collegiate environments, as Hall and Sandler detail.[2] They describe behaviors such as instructors' favoritism toward men, devaluing statements, sexist humor, and gender-biased language. Whitt et al. show that the ramifications of such environments for women, including a negative perception of the comprehension of science,

can persist throughout the entire college experience.[3] In small group settings, the quality of the experience has even been shown to have a marked effect on retention in STEM curricula, especially for minority students.[4] This phenomenon suggests that differences in educational experience across gender results from an ongoing intersection of established personality traits, peer-peer interactions, and peer-instructor interactions. In addition to the behaviors described by Sax and Hall[1,2], a small number of other studies have targeted the nature of peer-peer relationships on the basis of group gender dynamic. For instance, Krupnick concludes from videotapes of classroom settings at Harvard that there is a fundamental difference in the conversational style of men and women, the former more assertive and adversarial; the latter more "egalitarian," resulting in significantly reduced participation for women.[5] Chen et al. also focused on gender composition as a contributing factor to differential experiences, examining both participation and comfort among the same cohort of students surveyed in this study. They report that students attest (across survey score aggregates) to greater comfort in the company of their own gender but that women's participation has a greater dependence

on Workshop (PLTL small-group instruction[6]) gender composition and that they view gender composition as a more important deterministic factor in Workshop experience.[7] However, on average, female students pointed to a balanced gender composition as the optimum for maximizing both comfort and participation.[7] On the impact of instructor gender, Karp and Yoels reveal such biases as male instructors preferentially calling on men and failing to incorporate women's argumentative threads into discussion.[8] In environments led by female instructors, participation from men and women was far better balanced, and self-reported comfort significantly improved among female students.[8] Further research has shown that students' perception of their instructors is significantly correlated with gender compatibility.[9]

One of the foremost goals of educational research by teaching assistants is to gain insight into the factors that coalesce in Workshop to affect students' experiences, whether social, emotional, or pedagogical. With knowledge of the existing issues for women in STEM education, as well as the evidence of preference for values of the gender parameter of collaborative learning in the same cohort presented by Chen et al., it

is reasonable to suspect that students have concrete experiences that underlie their perceived optima for effective teamwork and intellectual growth.[7] The goal of the present study is to assess the prevalence and strength of gender preference among members of a cohort with one semester of Workshop exposure and then to allow them to describe the anecdotal rationale for their preferences in their own words. The conventional presentation of students' perspectives as a series of data points gathered via survey is limited in that it does not give them the chance to discuss how they feel about their encounters or their personal views on remedying detrimental aspects of the educational environment. Thus, in the format used here, experiential motifs for positive and negative formative interactions might be more clearly understood and later more effectively encouraged and mitigated by instructors and Workshop leaders, respectively.

Methods

A survey was administered over a period of three weeks (Feb. 16 - March 9, 2018) to a cohort of 33 students enrolled in the second semester of a freshman organic chemistry sequence. After first asking for the participant's gender identity, the questions solicited their preference for the gender composition of a Workshop (multiple choice), the reason for this preference (free response), any experiences that they had or had heard of that supported these reasons (free response), and their outlook (positive, negative, or neutral) on the change in Workshop gender composition from the first to second semester (multiple choice). An analogous series of questions were then posed regarding the gender of the Workshop leader. Twenty-six complete survey responses were collected (78.8 percent response rate), including 9 women of 13 in the class (35 percent of respondents, 69 percent response rate from gender identity group) and 17 men of 20 in the class (65 percent of respondents, 85 percent response rate from gender identity group). Due to the small sample size, only qualitative descriptive statistics could be analyzed for the data collected. To correct for the survey bias toward men, the raw response value totals for each prompt were normalized according to the following protocol:

$$\text{Women: corrected} = \text{raw} \times \frac{1}{0.35}$$

$$\text{Men: corrected} = \text{raw} \times \frac{1}{0.65}$$

Results & Discussion

Workshop Gender Composition (WGC)

Numerical Data

The data displayed in Figures 1 and 2 support the findings of Chen et al. regarding views on optimal Workshop gender composition (WGC) across the entire cohort and within gender groups. Considering the entire group, most students (16 of 26; 61.5 percent) preferred an equal number of men and women in their Workshops (1a). Figure 2a shows the reemergence of students preferring the company of their own gender when examined within gender groups, with only 27.1 percent of those in favor of more men than women actually being women, contrary to 84.8 percent of women in favor of more women than men. Additionally, 27.4 percent more women than men favored more women than men, as opposed to 18.3 percent more men preferring more men than women (Figure 2b). Even with normalization, men still contribute more strongly to the plurality favoring an equal number of men and women in Workshop than do women, contributing 54.2 percent of preference compared to 45.8 percent from women (Figure 2 2a). Again, this corroborates the previous semester's conclusions. Since women appear to view WGC as a more deterministic factor on quality and comfort than men,[7] it is logical that even if the majority of women prefers a balanced WGC, it would contribute to this contingent in a lesser fashion than men, as the equality imparted by female dominance would be more important as a deterrent to the possible negative alternatives.[2,5]

Students' perspectives from both semesters on changes in WGC from the first to the second semester were also assessed, both across types of changes and student's opinions on the impact of these changes on the quality of their Workshop experience. Figure 3a shows that men and women were fairly evenly matched in their categorical reactions to different types of WGC changes, with one notable exception: the only respondents reacting negatively to a decrease in the representation of women were women themselves. Once more,

this suggests that women are more sensitive to changes in their own representation in the small-group setting and view gender compatibility with collaborators as a more important determinant of Workshop outcomes; no gender differences were observed for positive reactions to a decrease in female representation. This may indicate differences in self-efficacy among men and women. Namely, that due to the existing climate of gender-biased treatment,[2] women may depend more on the perceived support of other women for a positive outlook on a change in WGC. However, Figure 3b reveals an important aspect of student perspective. The majority of students (73.1 percent) had a neutral outlook on changes in their WGC, which suggests that, as a whole, speculations based on preferences and even experiences from the past semester appear less relevant than formative experiences within the new Workshop itself. Students seem to view their own agency in acclimating to a novel environment and WGC as more important than any possible deterministic factors, which is

vital to developing strategies that enhance comfort and productivity, work with students' strengths, and do not overplay the role of gender in a Workshop's success.

Free-Response Data: Themes

Ensuring comfort for all members

In my experience, people feel more comfortable around others of the same gender and tend to group off like that. (female respondent)

...as a result, he prefers to interact in groups that are composed of at least one female as he feels that this undercurrent among the other males of having to prove themselves as the 'alpha male' is much less when at least one female is present. (female respondent)

I feel like I may connect with men and women in different ways, so that with an equal proportion of men and women in Workshop, the group dynamic will be more balanced. (male respondent)

Students who favor equal representation of women and men in Workshop commonly remark on the importance of allowing both genders to reap the benefits

of compatibility. It is clear that the students are aware of the potential detriment arising from unbalanced WGC, especially with regard to damaging male behaviors. However, they still acknowledge that each member, gender identity notwithstanding, can benefit both from the company of their own gender and from the cross-gender, understanding that development as a result of heterogeneous WGC. This supports the finding of Chen et al. that while individual preferences tend toward same-gender companions, comfort and participation are maximized with an equal number of men and women.[7]

Expectations and consistency for behavior patterns

I've noticed that when I need help on homework in a class (any class), I typically consult with females for a clearer explanation. And they don't get frustrated by my endless questions for more clarity. Maybe females share similar mental models? (female respondent)

I tend to feel like women are able to act more collaborative (rather than competitive) so more women

Totals
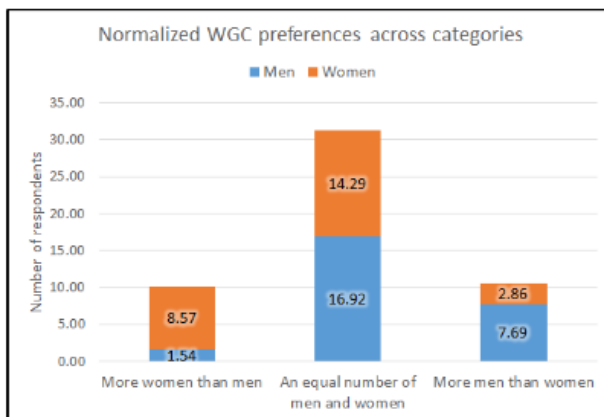
(a) By composition types
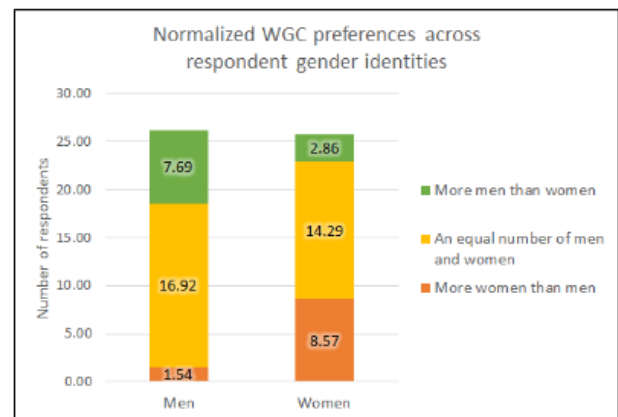
(b) By respondent gender identity

Figure 1: WGC preference across composition types and respondent gender identity

than men generally provides a more welcoming environment. (female respondent)

When I was working in a group of only guys in a calc [workshop], people started to just make their way through the work without discussing, which really wasn't productive for a Workshop setting. (male respondent)

It makes the getting to know people less awkward. As time passes in the semester it matters less and less. (male respondent)

It's not a strong preference and there was no option for 'gender composition does not matter to me.' I think maybe I just know more of the boys. (female respondent)

My first Workshop was all guys, so I just like consistency. (male respondent)

The majority of students reporting a preference either for more men than women or more women than men highlighted some known issues presented in the existing literature.[2,3,9] Mainly, it appears that they have observed that women tend to maintain discussion and avoid argument more effectively than men in a small-group environment, as well as better emotional support and mutual consideration - all elements of a successful Workshop experience. At the same time, however, the *anticipated* ease with which the students can become familiar seems inherently greater for people of the same gender, which directly impacts students' attitudes in their initial encounters with a new group. Overall, students prioritize having reasonable expectations for how they will meet their educational and sociological needs while they adjust to an unfamiliar WGC. Even so, these factors appear to have more influence over the impression created by a new WGC rather than its long-term outcomes, as one student pointed out. This calls attention to the notion that students' preferences and expectations for a Workshop may appreciably differ from their perception of its quality *in practice* as they have more formative experiences with the progression of time. For instance, Chen et al. found that while WGC preferences clearly align with gender compatibility, self-reported comfort and participation were highest, on average, in groups with equal numbers of men and women.[7]

Respect and familiarity among members

I think that the largest factor on my comfort level and participation in Workshop is my comfort level and relationship with the other people in my Workshop which is based on personality and not gender identity. I am much more willing to share my ideas when I am among people who I consider friends and who I know will not be annoyed by me sharing my input. (female respondent)

...more diverse group projects as far as gender resulted in smoother, more efficient work. (male respondent)
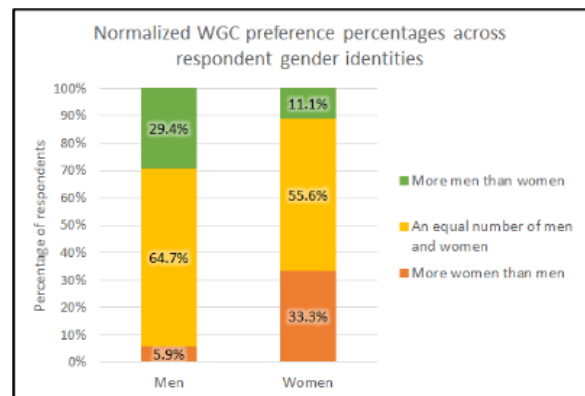
Last semester, the number of men and women was equal and I just felt like we worked well together. It was a positive experience. (male respondent)

I believe (from personal experience and discussions with other friends) that for Workshop composition, it would be best if a

Percentages
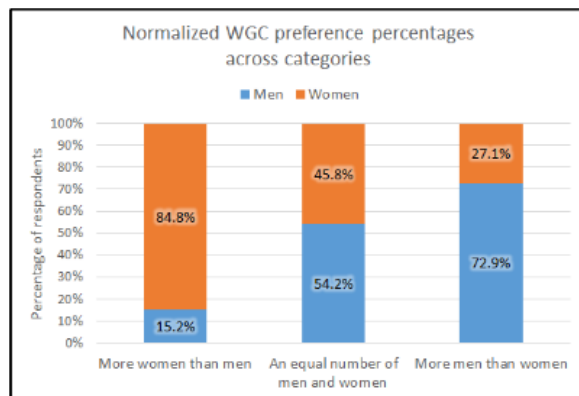
(a) By composition types

(b) By respondent gender identity

Figure 2: WGC preference across composition types and respondent gender identities by percentage

Perspectives on Change
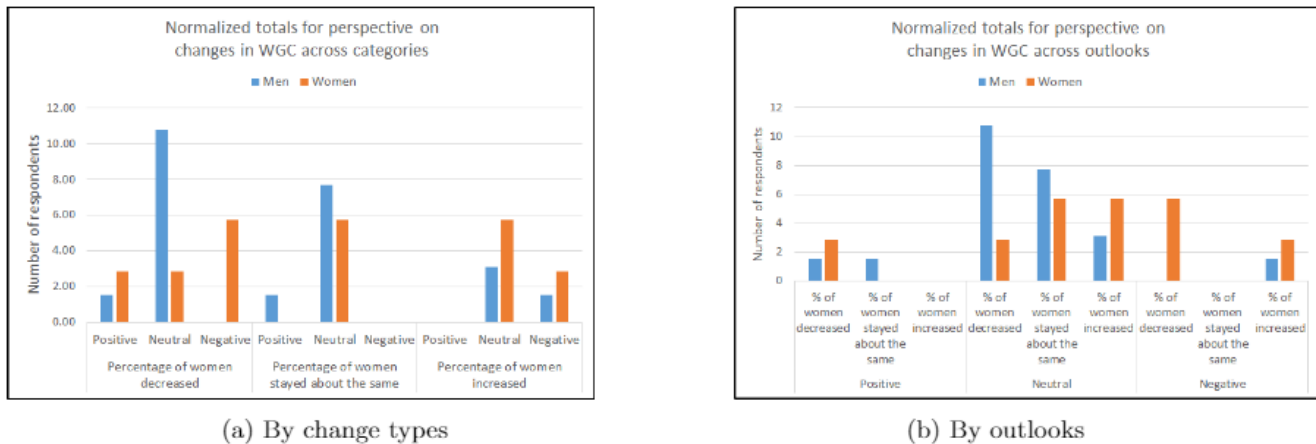

(a) By change types

(b) By outlooks

Figure 3: Perspectives on changes in WGC from first to second semester

Workshop group was not made up entirely of females or entirely of males. And since I personally do not have a preference of whether or not I am the only girl in an otherwise all-male group, I think that even a very skewed but still not homogeneous gender composition would be preferable for a Workshop rather than a completely homogeneous Workshop and that the degree of skew is irrelevant. (female respondent)

Preconceptions about the sociological consequences of a particular WGC seem to primarily deal with negative formative experiences early in the process of adjusting to a new team of peers. The overlap between this cohort's reports of destructive behaviors and the existing motifs presented in the current body of literature includes frequent interruptions, poor communication or facility of discussion, differential responses to leadership, low participation due to caution or trepidation, and an inability to deal with group issues such as grade stress or differences in opinion. All of these appear within Tuckman's two earliest phases of small-group development,[10] and while gender representation has not been shown to influence a group's ability to progress through developmental stages,[11] neither of these studies actually consulted the subjects for their perceptions of the role of gender in early formative experiences. But it is reasonable to suspect from the results obtained here that surface realizations of team-building behavioral issues have an anticipatory component of gender interaction *initially*. Unfortunately, because of the diversity in individual students' views on the optimal Workshop environment, this idea does not point to a particular strategy for controlling WGC in the beginning weeks of the semester. For instance, one woman might prefer the emotional transparency and feeling of mutual support expected from a team comprised of other women, while another might appreciate the assertiveness and focus expected from one dominated by men. Only through a pre-Workshop assignment survey could such preferences be understood, and even then subjecting students to an inquiry about gender preferences at the beginning of the semester would portray WGC as excessively deterministic and cause more harm than good for college students from an ever-more egalitarian generation.

Throughout the administration of the survey, many of the participants voiced concern over the lack of an option for "WGC doesn't matter to me" in the preliminary multiple-choice questions. This manifested in several responses, for participants reporting preferences for both balanced and skewed WGCs, writing "N/A," "no preference," etc., and while devoid of experiential data, these are useful when considered alongside the selected responses above. Students recognize how peers transition from operating on preconception to relating to one another on the basis of current experiential motifs: how respectfully Workshop members treat each other, how familiar or friendly they are with one another, or how many positive

and negative experiences in discussion of Workshop problems they have with one another. Some students may not even consider the influence of gender composition, seeking to look past demographics and initiate relationships immediately. Still others may express a lack of preference out of deference to their independent ability to create success even if they believe that other students do operate on expectations of gender norms. If any deterministic factor exists beyond the control of the instructor, Workshop leader, or students, it is not WGC, but rather the particular combination of personality types present. In other words, while expectation informs acclimation at the beginning, how members actually treat each other, regardless of gender, is most important in promoting the collaborative success of a Workshop.

Workshop Leader Gender (WLG)

Numerical Data

Figures 4 and 5 display the preference data, aggregate and by percentage, for Workshop leader gender (WLG) after normalization. Overall, the data show a mild trend of preference for compatibility among student gender and WLG. Among those preferring a male leader, 1.62 times as many men responded as women, and among those preferring a female leader, 1.24 times as many women responded as men. Across respondent genders, 1.33 times as many women preferred a female leader as preferred a male leader, and this ratio was 1.50 for participant men. Figure

5 shows clearly that preference for compatibility of WLG and Workshop members is slightly stronger among men, pointing to a differential perception of importance of Workshop gender parameters among the students. (In Figures 4 - 6, three responses were omitted due to students self-reporting an arbitrary selection, making the normalized totals slightly unequal.)

The evidence from last semester[7] and from the first phase of this investigation suggest that women, within their early-stage preconceptions, place a greater importance on WGC than men. In this phase, it is apparent that men attribute greater importance to their anticipated ability to relate to their Workshop leaders on the basis of gender. Given the known problematic male behaviors in small-group settings, including interruption, tendency for individuals to dominate, and poorer maintenance of discussion, this result is consistent with the idea that men and women seek educational value from different sources within the environment. This interpretation leads to the following working hypothesis.

Women, reporting on the importance of a *cooperative*, accepting, and interdependent approach to Workshop, would naturally draw most of their preconceptions from WGC. On the other hand, men, having a more *individualistic* relationship with Workshop and a decreased tendency to depend on their fellow students for extracting the instructional value; being more likely to depend on the leaders themselves for extracting this

value. For instance, based on these findings, women might be more likely to ask other members of the group questions and synthesize information from a discussion, whereas men might more readily ask their Workshop leaders for input and make the most effective strides outside of collaborative efforts on Workshop problems. Ultimately, women and men seem to use anticipatory knowledge of gender parameters differently according to their best methods of engaging with the Workshop setting. Thus, in the early stages of team progression, ensuring that all students can meet their unique needs may require an awareness of the role that gender plays in acclimation.

Figure 6a shows little difference in preconceptions regarding changes in WLG among the respondent genders, a similar result as that obtained when examining WGC. However, Figure 6b shows that even more students (80.1 percent) have a neutral outlook on changes in WLG than on those in WGC (73.1 percent, Figure 3b). The data in Figure 6 are not normalized, leading to an increased susceptibility to survey bias toward men's preferences, yet men displayed more attention to WLG than women. This result is qualitatively useful because even fewer students reported a positive or negative outlook on a change in WLG, opposite to the predicted effect of men's preponderance in the student sample. Once more, this suggests that most students trust in their own agency in accommodating any changes in their Workshop environments from one semester

to the next to overcome initial issues (described in this study as a function of preconception), and soundly progress through the later stages of team development.

Free-Response Data: Themes

Expectations of leadership behaviors

The female TAs whom I have had in the past have just been less forceful when it comes to getting people talking or leading the group, which doesn't work well for me. I've found that having a Workshop leader who inserts themselves into the conversation actively encourages group work better... (male respondent)

I feel like a female Workshop leader can stay more focused on the topic. (male respondent)

I usually prefer female Workshop leaders or TA's because I generally think they are better at explaining things and have a more laid back nature. That being said, I changed from a male TA to a female TA this semester and I actually preferred the male TA better. (female respondent)

It doesn't really matter but men tend to be more assertive in presenting info which works better in a Workshop. (female respondent)

Heart-to-heart connection on an emotional level. (female respondent, preference for female leader)

Women are usually very patient and encouraging. (male respondent)

One of the general trends arising in students' responses is an expectation of leadership styles that appear to conform to expected gender norms. It is interesting to note that while such behaviors have a demonstrated history of causing problems in small-group education, they can, according to the participants, actually support an effective approach in an individual Workshop leader. For instance, the assertiveness described by two of the respondents above as characteristic of male leadership likely contributes directly to interruptions. Other imbalanced social behaviors, and inconsistent responses to Workshop leadership that disrupt the team's progress through development seem, in fact, to be helpful for some students. Presumably, this attribute enables them to better maintain focus in the group at large on the problems at hand and to exert greater control over the flow of discussion, perhaps even to discourage conversational imbalances from arising. In contrast, some students seemed to prefer female Workshop leadership for the same reason, while others favored female leadership because of the anticipated positive impact of their superior social egalitarianism both on the quality of discussion and on the perceived emotional support.

Overall, the students' preconception of their leaders' behavior corresponds mainly to generalizations of previous experiences with leaders of a particular gender. This supports the idea that, over time, even as students may come to realize that gender norms have an insignificant impact on the progress of their team or the leader's behavioral style, the experience with that leader itself feeds back upon and refines the preconceptions for future experiences. In other words, as students encounter more Workshop lead-

Totals
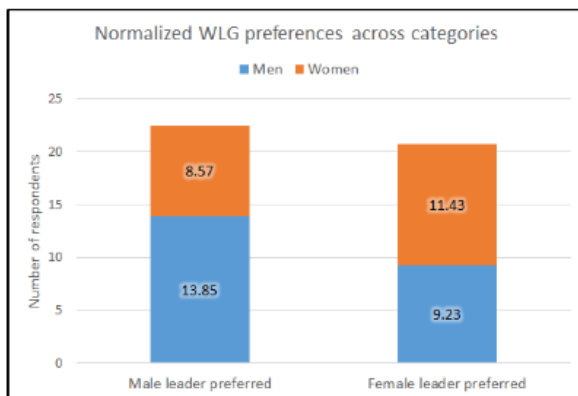
(a) By preferred leader gender identity
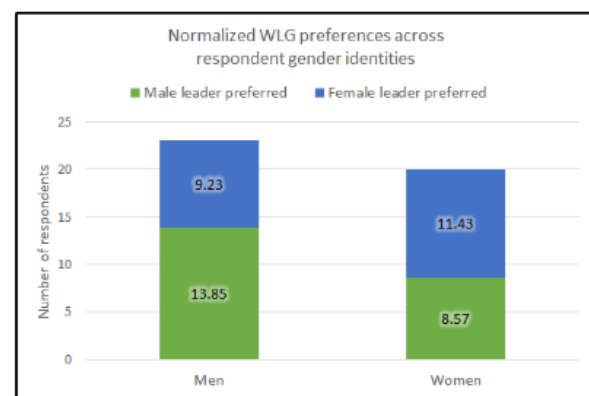
(b) By respondent genders

Figure 4: Normalized WLG preference across preferred leader genders and respondent genders

Percentages

(a) By preferred leader gender identity
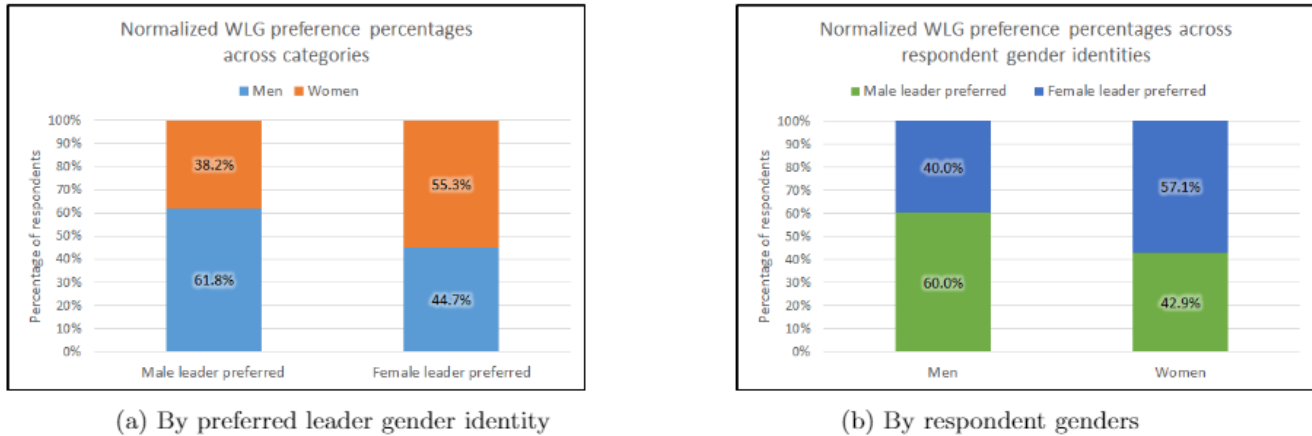
(b) By respondent genders

Figure 5: Normalized WLG preference across preferred leader genders and respondent genders by percentage

ers who partially or completely confirm their expectations, they may place greater faith in the predictive power of these expectations. For instance, if a woman has a series of negative encounters with biased male leaders or peers, she may become less inclined to engage with the learning environment (and have an empirically valid reason not to do so based on personal experience), which likely contributes to the documented trends of retention in STEM curricula.[4]

Performance over preconception - no preference

I do not evaluate people based on their gender identity, only their knowledge and character. So, if two people of different genders were to have the same general knowledge and character, I would feel equally comfortable around them as people and as Workshop leaders. (female respondent)

I just find females to be less intimidating to approach, but I think that if you are able to cultivate a beneficial relationship between yourself and the TA, then it doesn't matter your gender. It's more like

a first impression thing...and from there is where people usual create preferences between male and female. (female respondent)

I'm not entirely sure that I have a preference. I only picked male because I've only ever had a male Workshop leader. I'm not entirely sure that the gender alone makes me feel comfortable and makes the Workshop effective. (male respondent)

I only prefer a Workshop leader that can explain concepts well. (male respondent)

No; forced choice. The quality of the TA matters more to me. (male respondent)

Some variation of "no preference" or "you didn't give an option for N/A" appears in the majority of the students' free response data. While the students exemplifying the previous experiential theme expressed some ambivalence about choosing a particular gender as preferred, those grouped in this theme clearly affirm either that WLG does not matter, that their possible biases are implicit or subconscious or that, though involved in the

impression that a new Workshop environment can make on a student, WLG does not impact the group's success in the long-term. These views corroborate the existing research addressing this question. Dobbins et al. find that leader gender has no significant effect on leadership behaviors or on the satisfaction of the members of the group in question,[12] and in fact, those leaders who can perform effectively in a given field tend to converge on a similar behavioral approach, regardless of gender.[13] Some students responding along this theme may still possess implicit or subconscious biases. For instance, some selected responses above separate notions of "comfort" and leader expertise, but comfort may be more significant than the students realize, especially if discomfort is ultimately a prohibitive barrier to effective engagement with the Workshop environment, no matter how knowledgeable the leader is.[7,9] However, considering the lower perceived impact of WLG on Workshop quality as shown by the numerical data and this major tendency in the

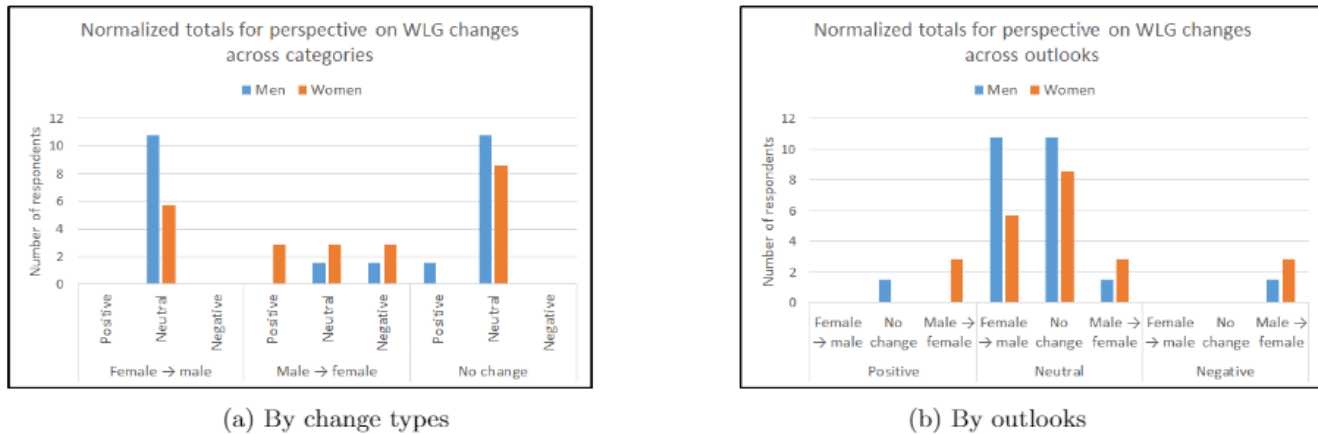## Perspectives on Change

(a) By change types

(b) By outlooks

Figure 6: Perspectives on change in WLG from first to second semester

free-response data, it appears that students recognize a leader's preparedness, background with the subject material, and personal style of relating to other people, as most relevant to the group's success. If WLG plays any part, it exists mainly as a manifestation of preconception, and these expectations, as with WGC, seem to affect the acclimation of members to the new setting and to chiefly contribute to developmental challenges in the early stages of team-building.

Conclusions

The present study addressed the role of Workshop gender composition (WGC) and Workshop leader gender (WLG) on group development, instructional value, and comfort in Workshop as assessed through students' own perspectives, and is mediated by both a quantitative display of preference data and an analysis of student- produced free-response data pertaining to each factor. For WGC, the numerical data confirmed the finding of Chen et al. that, at the surface level, students seem to prefer the company of

their own gender, yet that across the entire cohort surveyed, an equal representation of men and women is ideal. Most preferences for unequal representations of genders came from preconceptions of well-documented gender-aligned behaviors, some conducive and others detrimental to team cohesion and performance. Overall, women respondents seemed to favor the company of female Workshop members more strongly than the men did male members, suggesting that these women extract more instructional value from their interactions with their peers in discussions and collaboration. Yet a sizable majority of the students acknowledge the importance of both men and women having the ability to comfortably meet their needs and balance their Workshop experience with a variety of personality types and approaches to problem-based learning. Additionally, the students resounded their awareness that while such expectations can inform early decisions in Workshop, the degree of respect, amicability, and understanding that members consistently show

one another is most important for collective success. This sentiment was reflected particularly strongly with 73.1 percent of students having a neutral outlook on any changes in WGC, suggesting that students depend most on and trust most in their adaptive agency when pursuing success in a new Workshop environment.

The students reported WLG as even less deterministic of Workshop quality, with 80.1 percent indicating a neutral outlook on any change in WLG with the semester. Preferences again aligned with gender compatibility, and for this variable, men more strongly favored male leaders than women favoring compatible leaders. This suggested that men seem to derive more educational value from their interactions with leaders than women, a complementary observation to that made when examining WGC. When asked for their own words on WLG preference sources, the students described expectations for leadership styles in line with known behavioral patterns corresponding with gender; male leaders would more assertively lead discussions,

and female leaders would provide better emotional support, as an example. However, the most significant motif was that WLG does not play a role in the global success of peer-led team learning in a Workshop group. Just as the students prioritized clear and respectful interactions with group members over WGC, they cited leaders' levels of knowledge of the subject material, their facility with explanation, and friendliness and openness of teaching style (positives appearing for both genders) as more impactful than WLG itself.

What does this mean for the Workshop program?

Few deterministic factors for Workshop success have been identified through the students' experiential motifs, but one that is tangible and controllable is the apparent optimum of Workshops that are not homogeneous in gender composition. The students surveyed in this study have clearly stated the need for a variety of interaction patterns, approaches to thinking about organic chemistry problems, personality types, and social structures within the Workshop unit. Additionally, this seems to provide a balance of comfort for both men and women, providing them with a diversity of thought yet the social familiarity from the presence of their own gender. Based on their responses, both quantitative and qualitative, one of the simplest methods for avoiding these issues is to ensure, when possible, that sections are heterogeneous in gender representation. Additionally, having at least two members of a single gender when possible

could diminish the frequency of feelings of isolation in Workshop. Though few students mentioned it, this feeling is well-documented,[2,3] and it is worthwhile to regulate any controllable factor that can ease a student's social burdens in Workshop.

For Workshop leaders, the evidence presented here indicates three main ideas for the future improvement of students' experience.

Accommodating transitional difficulties

The results of this study have clearly shown that the information that students use to inform their decisions in Workshop, their strategies for engaging with the Workshop environment, and their views on its relative success change over the course of a semester. In the earliest stages of team development, most likely during the first two to three weeks of the semester, students rely more heavily on their preconceptions about the experiential influence of gender than at any other time during the semester. As a result, they may display caution and reservation which, while counterproductive toward collaborative growth and educational success, act as a defense mechanism against the possible destructive behaviors and outcomes that they view as functions of WGC and WLG. Thus, it is vital for Workshop leaders to actively discourage such negative consequences at this stage and demonstrate a particular vigilance to the prevention of conversational imbalances, lack of emotional support, disrespectful conduct along gender axes, and other

preconceived detrimental factors mentioned here. In this way, leaders can show students that gender will not obstruct their success in working alongside peers and progressing through stages of team development and accelerate the transition of focus from preconception to the week-to-week, tangible interactions that they have with their group members. Concentrating on these relationships, as the students have expressed, is more directly relevant to the long-term success of the group and enhancing its ability to effectively engage all members in the learning process.

Meeting the unique needs of all students

One of the most interesting findings of this investigation is that gender appears to play a role in how a student extracts instructional value from the Workshop setting. Given the results obtained, in mixed-gender Workshops, it is more likely that men *could* fail to contribute to discussions and empower the group through problem-solving in their focus on relating directly to the leader. It is also reasonable that a male student could monopolize conversation, interrupt, and disrupt productive discussion, especially if the WGC is female-skewed. Because women appear to benefit more from discussions and the reciprocal peer questioning that hallmarks the Workshop model, they could miss out on this value in the event that a man acted in this way. Similarly, if there is not enough opportunity for making independent strides (i.e., time outside of discussion for internal synthesis of information and

collection of relevant concepts) men might become underserved in this regard. Of course, such predictions rely on the trends in the literature and on the responses analyzed in this study, but varied and entirely opposite patterns are equally probable. The essential awareness, however, remains the same; students meet their needs in different ways, and leaders must keep in mind that unrestrained gravitation toward natural learning strategies may leave some students' needs unsatisfied. Carefully observing and understanding a group's needs will lead to balanced solutions to potential issues. For instance, workshop leaders should make certain both that men in Workshop engage consistently and openly with the group and that women have enough opportunities to grapple with the problems independently, to further their individual mental models, before sharing in a discussion. In this way, students' approaches can be modulated to suit not only their personal preferences for informational uptake but also to accommodate collective progress and stimulate intellectual growth in less comfortable yet necessary areas.

Most important: encouraging respect and honing instructional style

By and large, as summarized before, the surveyed students understand their preconceptions for what they are. They recognize that while such views are relevant to the transition from one Workshop group to another, they are not predictive of or relevant to the ultimate degree of suc-

cess that the Workshop enjoys throughout the semester. More significant than any WGC, the students expressed, is the amount of respect and friendliness with which group members treat one another. Such conduct promotes a feeling of safety to participate fully and earnestly in a discussion, diminishes apprehension over suggesting an incorrect answer, and motivates further positive relationships within the team. It leads the students to *want* to succeed in Workshop and to engage in a manner necessary for doing so. On the part of the Workshop leader, students most frequently mentioned their leader's strength of background in organic chemistry, their ability to clearly explain answers and concepts, and the openness and cordiality of their leadership style as the most influential factors on a Workshop's quality. Therefore, in addition to making a friendly impression on students, leaders must also focus on presenting themselves as trustworthy, credible, and accurate sources of content information. While instructors' selection of Workshop leaders ensures that only students equipped with the proper background to occupy this role are selected to do so, it is important for leaders to understand that the impression they make in early stages of Workshop development has both social and academic components. Each of these aspects directly impacts how the students view the quality of leadership and, in turn, their perceived level of support to achieve their highest potential within Workshop and within the class altogether.

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How does Campaign Spending Affect Voter Behavior, and What Does this Mean for the American Democracy?

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Abstract

In this study, I consider how campaign spending influences voter behavior by considering Senate incumbent reelection data from 1980 to 2000. I first consider a subset of the data in which the incumbent and their challenger spend approximately the same amount on their campaign to build a predictive model for voter behavior. I then applied this model to the full dataset, allowing campaign spending to vary. Next, I built a second model using the full dataset, allowing the ratio of incumbent and challenger campaign spending to vary. Analysis of the variance tables and partial F tests determined that the addition of this regressor in the predictive model improves the fit of the data.

Introduction

The American political system constitutes a representative democracy in which political office is won by a simple majority (excluding the presidential office and any appointed positions such as the Supreme Court and the Cabinet). Candidates hoping to win office need to effectively inform voters of their policy stances and convince them not only to vote, but also win their vote. They often do this using a team of people working on their campaign, which helps them reach the public by broadcasting televised messages, calling the electorates to speak with them about voting, and going door to door informing the voters of the issues. For this reason, it is intuitive that a candidate's campaign spending, including their team's salary and access to public platforms, may affect the number of individuals in their electorate that vote for them.

For this reason, the effects of campaign spending on voter turnout have been a subject of great study. Many studies on the effect of campaign spending on voter behavior were conducted in the 1980s and 1990s, providing evidence to support the claim that these factors are associated in elections for state legislator, congressional representative, and statewide political offices (Hogan, 2013). However, in 2010, the topic gained increased attention due to the Supreme Court's ruling on the case *Citizens United*, which effectively deregulated campaign finance policy. This ruling allowed for the creation of "Super PACs", Political Action Committees that can raise money without limit from individuals, corporations, and unions. They may not directly coordinate with candidates but may openly advocate for and against candidates. In other words, Super PACs allow the country's wealthiest citizens and organizations to pour money into the campaign of the candidate of their choosing (Zocalo, 2016).

If money spent on a campaign affects the number of votes for a candidate by increasing their likelihood of being elected, this would raise major concerns. The American political system, as a representative democracy, fundamentally depends on one vote per citizen as a way to justify the selection of a representative. Reducing a citizen's voice to one vote in theory should give everyone an equal chance of electing a candidate that represents their interests. The issue of campaign spending and Super PACs then leads to the unavoidable conclusion that a wealthy person on their own may put a great amount of money into a campaign for a candidate who represents their interests, an action that cannot be matched by most American citizens, thereby giving the wealthy a greater chance of representation on the American political landscape.

Ideally, in a representative democracy, individuals elected to public office are candidates who represent the majority, with high competence as political leaders,

regardless of financial means. If campaign spending has a positive effect on votes for a candidate after controlling for other factors, this could suggest that politicians with substantial monetary means, possibly through wealthy donors or personal reserves, have an advantage over those without the same resources, regardless of their merit as an elected official. Furthermore, if money can buy elections for some candidates, wealthy donors may have the ability to fund the campaigns of candidates they support and thereby gain unequal representation compared to citizens without the same means, undermining the validity of the American representative democracy. To consider this issue, in this paper I investigate how campaign spending affects voter turnout by analyzing Senate incumbent reelection data from 1980-2000.

Data

My dataset consists of Senate incumbent reelection data from 1980-2000, taken from Michael Peress' senate_expanded.dta. It includes the following variables related to information about the electorate, the incumbent, and the candidate running against the incumbent, referred to as "the challenger." Note that variables that I created that were not originally in the data set are marked with "*". The abbreviations used in the dataset follow the names of the variables in parentheses. There are 295 observations in the dataset. Figure 1 in the appendix shows summary statistics for the dataset.

Electorate Data: State ab-breviation (st_abr), State name (st_name), State population in millions (st_pop), State unemployment rate (St_unemp), Southern State (st_south) (coded as a 1 if state is in the south, 0 otherwise).

Incumbent Data: incumbent Common Space score, a measure of liberal vs. conservative voting records (inc_pos) (coded so negative values imply liberal voting records, and positive values imply conservative voting records), incumbent political party (inc_partyID) (coded as 1 for republican, 0 for democrat), transformed incumbent political party such that 1= republican and -1=democrat (ID)*, incumbent spending for reelection campaign in millions of dollars (inc_spend), Number of years incumbent has been in office until re-election race (inc_tenure), Proportion of republican to democrat votes for the incumbent (inc_2p_share), a possible measure of the satisfaction of a large proportion of state's population with incumbent political perspectives (inc.ten.ID)* (created by inc_tenure*ID).

Challenger Data: Political experience of challenger (ch_qual) (coded so that Former member of the House = 4, Former state Governor = 3, Former local elected official = 2, Former State Legislator = 1, and No experience = 0), Challenger spending on campaign in millions of dollars (ch_spend)

Other: Ratio of incumbent spending to the sum of incumbent and challenger spending (inc.chal_ratio)*

Hypothesis and Methods

My basic hypotheses are as follows:

H_o: *Campaign spending does not affect electorate behavior*

H_1: *Campaign spending does affect electorate behavior*

If it is possible to manipulate a race with money, then we should consider how this effect may be observed. Specifically, what would it look like if money did not make a difference, and what would it look like if it did? To consider this question, one must first find a baseline of expected outcomes when the incumbent and the challenger both spend the same amount on their campaigns, and what variables may be used to predict that outcome.

In order to create a predictive model for this baseline, I first create a subset of the dataset containing the observations with the ratio of incumbent spending to the sum of incumbent spending and challenger spending (inc. chal_ratio) from .4 to .6, with a total of 69 observations. Figure 2 shows a graph of challenger to incumbent spending for the full dataset, and Figure 3 shows the same graph for the subset when spending for both is about the same.

Considering the spread of incumbent and challenger spending individually, the minimum amount spent by an incumbent in this dataset was $0 with a max of $24.195 million. The mean is $3.479 million, the median is $2.618 million, with the middle 50% of the data falling between $1.538 and $4.572 million. For the challenger, the minimum amount

spent in this dataset was $0 with a max of $29.962 million dollars. The mean is $1.991 million, the median is $0.897 million, with the middle 50% of the data falling between $0.266 and $2.147 million.

In order to consider what outcomes could be expected when both the incumbent and the challenger spent about the same amount, I created a new variable to examine how the political party and tenure (inc.ten.ID) of an incumbent might give an impression of the status quo as far as the political opinion of the majority of the population in a state that votes when the absolute value of this variable is large (implying a longer tenure). This then should be related to the ratio of Republican to Democratic votes received (inc_2p_share). Due to how the data is coded, if inc.ten. ID is positive, then the incumbent is Republican. If it is negative, the incumbent is a Democrat. This means that we would expect a larger inc_2p_share score and a large positive value of inc.ten. ID, indicating a Republican incumbent who has held office for a long time. A negative value of inc. ten.ID with a large absolute value represents a Democrat who has held office for a long time, and we expect them to have a small inc_2p_share score.

Before continuing, I checked the correlation of inc_partyID with inc_pos. The latter indicates the extent of the incumbent's conservative (positive) or liberal (negative) leaning. If the correlations do not line up well in the subset, then the purpose of in.ten.ID is defeated. We find a
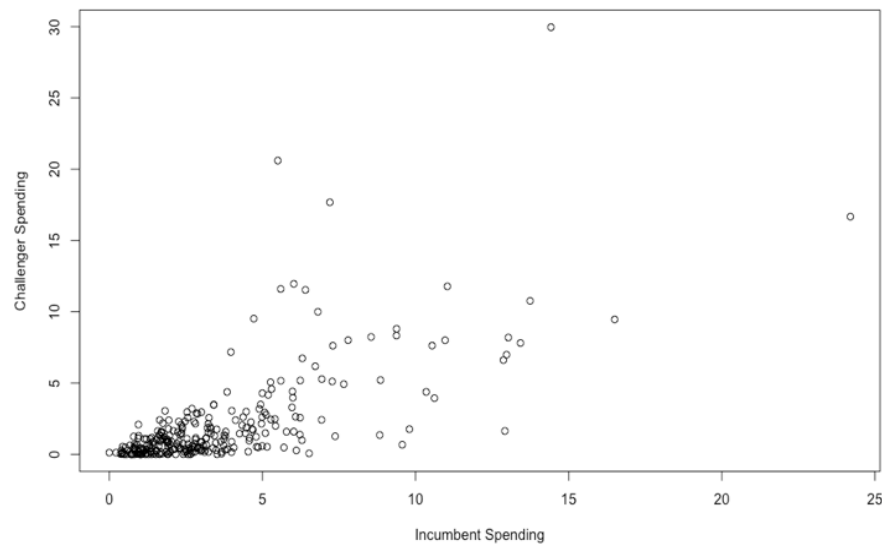

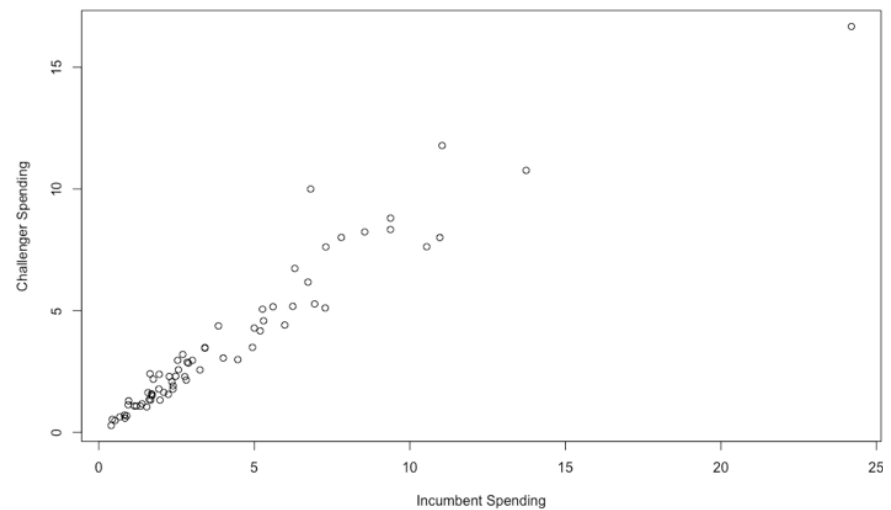**Figure 2:** Challenger to incumbent spending in millions of dollars, full dataset.

Figure 3: Challenger to incumbent spending in millions of dollars, ratio of spending from .4 to .6.

correlation of 0.8792422, which I interpret as substantial.

To identify the variables that likely affect the status quo of what we can expect when the incumbent and the challenger spend the same amount, I create a linear regression to predict in_2p_share using inc.ten.ID, after controlling for other variables. To create this model, I consider a number of variables: year, state abbreviation, state name, southern state, state population, state unemployment rate, ratio of Republican
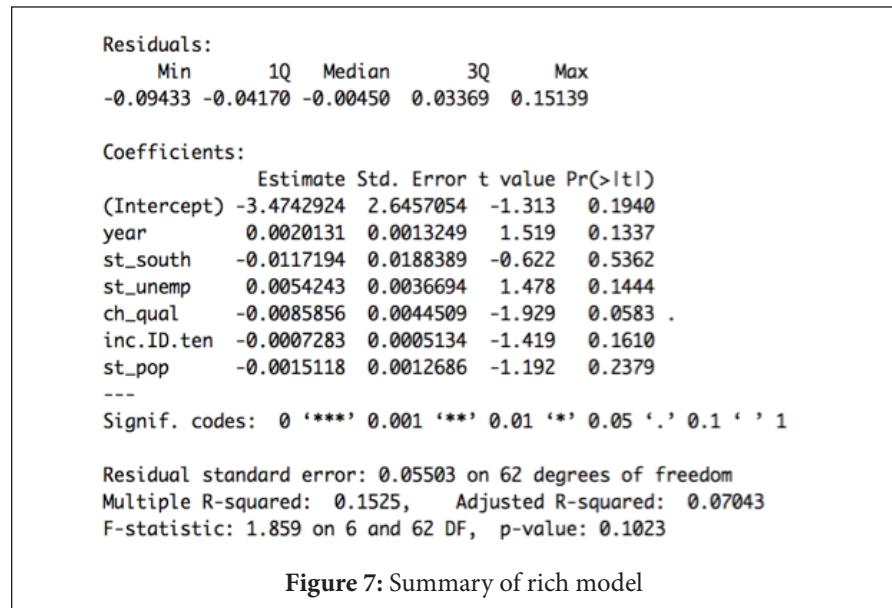
to Democrat incumbent votes, incumbent common space score, incumbent spending, incumbent tenure, challenger spending, challenger quality, ratio of incumbent to challenger spending, ID, inc. ID.ten, and incumbent party ID. I start with the variables year, state population, southern state, state unemployment rate, challenger quality, and inc.ID.ten, to avoid redundancies. Figures 4, 5, and 6 in the appendix show descriptive statistics for these variables in the subset when incumbent and challenger spending is the same,

as well as their correlation matrix and plots respectively. This set of variables appears reasonable, with minimal correlation between them. The greatest absolute value of these correlations (0.56) is between year and unemployment rate but, otherwise, all correlations are relatively low.

Model Selection

First, I fit a rich model of the variables year, state population, southern state, state unemployment rate, Challenger quality, and inc.ID.ten as regressors on the dependent variable of the ratio of Republican to Democrat incumbent votes for the subset of the data when incumbent and Challenger spending is about the same. Figure 7 gives a summary of the residuals, coefficients, individual t-tests for the coefficients, R-squared, adjusted R-squared, and F-test for the significance of the model. As can be seen in Figure 7, we do not find significant regression coefficients in the rich model. Diagnostic Plots are given in Figure 8 in the appendix. These plots show no evidence for the need of a transformation of any of the variables.

I now use forward selection to more closely consider possible variables for the model, using α−to−enter=0.15. From the one-variable models, challenger quality has the greatest statistical significance. I choose to include this variable and then consider two-variable models with Challenger Quality. This results in the selection of inc.ID.ten as the second variable. Out of the three-variable models, none of the remaining variables year, southern

```
Residuals:
     Min       1Q   Median       3Q      Max
-0.09433 -0.04170 -0.00450  0.03369  0.15139

Coefficients:
               Estimate Std. Error t value Pr(>|t|)
(Intercept) -3.4742924  2.6457054  -1.313   0.1940
year         0.0020131  0.0013249   1.519   0.1337
st_south    -0.0117194  0.0188389  -0.622   0.5362
st_unemp     0.0054243  0.0036694   1.478   0.1444
ch_qual     -0.0085856  0.0044509  -1.929   0.0583 .
inc.ID.ten  -0.0007283  0.0005134  -1.419   0.1610
st_pop      -0.0015118  0.0012686  -1.192   0.2379
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.05503 on 62 degrees of freedom
Multiple R-squared:  0.1525,     Adjusted R-squared:  0.07043
F-statistic: 1.859 on 6 and 62 DF,  p-value: 0.1023
```

Figure 7: Summary of rich model

state, or state population are significant, and none have a p-value that is less than the α−to−enter threshold. Figures 9, 10, and 11 show summary tables of the one-variable, two-variable, and three-variable models respectively.

Therefore, using forward selection, the resulting model is:

$$\hat{E}(inc-2p-share|ch-qual,inc.ID.ten)=0.551+(-0.008)*(ch-qual)+(-0.001)*(inc.ID.ten)$$

Figure 12 gives a summary of the residuals, coefficients, individual t-tests for the coefficients, R-squared, adjusted R-squared, and F-test for the significance of this model. Figure 13 gives different angles of the three-dimensional plot of this regression plane, where the black points are observations, the gridded plane is the regression plane, the red diamonds are predicted values, and the red lines are residuals.

Diagnostic Plots for this model are given in Figure 14 in the appendix. They do not show anything unusual.

The results of the analysis of this subset of the data for when incumbent and challenger spending are similar suggest that in this case, the experience of the challenger, the political party, and amount of time in office of the incumbent are the most useful predictors of the ratio of Republican to Democrat votes for the incumbent. To determine the effect of challenger and incumbent spending, I now consider the dataset in which there is no restriction on campaign spending and revisit my hypothesis. Now that I have a model to predict what happens when spending is similar for the candidates, I want to know if the model that allows spending to vary more is better for the larger data set than one using only the two variables of challenger quality and inc.ID.ten as regressors. This would imply that campaign spending is a statistically significant predictor for the ratio of Republican to Democrat votes for the incumbent.

```
===============================================================
                     Dependent variable:
              ---------------------------------------------
                          inc_2p_share
              (1)    (2)    (3)    (4)    (5)    (6)
---------------------------------------------------------------
year          0.0002
              (0.001)

st_south             -0.006
                     (0.018)

st_unemp                    0.003
                            (0.003)

ch_qual                            -0.009**
                                   (0.004)

inc.ID.ten                                -0.001*
                                          (0.0005)

st_pop                                           -0.001
                                                 (0.001)

Constant      0.148  0.534*** 0.515*** 0.555*** 0.530*** 0.539***
              (2.124) (0.008) (0.019) (0.012) (0.007) (0.009)

---------------------------------------------------------------
Observations  69     69     69     69     69     69
R2            0.0005 0.002  0.016  0.063  0.046  0.012
Adjusted R2   -0.014 -0.013 0.001  0.049  0.032  -0.003
Residual Std. Error (df = 67) 0.057 0.057 0.057 0.056 0.056 0.057
F Statistic (df = 1; 67)  0.033 0.103 1.063 4.484** 3.265* 0.822
===============================================================
Note:                        *p<0.1; **p<0.05; ***p<0.01
```

Figure 9: One-variable models

```
===========================================================
                     Dependent variable:
              ------------------------------------------
                          inc_2p_share
                (1)    (2)    (3)    (4)    (5)
-----------------------------------------------------------
year          0.0002
              (0.001)

st_south             -0.016
                     (0.018)

st_unemp                    0.003
                            (0.003)

inc.ID.ten                         -0.001*
                                   (0.0005)

st_pop                                    -0.001
                                          (0.001)

ch_qual       -0.009** -0.010** -0.009** -0.008** -0.009**
              (0.004) (0.004) (0.004) (0.004) (0.004)

Constant      0.184  0.560*** 0.537*** 0.551*** 0.558***
              (2.072) (0.014) (0.021) (0.012) (0.013)

-----------------------------------------------------------
Observations  69     69     69     69     69
R2            0.063  0.074  0.080  0.101  0.069
Adjusted R2   0.035  0.046  0.052  0.074  0.040
Residual Std. Error (df = 66) 0.056 0.056 0.056 0.055 0.056
F Statistic (df = 2; 66) 2.226 2.631* 2.871* 3.710** 2.434*
===========================================================
Note:                    *p<0.1; **p<0.05; ***p<0.01
```

Figure 10: Two-variable models

```
=================================================
                Dependent variable:
              -----------------------------------
                     inc_2p_share
                (1)      (2)      (3)
-------------------------------------------------
inc.ID.ten    -0.001*   -0.001   -0.001*
              (0.0005)  (0.0005) (0.0005)

ch_qual       -0.008*   -0.009** -0.008*
              (0.004)   (0.004)  (0.004)

year          0.001
              (0.001)

st_south                -0.012
                        (0.018)

st_pop                           -0.001
                                 (0.001)

Constant      -0.746    0.555*** 0.555***
              (2.106)   (0.014)  (0.013)

-------------------------------------------------
Observations  69        69       69
R2            0.106     0.107    0.110
Adjusted R2   0.065     0.066    0.069
Residual Std. Error (df = 65) 0.055 0.055 0.055
F Statistic (df = 3; 65)  2.576* 2.599* 2.682*
=================================================
Note:             *p<0.1; **p<0.05; ***p<0.01
```

Figure 11: Three-variable models

```
Residuals:
    Min        1Q      Median      3Q       Max
-0.101655 -0.042326 -0.009376  0.039303  0.144050

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  0.5511458  0.0123989  44.451  <2e-16 ***
inc.ID.ten  -0.0007920  0.0004721  -1.677  0.0982 .
ch_qual     -0.0083871  0.0041897  -2.002  0.0494 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.05493 on 66 degrees of freedom
Multiple R-squared:  0.1011,    Adjusted R-squared:  0.07381
F-statistic:  3.71 on 2 and 66 DF,  p-value: 0.02973
```

Figure 12: Summary of linear regression of ratio of republican to democrat incumbent votes on Challenger Quality and Inc. ID.ten when incumbent and Challenger spending is about the same
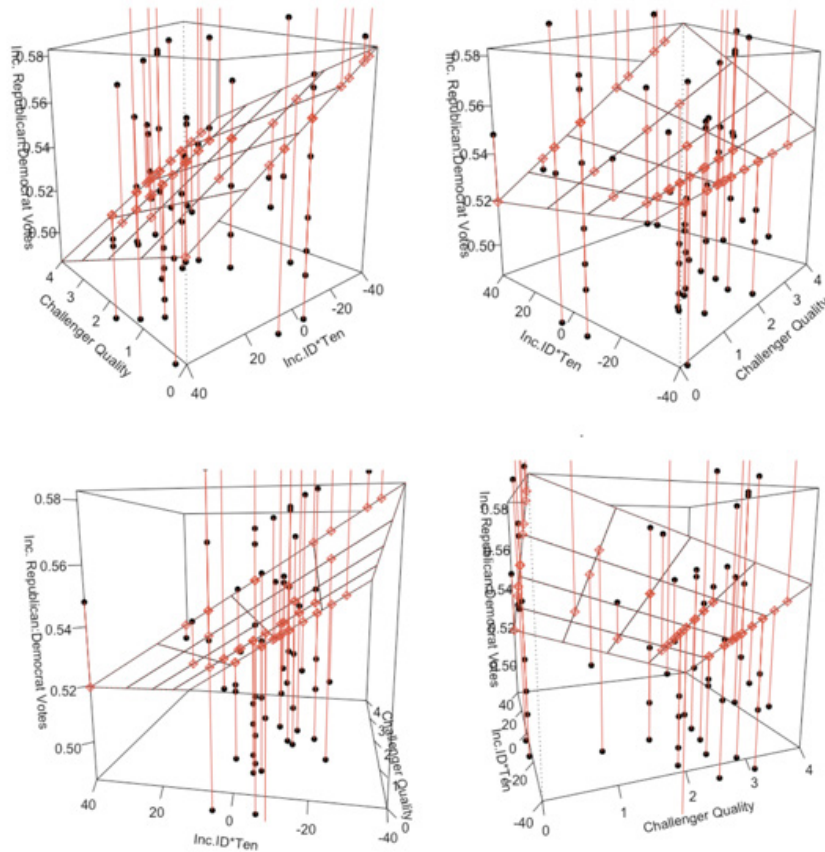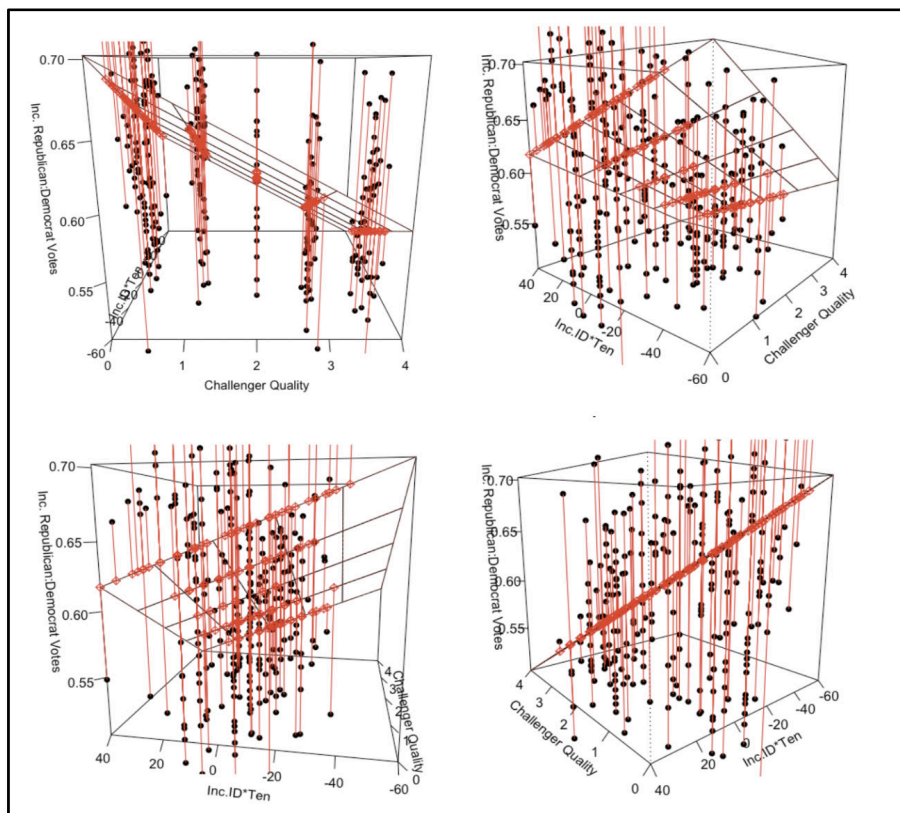
Figure 13: Three-Dimensional plot of linear regression of ratio of republican to democrat incumbent votes on Challenger Quality and Inc.ID.ten when incumbent and Challenger spending is about the same.

Therefore, my hypothesis can be redefined as:

$H_o : F_1 \geq F_2$

$H_1 : F_1 < F_2$

where: F_1 is the partial F Statistic from Model 1, using Challenger Quality and inc.ID.ten regressors to predict the ratio of republican to democrat votes for the incumbent F_2 is the partial F Statistic from Model 2, incorporating campaign spending as a regressor to predict the ratio of republican to democrat votes for the incumbent

In order to do this, I first create a model for the larger data set using the regressors from Model 1 which were identified as significant regressors when incumbent and challenger spending is about the same. I will then use forward selection to consider other significant variables in the full dataset to create a predictive model that allows campaign spending to vary.

Model 1:

```
E^ (inc-2p-share|ch-
qual,inc.ID.ten)=0.652+(-
0.029)*(ch-qual)+(-
0.001)*(inc.ID.ten)
```

Figure 15 gives a summary of linear regression of ratio of Republican to Democrat incumbent votes on Challenger Quality and Inc.ID.ten using the full data set. It includes a summary of the residuals, coefficients, individual t-tests for the coefficients, R-squared, adjusted R-squared, and F-test for the significance of the model. As seen in Figure 15, the regression coefficients for both Challenger Quality and inc.ID.ten are significant. The F-statistic is 41.9 on 2 and 292 degrees of freedom. Figure 16 gives different angles of a three-Dimensional plot of linear regression of ratio of Republican to Democrat incumbent votes on Challenger Quality and Inc.ID.ten on the full dataset.

```
Residuals:
      Min       1Q   Median       3Q      Max
 -0.23922 -0.06244 -0.00455  0.05551  0.32812

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  0.6516007  0.0070807  92.024   <2e-16 ***
ch_qual     -0.0285158  0.0032266  -8.838   <2e-16 ***
inc.ID.ten  -0.0008448  0.0003528  -2.394   0.0173 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.08799 on 292 degrees of freedom
Multiple R-squared:  0.223,      Adjusted R-squared:  0.2177
F-statistic:  41.9 on 2 and 292 DF,  p-value: < 2.2e-16
```

Figure 15: Summary of linear regression of Model 1 using the full data set

Figure 16: Three-Dimensional plot of Model 1, linear regression of ratio of republican to democrat incumbent votes on Challenger Quality and Inc.ID.ten on the full dataset.

Figure 17 in the appendix shows the diagnostic plots for Model 1 on the full dataset, which do not show anything unusual.

To create Model 2, which incorporates varying campaign spending for the incumbent and challenger, I choose a new set of variables to include in a rich model. I begin with the variables year, southern state, state population, state unemployment rate, Ratio of Republican to Democrat votes for the incumbent, challenger quality, the ratio of incumbent campaign spending to the sum of incumbent and challenger campaign spending for a given race, and inc.ID.ten. The only variable included here that was not included in the selection of Model 1 is inc.chal_ratio, which is the ratio of incumbent spending to the sum of incumbent and challenger spending. Figure 18 in the appendix shows the descriptive statistics for these variables for the full dataset of 295 observations. Figure 19 shows the correlation matrix of these variables for the full dataset. Figure 20 shows their corresponding correlation plots. It should be noted that the correlations with the greatest strength are between state unemployment and year, as before, with -0.57. Between ratio of Republican to Democrat votes for the incumbent, challenger quality, the ratio of incumbent campaign spending to the sum of incumbent and challenger campaign spending for a given race, the correlation was found to be 0.67, which may be substantial.

Figure 21, below, shows a summary of the rich model with all variables included, with the dependent variable once again being the ratio of Republican to Democrat votes for the incumbent. Challenger Quality, inc. ID.ten, and ratio of incumbent campaign spending to the sum of incumbent and Challenger campaign spending for a given race all have statistically significant regression coefficients in this model, though none of the other variables included do. I will once again use forward selection with α-to-enter=0.15 to build Model 2, but this time I will start with a model that uses in.chal. ratio and build from there, since I am interested in a model that incorporates this variable.

Figures 22, 23, and 24 show forward selection two-variable, three-variable, and four-variable models. From the two-variable models, including the ratio of incumbent campaign spending to the sum of incumbent and challenger campaign spending for a given race, challenger quality has the smallest p-value, and is added to the model. For three-variable models, including ratio of incumbent campaign spending to the sum of incumbent and challenger campaign spending for a given race and challenger quality, inc. ID.ten has the smallest p-value, and so it is added to the model. From the four-variable models in Figure 24, it can be seen that none of these models add an additional significant regression estimate.

Thus, Model 2 built through forward selection is:

$$\hat{E}(inc-2p-share|ch-qual, inc.ID.ten) = 0.652 + (-0.029)*(ch-qual) + (-0.001)*(inc.ID.ten)$$

Figure 25 shows a summary of Model 2 on the full dataset, including a summary of the residu-

```
Residuals:
     Min       1Q   Median       3Q      Max
-0.18618 -0.04252 -0.00784  0.03933  0.32288

Coefficients:
                Estimate Std. Error t value Pr(>|t|)
(Intercept)    2.2942804  1.6138667   1.422 0.156227
year          -0.0009468  0.0008084  -1.171 0.242478
st_south       0.0099608  0.0100811   0.988 0.323954
st_pop        -0.0011294  0.0007827  -1.443 0.150154
st_unemp      -0.0011825  0.0023535  -0.502 0.615758
ch_qual       -0.0130733  0.0028212  -4.634 5.45e-06 ***
inc.chal_ratio 0.3145130  0.0239024  13.158  < 2e-16 ***
inc.ID.ten    -0.0010415  0.0002834  -3.675 0.000284 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.06957 on 287 degrees of freedom
Multiple R-squared:  0.5226,    Adjusted R-squared:  0.511
F-statistic: 44.89 on 7 and 287 DF,  p-value: < 2.2e-16
```

Figure 21: Summary of the rich model of potential variables for Model 2, using observations for the full dataset.

als, coefficients, individual t-tests for the coefficients, R-squared, adjusted R-squared, and F-test for the significance of the model. We see that the F-statistic is 102.9 on 3 and 291 degrees of freedom. Figure 26 shows the linear regression plane when the challenger has no previous experience in political office. Figure 27 shows the plane when the challenger was a former state legislator. Figure 28 shows the plane when the challenger was a former local elected official. Figure 29 shows the plane when the challenger was a former state governor. Figure 30 shows the plane when the challenger was a former member of the House. Finally, Figure 31 shows the plane when the challenger quality vari-

	Dependent variable:					
	inc_2p_share					
	(1)	(2)	(3)	(4)	(5)	(6)
inc.chal.ratio	0.360***	0.354***	0.350***	0.356***	0.308***	0.360***
	(0.023)	(0.023)	(0.023)	(0.023)	(0.024)	(0.023)
year	-0.001					
	(0.001)					
st_south		0.013				
		(0.010)				
st_pop			-0.002**			
			(0.001)			
st_unemp				0.001		
				(0.002)		
ch_qual					-0.014***	
					(0.003)	
inc.ID.ten						-0.001***
						(0.0003)
Constant	2.393*	0.351***	0.364***	0.348***	0.408***	0.347***
	(1.358)	(0.017)	(0.018)	(0.021)	(0.020)	(0.017)
Observations	295	295	295	295	295	295
R2	0.451	0.450	0.455	0.447	0.490	0.473
Adjusted R2	0.447	0.446	0.451	0.443	0.486	0.470
Residual Std. Error (df = 292)	0.074	0.074	0.074	0.074	0.071	0.072
F Statistic (df = 2; 292)	119.957***	119.411***	121.715***	118.018***	140.206***	131.165***
Note:				*p<0.1; **p<0.05; ***p<0.01		

Figure 22: Possible two-variable models for Model 2

	Dependent variable:				
	inc_2p_share				
	(1)	(2)	(3)	(4)	(5)
inc.chal.ratio	0.312***	0.307***	0.306***	0.308***	0.313***
	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)
ch_qual	-0.014***	-0.014***	-0.014***	-0.014***	-0.014***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
year	-0.001				
	(0.001)				
st_south		0.011			
		(0.010)			
st_pop			-0.001		
			(0.001)		
st_unemp				0.001	
				(0.002)	
inc.ID.ten					-0.001***
					(0.0003)
Constant	2.509*	0.406***	0.414***	0.401***	0.402***
	(1.306)	(0.020)	(0.020)	(0.023)	(0.020)
Observations	295	295	295	295	295
R2	0.494	0.492	0.493	0.491	0.515
Adjusted R2	0.489	0.487	0.488	0.485	0.510
Residual Std. Error (df = 291)	0.071	0.071	0.071	0.071	0.070
F Statistic (df = 3; 291)	94.842***	93.903***	94.482***	93.427***	102.878***
Note:			*p<0.1; **p<0.05; ***p<0.01		

Figure 23: Possible three-variable models for Model 2

	Dependent variable:			
	inc_2p_share			
	(1)	(2)	(3)	(4)
inc.chal.ratio	0.316***	0.312***	0.313***	0.313***
	(0.024)	(0.024)	(0.024)	(0.024)
ch_qual	-0.014***	-0.013***	-0.014***	-0.014***
	(0.003)	(0.003)	(0.003)	(0.003)
inc.ID.ten	-0.001***	-0.001***	-0.001***	-0.001***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)
year	-0.001			
	(0.001)			
st_pop		-0.001		
		(0.001)		
st_south			0.007	
			(0.010)	
st_unemp				0.0004
				(0.002)
Constant	2.007	0.408***	0.401***	0.400***
	(1.285)	(0.020)	(0.020)	(0.023)
Observations	295	295	295	295
R2	0.517	0.519	0.515	0.515
Adjusted R2	0.511	0.512	0.509	0.508
Residual Std. Error (df = 290)	0.070	0.069	0.070	0.070
F Statistic (df = 4; 290)	77.698***	78.200***	77.130***	76.914***
Note:		*p<0.1; **p<0.05; ***p<0.01		

Figure 24: Possible four-variable models for Model 2

able is not included

Figure 32 in the appendix shows diagnostic plots for Model 2 on the full dataset. As shown in the residual plot included in Figure 32, there is a slight pattern among the residuals, which suggests that there is an alternative, nonlinear method of modelling this data. However, since most of the data appears to be in a random scatter about 0, we will proceed with the analysis as a linear model. Regardless, further studies may reveal the need for another type of model.

```
Residuals:
      Min       1Q   Median       3Q      Max
 -0.19200 -0.04198 -0.01039  0.04055  0.33707

Coefficients:
                Estimate Std. Error t value Pr(>|t|)
(Intercept)    0.4018437  0.0196989  20.399  < 2e-16 ***
inc.chal.ratio 0.3133548  0.0236932  13.226  < 2e-16 ***
ch_qual       -0.0138813  0.0027838  -4.987 1.06e-06 ***
inc.ID.ten    -0.0010799  0.0002799  -3.858 0.000141 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.06966 on 291 degrees of freedom
Multiple R-squared:  0.5147,    Adjusted R-squared:  0.5097
F-statistic: 102.9 on 3 and 291 DF,  p-value: < 2.2e-16
```

Figure 25: Summary of Model 2 on full dataset.
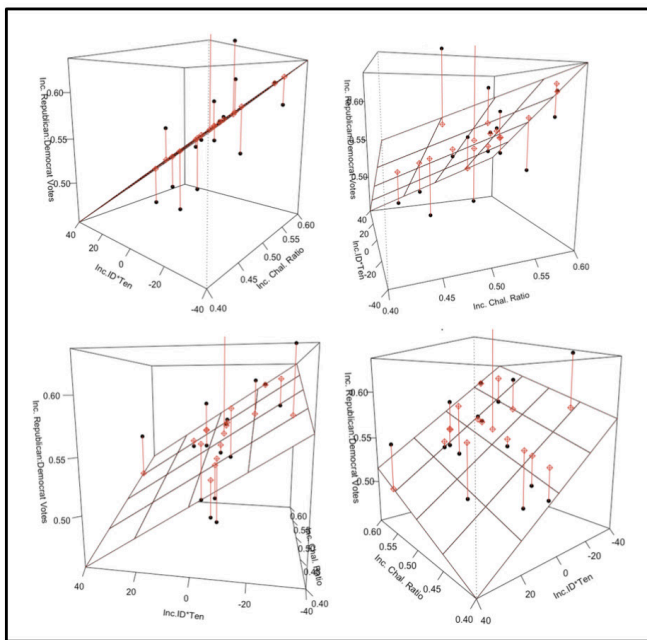
Figure 26: Model 2 full dataset, challenger no previous experience was a former
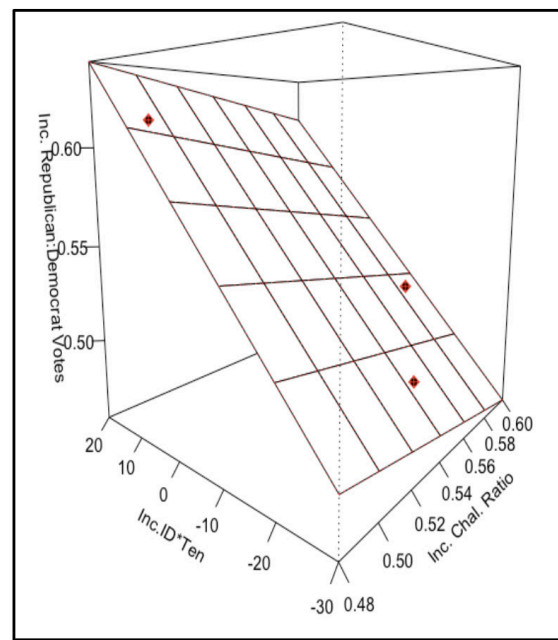
Figure 27: Model 2 on full dataset, challenger state legislator
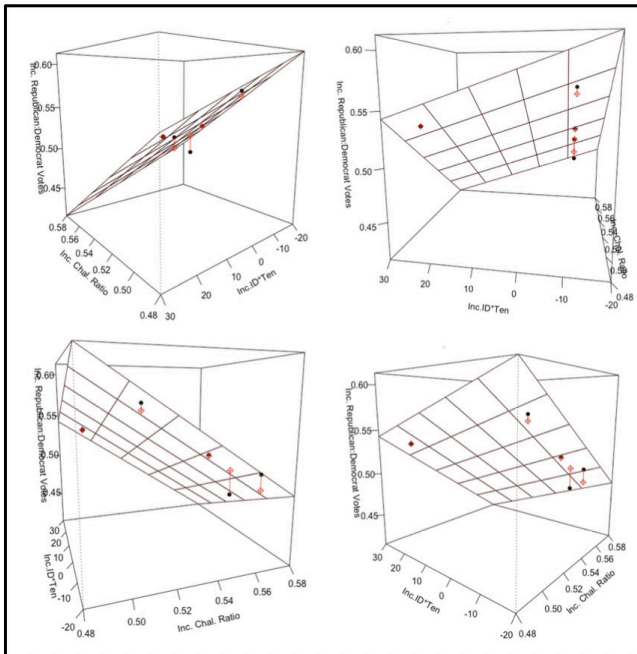
Figure 28: Model 2 Full dataset, Challenger former local elected official
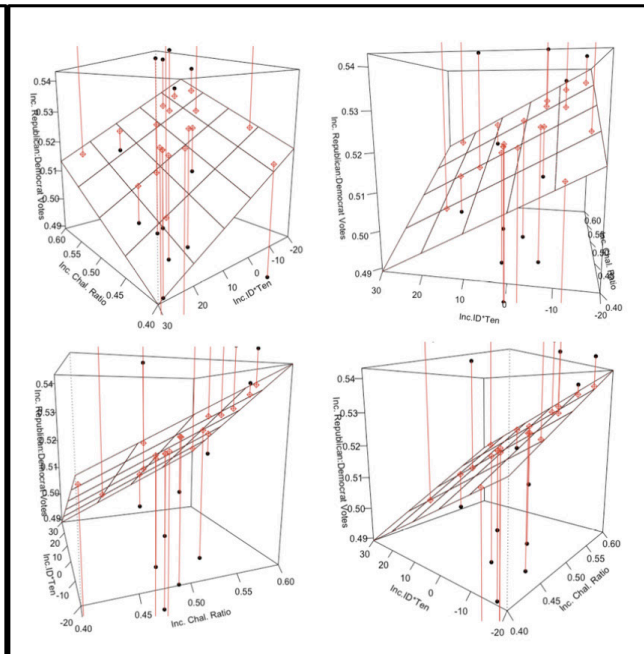
Figure 29: Model 2 on Full dataset, Challenger was Former State Governor
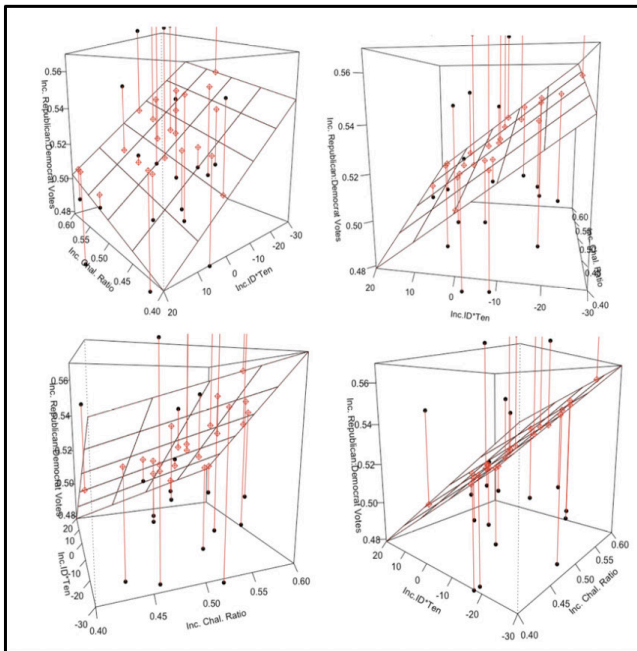

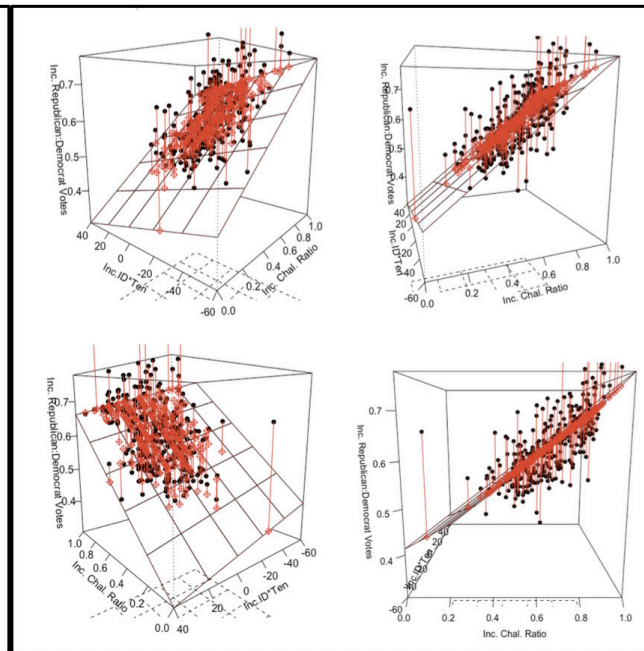Figure 30: Model 2 full dataset, Challenger Former Member of the House

Figure 31: Model 2 on full dataset, not including Challenger Quality Variable

```
Analysis of Variance Table

Response: inc_2p_share
            Df  Sum Sq Mean Sq F value  Pr(>F)
ch_qual      1 0.60453 0.60453 78.0729 < 2e-16 ***
inc.ID.ten   1 0.04440 0.04440  5.7335 0.01727 *
Residuals  292 2.26099 0.00774
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Figure 33: Anova Table for Model 1 on the full dataset

```
Analysis of Variance Table

Response: inc_2p_share
               Df  Sum Sq Mean Sq F value    Pr(>F)
inc.chal.ratio  1 1.30013 1.30013 267.913 < 2.2e-16 ***
ch_qual         1 0.12537 0.12537  25.835 6.665e-07 ***
inc.ID.ten      1 0.07224 0.07224  14.887 0.0001406 ***
Residuals     291 1.41217 0.00485
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Figure 34: Anova Table for Model 2 on the full dataset

Comparison of Partial F Statistics

To analyze my null and alternative hypotheses, I use partial F tests to compare my two models and their fit for the data. Figure 33 and Figure 34 give the Analysis of Variance tables for Model 1 and Model 2 respectively.

The partial F Test for the significance of the addition of inc.chal.ratio to our model can be calculated as follows:

Thus, this test shows that there

$$F = \frac{\left[\frac{(2.26099 - 1.41217)}{(292 - 291)}\right]}{(.00485)} = 175.0144$$

$$P - value \approx 0$$

is evidence of a significant difference in our ability to predict the ratio of Republican to Democrat votes for the incumbent with the addition of the regressor variable for the ratio of incumbent campaign spending to the sum of incumbent and challenger spending in a given race, as is done in Model 2.

Conclusion

In considering the effect of campaign spending on voter outcomes, the results of this study provide evidence supporting the claim that money does matter, at least as far as this dataset is concerned. When both the incumbent and the challenger spend similar amounts on their campaign, voter behavior appears to be best explained by the political party and amount of time that the incumbent has spent in office. This is a possible reflection of the interests of the electorate and the political experience of the challenger. In a representative democracy, one may interpret this in a positive light, because citizens want a representative who is competent and will represent their opinions well. However, when the role that money can play in an election is considered, voter behavior appears to be susceptible to this influence.

What does this mean for the validity of the American democracy? If money can play such a large role in choosing our representatives, how are we to ensure that those who lack substantial financial resources are heard in the same way that the wealthy are? While we each may have only one vote, how does money affect the political landscape, and change who we are voting for in the first place? How do we prevent our country's representative political institution from being replaced by an aristocratic one? What does this study mean for campaign financing reform, and how can we bring about change if the ballot itself is controlled by those who would not benefit from reform? There is no simple answer to these questions, but perhaps this study, as well as others examining this topic, can expose an unpleasant but existing truth. Maybe one day we can make the necessary changes to progress toward a more perfect union.

Biblography

1. Hogan, R. E. (2013), Campaign Spending and Voter Participation in State Legislative Elections. Social Science Quarterly, 94: 840-864. doi:10.1111/j.1540-6237.2012.00897.x

2. Zocalo Public Square (2016) http://time.com/4182502/campaign-finance-reform/

3. Data from Michael Peress' senate_expanded.dta.

Appendix

```
==================================================
Statistic        N    Mean   St. Dev.  Min    Max
--------------------------------------------------
year           295 1,989.844  6.360   1,980  2,000
st_south       295    0.220   0.415      0      1
st_pop         295    4.897   5.438   0.454  33.872
st_unemp       295    6.027   2.185   2.300  15.600
inc_2p_share   295    0.610   0.099   0.404  1.000
inc_pos        295   -0.017   0.312  -0.595  0.662
inc_spend      295    3.479   3.064   0.000  24.195
inc_tenure     295   12.186   8.065      0     42
inc_partyID    295    0.481   0.501      0      1
ch_spend       295    1.991   3.332   0.000  29.962
ch_qual        295    1.505   1.591      0      4
inc.chal_ratio 295    0.726   0.187   0.000  1.000
ID             295   -0.037   1.001     -1      1
inc.ID.ten     295   -1.576  14.545    -42     40
--------------------------------------------------
```
Figure 1: summary statistics for variables included in full dataset.

```
==================================================
Statistic      N    Mean   St. Dev.  Min    Max
--------------------------------------------------
year          69 1,988.783  6.528   1,980 2,000
st_south      69    0.174   0.382      0     1
st_unemp      69    5.936   2.384   2.300 15.600
inc_2p_share  69    0.533   0.057   0.424 0.700
ch_qual       69    2.449   1.595      0     4
inc.ID.ten    69   -3.145  14.157    -35    40
st_pop        69    5.060   5.807   0.511 32.683
--------------------------------------------------
```
Figure 4: summary statistics for initial selected variables in subset of data when incumbent and challenger spending is about the same.

	year	st_south	st_unemp	inc_2p_share	ch_qual	inc.ID.ten	st_pop
year	1.000000000	0.07439385	-0.56811949	0.02215834	-0.003192507	0.24725662	0.1927515
st_south	0.074393846	1.00000000	0.04306365	-0.03914999	-0.250872219	0.11899859	0.1713144
st_unemp	-0.568119491	0.04306365	1.00000000	0.12496767	0.026205554	-0.33093985	0.1357658
inc_2p_share	0.022158335	-0.03914999	0.12496767	1.00000000	-0.250462936	-0.21557229	-0.1101043
ch_qual	-0.003192507	-0.25087222	0.02620555	-0.25046294	1.000000000	0.08171087	0.1340203
inc.ID.ten	0.247256620	0.11899859	-0.33093985	-0.21557229	0.081710868	1.00000000	-0.0782815
st_pop	0.192751513	0.17131439	0.13576582	-0.11010431	0.134020262	-0.07828150	1.0000000

Figure 5: correlation matrix for initial selected variables in subset of data when incumbent and challenger spending is about the same.
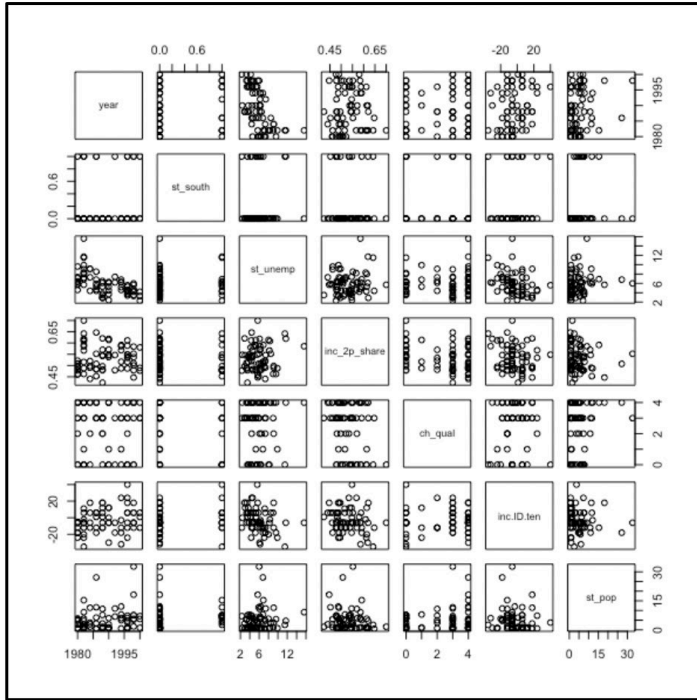
Figure 6: correlation plots for initial selected variables in subset of data when incumbent and challenger spending is about the same.
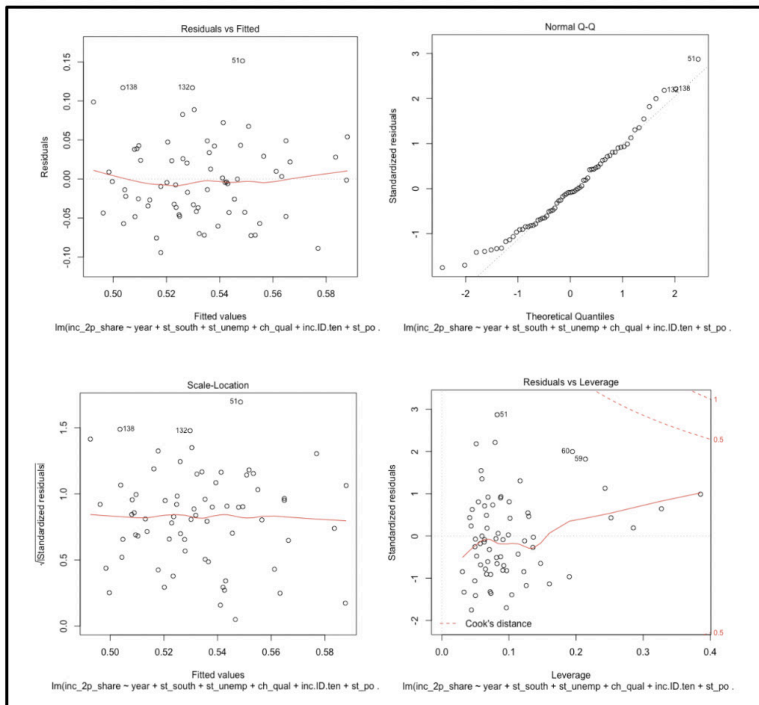

Figure 8: Diagnostic plots for rich model of selected variables when incumbent and challenger spending is about the same.
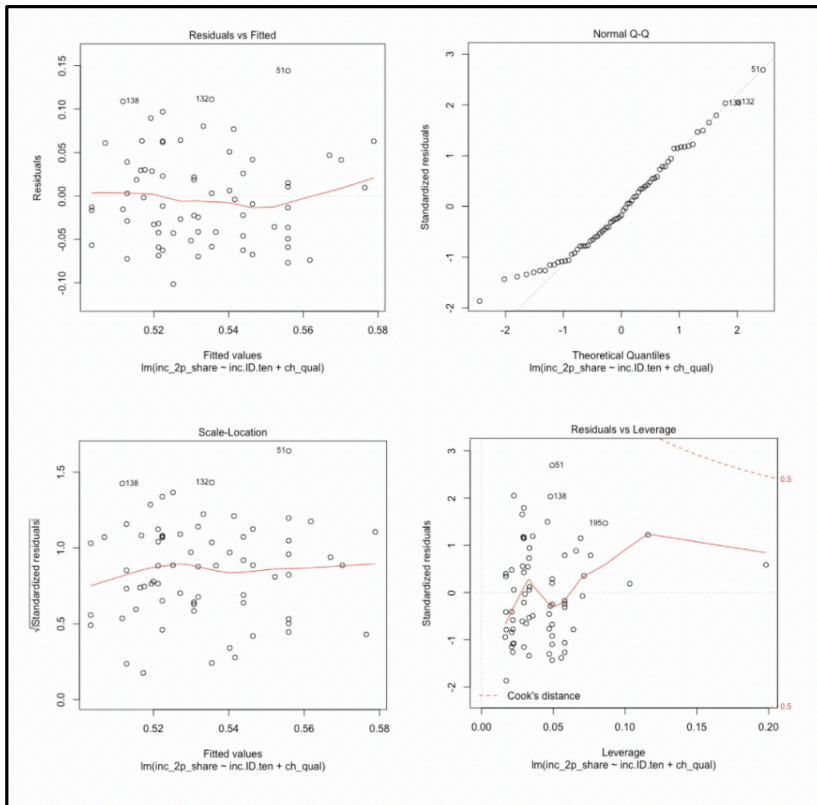
Figure 14: Diagnostic plots for linear regression of ratio of republican to democrat incumbent votes on Challenger Quality and Inc.ID.ten when incumbent and Challenger spending is about the same.
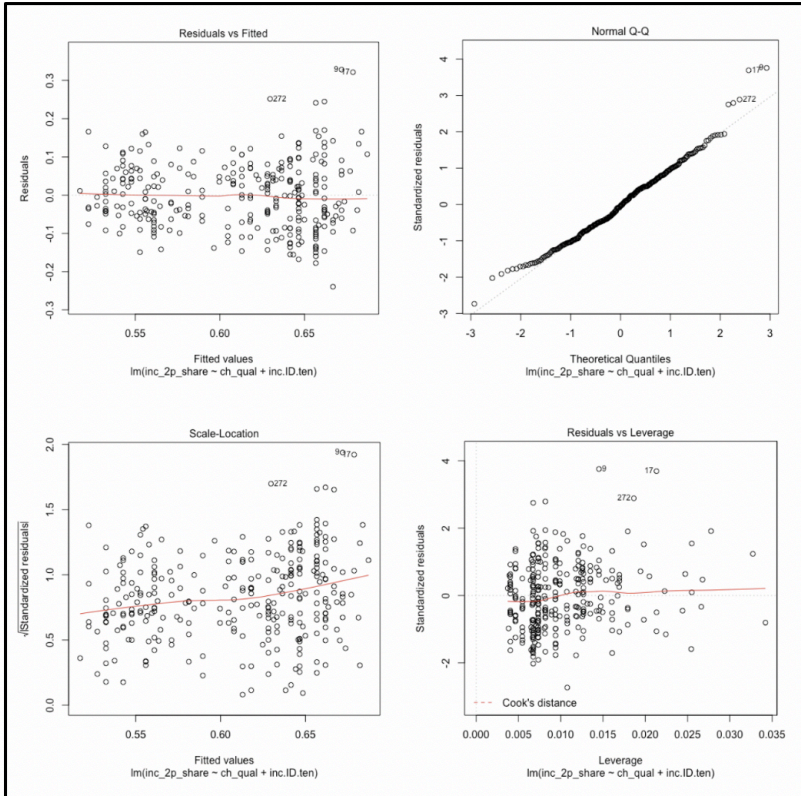
Figure 17: Diagnostic plots for Model 1 on full dataset

```
=====================================================
Statistic           N    Mean     St. Dev.  Min    Max
-----------------------------------------------------
s4.year             295  1,989.844  6.360   1,980  2,000
s4.st_south         295  0.220     0.415    0      1
s4.st_pop           295  4.897     5.438    0.454  33.872
s4.st_unemp         295  6.027     2.185    2.300  15.600
s4.inc_2p_share     295  0.610     0.099    0.404  1.000
s4.ch_qual          295  1.505     1.591    0      4
s4.inc.chal_ratio   295  0.726     0.187    0.000  1.000
s4.inc.ID.ten       295  -1.576    14.545   -42    40
-----------------------------------------------------
```

Figure 18: Descriptive statistics for potential variables for Model 2 for the full dataset

```
                 s4.year   s4.st_south   s4.st_pop  s4.st_unemp s4.inc_2p_share   s4.ch_qual s4.inc.chal_ratio s4.inc.ID.ten
s4.year          1.00000000  0.03366512  0.10010454 -0.57305800     0.01902941 -0.0580904470        0.12517364  0.1100609323
s4.st_south      0.03366512  1.00000000  0.11780301  0.13206041     0.09346137 -0.0712389150        0.05644135 -0.1073197589
s4.st_pop        0.10010454  0.11780301  1.00000000  0.10363808    -0.16033019  0.1733255374       -0.10808274 -0.0357368899
s4.st_unemp     -0.57305800  0.13206041  0.10363808  1.00000000    -0.01566800  0.0733285524       -0.04531628 -0.1225650943
s4.inc_2p_share  0.01902941  0.09346137 -0.16033019 -0.01566800     1.00000000 -0.4557933738        0.66842634 -0.1231732751
s4.ch_qual      -0.05809045 -0.07123891  0.17332554  0.07332855    -0.45579337  1.0000000000       -0.39685966 -0.0007550523
s4.inc.chal_ratio 0.12517364 0.05644135 -0.10808274 -0.04531628     0.66842634 -0.3968596613        1.00000000  0.0585874162
s4.inc.ID.ten    0.11006093 -0.10731976 -0.03573689 -0.12256509    -0.12317328 -0.0007550523        0.05858742  1.0000000000
```

Figure 19: Correlation Matrix for potential variables for Model 2 for the full dataset
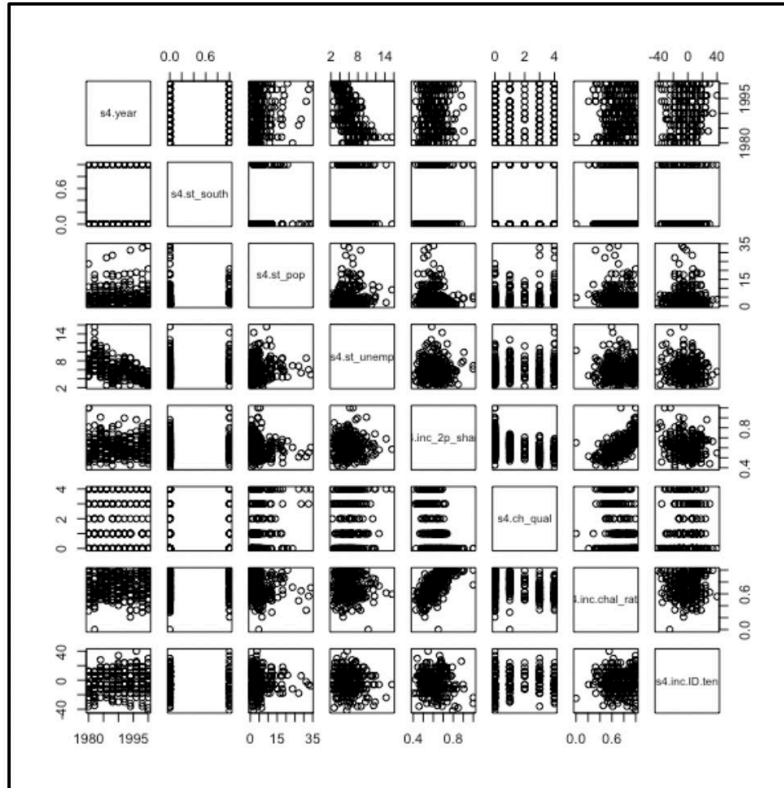
Figure 20: Correlation plots for potential variables for Model 2 for the full dataset
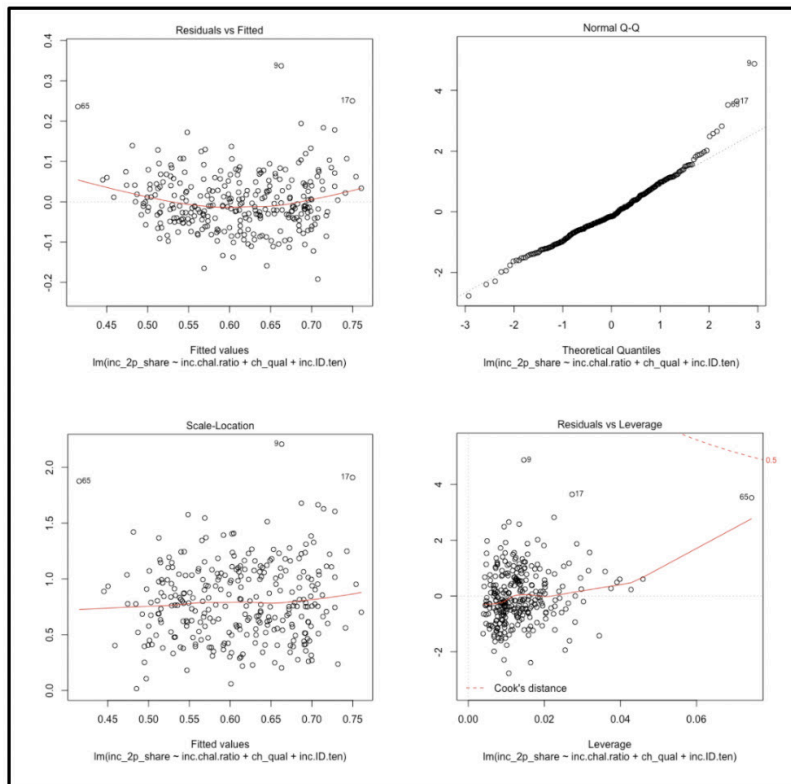

Figure 32: Diagnostic plots for Model 2 on Full Dataset

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