2018

Examining Political, Environmental and Economic Determinants of Refugee Flows from Mainland China to North and South Countries

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Examining Political, Environmental and Economic determinants of refugee flows from Mainland China to North and South countries.

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May 1st, 2018

The thesis is submitted in partial fulfillment of the requirements for the course Senior Seminar (EC 375), during the Spring Semester of 2018.

While writing this thesis, I have not witnessed any wrongdoing, nor have I personally violated any conditions of the Skidmore College Honor Code.

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Abstract

This research examines refugee migration originating from Mainland China to North and South countries, like Australia, United States, United Kingdom, Nepal and India. To analyze refugee flow, I used four different determinants: political, civil, environmental, and economic to isolate the importance of each determinate. The analysis was derived from the gravity model to estimate the flow of refugees. I estimated the random effects model for all three of my models. The empirical analysis demonstrated that PTS and fertility in China were the most significant determinant within developed countries for refugee flow, whereas the most important determinants for developing countries were fertility rate, distance, and population. I also find that in the overall model, all variables except China's GDP per capita were significant determinates of refugee flow. The analysis concludes that refugee flow to North countries is due to political and economic indicators while refugee flow to South countries is a result of distance and cultural components.

I. Introduction

The refugee crisis has been a growing global crisis since 1950 when the United Nations of High Commissioner for Refugees (UNHCR) was first established. Although it is a global crisis, many refugees originate from developing countries and seek refuge within developed countries. According to Ruaudel and Morrison-Métois (2017), the refugee crisis is regionally disproportional, displacing many individuals concentrated from Africa, the Middle East and South Asia. This is an issue of concern because of the large economic and civil liberties' gap between developed and developing countries that generate refugees. Refugees are believed to leave their home country due to a number of determinants. Thus, this paper aims to answer the following question: What are the political, environmental and economic determinants of refugee flow from Mainland China to North and South counties such as Australia, United States, United Kingdom, Nepal, and India?

Most relevant forced migration literature analyzed various determinants of refugee flows from civil liberties to economic determinants. Echevarria and Gardeazabal (2016) examined conflict and civil liberties within the home country of the refugees, and they concluded these two elements are significant determinants of refugee flow. Additionally, Ruiz and Vargas-Silva (2012) studied the relationship on refugee migration towards developed and developing

countries. They found that there are serious economic consequences for individuals within developing countries and concluded that the resettling country generates refugees who win and lose within the labor market (Ruiz and Vargas-Silva, 2012). Furthermore, authors like Iqbal (2004) and Chaney (2011) use the Gravity model to estimate their analyses. They found that the effects of increased Gross Domestic Product (GDP) per capita of the respective country attract the inflow of refugees (Iqbal, 2004 and Chaney, 2011). These findings are significant to further the analysis of forced migration.

The purpose of this paper is to understand the causes of refugee flow from Mainland China to North and South countries in the years of 1988 to 2016. Building on previous literature, I analyze several determinants of refugee flow, such as political, civil, environmental, and economic determinants. The paper analyzes push factors that may motivate refugees to leave China, and pull factors from the developed or developing countries, which may motivate refugees to resettle within the respective country. Analyzing refugee outflow from Mainland China is important because of its increasing global hegemony. According to Pricewaterhouse Cooper's study, "The Chinese economy will overtake the U.S. economy by 2030" (pwc). However, as a prospective leading economy, China has high inequality rates, an unbalanced economy, and political tension due to its authoritarian rule (Zhu and Wan, 2012). Examining refugee outflow from China can help to further understand the political, environmental, and economic climate of the nation and its development in the future.

The contributions of this paper are analyzing new factors that affect forced-migration, which previous literature failed to analyze. I expanded the analysis of civil determinants by analyzing the fertility rate within Australia, United States, United Kingdom, Nepal, India and China. The restrictions on refugees' rights to procreate can influence migration. The analysis of the push and pull factors of the fertility rate has helped broaden forced migration literature due to the lack of research in this area. In addition, I analyzed environmental factors such as the carbon emissions. China has produced significant air pollutants resulting in poor air quality within major cities (Chan and Yao, 2007). Previous forced migration literatures failed to analyze the relationship between environmental effects and refugee migration. Thus, this paper aims to bridge determinants that have not been accounted for in refugee migration.

This paper found significant correlations between refugee flow and political, environmental, and economic determinants varying between developed and developing

countries. Within the overall country model, refugee outflow from China increased towards countries that exhibited higher levels of GDP per capita, fertility rate, PTS, Co^2 emissions, and population. Comparably, the fertility rate in China has a negative relationship to refugee outflow. This is due to refugees' ability to produce more children that will influence them to stay in China. However, Co^2 emissions in China are also significant, which yields unexpected results. An increase in Co^2 should push refugees to flee China, but results claim that the increase in Co^2 will influence refugees to stay in China. Moreover, the distance between China and the North and South countries have a negative relationship with refugee outflow, which aligns with the Gravity model. The North model concluded that China's GDP per capita and PTS have significant positive effects on refugee outflow, whereas the fertility rate in China pushes refugees to migrate specifically to developed countries. However, these results are not conclusive with developing countries. South countries found that the fertility rate with respect to Nepal and India, and the population have a significant effect on refugee outflow to those countries, and the Co^2 emissions in China and distance between the countries have a significant negative relationship to refugee flow. Similarly, to the overall model, the Co^2 yields unexpected results.

The paper is organized as followed: Section II analyzes previous literature review related to forced migration and their findings. Section III explains the data collection and the motivation of variables. Section IV investigates the Gravity Model, Section V discusses the results, section VI provides the concluding remarks, and section VII explains the limitations of the paper and further research.

II. Literature Review

The refugee crisis is an important global issue that needs to be addressed immediately. The number of refugees continues to increase at staggering rates. The UNHCR reported that in 2015 alone there were 65.3 million people who were displaced, which is an increase of 5.8 million individuals since 2014 (Edwards, 2016). Specifically, Mainland China has seen an increase in their economic power in the international system and they are ranked as the second largest economy with 14.8% of the world’s economy (Gray, 2017). However, conditions for refugees within China are debated amongst many scholars where the Communist Chinese government is portrayed either as a friend (Fukuyama, 2013) or a foe (Gary et al., 2017). The Chinese government has also seen an increase in refugee outflow from 1975 until 2016 (UNHCR). The

refugees' have been affected by social, political or economic conditions; therefore, it is important to analyze the root determinants of the flight of refugees to combat an international crisis (Moore and Shellman, 2004).

The refugee crisis is an important economic concern because of the inflow of refugees fleeing a host country and resettling within a new country. The debates surrounding the refugee crisis are still polarized in the international system related to whether refugees help or harm the resettling country. There is also a large concern on the conditions of the host country and the lack of international awareness to change the current situation. Consequently, the refugees continue to suffer and they are forced to leave their home country. China is an important case study because of its growth in economic powers internationally, as mentioned before. Therefore, analyzing the determinants of refugees fleeing from China is significant to assess the internal conflict with the Chinese government and its effect on its people and the refugees.

There are abundant literatures related to the refugee crisis, but previous scholarship only highlights the effects after the refugees resettle (Echevarria and Gardeazabal 2016). There is limited literature on the specific determinants on the flight of refugees within a country. There is also a lack of literature on climate or environmental refugees, where individuals seek refuge due to a negative effect in climate change. Therefore, I will analyze four different determinants of the flight of refugees: political and civil determinants in section A, environmental determinants in section B, and economic determinants in section C.

A. Political and Civil Determinants

Political determinants are large factors of the flight of refugees as a result of the influence of the government, which have negative spillover effects on individual's civil liberties. One of the most oppressed ethnic groups in China are the Tibetan population (Human Rights Watch, 2017). The ethnic group has faced political and civil oppression that has scrutinized this ethnic group to flee China to neighboring countries like Nepal and India. Vincanne Adams (1998) analyzed Tibetan refugees since the 1960's and analyzed specific human rights violations on this ethnic group through personal interviews and observations. Since China's occupation of Tibet, the Tibetan population has faced cultural, and political genocide (Adams, 1998). Tibetan people claim that "The Chinese want our land, but they don't want the Tibetan people. The women in our village were called to be sterilized, one by one. Those who refused must pay a fine. They have no

money, so they have no choice" (Adams, 1998). The challenges the Tibetan population faced in the past and the challenges they continue to face by being an ethnic minority and the negative spillovers from the Chinese government leave the population no choice but to flee their home country.

The UNHCR data fails to present data before 1988 in their population statistics, and during the invasion of Tibet in the 1950's there were over a hundred thousand refugees fleeing Tibet into Nepal and India (Adams, 1998). The most significant variables to understand refugee flow in neighboring countries were the human right violations from the Chinese government, and the political oppression the Tibetan population group faced. In addition, the political and civil tyranny highlight the negative spillovers in the economic determinants because the Tibetan population were second class citizens within their own home they had limited resources compared to Chinese citizens. Adams (1998) highlights the statements from the Tibetan citizens, but he fails to aggregate his observations and make significant analyses. However, his contributions that highlight the oppression of the Tibetan population can help explain the migration from Mainland China to countries like Nepal and India. Additionally, analyzing ethnic and cultural genocide on the Tibetan population is difficult due to China's strict media control on this ethnic group.

Echevarria and Gardeazabal (2016) also analyze political and civil determinants of global forced migration from 1960 to 2014 using the persons of concerns data from the UNHCR. There are issues surrounding the persons of concerns data indicating that these individuals do not fall within one specific group such as refugees, asylum seekers or internally displaced persons. This approach can create uncertainty within the results, which can create unobserved heterogeneity. However, the authors explained that they used the persons of concerns data from 1960 to 2014 instead of asylum-seekers data because of the sample selection issue within asylum application process (Echevarria and Gardeazabal, 2016). Therefore, my dataset will contain only refugee-like count data due to the selection bias in asylum seekers and to account for the unobservable heterogeneity.

Majorities of literature on forced migration use the gravity model to analyze the refugee flow, which originated from the international trade flow theory. This approach is beneficial in analyzing forced migration because the model analyzed refugees as a flow of stock between two countries. Within Echevarria and Gardeazabl's (2016) empirical analysis, they concluded that the

absence of civil liberties or political rights in the country of origin is an important determinant of forced migration. The authors also found significant evidence that poor countries tend to migrate to richer countries with higher GDP per capita. However, they also find the distance between two countries explained the flow of refugees between the two countries (Echevarria and Gardeazabal, 2016). Echevarria and Gardeazabl (2016) concludes that conflict and civil liberties in the country of origin is the fundamental determinant of forced migration, followed by geographic distance, and the shared border between origin and destination countries. The authors also determine that armed conflict within the origin country is the main determinant of forced out-migration (Echevarria and Gardeazabal, 2016).

Echevarria and Gardeazabal (2016) also acknowledge their pooled regression for "dirty pooling" where they did not account for unobserved heterogeneity. Therefore, in my paper, I will account for unobserved heterogeneity, which will affect the refugee count and the covariates within my regression (Echevarria and Gardeazabal 2016). To resolve this problem, Echevarria and Gardeazabl (2016) reported dyad-specific fixed and random effects model. Similarly, I will analyze the fixed and random effects model to estimate my results. Although this paper was insightful, the authors analyzed various countries with different political systems, thus, analyzing civil liberties were beneficial to their study. Additionally, the authors do not account for the different political regimes throughout their countries, which can impact the variety in civil liberties scores. Meanwhile, China's civil liberties score has a constant trend of 6 where 7 indicates the worst levels of civil liberties (Freedom House, 2017). Thus, this does not provide significant evidence to understand the motivation of the flight of refugees. Instead, I will use the political terror scale motivated by Moore and Shellman (2004).

Moore and Shellman (2004) also analyzed forced migration, specifically analyzed the decision of individuals abandoning their home country. Similarly, to Echevarria and Gardeazabal (2016), the authors used the UNHCR dataset to study the flow of refugees, but they also used the Global Refugee Migration Project to study internally displaced persons from 1952 to 1995. Unlike Echevarria and Gardeazabal (2016), Moore and Shellman (2004) concentrated on a larger population to understand refugee's behaviors to flee their home country. Compared to Echevarria and Gardeazabal (2016), they also studied the relationship between the gravity model and forced migration. The authors were inspired to understand the level of violent behaviors from the government and the public within 175 different countries, and to understand the motivation

behind why the refugee population fled their home country (Moore and Shellman, 2004). Moore and Shellman (2004) investigated the humanitarian perspective using human rights variables, whereas other scholars only analyzed the scope of governmental influence on the flight of refugees. Additionally, the authors studied the negative consequences of forced migration within the international system, which is important to find a resolution for the negative spillover effects (Moore and Shellman, 2004).

Moore and Shellman's (2004) empirical framework is encompassed around the similar notions of Echevarria and Gardeazabal (2016) such as analyzing refugees as stock between countries. The use of refugees as stocks between countries is a common theme throughout forced migration scholarship. However, Moore and Shellman (2004) explicitly analyze the individual's decisions to leave the country; therefore, they use a negative binominal regression instead of the gravity equation. To measure for the violence from the government, Moore and Shellman (2004) used variables such as genocide and politicide events, violations of human rights, political freedom, and the rule of law in their empirical analysis. Their variables were significant and motivated variables within my paper such as China's genocide and politicide events by analyzing the political terror scale (PTS). The authors concluded that violence is the strongest indicator for leaving the host country, and they also found that institutional democracy and income are relatively small push indicators for refugees (Moore and Shellman, 2004).

Previous scholarship, like Moore and Shellman (2004) used either Possion regression or negative binominal distribution because they analyzed count datasets. Moore and Shellman's (2004) overall dataset had a lot of missing data for developing countries, which can cause skewed results. However, they address these concerns using the zero-negative binomial distribution (Moore and Shellman, 2004). The authors found the violent behaviors from the government were the main determinants of forced migration and transitional periods decreased the number forced migration (Moore and Shellman, 2004). Although, the authors analyzed a myriad of countries with different regime types, which is a similar mistake made by Echevarria and Gardeazabal (2016). Both papers (Echevarria and Gardeazabal, 2016 and Moore and Shellman, 2004) compared civil liberties of different regime types, which can create heterogeneity due to the mixture of the regime types. Thus, the difference between various democracies causes inconsistencies in the results. The authors should have analyzed the countries within separate categories such as authoritarian rule or democratic rule. Therefore, in

part, Moore and Shellman's (2004) paper was beneficial, but they fall short on issues related to environmental or economic determinants of the host country.

Political and civil determinants are the main indicators of refugee flow presented from previous literature. However, it is important to note the updated variables to analyze political and civil determinants. The common analysis the authors above state that increased conflict and oppression will heighten refugee outflow. Additionally, the regime type of the origin country is significant because democratic regimes are more likely to receive refugees whereas authoritative regimes are less likely to receive refugees. Thus, identifying the regime of the origin countries will provide evidence of the flow of refugees. Lastly, the political status of the origin country have spillover effects to individuals civil liberties within the country, which also provides evidence of refugee inflow or outflow.

B. Environmental Determinants

Environmental determinants in forced migration are a new area of study due to the recent threats on the environment from climate change. According to the UNHCR, climate refugees are people who flee their home country due to the negative effects of climate changes on their natural resources and its effects on diminishing the amount of resources available (UNHCR). Climate change comes hand in hand with economic growth because of the rise of factories and the improvement of economic development. For example, China has seen increased economic growth, but it has also seen increased climate change effects like air pollution. China's economic boom has increased its manufacturing sector supplying higher levels of manufacturing factories. Correspondingly, the factors increase production seeing higher levels of Co^2 emissions, which result in increased air pollution (Nace, 2017). Air pollution also has significant negative spillover effects such as polluting the air, water, and food that people depend on, which inevitably diminishes individual's health (UNECE). Our World in Data estimated that outdoor air pollution accounted for 4.2 million deaths only in 2016 throughout the globe (Ritchie and Max, 2017). Therefore, climate refugees are important to study, so policies can be reconstructed to diminish the effects of climate change.

One of the biggest concerns of climate change is the effects on individuals' physical wellbeing. Shahid (2010) analyzed climate change effects in Bangladesh through the investigation of the number of deaths by cyclones from 1965 to 2007 using data provided by

Nelson (2003). Bangladesh is an important case study because 40% of its population lives in poverty (Shahid, 2010). Additionally, Echevarria and Gardeazabl (2016) concluded that refugees migrate from poor countries to richer countries; thus, the case study of Bangladesh can provide insight on the relationship between clime change effects and refugee flow. The author studied various variables such as the impact of temperature, the frequency of natural disasters, air pollution, and sea-level impact on the individuals' health (Shahid, 2010). The variables used within Shahid's paper are seen within other climate refugees' literature, which provides evidence that these variables are significant to further analysis on refugee flow. The study was presented through Nelson's (2003) method called "disability-adjusted life year" to quantify the impact of major storms on deaths in Bangladesh (Shahid, 2010). However, the author failed to methodologically capture the deaths from other climate change effects, which would have strengthened the analysis.

Interestingly, Shahid (2010) analyzed the effects of the climate change on individuals' physical health in Bangladesh. The direct impact of climate change effects is synonymous to my analysis of environmental determinants where the effects directly impact individuals' health. The author concluded that air pollution directly impacts on individuals' health such as cardiovascular, respiratory, and allergy diseases, including lung infections, asthma, chronic obstructive pulmonary disease, lung cancer, and other pulmonary problems (Shahid, 2010). His analysis also concluded that climate change effects inevitably increase heat waves, higher precipitation, and increase natural disasters and these effects are felt significantly in populations that live within poverty (Shahid, 2010). Although, Shahid's analysis was significant to furthering my analysis of environmental determinants, the paper did not explain what specific variable of air pollution the author examined, and it primarily focused on Bangladesh because it is the most disaster-prone country in the world (Shadhid, 2010) whereas China is not a disaster-prone country. Hence, the case study of Bangladesh provided analysis on climate change effects where individuals living in poverty are at higher risks, which strengthens my analysis moving forward.

Other literatures on environmental effects vary their definition between climate and environmental refugees. Biermann and Boas (2010) defined climate refugees as individuals who fled due to environmental harm or climate change, and the type of migration is either voluntary or forced. Other authors, like El-Hinnaqi (1985) categorized climate refugees within a broader term called environmental refugees, which was defined as "people who have been forced to

leave their traditional habitat, temporarily or permanently, because of marked environmental disruption (natural and/or triggered by people) that jeopardize their existence or seriously affected the quality of their life." Therefore, I will use the term climate refugees and environmental refugees interchangeably. However, there are debates regarding displaced persons due to environmental reasons should be categorized as refugees. Kibreab (1997) created the term environmental refugees because he believed states would not be obligated to provide asylum, but with environmental refugees' countries would be required to provide asylum. Additionally, there was resistance during the 1990's because climate change effects had limited studies and the topic was fairly new. Conversely, authors such as El-Hinnawi (1985) and Jacobson's (1988) believed environmental refugees had the right to seek asylum by providing empirical evidence linking population growth, climate change and human mobility (Morriseey, 2012). With the controversial debate on environmental refugees, I believe it is important to further analysis on this particular group of individuals.

Biermann and Boas (2010) analyzed climate refugees through the study of climate change's various effects on different regions of the world. The authors used variables such as increased sea level, extreme weather events, and drought and water scarcity throughout different regions: Africa, Asia, Latin America, and Small Island developing states (Biermann and Boas, 2010). The variables analyzed are synonymous to those Shahid (2010) analyzed within his paper; however, Biermann and Boas (2010) failed to study the effects of air pollution on refugee flow. There are concerns with Biermann and Boas (2010) approach where they compared different regions to one another because of the variety of economic growth within each region that can affect the analysis of the migration of refugees. They concluded that small developing countries are at more risk of climate change effects compared to developed countries (Biermann and Boas, 2010). Thus, their analysis should have categorized developing countries versus developed countries. The author's empirical analysis also found that Africa and Asia are most prone to extreme weather events, increased sea level, and drought and water scarcity. While, Latin America was at risk for water stress and drought, and the small island states were at moderate risk of rise in sea level. Since smaller developing countries are more risk of climate change events, the German Advisory council on Global Change in 2007 stated, they believed a mass migration would occur from Central America and the Caribbean islands to the United States. Biermann and Boas (2010) statistical findings proved that in the upcoming year's climate change

effects will continue to affect developing countries. Therefore, it is important for the international system to rewrite and implement new policy changes that will positively affect developing countries and aid its climate refugee problems.

Biermann and Boas (2010) concluded by highlighting the lack of initiative from the existing governance to address issues on climate refugees. Similar to Biermann and Boas' (2010) beliefs, Hall (2015) also highlights the importance of inter-governmental organizations (IGO) engagement to address climate issues such as UNHCR and World Health Organization (WHO) (Hall, 2015). Unlike Biermann and Boas (2010), Hall (2015) targeted specific IGOs, International Organizations for Migration (IOM), and the United Nations Framework Convention on Climate Change (UNFCCC), whereas Biermann and Boas (2010) vaguely mentioned the UNFCCC. Previous literature on climate change effects target specific countries, and then analyzed the limitations of the organizations on policies such as Hall's (2015) analysis on the mechanics of the organization's characteristics, and type of legitimacy that inhibit policy changes. Hall's (2015) literature allows the organizations to understand the areas they fall short in to make active change within the climate sector.

Hall's (2015) empirical analysis is significant because it was the first to trace the overarching trends of IGOs engagement in the climate change regime. Hall (2015) examined the trends in IGO engagement or participation in the climate regime, which showed the behavior of IGOs. The author addressed the limitations of the analysis because IGOs do change over time as well as issues related to climate change. In addition, Hall (2015) failed to examine the importance of non-governmental organization. The results only portrayed participation within conferences; however, it did not depict the changes within each organization (Hall, 2015). As a result, the author interviewed over 100 representatives within the organizations throughout New York, Geneva and Kenya between 2009 and 2013. Hall's (2015) decision to pick three cities was interesting because the representatives could have similar philosophies, which could have caused biased results and unobserved heterogeneity. Additionally, Hall (2015) does not include the number of years the representative was in the organization. It would have been beneficial to Hall's (2015) literature to add a variety of representatives with various years of experience in the organizations to understand the variation between organizations.

Hall's (2015) findings highlighted the importance of organizational types because of their ability to finance, create, or operate projects to help climate change. IOMs are functional

organizations that have no supervisory authority over international laws or norms; therefore, they are able to maximize financing, whereas, UNHCR have a structural organization that limited their ability to maximize their autonomy in climate financing (Hall, 2015). Hall (2015) concludes by stating that different organizations have different preferences based on the type of their organization, where the UNHCR is motivated by ethical legitimacy while IOMs are motivated by realistic legitimacy. The areas Biermann and Boas (2010) lack in such as targeting the types of institutions that need strengthening are where Hall bridges the gap. However, Biermann and Boas (2010) provide specific strategies for climate refugees such as finance projects through grants, assist in relocation of refugees through international developmental agencies that Hall does not provide strategies for.

All of the papers provide important contributions to my analysis on environmental determinants and refugee flow. Most importantly the authors all conclude that refugee flow occurs from poor countries to richer countries; thus, the analysis between developing and developed countries is significant to understand refugee flow. The authors also claimed that actions from IGOs or NGOs will aid climate refugees and help the environment overall. Lastly, providing aid to developing countries is important due to the numerous consequences individuals in poverty and in developing countries face.

C. Economic Determinants

The refugee crisis is closely linked with economic determinants specifically within individuals from poor economies. Stark (2004) noted that the UNHCR in 2001 examined 50,000 refugees from nine different countries that were from poor economies. This philosophy is similar to Biermann and Boas (2010), where they found climate refugees who fled their home country where usually from developing or poor countries. However, Starks (2004) analysis focused on economic determinants of refugees. Starks (2004) analysis focused on human capital of worker's effect on the economy, and he expected that in a large economy if individuals left then only a small portion of individuals would leave, whereas in a small economy refugee flow would be larger because more people would be inclined to leave. Stark's (2004) analysis fails to address the level of social networks within different economies. Authors like Beaman (2012) highlighted the importance of social networks when refugees resettle because of informational spillover and network based job referrals. This component would have been essential within Starks (2004)

human capital of workers equation to further understand the influence of the individuals' net earnings on refugee flow.

Stark's (2004) conclusions prove that poverty increases refugee flow, and he also examined the relationship between resettled refugees living in poverty within their new country. Therefore, Stark (2004) believed that there is motivation for refugees to resettle within countries that provide social welfare programs to assist refugees. Thus, analyzing economic refugees is difficult because the welfare programs within the country and not the size of the economy can motivate the fundamental determinant of refugees leaving poor economies. However, there are many cases of refugees fleeing an emerging economy like China and resettling within developing countries like Nepal. Economic refugees are also closely related to political and civil determinants because of that causal relationship. For example, Tibetan refugee have fled China to neighboring countries like Nepal and India due to the political determinants that let the Tibetan population to live in poverty. Thus, it is important to study the economic determinants of refugee flows to understand the other challenges refugees face.

Saunders (2003) examined the impact of urbanization in rural areas of Tibet Autonomous Region (TAR) in China and its effect on poverty for the Tibetan population. The Chinese government has urbanized rural areas of TAR, which inhabits a large Tibetan population. This had negative effects on the Tibetan population in TAR because the Chinese government pushed the poor Tibetan communities into lower quality areas increasing poverty rates in the Tibetan population. Thus, the poverty rates in Tibet have not improved, and poverty has increased since 1990's (Saunders, 2003). This is an indicator of a push factor for ethnic minorities in China to flee. An official survey from TAR and Qinghai measured poverty and inequality rates, and saw limited improvement. The survey reported that TAR had the highest poverty rate in China, with 25% of the population living in poverty in 1999 (Saunders, 2003). However, the survey failed to highlight the different ethnic groups in the regions, which can cause unobserved heterogeneity between the ethnic groups.

Saunders (2003) analysis aligns with Starks (2004) ideologies of refugees fleeing areas due to poverty. The political history within China has created poverty within the Tibetan population, thus solely identifying Tibetan refugees as economic refugees is not correctly defined. However, the political climate has caused individuals to live in poverty; thus, Tibetan refugees' flight from China can be a result of the high levels of poverty. The Borgen project,

addresses global poverty issues, also analyzed Tibet's poverty rates in 2015 (Vera, 2017). Their results showed that Tibet's poverty rate was 32.9%, which is an updated poverty rate compared to Saunders analysis (Vera, 2017). The poverty rate can reflect the motivation for Tibetan refugees to flee China. However, the relationship between Tibetan refugees resettling within Nepal due to welfare programs is still ambiguous.

Economic determinants are important for refugee flow because of the spillover effects from political, and civil determinants. The authors within this section note that refugees migrate from small economies that tend to be from developing countries. Thus, the consistent analysis from various authors indicates that refugee flow originates from developing countries to developed countries. However, China is an emerging market and therefore the analysis of the ethnic minorities is important to understand the accurate levels of oppressions, which can also highlight the economic determinants of refugee flows.

III. Data Collection

This paper aims to understand the determinants of refugee migration from Mainland China to North and South countries such as Australia, United States, United Kingdom, Nepal, and India. Using the gravity model as the foundation of this paper, I analyzed the distance between the North and South countries to China, and the population in each country. These variables are the premise of the gravity model of forced migration and are thus significant variables to identify. To analyze the distance, I extracted the distance of the midpoints between each resettled country to the midpoint of China using Google maps. The distance or the transportation cost between two countries is important because the Gravity Model indicates an inverse relationship with GDP. Therefore, an increase in distance decreases the stock, or refugees, and the closer the distance between the two countries indicates higher refugee flows. Echevarria and Gardeazabal (2016) stated that, "Sharing a border is strongly significant, indicating that destination countries often receive forced migrants from neighboring countries." Additionally, population data for each country was extracted from the World Bank. Iqbal (2007) states that the increase of population within the resettled country increases refugee flow within countries with high levels of population.

To analyze the refugee flows between countries; I examined only refugee-like situation individuals from the UNHCR population statistics data for Australia, United States, United

Kingdom, Nepal, and India. According to the UNHCR, refugee-like situation individuals are whom were previously individuals within the others of concern group, but placed within the refugee category (UNHCR, 2013). Authors like Moore & Shellman (2004), and Echevarria and Gardezabal (2016) analyze person of concerns data from the UNHCR, but these authors are concerned with unobserved heterogeneity; therefore, I extracted data for only refugee-like situation individuals. The UNHCR is the main source of refugee data throughout previous literature in forced migration. In addition to refugee data, data collection regarding GDP per capita, fertility rate, and Co^2 emissions (kt) were extracted from the World Bank. The Political Terror Scale (PTS) is another important variable examined on a scale from 1-5, which was collected from the Political Terror Scale Project (Polity IV, 2014). The data for PTS contained annual human rights reports produced within Amnesty International's annual human rights reports (Polity IV, 2014). A high PTS score indicates high levels of abuse, political terror, or physical integrity rights violations (Echevarria and Gardeazabal, 2016). The descriptive statistics of the variables can be seen in Table 1.

IV. The Gravity Model

The Gravity model was originally tested as an international trade theory that examined aggregate investment flows between two countries as a result of the distance between the two countries. The equation follows:

$$T_{A,\,B} = \frac{(GDP_A)^{\alpha}(GDP_B)^{\beta}}{Dist_{AB}{}^{\zeta}} \qquad \text{(Equation 1)}$$

T is defined as trade flows between the two countries, A and B, and considering $\alpha, \beta, \zeta \approx 1$ (Chaney, 2011). Equation 1 also analyzes GDP respective to countries A and B, and GDP is inversely proportional to the distance between the two countries (Chaney, 2011). Chaney's (2011) empirical evidence shows that as distance increase, investment flow between the two countries, as investment flows increased, GDP for countries A and B decreased. The Gravity model is appropriate for testing refugee flow hypothesis because it analyzes refugee flow as a stock and explains the relationship between GDP per capita and the distance between two countries.

The Gravity Model of forced migration literatures (Echevarria & Gardeazabal 2016, and Iqbal 2007) has used this model to analyze aggregate refugee flows. However, an author such as Iqbal (2007) analyzes population of the respective country and its relationship to distance.

Population and the distance are consistent independent variables within the different determinants in my model. According to Echevarria and Gardeazabal (2016), population in the destination country has a positive and significant effect. Iqbal (2007) also stated that the gravity model suggests countries with larger populations and closer in distance to the host country attract more refugee flows. This can indicate that populous countries receive more refugees. The refugee flow model is derived from the gravity model. The equation follows as below:

$$Refugee\ Flows_{A \rightarrow B} = \frac{Population_A * Population_B}{Distance^2_{AB}} \quad \text{(Equation 2)}$$

Therefore, the gravity model provides the same theory for refugee flow as it does for investment flows, which states that refugees will resettle within neighboring or relatively close countries. Thus, I expect that countries that border China, like Nepal and India will have higher refugee flows compared to Australia, the United States, and the United Kingdom.

Equation (2) captures refugee flows as a function of distance and population only. Therefore, my model captures political, civil, environmental, and economic determinants in addition to distance and population, which is presented as Equation 3. I expect that the volume of refugees will increase with an increase in population size, and the volume of refugees will decrease proportionally with population size. Additionally, refugee flow will decrease due to an increase in distance between the two countries. The following equation was motivated by Iqbal (2007) and it represents the overall country model of the determinants of refugee flows:

$$ln(Refflows)_{it} = \beta_0 + \beta_1 \ln(Pop_{it}) + \beta_2(Dist_{it}) + \beta_3 \ln(GDP_{it}) + \beta_4 \ln(GDP_{CHit}) + \beta_5 (fert_{it}) + \beta_6(fert_{CHit}) + \beta_7 ln(CO^2{}_{it}) + \beta_8 \ln(Co^2{}_{CHit}) + \beta_9 \ln(PTS_{it}) + \varepsilon_{it} \quad \text{(Equation 3)}$$

Where *P* represents the population of each country, *D* denotes distance, *fert* represents the fertility rate of each country, and *fertCH* represents the fertility within China. Additionally, Co^2 is the levels of Co^2 emissions in kt from each country, and *PTS* represents the political terror scale. Equation 4 specifically analyzes the refugee outflows from Mainland China to North countries where *ln(NthRef)* represents developed countries like Australia, United Kingdom, and The United States. Equation 5 analyzes the refugee outflows from Mainland China to developing countries where *ln(SthRef)* represents the refugee outflow to Nepal and India.

$$ln(NthRef)_{it} = \beta_0 + \beta_1 \ln(Pop_{it}) + \beta_2(Dist_{it}) + \beta_3 \ln(GDP_{it}) + \beta_4 \ln(GDP_{CHit}) + \beta_5 (fert_{it}) + \beta_6(fert_{CHit}) + \beta_7 ln(CO^2{}_{it}) + \beta_8 \ln(Co^2{}_{CHit}) + \beta_9 \ln(PTS_{it}) + \varepsilon_{it}$$

(Equation 4)

$$ln(Sthref)_{it} = \beta_0 + \beta_1 \ln(Pop_{it}) + \beta_2(Dist_{it}) + \beta_3 \ln(GDP_{it}) + \beta_4 \ln(GDP_{CHit}) + \beta_5 (fert_{it}) + \beta_6(fert_{CHit}) + \beta_7 ln(CO^2{}_{it}) + \beta_8 \ln(Co^2{}_{CHit}) + \beta_9 \ln(PTS_{it}) + \varepsilon_{it}$$

(Equation 5)

Motivated from Echevarria and Gardezabal (2016) and the first proposed econometric form of the gravity model by Tinbergen (1962) presented the model in double-log form shown in equation 3. The two variables in the gravity model, population in each respective country, and distance of countries from China are in log form. The fertility rate in each resettling country, and in China examines the effects of civil determinants of refugee migration. (Log) PTS is another significant variable that will strengthen the analysis of political and civil determinants. (Log) PTS is seen within several previous forced migration scholarships, like Moore and Shellman (2004). Lastly, to examine the impact of environmental effects on refugee flow, I analyzed Co^2 emissions to analyze if there is a relationship to increased levels of Co^2 and refugee flow; as well as, $Co^2{}_{CHit}$ to analyze the push factor of China's Co^2 emissions on refugee outflow.

Political and Civil Conflicts

Internal and international conflict according to Iqbal (2007) is one of the most important causes of refugee flows. Assessing individuals' quality of life within the host country is important to understand for forced refugee migration. To understand the effects of Political and Civil conflicts on refugee flow, I analyzed the level of abuse, political terror, and physical integrity rights violations using PTS, and the fertility rate. Previous literature analyzed the effects of political and civil conflict as determinants of refugee flow, but many fail to capture the fertility rate as a determinant of refugee flow; thus, this is an important contribution made from this paper.

The fertility rate is significant to examine as a determinant of refugee flow as a result of China's historical one-child policy. The fertility rate can be interpreted as a push factor for refugee outflow or a pull factor to respective North and South countries. The one-child policy in China was first announced in 1979 and it lasted until 2013 (Wang et al., 2016). Between the years 1979 to 2016, individuals in China were only allowed to have one child due to the rapid

increase in the Chinese population (Wang et al., 2016). The population growth rate fell by 1.8% in the first five years of policy implementation (Wang et al., 2016). However, the policy produced several negative effects. Families began to choose between having a male newborn or a female newborn, and as a result of traditional upbringings, many parents and grandparents preferred a son rather than a daughter (Yuesheng and Wei, 1987). Therefore, many families were forced to either kill or abandon their female newborns in order to raise a son (Yuesheng and Wei, 1987). Additionally, this policy caused an unbalanced sex ratio within the Chinese population because families preferred sons to daughters. The one-child policy became more lenient in 2013 only to couples that were affected by the one-child policy, which allowed them to have two children (Wang et al., 2016). The one-child policy was completely eliminated in 2016, when all couples were permitted to have two children (Wang et al., 2016). As a result of the one-child policy and the strict population restrictions until 2016, I hypothesize that refugees' migration will increase towards countries will higher levels of fertility rates, and thus the fertility rate of China will be a push factor for refugees.

Previous literatures have shown that violent events within the country, such as a civil war or an internal conflict influence refugee flow from the host country. Moore and Shellman (2004) find that violent behaviors of governments and rebel groups, and more importantly the interaction between the two are the primary determinants of refugee migration. However, Echevarria and Gardeazabal (2016) conclude that civil conflict variables do not have a clear effect on refugee migration, but they also found that less democratic and more autocratic countries have less refugee migration inflow. Since 1977, China has had a stable score of -7 from -10 to 10, where -10 is an authoritative regime, and 10 is a fully democratic regime (Polity IV, 2014). Therefore, I expect the increase of PTS will have a positive effect on refugee flow because refugees from China are inclined to seek refuge within democratic nations.

Climate Change Effects

Historically, refugee migration scholarships have failed to capture the determinants of climate change because of the limited research. Climate change is a relatively new topic, that I will analyze throughout this paper and understand its relationship to refugee flow. Biermann & Boas (2010), and Hall (2015) analyzed the effects of climate change through the effects of water scarcity, the rise of sea level, and the actions of international governmental organizations.

Biermann and Boas (2010) stated that issues related to climate change and climate refugees have only recently seen global interest. These authors have expanded research and analysis on climate refugees, but many forced migration literatures failed to examine the effects of air pollution within the host country on refugee flow. Air pollution is an important determinant for refugees because it affects everything that it surrounds -- such as animals, forests, and bodies of water -- which can make living conditions difficult within the host country (Air & Water). Therefore, this paper offers valuable contributions to the forced migration literature by providing an updated analysis on environmental determinants of refugee migration.

The analysis of environmental determinants is important because of its effects on the world and its direct effects on forced migration. Climate change determinants like air pollution is an important determinant especially from emerging markets, like China due to the rise of its manufacturing industry (Wen, 2015). Our World in Data highlighted the steady increase in Co^2 emission within the world since 1913 (Ritchie and Max, 2018). In addition, Myers (2002) claimed that there were 25 million climate refugees in 1995, and there will be an additional 50 million climate refugees in 2050. Therefore, the analyses of climate change on refugees are crucial to minimize environmental refugees. More importantly, Biermann and Boas (2010) noted that climate refugees from developing countries are at more risk than developed countries. Therefore, the analysis of refugee flow to North and South countries will provide evidence of refugees preferring developed countries. Likewise, I expect the increase of Co^2 emissions within the resettled country will have a negative effect on refugee flow. However, the increase of Co^2 emissions within China will motivate refugees to migrate.

Economic Factors

Economic refugees migrate as a result of economic incentives, usually towards countries with higher levels of GDP per capita. However, economic refugees are difficult to analyze in isolation as a result of the issues that arise due to political and civil determinants. Additionally, economic refugees can be motivated to resettle into a country that have higher levels of GDP per capita; therefore, the distance between the two countries may not a driving factor. Ruiz and Vargas-Silva (2012) reinstated this notion by stating that future economic factors do not affect the destination of refugee migration. Consequently, this analysis can contradict the gravity model of international trade that implies that stock flow is driven by GDP and the distance between the

countries. However, Rasoulinezhad and Wei (2017) claim that GDP of countries influences trade flows. The GDP per capita between developed and developing countries from China based on the gravity model theory can explain if refugee flow is dependent on economic factors.

Research suggested that marginalized groups and refugees with economic insecurity are more likely to migrate. Saunders (2003) explained the Tibetan population in the Tibetan Autonomous Region (TAR) has high levels of poverty as a result of the Chinese government's efforts to marginalize this group. Additionally, the Tibetan population was economically desperate to improve their conditions that they were forced to sell their organs to support themselves (Adams, 1998). The Tibetan population in China is also the largest oppressed ethnic group (Human Right Watch, 2017). Thus, the political, civil, environmental and economic oppression mentioned previously have incentivized this ethnic group to migrate to countries that present more favorable economic conditions.

The gravity model of investment flows reiterates that countries with higher levels of GDP per capita will have increased investment flows or refugee flows (Chaney, 2013). Authors claimed that refugee flow originated from developing or poor countries, and as a result the refugees resettle in developed nations like Australia, the United States, and the United Kingdom (Stark, 2004). Therefore, I hypothesize that developed countries with higher levels of GDP per capita such as Australia, United States, and the United Kingdom will have increased refugee inflow from China, whereas Nepal and India will expect lower levels of refugee inflow.

V. Empirical Analysis

The data collected includes refugee count data from 1988 to 2016 for the UK and the US, whereas Australia, India and Nepal refugee count begins in 1996, 1992, and 1991. The unbalanced cross-sectional panel data collection began with 107 observations for refugees, but there were 2 zero refugee counts for the years of 1995 and 1996 in Nepal. Additionally, I had missing observations for fertility rate in China, fertility rate with respect to each country, Co^2 emissions, and PTS variables were accounted for within my regression. Thus, I had 91 observations for refugees within the final regression.

I estimated an OLS model and examined the variance inflation factor (vif) to estimate multicollinearity within the variables. As seen in table 4, I analyzed the variables vif to estimate the correlation: China's Co^2 has a vif of 16.22 and China's GDP vif is 13.94. These two variables

have a high vif because when the economy improves there are higher levels of production, which in fact increase Co^2 levels. In addition, distance has a vif of 7.89 and GDP has a vif of 9.05. These vif's can be understood as the developed countries such as the United States and the United Kingdom is the furthest distance from China, and the developing countries such as Nepal and India are closer in relation to China. To estimate my results, I ran a random effects model, a fixed effects model, and the Hausman test to determine which model would best fit. The fixed effects model omitted distance, and previously authors also excluded the fixed effects model due to similar reasons. Correspondingly, Echevarria and Gardeazabal (2016) also failed to use of fixed effect model to estimate their results because it did not identify the effects of the time-invariant covariates. Moreover, Rasoulinezhad and Wei (2017) concluded that they ran a fixed, random and a fully modified OLS estimator, and failed to use the fixed effects model because it inhibited their analysis for time-invariant variables in a gravity model. Therefore, I will use the random effects model to estimate my results as seen in table 4.

Recall that the two variables of the forced migration model were population and distance from North and South countries to Mainland China, which was rooted from the gravity model of migration. Table 4 concludes that distance is statistically significant for South and Overall model. South model is statistically significant at the 5%, and concluded that a 1% increase in distance will decrease refugee outflow by 82.91% while holding all variables constant. While, an increase in 1% in the overall model for distance will decrease refugee flow by 6.07% also holding all other variables constant. This can be due to various reasons that I fail to acknowledge such as the inability of refugees in developing countries that fail to have and obtain enough resources to leave for long distances (Gyalfason, 2000). However, previous scholarship (Rasoulinezhad and Wei 2017 and Chaney 2011) also concluded that an increase in distance would result in a negative stock flow because flows between neighboring countries are easier than flows between larger distances. Although, my results align with previous forced migration scholarship, I also fail to acknowledge that economic migrants do not accurately reflect the refugee applications (Echevarria and Gardeazabal, 2016). Thus, refugees whom fled to developed countries may be economic migrants, which do not fully explain distance between two countries.

My empirical analysis is also statistically significant for population for the South and Overall model and it aligns with Iqbal's (2007) conclusions. Iqbal's (2007) conclusion claimed

that a 1% increase in population with respect to the country will have a 2.72% increase in refugee outflow while holding all other variables constant for the overall model. While the South model shows that a 1% increase in population will increase refugee flow by 10.96% also holding all other variables constant. Population can be statistically significant for developing countries due to the proportional of cities to rural areas in developing countries that can incentivize refugees to migrate to developed countries with populous cities with increased opportunities. However, I do not include those variables that could explain these beliefs to further explain the significance of population. Furthermore, the two variables of the gravity model of migration are statistically significant; thus, I can further analyze other determinants of refugee migration.

Economic Determinants

Analyzing GDP per capita explains the significance of refugee migration through the economic determinant lens. GDP per capita has a positive relationship with refugee flow and it is statistically significant within the overall model. A 1% increase in GDP per capita will result in a 3.04% increase in refugee outflow from China while holding all other variables constant. This is similar to Echevarria and Gardeazabal's (2016) results that concluded GDP per capita was not significant within their fixed effects model, but GDP per capita in the destination country is significant within their pooled regression, and exponential mean specification with dyad-clustered standard errors. Similarly, Rasoulinezhad and Wei's (2017) empirical results also indicated that an increase in GDP per capita would have increased trade flow or refugee flow between the two countries. This shows that the GDP per capita of the resettling country is a significant determinant for refugee migration. However, the North model provides evidence that China's GDP per capita is statistically significant. We cannot conclude that China's GDP per capita is a push factor because I expected the increase of China's GDP per capita would decrease refugee flow, but table 4 concludes that a 1% increase in China's GDP per capita will increase refugee flow by 0.7% while holding all other variables constant. Thus, this unexpected variable can be due to the lack of variables examined for economic determinants explained below.

Although GDP per capita is statistically significant there are still debates that state GDP per capita influences refugee outflow from China. First and foremost, I only use one variable, GDP per capita, to analyze economic determinants, which can have implications because there are several factors that play into the economic determinants. I also have unbalanced observations

for North and South countries that can cause the results to be biased. Lastly, economic refugees can be misrepresented because many economic refugees are believed to falsify their application by claiming to either be asylum seekers or migrants. Thus, using only refugee-like data fails to capture all known economic refugees.

Political and Civil Determinants

Next, I will discuss the effects of the political and civil determinant variables. Similarly to the economic determinants, the political and civil determinants for fertility rate in the overall model are statistically significant, which indicates that a 1-unit increase in fertility rate will have a 2.24% increase in refugee outflow from China while holding all other variables constant. This effect explains that restrictions limiting procreation will affect refugee migration. The restriction of procreation also concludes that policy implemented by the government can have serious implications on refugee flow. Additionally, the south model for fertility rate concludes that a 1-unit increase in fertility rate will increase refugee flow by 1.76% also holding all other variables constant. The significance of the fertility rate in developing countries can explain the importance of fertility; however, studies have shown that developing countries higher levels of fertility rates, while developed countries have lower levels of fertility rates (Bongaarts, 2008). Therefore, to improve my analysis, I should expand on various policy implications between developing and developed countries implemented and understand the policy implications relationship to refugee flow. Moreover, to ensure my results would not be biased, I should also increase the sample size of refugees from various originating countries to fully understand the impact of fertility rate.

The analysis on the fertility rate within China is statistically significant for the overall and north model, and it is an important determinant for refugee flows. The fertility rate of China with respect to each North and South country has a negative relationship to refugee flow. I expected fertility rate to have a negative relationship to refugee flow because if procreation restrictions within China were relaxed then refugees will be more inclined to stay in China. Table 4 confirms that if there is a 1-unit increase in fertility rate within China then refugee outflow will decrease by 1.75% in the overall model and while holding all other variables constant. The north model also claims that the fertility rate in China is statistically significant, indicating that a 1 unit increase in fertility rate in China will decrease refugee flow to North countries by 2.0% while holding all other variables constant. Again, the results can be due to various policies

implemented by the Chinese government and not a direct result of the fertility rate. However, there is limited literature on the relationship between fertility rate and refugee migration to address my concerns. Thus, the analysis of the fertility rate is a significant contribution to the refugee migration scholarship because it allows a new perspective that other forced migration literature failed to see.

Another important variable for examining political and civil determinants is PTS. PTS is statistically significant for the overall and north model. Table 4 concludes that a 1% increase in PTS for the overall model will result in a 0.65% increase in refugee outflow, which indicates that higher levels of abuse within the respective country will result in refugees leaving the country. This analysis is similar throughout the forced migration literature. Moore and Shellman (2004) concluded that this had a positive statistically significant effect on forced migrant flows. Additionally, the north model concludes that a 1% increase in PTS will increase refugees into north countries by 0.67% while holding all other variables constant. The south model for PTS is not statistically significant and I expected this analysis would not be statistically significant because civil liberties in developed countries exceed those of developing countries; therefore, refugees would be more inclined to flee to developed countries. However, civil liberties variables are not more in depth analysis addressed within this paper that most forced literature papers address. A deeper analysis of civil liberties could be beneficial to this paper to determine the impact of civil liberties on refugee flow.

Climate Change Determinants

The analysis of climate effects and refugee migration is a relatively new area as I have mentioned before and my analysis highlights interesting outcomes. The results for Co^2 emissions are statistically significant for the overall model, which illustrates that the climate determinant does indeed affect refugee flow. The increase of Co^2 emissions in the overall model states that a 1% increase of emissions will yield positive refugee outflow of 0.27% while holding all other variables constant. However, the Co^2 specifically for China yields unexpected results. The results concluded that an increase of Co^2 in China would decrease refugee flow by 1.84% in the overall model, and 2.85% in the south model while holding all other variables constant. I hypothesized a negative relationship between Co^2 emissions and refugee flow and thus the unexpected sign can be due to omitted variables. Since the analysis of Co^2 emissions and refugee flow is a new topic

of interest, there is limited scholarship that provides further explanation on the empirical analysis provided from this paper.

VII. Conclusion

The paper aims to understand refugee flow from Mainland China to developed and developing countries by analyzing various determinants. The empirical analysis' main conclusions indicated that refugee flow is significant towards countries with higher GDP per capita and with countries that are closer in distance. Additionally, the distance between two countries and the fertility rate are important determinants for refugees migrating to developing countries. The PTS score is another significant indicator of refugee flow where refugees migrate towards developed countries due to their low levels of human rights abuses.

Keeping the results in mind, there are several policy implications that can be prescribed to reduce refugee flows. The analysis indicates that refugees are mostly concentrated in developing countries; therefore, action is required within poorer countries. Previous literature target inter-governmental organizations, like the United Nation and the UNHCR to take action against the refugee crisis. These organizations need to quickly find solutions to remedy civil liberties within developing countries because it is one of the most prevalent reasons why refugees flee their home country. Additionally, these organizations should work hand in hand with local NGOs in the developing countries to address internal conflict. This approach will benefit poor individuals' in the country and address problems immediately. However, failure to address violations against civil liberties will increase refugee outflow in the home country.

Environmental refugees are another vital group to acknowledge because of the increasing environmental issues created by climate change. Again, IGOs need to come to a unanimous decision during Climate Conferences to rapidly change the dynamic in developing countries. Without international assistance, poor countries will continue to suffer from devastating climate change effects. Recently Puerto Rico has faced serious environmental damages due to climate change, and the damages from natural disasters have negatively impacted communities. The Environmental Protection Agency (EPA) claimed that climate change caused the destruction in Puerto Rico and since 1958 there has been a 33% increase in heavy storms (EPA, 2016). Therefore, if developed countries and IGOs fail to immediately act then the number of climate refugees will continue to rise and add to the growing refugee crisis.

Lastly, distance is another important indicator of refugee flow. Previous literatures have claimed that the closer countries are in relation, the higher refugee flow will be. Therefore, if specific countries are in crisis then IGOs and NGOs should take into consideration providing aid to neighboring countries. For example, refugee flow from Mainland China to Nepal and India is significant and thus, if the IGOs attempt to provide aid to Nepal and India to increase their social welfare programs specifically to accommodate incoming refugees then refugees will have resources and assistance once they are resettled. These methods will help refugees and decrease refugee flows in the future if the methods prescribed are followed.

VIII. Limitations and Further Research

This paper contributes to the literature on forced migration in many different aspects. First and foremost, I analyzed the push and pull factors of refugee flows where previous literature in forced migration failed to analyze. Secondly, I helped broaden the scope of political and civil determinants by examining the fertility rate of the North and South countries and Mainland China. Lastly, I introduced a new environmental analysis to refugee flow. I studied the effects of Co^2 emissions on the flow of refugees from China to North and South countries.

There are several limitations to my paper, and these limitations have inhibited the results especially within the North and South model. The separation of the models resulted in insignificant results for my north and south models, but specifically within the south model. Since, I only analyzed Nepal and India datasets this created a small sample size for the number of refugee flow to developing countries, which limited the analysis. Additionally, many forced migration literatures used a large sample size where they analyzed over 100+ countries, whereas I only analyzed five countries. Thus, this is another limitation in this paper. However, these limitations can also be areas of further research. With an increase in allotted time, I would like to further this research for refugees originating from Mainland China to 100+ countries and further separating the countries in North and South countries to understand refugee flow to developed and developing countries. Additionally, I would like to further the refugee flow analysis by including more variables in the economic and environmental determinants section. Trebilcock (2003) analyzed social welfare expenditure from specific governments and its significance on refugee flow, and this analysis would strengthen the results for economic determinants. I would also expand the variables used in the environmental determinants by adding variables Biermann

and Boas (2010) used such as drought, water scarcity, and the rise of sea level to broaden the scope of environmental determinants. Thus, further analysis within the different determinants will explain refugee flows from Mainland China to North and South countries.

List of Tables

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Country	0	-	-	-	-
Year	123	2002.8	7.6	1988	2016
refugees	121	26981.5	39610.7	1	110098
Pop	123	3.17e+08	4.25e+08	1.83e+07	1.32e+09
GDP	123	23705.9	20290	172	67708.7
GDP_{CH}	123	2562	2537.7	283.5	8123.2
$fert_{CH}$	119	1.7	0.2	1.5	2.593
fert	119	2.5	1	1.6	5.097
Co^2	115	58245.4	132035.4	0.05	394793
Co^2CH	115	4.1	1.8	2.2	7.6
PTS	117	2.4	1.3	1	5
Dis	123	6776.9	3515.7	2058	11640

Table 2. The Variables of the Model

Variable	**Definition**	**Unit**
Refflows	Refugee flow between China and North and South countries	Count unit; 1 refugee indicates 1 person
Pop	Population within each country	Count unit
Dist	Distance between capitals of China and North and South countries	Kilometers
GDP, *Where GDP_{CH} is China data*	GDP per capita in each respective country	Thousands of US $
Fert, *Where $Fert_{CH}$ is China data*	Fertility rate is the average number of children that would be born to woman over her lifetime in each respective country	Percentage %
Co^2, *Where Co^2_{CH}, is China data*	Total amount of carbon dioxide measured within the atmosphere	Kt
PTS	Political Terror Scale measured by a scale, where the higher the number indicates high levels of abuse, political terror, or physical integrity rights violations	Scale from 1-5

Table 3: VIF test for multicollinearity

Variable	VIF
Co^2_{CH}	16.22
CHGDP	13.94
GDP	9.05
Dist	7.89
PTS	3.82
fert	3.65
Pop	1.94
Co^2	1.67
$fert_{CH}$	1.32
MEAN vif	6.61

Table 4: Estimation of results -- Random effects model

Dependent variable: Refugee flows

Reflows	**North**	**South**	**Overall**
lnGDP	0.6 (0.45)	0.83 (1.38)	3.04*** (0.274)
lnCHGDP	0.70* (0.37)	0.49 (0.98)	0.28 (0.40)
Fert	1.28 (0.58)	1.76*** (0.55)	2.24*** (0.21)
lnPTS	0.67*** (0.16)	0.42 (0.44)	0.65*** (0.21)
lnCo2	0.041 (0.17)	-0.17 (0.58)	0.27*** (0.02)
$lnCo2_{CH}$	-0.20 (0.77)	-2.85** (0.94)	-1.84** (0.85)
lnPop	0.60 (1.93)	10.96** (3.91)	2.72*** (0.075)
$Fert_{CH}$	-2.0*** (0.30)	1.27 (0.95)	-1.75*** (0.39)
lnDist	2.91 (7.66)	-82.91** (39.31)	-6.07*** (0.71)
_cons	-40.44 (36.10)	433.50 (235.29)	-21.07*** (4.16)
R^2 ***within***	0.92	0.71	0.75
R^2 ***overall***	0.95	0.99	0.97

Note: Standard errors in parentheses, and *, **, *** is significant at the 10%, 5%, and 1% levels.

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