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The Effect of Natural Resource Control on Self-Determination Movement Success

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## ABSTRACT

With nongovernment actors becoming more prevalent in the modern day, one begins to ask what makes them successful. This thesis seeks to find what factors play into the success of self-determination movements (SDMs), with a particular focus on natural resources such as hydrocarbons and diamonds. Previous research on this topic is sparse, mainly focusing on the onset and duration of self-determination movements. Additionally, very little attention is paid to those who do not use violence; despite this, researchers appear to agree that hydrocarbons and diamonds do have an impact on self-determination movements. This research uses data from several datasets with information ranging from the geolocation of natural resources and ethnic groups to the accomplishments of 506 SDMs from 1945 to 2012. Through the use of multilinear regression, this research found that the control of natural resources such as hydrocarbons and diamonds positively impact the success of self-determination movements. Additionally, I also found that de facto states may have significantly different determinants of success compared to other types of SDMs.

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## Chapter 1

### Introduction

What factors play into a self-determination movement's success? Research done on this minimal at best. Many researchers tend to focus on the onset and duration of self-determination movements without any consideration for their resolutions. When resolutions are considered, the reasons for their successes or failures are largely ignored since self-determination movement success is seemingly rare in the post-WWII era. My thesis aims to investigate self-determination movement success and to provide a background for future study. Specifically, I focus on self-determination movements, loosely defined as ethnic groups seeking greater autonomy from a parent state, and what plays into the success of an SDM. I argue that natural resources play a major role in the success, with success defined as achieving greater autonomy from the parent state. Specifically, the control of diamonds and oil serves self-determination movements well. Several other factors play an important role in self-determination movement success as well such as the use of violence and the demands of an SDM.

This question is important to our understanding of self-determination movements as a whole. Through determining what makes an SDM successful, one can begin to understand why these nonstate actors operate the way they do. Additionally, knowing what makes self-determination movements successful can be pivotal to preventing calls for greater autonomy in the first place. If SDMs can mobilize effectively through the utilization of certain things such as oil and diamonds, then policymakers can work in regions containing these natural resources to make sure that ethnic minorities are content. Additionally, if the presence of natural resources in a region can impact the success of a self-determination movement, then this lends further credence to theories of ethnic grievances based on natural resources (Norman, 2003; Medani, 2011; Humphreys, 2005).

I both build on and depart from the literature that already exists on the subject of self-determination movements. Most of this literature focuses on either violent SDMs such as the Irish Republican Army or peaceful ones such as the Catalonian Independence Movement. Very few researchers look at the cross-section of both of these types of SDMs, which I examine.

Because of this division in the literature, mainly violent self-determination movements have been studied in relation to natural resources. I may also help establish if there is any interaction between violence and natural resources in relation to SDM success. Finally, as a major departure from self-determination movement literature, I will look at self-determination movements that become de facto states as successes of self-determination in some models. This is because de facto states are successful in acquiring autonomy from their parent states, but they fail to receive international backing for this autonomy.

I use data from several sources to analyze what contributes to SDM success. For data on self-determination movements, I use Sambanis et. al.'s (2018) SDM Dataset. Data pertaining to natural resources has been collected from two sources: the PETRODATA and DIADATA datasets (Lujala et al, 2007; Gilmore et al, 2005). Finally, to link the SDM Dataset to the natural resources, I use the Geo-referencing Ethnic Power Relations (GeoEPR) dataset (Vogt et al, 2015). To analyze these data together, they will be compiled in ARCGIS. Following this, I run multivariate analyses with self-determination movement success as the dependent variable, and the presence of hydrocarbons and diamonds within the SDM territory as the independent variables. I also use several control variables to account for violence, the stated goals of the self-determination movements, and how de-facto states influence the results.

My analysis illustrates that there is support for the theory that the control of diamonds and hydrocarbons by self-determination movements increase the likelihood of SDM success. This research also finds that considering de facto states as successes of self-determination may alter what factors play into SDM success.

## Chapter 2

### Literature Review

Why are some ethnic group's claims for self-determination more successful than others? The literature on this topic has failed to succinctly answer this question. This is due to a plethora of potential reasons. One of the first may be disagreement on what should be considered when analyzing self-determination. Some authors (Ayres and Saideman, 2000) argue that decolonization movements should be included in this work while others (Fearon and Laitin, 2003; Collier and Hoeffler, 2002; Humphreys 2005; and Ross 2004) argue that decolonization is a substantially different from the normal study of self-determination. Another issue facing the study of ethnic group success in self-determination comes from the cases used to examine the topic. Most authors tend to examine civil wars instead of the larger category of self-determination; additionally, these authors generally study the onset and duration of these conflicts instead of examining their conclusions (Ayres and Saideman, 2000; Fearon and Laitin 2003; Collier and Hoeffler 2002; Humphreys 2005; Ross 2004). This has led to conflicting accounts by various researchers as to what is important to a self-determination movement and how it progresses.

Broadly speaking, a self-determination movement is a "movement by one or more political organizations that are connected to an ethnic group and make claims for increased self-determination from a state" (Sambanis et al, 2018, 658). With this definition, it becomes clear that a wide variety of organizations, from the violent Irish Republican Army to the Catalanian independence movement are self-determination movements ("Real Irish Republican Army," 2019; "Catalonia's Bid for Independence from Spain Explained," 2019). This variety of actors



paired with few cohesive datasets on the topic may contribute to the lack of strong results in regard to self-determination movement success.

With such a broad range of actors, it makes sense that defining what constitutes the success of a self-determination movement is a difficult endeavor. While there are several factors that one can consider such as the aims of the movement, the level of autonomy for an ethnic group before and after the movement, and concessions granted by a state to a movement, these factors do not necessarily capture the entire range of possible outcomes for a movement (Sambanis et al, 2018, 666). When examining the literature on self-determination movements, it becomes increasingly difficult to discern what can be considered a success and what could be considered a failure. This is due to a lack of focus on the termination of self-determination movements paired with weakly defined parameters for what constitutes a success.

Several factors are discussed in the literature which could impact the success of a self-determination movement. Many of these aspects can be broken down into two large sub-categories: ethnic issues and economics. Most authors generally side with one of these options or the other. Writers such as Collier and Hoeffler (2002) and Ross (2004) generally argue that self-determination is more reflective of a group's desires to attain a better economic standing in the world as opposed to addressing significant ethnic grievances. This argument can be well applied to Catalonia who sought to gain greater control over their economy by leaving Spain ("Catalonia's Bid for Independence from Spain Explained," 2019).

Writers such as Ayers and Saideman (2000), Norman (2003), Medani (2011), and Humphreys (2005) all argue that self-determination movements are caused more by ethnic grievances. These authors generally find that grievances over the mistreatment of an ethnic minority or the misappropriation of resources by a parent state are more likely to trigger a self-

determination movement. This can be seen in the case of the Irish Republican Army which sought to free Ireland from Britain due to the vast mismanagement and neglect felt by the Irish people (“Real Irish Republican Army,” 2019).

Ethnic issues can have wide ranging impacts on self-determination movements. If an ethnic group is dominant in a country, then smaller ethnic groups are more likely to rebel (Collier and Hoeffler, 2002, 8-9). Furthermore, small ethnic groups can create long and destructive civil conflicts despite being lower in numbers (Fearon and Laitin, 2003, 88). However, if an ethnic minority well-dispersed through a country, there is less of a chance for a self-determination movement to form (Ayres and Saideman, 2000, 110). Norman (2003, 195) argues that secessionist movements must have a geographically concentrated ethnic minority seeking to reclaim their homeland to be viable. Additionally, the presence of a diaspora can increase support and funding for a self-determination movement abroad (Collier and Hoeffler, 2002, 8-9). These issues are only compounded when there is a lack of democratization in a country (Medani, 2011, 147). If this is the case, there can be a lack of transparency from the government which will create distrust from ethnic minorities.

It has been argued that low GDP per capita, slow GDP growth, and high dependence on primary commodity exports increase the risk of violent conflict (Collier and Hoeffler, 2002, 8-9). Additionally, less development in a state and an agrarian economy are indicators of civil conflict (Humphreys, 2005, 534). When an ethnic group feels as if there is a lack of opportunity in the country they are in, they are more likely to seek greater autonomy (Fearon and Laitin, 2003, 75).

Natural resources also appear to play a major role in self-determination movement success. Two resources are extremely prominent within the literature: hydrocarbons and diamonds. Work done on the impact of hydrocarbons is inconclusive. Authors such as Collier

and Hoeffler (2002) and Ross (2004, 61-64) argue that oil plays an important role in civil conflict due to its ability to be sold or used as a bargaining chip through oil futures. However, authors such as Humphreys (2005, 522) point out that the data used by Collier and Hoeffler (2002) and many other studies include the reexportation of oil, which artificially makes some economies look more dependent on the resource. This has the negative outcome of blurring the lines between oil that is extracted in a country and oil that travels through the country from international trade. Going further into the issue of oil, authors such as Humphreys (2005, 534) argues that oil futures and war booty contracts are insignificant to self-determination movement outcomes while authors such as Ross (2004, 61-64) and Vines (2002, 2) argue that these concepts in addition to bribes play a major role in determining the duration and success of a movement.

The literature on diamonds is much less divisive. Primarily, the argument on diamonds rests on what kinds of diamonds play a role in self-determination movements. The extraction of primary diamonds requires extensive machinery to achieve while secondary diamonds are far easier to acquire (Gilmore et al, 2005, 261). Since secondary diamonds are easily extracted through activities such as panning, they are lootable and can be directly sold by self-determination movements. This should make secondary diamonds more valuable to a self-determination movement and aid in funding their success.

Other natural resources most likely play a role in self-determination movement success as well. It has been noted that resources such as illicit drugs have initiated and prolonged conflicts (Ross, 2004, 46). Gemstones similarly appear to play a role in initiating conflicts (Ross, 2004, 46). Precious metals such as nickel, phosphorus, chromium, tantalite, and gold may play important roles in self-determination movement onset, duration, and success as well; however, at

this time very little work or cohesive data exists for these resources (Aallaoui 2019; Gilmore et al, 2005, 260; Vines, 2017, 32).

There has also been some limited discussion on whether timeframes play an important role in secessionist and civil war movements. Fearon and Laitin (2003, 75) find that states formed between 1945 and 1970 are where civil conflict is rooted, and not the states that generated from the termination of the Cold War. Vines (2002, 1) argues that post-Cold War rebellions have been significantly more violent due to the loss of international aid that was provided by the USSR and the United States. Without this steady stream of income, they have had to resort to extraction of resources, kidnappings, and bribery (Vines, 2002, 2).

Finally, the creation of de facto states deserves some attention. These actors are separatist groups that have successfully broken away from their parent state but have failed to gain international recognition (Florea, 2016, 338). These special cases of self-determination movements come with their own unique set of issues. Since the international community does not recognize them, it is difficult to determine whether they have successfully achieved their goals. This lack of recognition has led most researchers to declare that de facto states are failures of self-determination (Florea, 2016, 338). Given that they functionally serve as a state for the land and people in their jurisdiction, they should be considered successes (Florea, 2016, 338).

## Chapter 3

### Theoretical Approach

This thesis seeks to answer the question: how does a self-determination movement's control of natural resources such as diamonds and hydrocarbons impact the movement's success? As shown through the literature, several other factors are going to have an impact on the success of a self-determination movement. Aspects of a self-determination movement such as the use of violence and the claims being put forward by a movement all will contribute to the outcomes of success or failure as well.

To begin, it is important to consider what is covered by the definition of a self-determination movement. Sambanis et al. (2018, 658) defines a self-determination movement as "movements by one or more political organizations that are connected to an ethnic group and make claims for increased self-determination from the state." Sambanis et al. (2018, 658) also states that a self-determination movement must show legitimate action toward increasing autonomy from central authorities of a state or region. In other words, they must be politically active. This definition excludes decolonization movements since colonies are not incorporated directly into the state the same way as other provinces and territories would be (Sambanis et al, 2018, 658). Additionally, movements such as Enosis or other state unification attempts are not defined as self-determination movements unless they are first separating from another state. Finally, interstate organizational breakdowns such as Brexit are not seen as self-determination movements since the member states of the European Union do not make up a unified country (Sambanis et al, 2018, 658-659). This definition covers the full scope of what this thesis intends to study.

Considering the timeframe of study for this topic is also important. This thesis intends to examine self-determination movements that continued past or began in 1945 to the present. Since World War II, the concept of nation-states has been the international standard for what should be considered a country. Prior to this time, it becomes increasingly difficult to discern what a state is or what constitutes a self-determination movement since institutional standards were quite different (Florea, 2016, 337).

After establishing the unit of analysis for this thesis, one must consider the dependent variable. The success of a self-determination movement has traditionally been measured in binary terms as a full success or full failure (Florea, 2016, 338). I find this characterization of success and failure to be arbitrarily limiting. Considering the success of a self-determination movement on a continuum is a much more realistic approach to the world. This also allows one to take into consideration the aims of some self-determination movements that do not necessarily seek full independence but a greater degree of autonomy from the parent state.

On the lower end of self-determination movement success are concessions on cultural rights or increased central state access (Sambanis et. al, 2018, 666). While these concessions are an important step for a self-determination movement, they often do not result in any greater degree of autonomy for the group. Directly receiving greater autonomy in the form of stronger local governance or new governing structures would represent a stronger form of success. This kind of success can be seen in regions such as the Greenland (Baldacchino, 2004, 77). The full expression of self-determination is becoming a sovereign entity from a parent state. This means that both internationally recognized states and de facto states are considered the highest form of success in a self-determination movement. This is a significant departure from traditional works on self-determination movements that would consider de facto states failures of self-

determination. A lack of international recognition should not be the make-or-break factor for success. This is especially true given that international organizations such as the United Nations and established states have strong incentives to discredit de facto states and secessionist movements as a whole since they are a threat to national cohesion (Nayar, 1975, 326-327).

The explanation for why de facto states should be considered a success of self-determination becomes evident as one considers how these entities operate in the world. They serve as a state for the land and people in their jurisdiction, much as any normal state would (Florea, 2016, 338). Many de facto states will also engage in state building after they have gained military control over a territory (Florea, 2016, 346). This makes a de facto state much less likely to reintegrate with the parent state. Additionally, if a de facto state receives foreign aid, it is less likely to be recognized by other states for political reasons (Florea, 2016, 349). Due to this, even if the actor can effectively govern their territory without the influences of their parent state, they are still denied the formal title of state. This can be seen in de facto states such as Transnistria, where the entity engages in trade with Russia, the European Union, and its parent state Moldova (Dembinska and Merand, 2019, 16-17). The de facto state also engages in state defense, infrastructure projects, and social security which make it clear that Transnistria has created its own government structure free of Moldova (Dembinska and Merand, 2019, 16-17). The experience of Transnistria is very similar to many other de facto states throughout the world.

With both self-determination movements and their success explained, it is now important to consider how a self-determination becomes successful. I argue that natural resources play a major role in the success of self-determination movements. It has been argued that the presence of natural resources in a self-determination movement's land will agitate secessionist tendencies

of an ethnic group (Collier and Hoeffler, 2002, 7). This is because oftentimes when a state gains access to a natural resource in the land of an ethnic minority, the state often displaces or ignores the minority's interests in order to extract the resources. Repression of groups in resource-rich areas appears to be a major driving force behind secessionist movements (Ross 2004; Collier and Hoeffler 2002). This has been reinforced by the findings of Ross (2004, 61-63) that show that the presence of oil, gemstones and illegal drugs influence the onset and duration of civil wars. An example of this playing out is in the successful self-determination movement of South Sudan, where oil-rich regions between the movement's borders and the parent state prolonged the conflict between the two actors (Medani, 2011, 136). I believe that both control and concentration of natural resources play a role in the success of SDMs.

If the ethnic group in a region does have control over the production and sale of natural resources in their area, they will feel more financially independent from the rest of the state. Higher levels of financial independence and success can generate feelings of unfairness among minority groups in an area. This was the case in Catalonia in its bid for independence in 2017 ("Catalonia's Bid for Independence from Spain Explained", 2019). But whereas this region had businesses that could easily move out of the region, natural resources must be produced from specific locations. This gives secessionists who can control these resources leverage against their detractors (Vines, 2002, 2). This financial advantage also would allow these actors to fund their secessionist activities (Vines, 2002, 1).

Ha<sub>1</sub>: Control of hydrocarbons by self-determination movement → ^ Increased success of movement

Ha<sub>2</sub>: Control of diamonds by self-determination movement → ^ Increased success of movement



From the literature, two natural resources are extremely prominent: hydrocarbons and diamonds. Both of these resources stand to greatly prolong a movement's duration and potentially help self-determination movements succeed in reaching their goals. The form that these resources take play an important role in how useful they are to a movement. For oil, both natural gas and oil need extensive machinery to be properly extracted for use (Thieme et al, 2007, 9). Due to this, oil and natural gas are much harder for self-determination movements to seize and directly use. Instead, organizations may choose to collect bribes or ransoms from oil companies to prevent their production from being harmed (Vines, 2002, 2). Self-determination movements may also sell oil and natural gas futures to companies in an attempt to fund their activities once they control a region that contains these resources (Ross 2004, 61-63). It is important to note, however, that the research done on oil and its relationship to self-determination movement success has been flawed. For example, research done by Collier and Hoeffler (2002) use data that include the re-exportation of oil, which artificially makes some economies look more dependent on the resource (Humphreys, 2005, 522). Additionally, some researchers argue that oil futures and other war booty contracts are insignificant to the duration or success of self-determination movements (Humphreys 2005, 534).

Diamonds are an equally interesting resources to examine in the context of self-determination movements. While the extraction of primary diamonds still requires extensive machinery much like oil and natural gas, secondary diamonds are easier to acquire (Gilmore et al, 2005, 261). Since secondary diamonds are easily extracted through activities such as panning, they are lootable and can be directly sold by self-determination movements. This allows the

movements to easily fund their activities which could allow self-determination movements to be more successful.

It can also be seen that when a self-determination movement has too high of a percentage of a state's natural resources, the parent state is much more likely to fight harder to retain that territory. This can be seen in regions such as Biafra. Biafra contained Nigeria's first oil well and the vast majority of the oil wells in the country (Oduanya, 2020). Because of this, the Nigerian government fought quickly and ferociously to quell the separatist movement in the region (Nayar, 1975, 323-324).

Ha<sub>3</sub>: ^ Concentration of natural resource wealth in a self-determination movement's territory → v decreased success of movement

It is important to consider that other natural resources may be important to this work as well. From the literature, one can find mentions of timber, water, and precious metals among other things (Ross, 2004; Aallaoui, 2019). While these resources may be important in determining the outcome of self-determination movements, they will not be covered in this study. This is because while important, they do not seem to have the same prevalence as hydrocarbons and diamonds. Additionally, for practical purposes the inclusion of several more natural resources would increase the complexity of this work beyond the scope of what it is intending to achieve.

Moving away from the topic of natural resources, several other aspects of self-determination movements must also be measured for this study to be explanatory. One of the biggest aspects of self-determination movements is whether or not they choose to use violence to meet their aims. Including the use of violence in this research is important since violence has important public perception consequences. This can be seen in the case of Basque terrorism

where ETA group became too violent and lost the favor of the Spanish people ending their chances of success (“ETA ten years on,” 2021). Alternatively, violence can show a willingness to commit to greater autonomy or independence from a self-determination movement. This could be seen in the case of Bangladesh’s independence movement when a war for independence sparked support from other countries in the region (“Bangladesh profile – Timeline,” 2019).

Another important factor in determining the success of a self-determination movement are the goals of the movement. While this may seem obvious, the interests of self-determination movements varies from organization to organization. Many self-determination movements seek no more than greater autonomy within a country. Such was the case in Switzerland when the Jurassians lobbied the government for the creation of their own canton (Sambanis et. al, 2017, 5). Many other groups seek full independence as well such as the Catalonians or Biafra (“Catalonia's Bid for Independence from Spain Explained,” 2019; Nayar, 1975). These varying interests translates into different levels of success for groups. Greater autonomy for the Jurassians would be a much bigger success than it would be for the Catalonians.

To summarize, my hypotheses state that the control of both hydrocarbons and diamonds should increase the chances of success for a self-determination movement; however, if an SDM has too high of a concentration of natural resources, a parent state may work harder to prevent the SDM from gaining greater autonomy, thus decreasing the success of an SDM. These hypotheses are further summarized below:

Ha1: Control of Hydrocarbons by self-determination movement  $\rightarrow$   $\wedge$  Increased success of movement

Ha2: Control of Diamonds by self-determination movement  $\rightarrow$   $\wedge$  Increased success of movement

Ha3: ^ Concentration of natural resource wealth in a self-determination  
movement's territory → v decreased success of movement

## Chapter 4

### Analytical Approach

As previously described in the theory section, there are many potential links between natural resources and self-determination movements. In order to test the hypothesized links between self-determination movements and natural resources, a model must now be constructed. In building this model, I hope to find a meaningful relationship between self-determination movements and natural resources. In particular, I believe that if a self-determination movement has natural resources, then they will be more successful. In order to test the hypotheses laid out in the theory section, I will use several ordinary least squares multivariate regressions to test for any significant relationships.

To best understand SDM success, I will analyze data at the level of the self-determination movements themselves. This is because the boundaries of these ethnic groups will make it easy to determine whether there are natural resources in their territory, and which caches are readily available to them. Contrast this to other available sources of data on natural resources. The easiest source on resources comes at the state level; however, states are too large for this research. This is because self-determination movements do not occupy the entirety of a state. Due to this, using data from the state level could generate several type one errors since many states have several resource caches, but self-determination movements do not always align with the resource laden regions of a country. An alternative to this could be to break down states into smaller data points such as counties, but this comes with its own major setbacks as well. Counties and other smaller governmental territories do not necessarily contain all of a self-determination movement or all of a resource cache in a country. Because of this, measuring at levels smaller than the self-determination movement could cause many SDMs and resource caches to be double counted. Measuring at the self-determination movement level will allow for the least amount of double counts or type one errors with the data available for use. The SDMs will also be tracked through time to observe how the discovery of new diamond and hydrocarbon production centers may impact the success of the movement. This would make the final unit of analysis as an SDM-year. There are 102 unique SDMs and 3,527 data points across all SDM-years.

With the unit of analysis established, one can then begin to examine how the variables are going to be measured and what data sources they come from. The first variable of interest is the dependent variable: Self-determination movement success. For success, I plan to use data collected by Sambanis et. al (2018, 666). The variable is ordinal on a zero to three scale. Zero will represent no accommodations given to an SDM while three represents full independence. One represents concessions given on cultural rights or concessions on central state access. Two represents gaining greater autonomy.

With the dependent variable well defined, it is now time to examine the independent variables for this research: hydrocarbons and diamonds. Hydrocarbons consist of oil and natural gas for the purposes of this study. The presence of hydrocarbons will be measured as a binary variable, with 0 being no presence of oil or natural gas and 1 being the presence of oil and/or natural gas. Offshore hydrocarbons will not be included in this study since territorial waters are not considered when determining the land of an SDM. This data is sourced from the PETRODATA dataset (Thieme et al, 2007, 9). In addition to the presence of hydrocarbons, the average global oil price measured in 2022 US dollars (McMahon, 2022). This will indicate how much money per barrel of oil a self-determination movement could receive to fund their activities. The production of hydrocarbons will also be accounted for since a known reserve may not necessarily be producing any resources. Active production of hydrocarbons will be coded 1 for active production and 0 for no known production. I expect to find that these measures related to hydrocarbons will have a positive relationship with SDM success.

The other natural resource that will be accounted for is diamonds. This data be sourced from the DIADATA dataset (Gilmore et al, 2005b). To account for the differing levels of ease at which one can extract various kinds of diamonds, the presence of diamonds will be coded on a zero to four scale with zero lacking any diamonds and four for secondary diamonds such as alluvial diamonds that are easily extractable and thus lootable (Gilmore et al, 2005a, 261). One represents the presence of diamonds but of an unknown type, two for marine diamonds which require specialized extraction equipment, and three for primary diamonds such as kimberlite which require extraction equipment. In order to ensure that a diamond mine is actually producing, a variable for production was also incorporated into this study. This is an ordinal variable with zero representing no production, and then for each diamond mine within an SDM's

territory that is producing, the variable will increase by one. I also expect that these diamond production variables will have a positive relationship with SDM success.

This research also requires several control variables to ensure that other well-known influences on SDMs are not underlying the results. All control variables were sourced from the SDM Dataset (Sambanis et al, 2018). The first control variable of interest is the stated goals of the SDM. This will be measured on a one-to-four-point scale with one being a call for greater autonomy in a state and four being an irredentist claim where the self-determination movement seeks secession and then merges with another state. Two represents a sub-state secession where the self-determination movement wants separation from a pre-existing autonomous region but does not want to leave the parent state. Three represents the claim of independence from the parent state. This coding scheme is used in Sambanis et al.'s (2018, 666) work.

The next control variable is the use of violence by an SDM. This variable will be coded as a 1 if the SDM engaged in violent actions and 0 if it did not. The definition of violence is synonymous with the Sambanis et al (2018) definition.

The final control variable that will be used is a dummy variable indicating whether a self-determination movement is also a de facto state. If an SDM is a de facto state, then it will be coded as a one, if it is not, then it will be coded as zero. For quick reference, all the variables listed above as well as their coding are reported in Table 1.

**Table 1: Variables**

Type of Variable	Variable Name	Coding	Numerical Meanings
Dependent	SDM Success	Ordinal 0-3	0-No Concessions Given 1-Greater Cultural Rights or Central State Access 2-Greater Autonomy 3-Independence
Independent	Presence of Oil	Binary	0-No Oil Present 1-Oil Present
Independent	Oil Production	Binary	0-No Oil Production 1-Oil Production

Independent	Price of Oil (In 2022 US Dollars)	Continuous	Price of Oil
Independent	Type of Diamonds	Ordinal 0-4	0-No Diamonds 1-Diamonds of an Unknown Type 2-Marine Diamonds 3-Primary Diamonds 4-Secondary Diamonds
Independent	Production of Diamonds	Discrete 0-3	For every one-unit increase, there is one additional active diamond mine.
Control	SDM Stated Goals	Ordinal 1-4	1-Seeking Greater Autonomy 2-Seeking Own Governing Region 3-Seeking Independence 4-Irredentist Claim
Control	Violence	Binary	0-Has Not Used Violence 1-Has Used Violence
Control	De Facto State	Binary	0-Not a De Facto State 1-Is a De Facto State

In order to link each variable to each observation, ArcGIS must be used. This is because the diamond and hydrocarbon datasets are not necessarily attached to any state, county, or region that can be meaningfully combined with the self-determination movements. PETRODATA and DIADATA also handily come with shapefiles that can be easily managed in the ArcGIS software. Unluckily, the SDM dataset does not. In order to place the self-determination movements on the map, a transitional data known as the Geo-Spatial Ethnic Power Relations (GeoEPR) dataset was used (Vogt et al, 2015). This dataset provides polygon shapefiles for politically relevant ethnic groups. In order to combine the GeoEPR shapefiles and the SDM Dataset, an intermediary dataset was created since the GeoEPR and SDM use different naming conventions for the ethnic groups. Once the SDMs and GeoEPR were merged, it then became



possible to overlay the SDMs with the DIADATA diamond production sites and the PETRODATA hydrocarbon production sites. ArcGIS then produced a dataset containing the relevant combinations of SDMs, hydrocarbon production centers, and diamond production centers.

Since the SDM dataset is a timeseries, and DIADATA and PETRODATA are not, DIADATA and PETRODATA had to be expanded out by year after merging with the GeoEPR. Additionally, SDM territories containing multiple diamond or hydrocarbon production sites had to be condensed so that multiple cases of the same SDM in the same year were not present. If an SDM had more than one diamond mine and these mines produced different types of diamonds, then they were condensed based on diamond type since this is relevant to the study. This data expansion and consolidation was conducted through the use of R programming software.

With all the variables defined and combined, it is important to consider where the variation in this study will be coming from. This variation is two-fold. The first form of variation is through time. The cases range from 1945-2012. Throughout this timeframe, natural resources that exist within SDM territories are discovered. Additionally, the change in global oil prices represent a change through time. Variation through cases will occur through the varying levels of success that the self-determination movements experience. 102 unique SDMs exist within this dataset, with each SDM existing within this time frame for an average of 34.6 years. Case variation will also occur through the presence of hydrocarbons and diamonds since different SDMs may or may not have diamond or hydrocarbon production sites.

Now that all the information regarding the variables has been laid bare, it is now time to discuss the model specifications that will be used. I will use an ordinary least squares model to examine these data. In order to account for the potential continuity over time for a given group, I will use clustered standard errors with clustering occurring around the group variable. In terms of fixed effects, my primary results will not feature them. This is because variation within the model is low. Due to this, adding fixed effects may not be appropriate. Additionally, when fixed effects are implemented, statistical significance within the model does not substantially change. These results will be displayed in tables created using the R package Stargazer (Hlavac, 2018).

Before I proceed with analysis, it is important to consider the limitations of this work. One limit of the PETRODATA dataset is its coding of the hydrocarbon polygons. This dataset combines hydrocarbon basins that are less than 30,000 meters together and puts a 30,000-meter

buffer zone around production sites. Additionally, some hydrocarbon basins were trimmed near international borders, meaning that some hydrocarbon sites are slightly smaller than they should be. This coding of the shapefile polygons could create both type I and type II errors given the various modifications made to the hydrocarbon production sites. This means that some SDMs may be miscoded as having hydrocarbons when they should not or not have hydrocarbons when they should. These errors could result in a distortion of how hydrocarbons are dispersed among SDMs in reality. Since DIADATA consists of point data rather than polygon data, this is not a problem for diamonds. Another limitation of this work is confirming the actual control of natural resources. I make the assumption that since natural resources exist within an SDM's territory that they are controlled by that group. In order to accurately test for this, one would have to find evidence through news stories or other indicators of legitimate control, which is outside the scope of this study.

A further limitation of this study is that only diamonds and hydrocarbons are being examined when several other natural resources could have an impact on SDM success. Testing for the presence of other natural resources is important, but there is a lack of useful resource data that is not already attached to rebel groups (Rebel Contraband Dataset, for example). Since these resource data are already attached to rebel groups and not disaggregated from them, they would favor armed SDMs over non-rebel SDMs and potentially skew the results in favor of those using violence or having claims of outright secession (Walsh, 2019). One notable exception to this is the GEMDATA (Lujala, 2009), created by the authors of DIADATA and PETRODATA. This dataset could be incorporated into this study but lacks the literary significance of diamonds, hydrocarbons, timber, and other precious metals. For this reason, it was not included. However, both research into how gemstones and other natural resources may impact self-determination movement success is a good source for future study in this topic area.

## Chapter 5

### Results and Analysis

As described above, nine different variables are used to examine the relationship between the success of self-determination movements and their control over natural resources. In order to paint an accurate depiction of the data that is being used, I am going to go through each variable and explain them one by one. It is important to note again that the unit of analysis is the SDM-year. Because of this, the 3,957 data points used in this research is clustered by SDM to ensure across time trends are accounted for when determining significance levels. With this in mind, the description of the variables can begin. It is important to examine the distributions of these variables to better understand the results. Several of the variables used in my thesis have a strong right skew. In other words, the variation between cases is low. This is important to keep in mind when looking at the regression results that are presented later. A table of these summary statistics may also be found in Table 2.

**Table 2 Summary Statistics**

Variable	Observations	Mean	Standard Deviation	Median	Upper Value	Lower Value
Accommodations (Base)	3597	0.1654	0.5431	0	3	0
Accommodations (De Facto as Success)	3597	0.3492	0.8731	0	3	0
Accommodations (Binomial)	3597	0.0898	0.2859	0	1	0

Accommodations (De Facto as Success Binomial)	3597	0.1493	0.3564	0	1	0
De Facto State	3597	0.0648	0.2462	0	1	0
Stated Goals	3597	2.002	1.0285	2	4	1
Use of Violence	3597	0.6130	0.4871	1	1	0
Hydrocarbon Presence	3597	0.4684	0.4991	0	1	0
Hydrocarbon Production	3597	0.0170	0.1291	0	1	0
Average Annual Oil Price Per Barrel (2022 USD)	3592	53.45	28.64	41.70	127.83	20.55
Diamond Production	3597	0.0336	0.2694	0	3	0
Diamond Type	3597	0.3278	1.0439	0	4	0

Beginning with the accommodations variable, this varies between 0 and 3 with a mean of 0.1654 and a standard deviation (SD) of 0.5431. Given that the median is 0, this indicates that the majority of SDMs receive no concessions. It is important to note that 61 points are at a 1, 252 points are at a 2, and 10 points are at a 3, compared to the majority of 3,274 at 0. I also created binary variables to represent any success or any failure. When examining the binary variable for the basic accommodation variable, the mean is 0.0898 with a standard deviation of 0.2859. There are 3,274 failures (0) and 323 successes (1).

With the dependent variable accurately depicted, one must now examine the independent variables. To begin, the presence of hydrocarbons is relatively well-distributed with 1,685 data points having hydrocarbons (1) while 1,912 do not (0). This gives the variable a mean of 0.4684 with a standard deviation of 0.4991. This means that just under half of the SDMs in this time period control a hydrocarbon production site. Whereas this variable indicates that there is a presence of hydrocarbons, the actual known production of hydrocarbons paints a very different picture. Only 61 cases have hydrocarbon production while 3,536 have no known production. This shows that while many SDMs may have hydrocarbon sites, very few of these actually generate resources. The price of oil, which serves as an indicator of how valuable oil is in a given year, has a mean of \$53.45 with a standard deviation of \$28.64. The high value is \$127.83 while the low value is \$20.55. This variable appears normally distributed and is applied to SDMs across time. However, it is important to note that overall oil prices have increased over time, even when adjusting for inflation.

Shifting to diamonds, 3,524 data points have no diamond production, while 49 have 1 producing diamond mine and 24 have 3 producing diamond mines. There are no cases of SDMs having two producing diamond mines. Yet again, this shows that most SDMs across time do not have diamond mines. This puts the mean at 0.0336 with a standard deviation of 0.2694. When looking at the types of diamonds present, 3,268 have no diamonds, while 137 cases have primary diamonds (3) and 192 have secondary diamonds (4). No cases have unknown (1) or marine (2) diamond types. This variable has a mean of 0.3278 and a standard deviation of 1.0439. These statistics show that SDMs control more secondary than primary diamonds.

With the independent variables examined, the control variables must now be considered. The stated goals of the SDMs appear well-distributed with a high of 4, a low of 1, and a mean of

2.0020 with a standard deviation of 1.0285. This shows that SDMs vary significantly in what goals they are seeking out. The use of violence is also well-distributed with a mean of 0.6130 and a standard deviation of 1.0285. Since this is a binary variable, this mean indicates that more SDMs use violence than do not use violence. The final control variable is whether an SDM is a de facto state or not. This variable has a mean of 0.0648 with a standard deviation of 0.2462. Only 233 cases are considered de facto states (1) while 3,364 are not (0). This shows that there are few de facto states across time in this data.

Before running regression analyses, I also ran correlation tests to examine if any of these variables had high correlations, which could result in collinearity in the model. The results associated with these tests in addition to scatter plots depicting the relationship between variables and probability density functions for each variable are shown in Appendix A. Most of these results are not striking; however, there are some interesting features. As will also become apparent in the multilinear regressions, some variables are statistically significant with some accommodation variables but not with others. This can be seen with variables such as violence, where at the 5% significance level it is not significant with accommodations or the accommodations binary but is significant with the accommodations with de facto states as successful and its binary. Notably, the production of hydrocarbons is statistically significant with all of the accommodation variables. While there are some statistically significant correlations between independent and control variables, none of these are very high and should not impact the regressions. Unsurprisingly, the accommodation variables are highly correlated with each other since they are all based off of the same base data, and thus will not appear together in any regression in this thesis.

With the bivariate analysis complete, multivariate regression analysis may now begin. I ran four models, one which considers all variables together, one which considers only oil, one that considers only diamonds, and one that considers both natural resources together without any control variables. The results can be seen in Table 3 below.

**Table 3 Regression Table Summary**

	<i>Dependent variable:</i>			
	<i>Accommodation</i>			
	(1)	(2)	(3)	(4)
Stated Goals	0.004 (0.011)	-0.004 (0.012)	0.003 (0.011)	
De Facto	0.034* (0.020)	-0.001 (0.024)	0.034* (0.020)	
Violent	0.014 (0.025)	0.019 (0.024)	0.011 (0.025)	
Hydrocarbon Presence	0.101*** (0.023)		0.103*** (0.023)	0.099*** (0.023)
Hydrocarbon Production	0.307 (0.262)		0.322 (0.273)	0.298 (0.262)
Diamond Production	0.072** (0.029)	0.093** (0.041)		0.069** (0.029)
Diamond Type	-0.0003 (0.017)	0.006 (0.025)		-0.00002 (0.017)
Price of Oil (2022 Dollars)	-0.001*** (0.0003)		-0.001*** (0.0003)	-0.001*** (0.0003)
Constant	0.170*** (0.029)	0.164*** (0.028)	0.173*** (0.030)	0.184*** (0.021)
Observations	3,592	3,597	3,592	3,592
R <sup>2</sup>	0.022	0.003	0.021	0.022
Adjusted R <sup>2</sup>	0.020	0.001	0.019	0.020

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

The analysis reveals several interesting findings. To begin, these models have extremely low R-squared values, indicating that the models do not explain much of the variation in success

rates. The highest adjusted R-squared value of 0.020 comes from the full model and the one that lacks control variables. The lowest is the diamond model with an adjusted R-squared of 0.001. These R-squared values make sense given the distribution of the data. Under 10% of the observations in this model are non-zero. Because of this, there are constraints on how much variation can be explained using a model.

For the purpose of analysis, I will be discussing anything that is statistically significant at a 95% confidence level. For all of the models depicted, the presence of hydrocarbons, production of diamonds, and the price of oil is statistically significant. The presence of hydrocarbons and the production of diamonds both appear to make a self-determination movement more likely to receive accommodations; however, the price of oil globally appears to negatively impact the success of self-determination movements. If hydrocarbons are present in an SDM's territory, then accommodations increase by 0.101 in the full model. This amount changes to 0.103 in the oil-only model and to 0.099 in the resource-only model. This shows that these results are relatively stable regardless of other variables. If diamonds are being produced in an SDM's territory, then accommodations increase by 0.072. In the diamond-only model this number increases to 0.093 and in the resource-only model it drops to 0.069. These results are also very similar to each other. As the global price of oil increases by 1 dollar, accommodations will decrease by 0.001 across all models. These results support my hypotheses. The presence of hydrocarbons being statistically significant and having a positive impact on self-determination success supports my hypothesis that control of hydrocarbons increases the chances of SDM success. A similar case exists for the statistically significant and positive impact that diamond production has on self-determination movements. Finally, a statistically significant increase in



oil prices leading to a decrease in SDM success lends credence to the hypothesis that the greater the concentration of natural resource wealth, the more likely an SDM is to fail.

These same results can also be seen when the accommodations variable is transformed into a binary variable with one being any accommodations and zero being no accommodations in a given year. As show in Table 4, the same three variables of hydrocarbon presence, diamond production, and global oil prices remain statistically significant. This further shows the robustness of these results.

Table 4 Binomial Accommodations Regression Models

	<i>Dependent variable:</i>			
	Accommodation Binomial			
	(1)	(2)	(3)	(4)
Stated Goals	-0.001 (0.005)	-0.005 (0.006)	-0.001 (0.006)	
De Facto	0.013 (0.011)	-0.005 (0.012)	0.012 (0.010)	
Violent	0.004 (0.012)	0.007 (0.012)	0.003 (0.012)	
Hydrocarbon Presence	0.051*** (0.012)		0.052*** (0.012)	0.051*** (0.012)
Hydrocarbon Production	0.143 (0.131)		0.150 (0.136)	0.142 (0.131)
Diamond Production	0.032** (0.015)	0.042** (0.020)		0.031** (0.015)
Diamond Type	0.0001 (0.009)	0.003 (0.012)		0.0001 (0.009)
Price of Oil (2022 Dollars)	-0.001*** (0.0002)		-0.001*** (0.0002)	-0.001*** (0.0002)
Constant	0.101*** (0.016)	0.096*** (0.015)	0.102*** (0.016)	0.101*** (0.011)
Observations	3,592	3,597	3,592	3,592
R <sup>2</sup>	0.020	0.002	0.019	0.020
Adjusted R <sup>2</sup>	0.018	0.001	0.017	0.018

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

## Chapter 6

### Conclusion

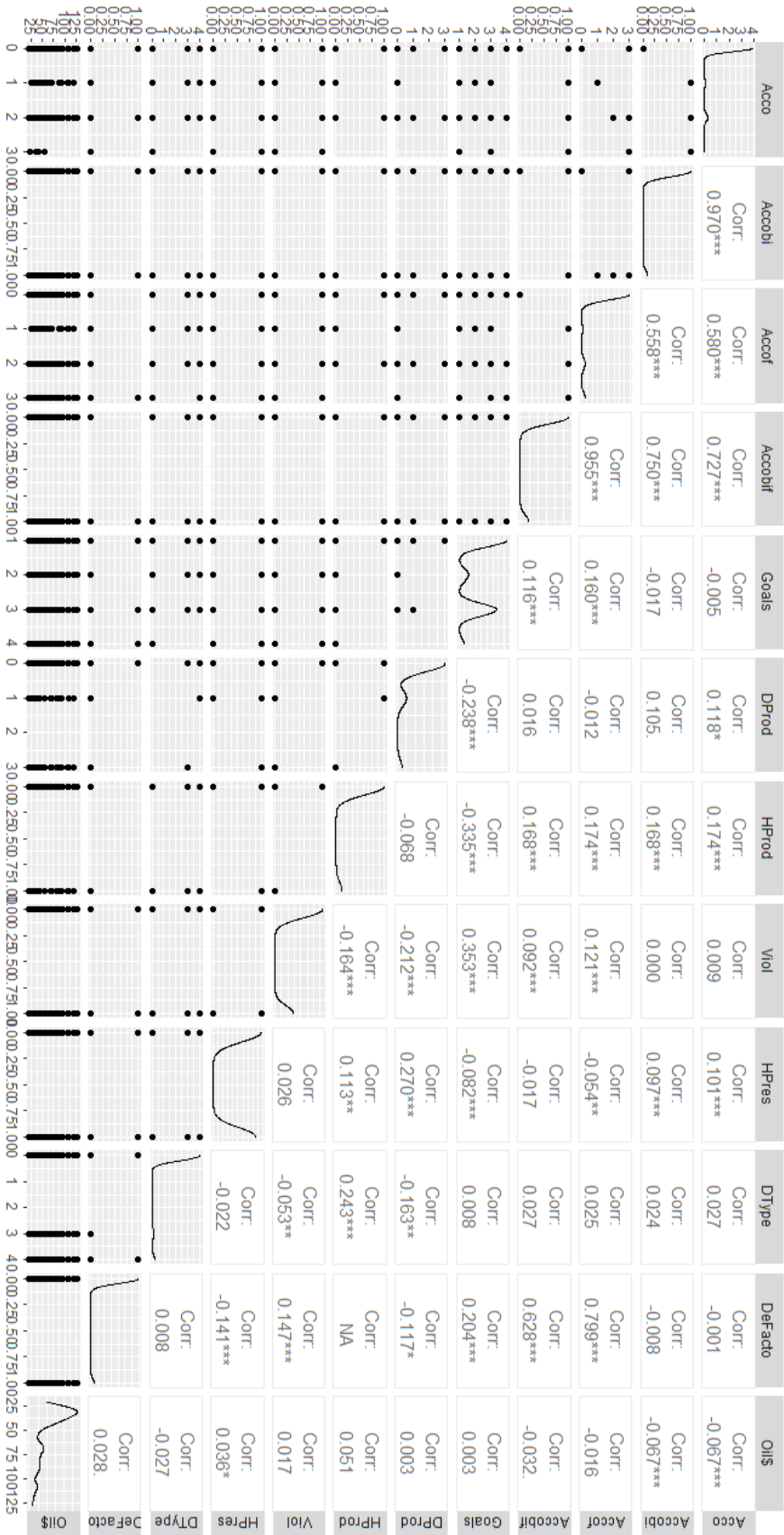
Overall, my research attempts to identify potential factors in the success of self-determination movements, and my results demonstrate some interesting findings. Firstly, my work shows support for the theory that SDM control of natural resources such as hydrocarbons and diamonds increase the likelihood of success for a self-determination movement. Additionally, controlling too high of a concentration of natural resources appears to make an SDM less likely to succeed. However, it also appears that being a de facto state does not have any impact on SDM accommodations.

The case of de facto states may become even more interesting when considering them as full successes. In rudimentary analyses of a modified accommodation variable where de facto states are coded as full successes, it appears to be the case that de facto states may have an entirely different set of criteria for what makes them successful. Further research should be conducted on what may make de facto states successful in self-determination as compared to other SDMs.

However, despite these findings, it is important to note the limitations of this research. To begin, the underlying data of this study appears to be skewed. With this in mind, other models may be more well-suited to analyzing the data. Specifically, given the structure of the data, future research may want to consider the use of logit and ordered logit models to model their data. The data used may also be insufficient to draw strong conclusions from as only a small portion of self-determination movements were touched on and major self-determination movements such as Catalanian and Taiwanese independence movements were omitted. Having more cases may reduce the skewedness of the data and lead to more fruitful results.

Additionally, as previously mentioned, other natural resources may play a major role in the success of self-determination movements. Incorporating more types of natural resources into research like this would be a good space for future studies. Variables beyond natural resources could also help to explain self-determination success which could be incorporated into future studies. For example, this research does not touch on relationships between ethnicities, ethnic diaspora support, or the concentration of certain ethnic groups within countries. These aspects could help future research analyze how ethnic grievances play into SDM success.

## Appendix A Correlations



Correlations Table: Table displays correlations, the density function for each variable, and the scatter plot for each pair of variables. Abbreviations are as follows: Acco- Accommodations, Accobi - Accommodations Binary, Accof - Accommodations De Facto Success, Accobif – Accommodations De Facto Success Binary, Goals – Stated Goals of SDM, DProd – Diamond Production, HProd – Hydrocarbon Production, Viol – Violence, HPres – Presence of Hydrocarbons, DType – Diamond Type, Defacto – De Facto State, Oil\$ - Cost of Oil

\*= P-value < 0.10 \*\*=P-value<0.05 \*\*\*=P-value<0.01

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## ACADEMIC VITA

### Education:

-Master of International Affairs – Class of 2023

Pennsylvania State University

-Graduate coursework in statistical and quantitative analysis, American foreign policy, globalization, legal frameworks, and global cultures

-Participating in an integrated undergraduate-graduate (IUG) degree program, completing degrees concurrently

-Bachelor of Political Science and Anthropology – Class of 2023

Pennsylvania State University

-Undergraduate coursework in climate change, ethics, medical anthropology, South Asian politics, Russian politics, Jewish communities, international affairs, American foreign policy, statistical and quantitative analysis, speech and rhetoric, globalization, sociology, and archaeology

-Dean's List: Fall 2018 – Fall 2021

-Paterno Fellow: Liberal Arts Honors Program

-Schreyer Honors Student

### Work Experience:

-Penn State Residence Life: August 2020- May 2021

-Job Title: Resident Assistant

-Responsibilities: planning and executing events, enforcing policy, coordinating with team of twelve, promoting community in residence halls, designing bulletin boards, working with small budgets, teaching about on-campus resources

-Center of the Performing Arts at Penn State: August 2018 - Present

-Job Title: Stagehand

-Responsibilities: cleaning stage, weighting rails, organizing materials, loading and unloading trucks, adhering to strict deadlines

### Leadership Experience:

-National Residence Hall Honorary: August 2020- Present

-Serving as Programming Chair

-South Halls Residence Association: May 2019-Present

-Serving as President

-Served as Vice-President

-Association of Residence Hall Students: October 2018-Present

-Serving as Cinemas Chair

-Responsibilities: Managing large budgets, selecting diverse and inclusive movies, developing advertisements, managing social media accounts

-Serving as National Residence Hall Honorary Liaison

-Responsibilities: Communicating between organizations to promote cooperation and teamwork, developing joint programming between organizations

-North Halls Association of Students: September 2018- May 2019

-Served as Vice President

-Boy Scouts: 2010-2018

-Achieved Eagle Scout

-Built 12 all-terrain wheelchairs to send overseas to disadvantaged communities, created a video tutorial to train future volunteers on hot to



build wheelchairs, worked with large budget, managed team of 20 volunteers

-Served as Senior Patrol Leader, Webmaster, and Librarian

Other Clubs:

-Penn State International Affairs and Debate Association: August 2018-Present

-Helped to staff conferences consisting of several universities and high schools

-Phi Sigma Alpha: January 2020-Present

-National Political Science Honor Society

Skills:

-Computer: Word, Excel, PowerPoint, Outlook, Microsoft Teams, SharePoint, Canva, Wix, RStudio, Google Suite, ArcGIS, social media

-Language: fluent in English, beginner in Spanish