

Impacts of Climate Change on American Immigrant Flows and Employment Sectors

Ziang Li¹ and Gabriela Nagle Alverio[#]

¹Beijing 101 Middle School, China

[#]Advisor

ABSTRACT

This paper focuses on the impacts of natural disasters caused by climate change on American immigrant flows and American immigrants' employment sectors. This paper consists of two distinct quantitative analyses. The first analysis investigates the relationship between climate disasters and the number of people that immigrated to the U.S. from 2010 to 2019 (which is the closest intact decade before the pandemic) for several countries and shows a positive relationship between climate change and American immigrant flows. This part also discusses the inherent variation between developed countries and developing countries, and analyzes the relationship between the gross domestic production index and the number of people that immigrated to the U.S. In the second part of the analysis, the paper analyzes the several American states that contain the highest number of immigrants and which employment sectors immigrants preferred in 2015, which is the median year of the period in the first analysis. As a result, the result shows that American immigrants' employment sector distribution varies for each state, and American immigrants are more likely to participate in fundamental occupations such as agriculture and infrastructure construction. At the end of the paper, some viable suggestions on current immigration policy and future prospects in the related research fields are mentioned.

Introduction

Climate change has become one of the most serious issues in the world and affects every human being. One of the largest impacts, which has been dubbed by many as the "human face" of climate change, is the effect on migration. Climate change exacerbates global flows of migrants by changing the risk calculus for some and forcing others to leave unsafe situations. As people move, levels of uncertainty in labor markets increase, thereby affecting the residents of recipient areas. As climate change impacts continue to worsen, more and more people will be forced to escape to other countries as climate migrants. Currently, under the 1951 Geneva Refugee Convention, climate change or environmental impacts are not recognized as legitimate reasons for granting asylum. However, climate change is often one driver among many that may cause asylum requests and migration to increase. According to the Yearbook of Immigration Statistics by U.S. Homeland Security (Homeland Securities, 2019), the number of immigrants to the U.S. has kept increasing since 1996. In addition, based on the Emergency Events Database (EM-DAT) (D. Guha-Sapir, 2022), the number of global climate disasters has also kept increasing in recent decades. However, research that analyzes the relationship between climate impacts and immigrant flows in the U.S. and the resulting impact on the economy is lacking. As such, I focus on how climate change affects immigrant flows into the U.S., and how the distribution of employment sectors of immigrants who are settled in the U.S. has changed over time.

Methods

To address these questions, I utilize a two-pronged approach. The first part of this study focuses on the relationship between climate change and American immigrant flows from 2010 to 2019. The second portion utilizes previous research conducted on the labor market impacts of American immigrants by the U.S. Resettlement Program, the Center of Immigrant Studies, and the Pew Charitable Trusts (PET, 2015) in order to visualize and analyze the changes of the distribution of employment sectors for American refugees from 2010 to 2019. In both parts of the analysis, I utilized this time frame because that is the most recent decade before the outbreak of the COVID-19 pandemic. The correlation analysis with the data from 2020-2021 is significantly abnormal and is likely an outlier from the overall chronological trend.

Analysis 1: The impacts of climate change on immigrant flows

Analysis 1 requires three data inputs: the number of people affected by natural disasters from 2010 to 2019; the Gross Domestic Production (GDP) data from 2010 to 2019; and the number of immigrants who migrated to the U.S. from 2010 to 2019. These data were needed for a subset of 6 major countries which were chosen based on their diplomatic relations with the United States, their distribution across all continents (except for Antarctica), and their variety of economic conditions. For the number of people affected by natural disasters, I accessed the EM-DAT database to seek related data. I selected all categories under the “Natural” branch for the years between 2010 and 2019. This yielded 3,278 events. Since the scale of some events is too small to affect migration trends, I omitted all events with less than 100,000 affected people. Then, I summed the annual number of affected people from each country in each year. The GDP data from all of the countries was provided by the World Bank. For the number of refugees who migrated to the U.S. from 2010 to 2019, I accessed the 2019 Yearbook of Migration by the U.S. Department of Homeland Security and derived all data points from Table 21: Persons Naturalized by Region and Country of Birth: Fiscal Years 2010 to 2019, which included the number of people that migrated to the U.S. from 2010 to 2019 for each country.

Using these data, I conducted a Pearson correlation analysis and a one-way ANOVA (analysis of variance) test to analyze the relationship between the number of people affected by natural disasters and the number of people who migrated to the U.S., as well as the relationship between the annual GDP and the number of people who migrated to the U.S.

Analysis 2: Changes in economic conditions (via employment sector) for immigrants in the US

To analyze the economic conditions of immigrants in the U.S., information about immigrant employment by industry and state is needed. The Center of Immigrant Studies and The Pew Charitable Trusts provided the data of immigrant population by state and immigrant employment in 2015, which is the median year of the research window in Analysis 1. By comparing the most popular jobs in the states with the largest number of immigrants, I can point to hotspots of immigrant employment sectors.

Results

Analysis 1: Climate change and immigrants

The correlation analysis between the number of people affected by natural disasters and the number of people that immigrated to the U.S. (Table 1) shows that China has the highest correlation index of 0.77, which means there is a strong relationship between these two factors. Except for India, other countries also show a relationship between natural disasters and immigration to some degree. The correlation index of China, Mexico, Australia, Japan and Brazil

are about 0.77, 0.53, 0.70, 0.37 and 0.31, respectively. Therefore, the number of people that migrate to the U.S. is correlated with the number of people affected by natural disasters, though this correlation varies significantly based on the country. In addition, I conducted another correlation analysis between the national GDP index and the number of people that immigrated to the U.S. to determine the impacts of GDP on immigrant flows. The highest correlation index of this analysis belongs to India, which is about 0.95; the lowest correlation index belongs to Japan, which is about 0.21. The correlation indices between the number of people affected by natural disasters and the number of people that immigrated to the U.S. are all higher than the correlation indexes between the national GDP index and the number of people immigrated to the U.S. for developed countries. However, the correlation indexes between the national GDP index and the number of people that immigrated to the U.S. are all higher than the correlation indexes between the number of people affected by natural disasters and the number of people that immigrated to the U.S. for developing countries.

Table 1. Correlation analysis of people affected by climate disasters and national GDP on the number of people that immigrated to the U.S. from 2010 to 2019.

| | Emdat Affected People vs Immigration | GDP vs Immigration |
|-----------|--------------------------------------|--------------------|
| China | 0.771184598 | 0.945697924 |
| Mexico | 0.533449513 | 0.508257954 |
| Australia | 0.704578177 | 0.295356619 |
| India | 0.194840927 | 0.947864843 |
| Japan | 0.365936093 | 0.208371803 |
| Brazil | 0.305189154 | 0.481791581 |

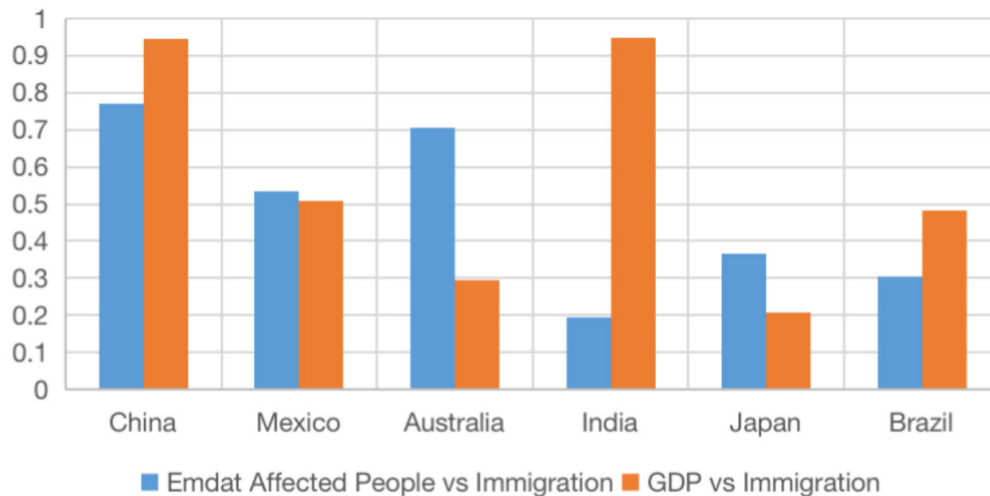


Figure 1. Correlation analysis of people affected by climate disasters and national GDP on the number of people that immigrated to the U.S. from 2010 to 2019.

Analysis 2: Employment sectors of immigrants to the U.S.

According to the statistics from the Center of Immigrant Studies, the top 5 states that received the largest influx of immigrants in 2015 were California, Texas, New York, New Jersey, and Florida. The state with the largest proportion of immigrants was California, where the number of immigrants exceeded one quarter of the total population.

Table 2. The immigrant shares of the population and total immigrant population of the top 5 states that contained the most immigrants in 2015.

| | Immigrant Share of Population | Total Immigrant Population (thousands) |
|------------|-------------------------------|--|
| California | 27.10% | 10,512 |
| New York | 22.60% | 4,465 |
| New Jersey | 21.90% | 1,961 |
| Florida | 20.00% | 3,974 |
| Texas | 19.40% | 4,522 |

According to the employment statistics from The Pew Charitable Trusts, agriculture and extraction, construction and manufacturing are the 3 most distinctive employment sectors (the number of employed immigrants apparently differed from the number of employed local citizens) in the states mentioned above. The most significant difference among five states mentioned above appears in California’s agriculture and extraction sector, where immigrants are 3.6 times more likely to be employed than local citizens. In the nationwide level, the employment index in Idaho and Illinois are 4.7 and 0.3 respectively, which are the largest and smallest indexes in the U.S. The variation in indexes of different employment sectors in different states are common, and each state has a unique high index and low index based on its location, resources, culture and degree of social development and industrialization. From the national perspective, the most popular employment sectors for immigrants are trade, transportation, and utilities, which occupied about 17% of the total American immigrant population.

Discussion

Based on the results, critical distinctions with implications for policymaking can be made. For developed countries, the number of people affected by natural disasters is more closely correlated with the people who choose to immigrate to the U.S. This may be because people in developed countries will be less restricted by economic factors when a natural disaster occurs and forces them to relocate. On the other hand, people in developing countries may not have the economic ability to leave their country even though a relocation may be needed.

According to the results of analysis 1, as the status quo of global climate change is getting worse, the trend of immigration to the U.S. is still developing. The results of analysis 2 highlight that the majority of American immigrants are engaging in fundamental industries, such as agriculture and infrastructure construction. They provide a relatively cheap labor source to the U.S. which fuels the broader economy, and by doing so, likely also expand the number of new jobs that can be created for local citizens. Based on the economic benefits that immigrants provide, the U.S. government should encourage migration of those affected by climate change by reducing barriers against migrants and establishing policies that support resettlement and employment.

Overall, these results highlight the impacts of climate change on American immigrants flows and the contributions of immigrants on American societal development.. Beyond expanding immigration policy to be more inclusive, as previously suggested, it is also critical to improve the selection mechanism of immigrants so that there is a focus on the diversity of experiences and skills that immigrants provide. To this end, I recommend setting up a thorough points-based citizenship registration policy based on their expertise, In addition, although climate change has a positive effect on American immigrant flows which can have beneficial effects on the economy, it still has a negative long-term impact on the global environment and can cause significant suffering for those very migrants. Therefore, climate mitigation efforts should be at the forefront of foreign and domestic policy priorities, so as to reduce the occurrence of related natural disasters and the subsequent negative impacts on potential migrants.

Conclusion

In conclusion, according to the EM-DAT database and the Yearbook of Immigrant Statistics, the degree of global climate change is correlated with the number of people that immigrated to the U.S. There is a significant difference between immigrants from developed and developing countries. People in developed countries, may be less constrained by economic issues when climate relocation is necessary, whereas for people in developing countries the opposite may be true. As for the employment sectors, immigrants are more likely to be employed in agriculture, construction and other fundamental industries in the nation. Immigrants provide tremendous economic value and promote American developments. As such, the U.S. should take a welcoming approach to migrants as climate change continues to increase their flows around the world.

Limitations

This analysis has some limitations that should be noted. Some events were ignored due to the small scale of people affected. However, they may contribute to the number of people who migrated to the U.S. So, the statistics of the number of affected people should be slightly smaller than the actual value. Furthermore, correlation is not causation. Without specifically controlling for a variety of other factors (e.g., income, unemployment rates), we cannot be reasonably sure that there is not an underlying factor that is driving these results.

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