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Root Causes of Migration from Guatemala: Analysis of Subnational Trends

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Executive Summary

This analysis shows that the increase in family migration from Guatemala to the United States has been disproportionately driven by people leaving departments (states) with large rural populations. Increased agricultural stress, such as that caused by recent droughts in Central America, is a key factor contributing to migration. We analyze U.S. government data on department of birth for Guatemalans apprehended at the U.S. southern border while traveling as part of a family unit from fiscal years 2012-2019. These data are linked to department-level measures of agricultural stress, size of the rural population, homicide rates, and wealth. The focus on variations in department-level characteristics allows us to evaluate the conditions present in departments of greatest out-migration. The results can inform discussions regarding root causes of Guatemalan migration and policy options.

Poverty, Climate Change, Corruption, and Violence

Nearly 50% of people in Guatemala live in poverty and 3.5 million were classified as food insecure in 2021. Frequent droughts linked to climate change in the Dry Corridor have significantly affected the agriculture sector, which employs more than 30% of Guatemalan workers. Natural disasters and the lack of political and economic support to recover from these shocks contribute significantly to ongoing cycles of poverty and food insecurity. These pressures have been amplified by the COVID-19 pandemic.

The homicide rate in Guatemala has been decreasing in recent years but some areas, including Guatemala City, continue to see high levels of violence. Transnational drug trafficking organizations control parts of the country, transporting cocaine from Colombia and

Key Points

- ***Guatemalan migration to the United States rose sharply in 2018 and 2019, with a substantial increase in migration of family units.*** Apprehensions of Guatemalans at the U.S. southern border averaged 61,000 people from 2012-2017, rising to 116,000 in 2018 and 264,000 in 2019, an increase of more than 400%. The percent of total apprehensions accounted for by people arriving as part of family units rose from less than 20% through 2014 to 44% in 2018 and 70% in 2019.

- ***The increased number of Guatemalan migrants arriving in family units at the U.S. southern border between 2012 and 2019 was disproportionately driven by people leaving rural areas.*** There is a strong link between being born in a rural area in Guatemala and migrating as part of a family unit to the United States. An increase in the percent of people in a department living in rural areas from 37% (10th percentile) to 60% (75th percentile) is associated with a yearly increase from 29 apprehensions to 69 apprehensions per 100,000 population, a 136% increase.

- ***Agricultural stress, such as that caused by the droughts in 2014-2015 and 2018, drives increased migration from Guatemala.*** A department experiencing at least one month with 9% of its cropland categorized by agricultural stress in a given year is associated with 57 apprehensions per 100,000 population, compared to 31 apprehensions per 100,000 population for departments that experience no agricultural stress, an 82% increase. If 24% of cropland is under agricultural stress, average apprehensions for the department rise to 62 per 100,000 population for the year.

- ***Increasing foreign aid could bolster agricultural resilience and increase the viability of internal migration options.*** A relatively small portion of U.S. foreign aid to Guatemala is focused on the agriculture sector. Increasing funding to adopt climate-smart agriculture techniques could improve livelihoods and food security, decreasing the need to migrate. Longer-term solutions will also require understanding and bolstering internal migration options.

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Venezuela to the U.S. market through routes in Guatemala and other Central American countries. Rates of extortion in the country are increasing, with small businesses being among the most frequently targeted. Corruption is high and the internationally heralded Guatemalan anti-corruption agency, CICIG, was disbanded in 2019.

Study Data

This study is based on data for 309,400 people apprehended by United States Customs and Border Protection (CBP) at the US southern border while traveling as part of a family unit during fiscal years 2012-2019. Data were obtained through a Freedom of Information Act request and identify city and department of birth for those apprehended.[i] The yearly totals closely align with published country-level totals of family unit apprehensions, verifying that the data represent the universe of apprehensions in this category. These data end before the Covid-19 pandemic and the November 2020 hurricanes. They provide a good base for examining drivers of migration prior to these major events, which are likely to continue contributing to migration in the future.

Analyzing sub-national data based on apprehensions allows us to complement previous work that has used surveys and interviews in Central American countries to better understand the drivers of migration and planned emigration.[ii] Respondents who experience crop loss due to drought, for instance, might respond to a survey by saying that economic stress, job loss, or lack of food is driving their migration decision, not mentioning climate change as a factor. Analyzing underlying conditions at the department level can enhance understanding of root causes that contribute to the resulting lack of economic or food security. Examining apprehensions also mitigates the problem that people who migrate as family units may be less likely to have a household member remain behind, resulting in migrants from this category being underrepresented in surveys based in sending countries.

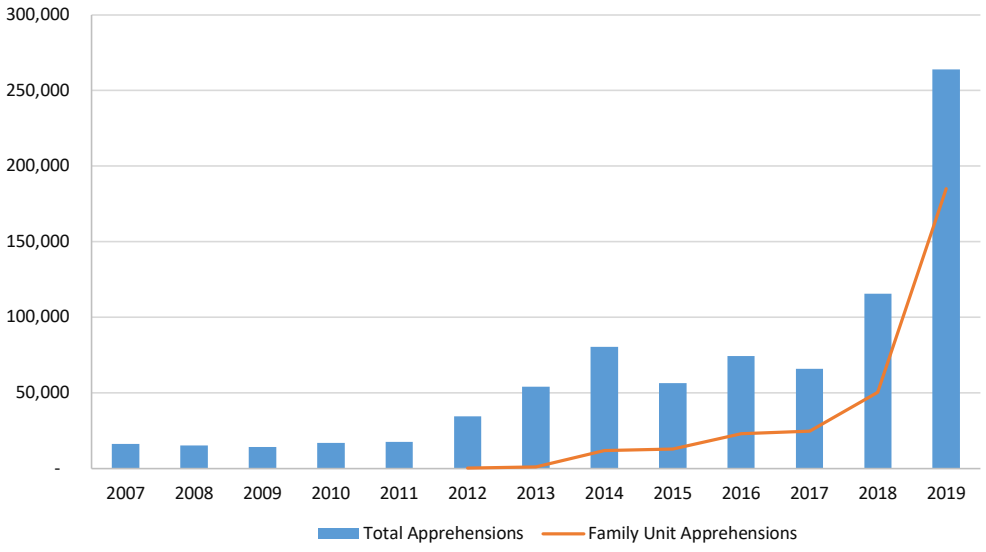
Our measure of migration in the analysis is the ***Apprehension Rate***, calculated as the number of individuals apprehended while traveling in family units per 100,000 population for each department in each year.[iii] We use the Agricultural Stress Index (ASI) from the Food and Agriculture Organization (FAO) to compute a measure of ***Agricultural Stress***. The ASI calculates the percent of cropland that is experiencing stress and functions as an early indicator of high likelihood of drought. It is aggregated to the department level in ten-day increments; we average the value for each month for each department-year and then use the maximum monthly value for the department-year in the analysis.[iv] A measure of ***Rural Ratio*** for each department is computed from the 2018 Guatemalan census as rural population divided by total population.[v] Data for ***Homicide Rate*** by department are from the Government of Guatemala.[vi] A ***Wealth Index*** that varies by region in Guatemala is included.[vii] The variable ***Dry Corridor*** is coded as 1 for departments located in the Dry Corridor of Central America and zero otherwise.[viii] We include a ***Year*** trend variable to pick up common trends that are not department-specific.

Apprehensions at the U.S. Southern Border

The number of people from Guatemala apprehended at the southern border of the United States has been growing since 2012 and increased substantially in 2018 and 2019, as shown in Figure 1. There has been a change in the nature of migration as well: the number of people arriving as part of family units was 15% of total apprehensions in 2014, rising to 44% of apprehensions in 2018 and 70% in 2019.

Figure 1: Apprehensions of People from Guatemala

U.S. Southern Border
2007-2019



Notes: Data for total apprehensions are from the US Customs and Border Protection website. Data on Family Unit apprehensions were supplied in response to a Freedom of Information Act request.

Table 1 shows the total number of family unit apprehensions by CBP at the U.S. southern border during fiscal years 2012-2019 by department of birth in Guatemala. Departments are listed by descending number of total apprehensions and summary statistics for each department are included. The largest number of those apprehended list Huehuetenango as department of birth. This is consistent with findings of other studies based on in-depth interviews and surveys, which have found evidence of significant migration from Huehuetenango to the United States. Reporting has called the department the "epicenter of migration" from the region and noted the high levels of malnourishment and impact of coffee rust in Huehuetenango.

The top five departments in terms of percentage of population apprehended at the U.S. southern border during this time were Huehuetenango (7.05%), Petén (3.93%), Quiché (3.89%), Baja Verapaz (3.04%), and San Marcos (2.88%). These areas have large rural populations, averaging 67% of total population across the five departments. By contrast, the five departments that saw the lowest percentage of their populations apprehended at the U.S. southern border average only 30% rural population.

Table 1: Apprehensions of People Arriving in Family Units at U.S. Southern Border Guatemala Departments 2012-2019

Department of Birth	Apprehensions	Population	Percent Population Apprehended	Largest Agricultural Monthly Stress	Rural Percent	Mean Homicide Rate per 100,000	Wealth Index
Huehuetenango	78,891	1,119,696	7.05%	9.3%	72%	9.6	57.7
Quiché	34,593	890,073	3.89%	23.9%	68%	4.6	57.7
San Marcos	29,331	1,016,916	2.88%	0.7%	75%	12.7	67.1
Petén	19,879	505,219	3.93%	45.1%	60%	60.3	57.9
Guatemala	17,787	3,085,980	0.58%	36.8%	9%	56.2	82.1
Alta Verapaz	12,603	1,100,635	1.15%	43.7%	69%	9.7	46.5
Quezaltenango	12,229	791,884	1.54%	33.3%	38%	21.1	67.1
Jutiapa	11,135	488,567	2.28%	14.9%	49%	42.1	59.8
Chiquimula	9,714	398,284	2.44%	21.3%	63%	65.8	57.4
Jalapa	9,298	325,252	2.86%	24.4%	37%	43.5	59.8
Baja Verapaz	8,701	286,148	3.04%	8.3%	60%	11.3	46.5
Chimaltenango	7,825	589,902	1.33%	12.2%	46%	18.1	63.3
Escuintla	6,592	706,693	0.93%	19.4%	39%	73.8	63.3
Santa Rosa	6,084	388,417	1.57%	5.0%	54%	48.8	59.8
Suchitepéquez	5,909	532,646	1.11%	5.1%	52%	23.4	67.1
Izabal	5,405	401,453	1.35%	21.4%	59%	62.4	57.4
Retalhuleu	5,392	316,073	1.71%	1.9%	43%	25.9	67.1
Totonicapán	3,793	421,420	0.90%	16.7%	51%	4.0	67.1
Zacapa	3,046	248,051	1.23%	45.3%	56%	69.0	57.4
Sololá	2,021	405,458	0.50%	0.0%	38%	5.4	67.1
El Progreso	1,737	176,021	0.99%	42.6%	48%	38.3	57.4
Sacatepéquez	1,621	321,564	0.50%	12.8%	12%	16.9	63.3
Average	**13,345**	**659,834**	**1.99**	**20.2**	**49.78**	**32.9**	**61.4**

Notes: Department of birth based on data from US CBP records for family unit apprehensions at the southern border for fiscal years 2012-2019. Department population is the U.S. Census Bureau estimate for 2011. Agricultural stress is measured by the Food and Agriculture Organization (FAO) for each department; the largest monthly average for the period is shown. Mean annual homicide rate for each department from 2011-2018, calculated based on data from the Guatemalan government. Rural percent is calculated from the 2018 Guatemalan census. Wealth index is based on 2012 household surveys from the Global Data Lab.

Statistical Analysis: Agricultural Stress, Rural Areas, and Migration

Our analysis examines the relationship between the apprehension rate of people migrating in family units from a department and department-specific characteristics. To ensure we are capturing potential effects prior to the apprehension period, we lag agricultural stress and homicides by one year. Table 2 presents our main statistical results.

Table 2: Guatemala Department Apprehension Rate
Members of Family Units, 2012-2019

	Year Model 1	Year Model 2	Canícula Model 3	Canícula Model 4
Lag Agricultural Stress (log)	0.088***	0.081***	0.082***	0.081***
Rural Ratio	3.755***	2.631***	3.852***	2.628***
Rural*Dry Corridor		3.044*		3.359**
Lag Homicide Rate (log)	-0.004	0.239*	0.009	0.274**
Homicide*Dry Corridor		-0.262		-0.292
Dry Corridor	0.267	-0.394	0.200	-0.524
Wealth Index	0.063**	0.079***	0.064**	0.083***
Year Trend	0.819***	0.825***	0.816***	0.822***
Observations	176	176	176	176

Notes: Dependent variable is the natural log of the department apprehension rate per 100,000 population for people apprehended at the U.S. southern border while arriving as part of a family unit. Random effects regression with robust standard errors clustered on department. Unit of analysis is department-year. In Models 1 & 2 agricultural stress is the maximum monthly average for the year; in Models 3 & 4 agricultural stress is the maximum monthly average for the canícula period (July and August). *p < 0.10; **p < 0.05; ***p < 0.01

The results from Model 1 show that an increased percent of cropland experiencing agricultural stress in a department is associated with increased apprehensions from that department at the U.S. southern border the following year. This relationship holds when department fixed effects are included in the regression, indicating that variation over time in agricultural stress within a department is associated with changes in apprehension rates. A similar relationship is observed when the dependent variable is replaced with a measure of total apprehensions for the department year (rather than apprehension rate).[ix] The result from Model 1 is substantial:

A change in the value of agricultural stress from 0% of cropland affected to 9% affected is associated with an increase in the department's apprehension rate from 31 to 57 people per 100,000 population the following year.

If 24% of cropland is under agricultural stress (95th percentile), average apprehensions for the department rise to 62 per 100,000 population for the year. Model 1 also shows that departments with a larger percentage of people living in rural areas have higher apprehension rates, even controlling for agricultural stress.[x]

An increase in the percent of people in a department living in rural areas from 37% (10th percentile) to 60% (75th percentile) is associated with a yearly increase from 29 apprehensions to 69 apprehensions per 100,000 population, a 136% increase.

The positive coefficient on Wealth Index is consistent with higher apprehension rates from wealthier areas, suggesting that access to funding increases the ability to migrate. This is consistent with studies finding that migration often has a positive relationship with income.[xi] We find no evidence that wealth interacts with any of our other variables of interest.

The coefficient on Homicide Rate is not significant in Model 1, which differs from some previous findings. Examining apprehensions of unaccompanied minors from Central America at the U.S. southern border from 2011 to 2016, Clemens (2017) finds that higher levels of homicides in a municipality were associated with increased apprehensions.[xii] Several factors may account for the lack of association between homicides and apprehensions in Model 1. One possibility is that the importance of various drivers of migration differs across regions of the country. We attempt to unpack this in Model 2, where we interact the indicator variable for Dry Corridor with the measures for Rural Ratio and Homicide Rate.

The positive and significant coefficient on Homicide Rate in Model 2, coupled with the insignificant coefficient on the interaction term Homicide*Dry Corridor, suggests that for departments outside of the dry corridor, homicides are associated with increased apprehensions. When the homicide rate increases from the 10th percentile to the 75th percentile in departments outside of the dry corridor, the apprehension rate increases by 72%.

The lack of importance of homicides in driving migration from the dry corridor is consistent with an interpretation that poverty and climatic shocks, which are disproportionately present in this area, overwhelm homicides as a driving force of migration. It is possible that the incidence of violence, including homicides, in other areas of the country contributes to the decision to migrate internationally rather than internally, creating a connection between violence and emigration that is not defined by subnational variation in homicide rates. We also note that the homicide rate is only one measure of violence; high levels of other types of crime associated with violence may also factor into migration decisions and are not captured here.

In Model 2 the coefficients on Rural Ratio and Rural*Dry Corridor are both positive and significant, consistent with an interpretation that more family units are leaving rural areas and that this is particularly pronounced for rural areas in the dry corridor. The variation in the relationship between explanatory variables and apprehensions, as demonstrated by the interactions with Dry Corridor, suggests caution is needed in drawing conclusions from analyses aggregated over large areas.

Models 3 and 4 shift the measure of agricultural stress to examine the canícula period, a meteorological phenomenon creating decreased precipitation in July and August during the otherwise rainy season in Guatemala. Characteristics of the annual canícula have strong impacts on agricultural productivity, particularly in farming regions in the dry corridor, as this period can affect both the harvest from the Primera season and planting for the Postrera season.[xiii] The agricultural stress measure in Models 3 and 4 is the higher of monthly stress for July or August for the department in the given year. The results are consistent with those from Models 1 and 2, which used the yearly maximum to measure agricultural stress.

Policy Implications and Foreign Assistance

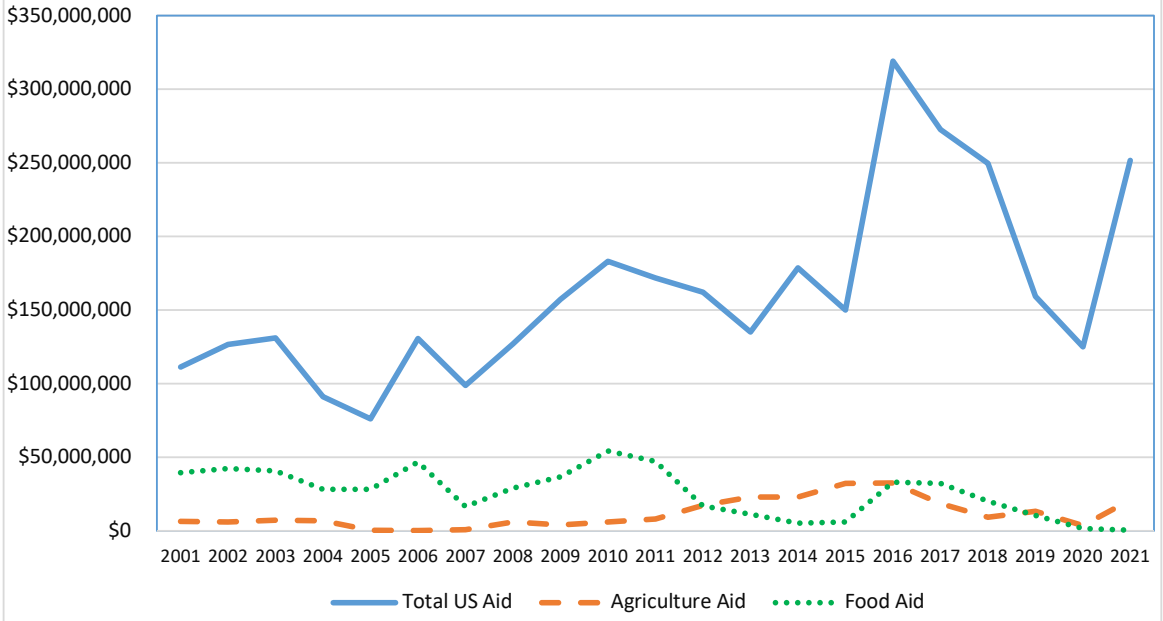
The evidence presented here suggests that the increase in arrivals of family units from Guatemala at the U.S. southern border is disproportionately driven by people leaving rural areas, particularly in the dry corridor. Years of higher agricultural stress for a department are followed by years of higher apprehensions from that department. Increased agricultural and rural resilience will be an essential component for any policies aimed at reducing the need for migration from the region. The need for investment in resilience is growing as the impact from climate change on crops in Guatemala is projected to increase.

> **Additional aid for agriculture could increase agricultural resilience to climate change, decrease food insecurity and malnutrition, and provide people with alternatives to migration.**

Figure 2 shows U.S. foreign aid to Guatemala. Aid for agriculture and food aid make up a relatively small portion of total U.S. aid to the country. Analysis has shown that multiple types of investment in climate-smart agriculture in Guatemala would be profitable, but require short-term upfront investments that may not be feasible for small-scale farmers without outside assistance. Additional aid for agriculture could increase agricultural resilience to climate

Figure 2: U.S. Foreign Aid to Guatemala

Total Aid, Agriculture Aid, Food Aid
2001-2021



Notes: Obligations in constant dollars, extracted from US Foreign Aid Explorer on 3/7/2022. Agriculture includes DAC purpose codes 31110-31199; Food Assistance/Food Security includes DAC purpose codes 52010 and 72040.

change, decrease food insecurity and malnutrition, and provide people with alternatives to migration.

Even with investment in new agricultural techniques, there is likely to be some continued movement out of rural areas. The World Bank projects large increases in internal migration related to climate change by 2050. Recent survey evidence shows that 43% of people surveyed in El Salvador, Guatemala, and Honduras expressed a desire to move internationally, while only 14% of respondents in Guatemala wished to move internally. Increasing the attractiveness of internal migration options for Guatemalans will be important. Effective policy in this area will require research to understand viable internal migration pathways and significant effort to address the seemingly intractable problems of drug trafficking, violence, corruption, and lack of economic opportunity that contribute to the preference for international, rather than internal migration.

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[i] Data from the Freedom of Information Act (FOIA) request were generously shared by Stephanie Leutert. For 87% of apprehensions the department of birth was specified. When the department was not specified but city of birth was specified, we attempted to match the recorded city to a department. We also changed a small percentage of departments that appeared to be misclassified. After this process we were able to assign 95% of apprehensions to a specific department. Full coding rules for assigning department are available from the authors.

[ii] Two influential studies are Ruiz Soto et al (2021) and Creative Associates (2019).

[iii] We take the natural log of this variable in the analysis. Data for department population are from 2011, as estimated by the U.S. Census Bureau (available at https://www.census.gov/geographies/mapping-files/time-series/demo/international-programs/subnationalpopulation.html).

[iv] Available at https://www.fao.org/giews/earthobservation/country/index.jsp?lang=en&code=GTM; accessed March 4, 2022.

[v] Available at https://www.censopoblacion.gt/mapas; accessed March 4, 2022.

[vi] Shared by Stephanie Leutert (RESPUESTA SOLICITUD No. 1259-2020). We calculate the homicide rate per 100,000 people (based on 2011 population) and use the natural log in the analysis.

[vii] The mean international wealth index score from Global Data Lab Area Database 4.0 is used, based on household surveys; the values used are from 2012, which is a baseline at the beginning of the period analyzed (https://globaldatalab.org; accessed March 3, 2022). This is available by region in Guatemala, so departments in the same region have the same wealth index.

[viii] Coding of departments in the Dry Corridor is based on Fraga (2020) and is coded 1 for the departments El Progreso, Jalapa, Jutiapa, Zacapa, Chiquimula, Huehuetenango, Quiché, Totonicapán, Chimaltenango, Baja Verapaz and Guatemala.

[ix] We prefer random effects models since many of the department-specific variables are measured in a way that does not vary over time, meaning they are dropped from an analysis including department fixed effects. When Model 1 is estimated with department fixed effects, the coefficient on the agricultural stress variable is 0.101 ($p=0.01$). When the dependent variable is log of total apprehensions (rather than apprehension rate), the coefficient on agricultural stress is 0.094 ($p=0.005$); log of population is also included as an explanatory variable in this equation.

[x] Rural ratio does not vary over time within a department in this analysis since there is only one census during the period. When Model 1 is estimated for individual years, the coefficient on the rural ratio variable is of similar magnitude to that shown in Table 1 with $p<0.05$ in each year from 2013-2019.

[xi] See, for example, Clemens (2020). In other models we include the square of the wealth index and do not find it to be significant.

[xii] Differences between this analysis and Clemens (2017) include: time period under analysis; focus on family units here (rather than unaccompanied minors); unit of analysis at the department rather than municipal level; focus exclusively on Guatemala (rather than the region) in this brief.

[xiii] See Rojas et al (2020).