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Determinants of Immigrant Apprehensions: The Case of U.S. Immigration

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Abstract
The incidence of illicit behaviors among foreign-born residents in the U.S. reveals significant variations across countries of origin. This paper identifies the factors underlying such cross-country variations in immigrant apprehensions by using cross-sectional data from 104 countries averaged across the 2002–2013 period. The results based on multiple regression techniques highlight the home country's social ills such as corruption, theft and homicide as key determinants. Also included in the regression models, as control variables, are proxies for economic development and geographic proximity to the U.S. Noteworthy is that, alcohol consumption, another explanatory variable, is negatively related to the apprehension incidence in the host country. These results suggest that chronic socio-economic problems such as corruption, crimes, and poverty in the country of origin are central in explaining the cross-country variations in alien apprehensions in the U.S.

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Keywords Immigration; corruption; alien apprehension; social ills

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1 Introduction

The U.S. is a country that hosts the largest number of foreign-born individuals from around the world with diverse objectives.[1] The history of immigration to the U.S. suggests that some immigrants are more likely to engage in illegal practices than others (e.g., Moore and Vedder, 2000). As explained in the Data section of this paper, there are indeed considerable cross-country variations in the average annual number of alien apprehensions per 100,000 aliens from the same country with a standard deviation as large as 1,108.24 for the 2002–2013 period. Therefore, this paper addresses the question of what country-level factors influence the large alien apprehension variations across countries for the U.S.

Many social ills are thought to be at play here, including corruption, crime, traffic safety culture, and alcohol use disorders, among others. For example, the persistence of corruption in a country can make corrupt behaviors a general attitude among citizens, and therefore emigrants from corruption-ridden countries may carry such attitudes to their host countries (Dimant et al., 2013) leading to a more frequent brushes with the legal system.

To the extent that immigrants bring their culture, way of life and attitudes with them, it is reasonable to hypothesize that immigrants from countries laden with such social ills are more prone to violating rules and regulations in their host countries. Factors such as levels of economic development and education in the home country are also important factors influencing behavioral patterns of immigrants. Although a review of raw data collected hints at all these factors being likely determinants, few formal empirical tests are found in the literature for determinants of immigrant apprehensions.

One previous study examined the effect of home country corruption on parking violations by the diplomats stationed in New York City (Fisman and Miguel, 2007). While inspired by this earlier study, the dependent variable selected in this paper is incidence of alien apprehensions, a measure of illicit behavior that is

[1] According to "Trends in International Migrant Stock: The 2013 Revision" by the United Nations (2013), the U.S. had the largest number of immigrants (45,785,090) in the world as of 2013, accounting for 19.8% of all immigrants. Almost three quarters of Americans today believe that immigration increases the crime rate in the country (e.g., Spenkuch, 2011), and a rise in the crime rate places considerable burdens on taxpayers' shoulders in funding immigration enforcement (e.g., National Immigration Forum, 2013).

wider in scope and coverage and more direct, against a number of explanatory variables for social ills. To focus on the impact of social ills on alien apprehensions, a number of control variables are considered, including indicators of economic development, geographical proximity to the U.S., investment relations, and regional and income-group dummies.

The results verify that individuals coming to the U.S. from countries with higher incidences of social ills (e.g., corruption, theft, and homicide) are more prone to apprehensions than those from countries less affected by such social ills. On the other hand, apprehension incidences decrease significantly with increases in levels of economic development and education in the country of origin.

The rest of the paper is organized as follows: Section 2 provides a literature review. Section 3 introduces the data and variables and Section 4 presents the econometric strategy and empirical results. Section 5 concludes.

2 A Literature Review

Few studies have examined illicit behaviors of individuals in foreign countries in relation to social ills such as corruption in their country of origin (Fisman and Miguel, 2007; Dimant et al., 2013; Alesina et al., 2013).

Fisman and Miguel (2007) conducted a unique empirical analysis that relates illicit behaviors of foreign individuals in the host country to the level of corruption in their home country by examining the parking behavior of United Nations diplomats in New York City from 149 countries and showed a significant positive correlation between the number of parking violations and the corruption level of the home country. Diplomats from less corrupt countries behaved remarkably well even in the absence of any legal consequences, whereas those from high-corruption countries committed multiple violations. Their findings also show that diplomats from high-corruption countries were significantly more likely to have unpaid parking violations prior to the 2002 enactment of an enforcement initiative confiscating diplomatic license plates. After the enactment of this strict regulation, their unpaid violations showed a sharp decline.[2]

[2] Parking violations dropped by more than 98% after enactment of the enforcement initiative in 2002.

Dimant et al. (2013) examined changes in the host country's corruption level resulting from the arrival of immigrants from high-corruption countries by using annual data for OECD countries over the 1984–2008 period and found that general migration had no significant effect on the host country's corruption level but that immigration from corruption-ridden countries had a significant positive effect – particularly over the long term – on the corruption level of the host country.

Alesina et al. (2013) examined gender treatment attitudes of second-generation immigrants (from different cultural backgrounds) who were born and raised in the U.S. and Europe and found some evidence of cultural norms and beliefs being internal to those individuals, suggesting that when individuals leave their external (corrupt) environments behind, their beliefs and values move with them regardless of where they go. They also presented evidence suggesting that immigrants may export some of their corrupt attributes to their host countries.

This study uses as the dependent variable the incidence of alien apprehensions in the U.S. by the country of origin to identify factors that explain cross-country variations in the illicit behavior of aliens. Unlike in Fisman and Miguel (2007), the present study's dependent variable covers the whole alien population to examine a host of indicators of social ills as candidate determinants by using relevant control variables including the level of economic development, geographical proximity to the U.S., and education as well as regional and income-group dummies. The results provide support for the main findings of Fisman and Miguel (2007).

3 Data and Variables

Cross-sectional data covering a total of 104 countries selected for the availability of relevant data for the 2002–2013-period are employed.[3] Period averages are used for all variables because of missing values for some variables. Table A1 of the Appendix provides summary statistics for all the variables and Table A2 provides a list of sample countries arranged by the immigrant apprehension ratio for the U.S.

[3] Territories of colonial status, overseas territories and countries with populations less than 100,000 are excluded.

3.1 The Dependent Variable: The Apprehension Ratio of Immigrants (APR)

Immigration data for the U.S. are obtained from two sources: the U.S. Department of Homeland Security and the Migration Policy Institute. To construct the dependent variable, two sets of data are retrieved: the number of foreign-born individuals (FBI) and the number of apprehended foreign-born individuals (AFBI) for each country. Here the term "foreign-born individuals" (immigrants) refers to people residing in the U.S. who are not U.S. citizens at birth. Included in the foreign-born population are naturalized citizens, lawful permanent residents, certain legal nonimmigrants, those admitted under some refugee or asylum status, and people illegally residing in the U.S.[4]

Data on FBI and AFBI for each country are obtained from the Migration Policy Institute of the U.S. (MPI, 2014) and the U.S. Department of Homeland Security (DHS, 2011–2013), respectively. The DHS provides annual data for 176 countries and territories, and MPI data cover 109 countries. Cross-country AFBI data are aggregate data that include both criminal offenses and immigration violations and supplied without any breakdown by offense type.

Dividing AFBI by FBI and multiplying the result by 100,000 provides,

$$APR(A,t) = [\ AFBI(A,t) / FBI(A,t)\ ] * 100{,}000 \quad (1)$$

where the APR (apprehension ratio) represents the annual number of apprehensions per 100,000 aliens and (A,t) indicates country A in year t. The ratio is multiplied by 100,000 to keep the dependent variable of the regression model in its log form to reduce the skewness of the distribution while mitigating the potential problem of heteroskedasticity. As shown in Table A1 of the Appendix, the APR reveals considerable cross-country variations (from 17.79 to 7,582.33) with a standard deviation as high as 1,108.24 for the 2002–2013 period.

[4] Defined by the U.S. Census Bureau.

3.2 Explanatory Variables

Corruption: For the measure of corruption, two sets of data are considered: Corruption Control data from the Worldwide Governance Indicators (WGI) and the Corruption Perception Index from Transparency International (TI). These two indicators of corruption produce similar regression results but 'Corruption Control' data are selected (e.g., Kaufmann et al., 2014) for their broader country coverage and data completeness with no missing values after the year 2000.[5] The index is scaled from –2.5 to 2.5 with –2.5 representing the highest level of corruption (weakest control) and 2.5, the lowest level of corruption (strongest control). The data are multiplied by –1 for a more intuitive interpretation of the scale such that the higher the value, the higher the level of corruption.

Theft: Loss (as a percentage of annual business sales) from theft, robbery, vandalism, and arson is used as a proxy for the crime of theft, and data are collected from World Bank Data Tables (World Bank, 2014b). According to the U.S. Government Accountability Office Criminal Alien Statistics (GAO, 2011), more than 400,000 immigrants were arrested because of theft-related offenses in 2011.

Homicide: Data on the homicide rate (per 100,000 people) are obtained from the International Homicide Statistics database (UNODC, 2014a). Captured in the data are unlawful homicides purposely inflicted because of some domestic dispute, interpersonal violence, violent conflicts over land resources, inter-gang violence over turf or control, and predatory violence and killing by armed groups. Gurr (1989) argued that U.S. trends in violent crimes are strongly correlated with the arrival of new immigrants. Some studies (e.g., Spenkuch, 2013; Monkkonen, 1989; Lane, 1989) have also found a significant positive relationship between immigrant populations and their involvement in homicide.

Alcohol: Abundant reports and statistics link alcohol consumption to traffic accidents, violent crimes, sexual assaults, child abuse, and domestic violence. Given the habit-forming nature of drinking and the concurrent cross-border migration of immigrants' culture and way of life, it is reasonable to assume the

[5] The correlation coefficient between corruption control and the corruption perception index is high across years (ρ=0.97 on the average). However, the corruption perception index has many missing data points requiring extrapolation. It also has a serious data consistency problem because of changes in the data construction methodology over time.

existence of a relationship between the incidence of alcohol-related crimes and offenses in the home country and the alien apprehension ratio for the host country.

Because data on the incidence of alcohol-attributable crimes and anti-social behavior are not available for all countries in the sample, per capita alcohol consumption (average daily intake in grams of pure alcohol for individuals 15 and over) is used as a proxy, and data are obtained from the Global Status Report on Alcohol and Health (WHO, 2014b). However, per capita alcohol consumption has a number of limitations as a proxy measure for the incidence of alcohol-attributable crimes and offenses. Being merely a per-person average at the population level, it does not account for the magnitude of alcohol use disorders (including alcohol dependence and the risky use of alcohol) in society, including the prevalence of heavy episodic drinking,[6] which varies across countries depending on sociocultural attitudes and legal tolerance toward drinking.

Distance: To determine the impact on alien apprehensions in the U.S. resulting from illegal border crossings, data on distances from the U.S. to 104 countries (in kilometers) are collected from the website of Distance From To: Distances between Cities & Places (2015). Individuals from countries near the U.S. are assumed to be more likely to make illegal entry into the U.S. than those residing farther away. The APR values for the whole sample of 104 countries are sorted and ordered (shown in Table A2 of the Appendix) to obtain a list of countries with the highest alien apprehension incidence in the U.S., which is topped by Honduras, Mexico, and Guatemala. These top three are followed by other Latin American countries, including Brazil, Nicaragua, Costa Rica, and Ecuador. This suggests the distance factor should be controlled adequately to reveal the impact of key determinants such as social ills on cross-country APR variations.

Income: As a proxy for the home country's income level, per capita GDP is considered, and data are from the United Nations Statistics Division (UNSD, 2012). In addition, data on energy use (kilograms of oil equivalent per capita) from World Bank Data Tables (World Bank, 2014a) are considered. A number of empirical studies (e.g., Mehlum et al., 2006; Krueger and Maleckova, 2003; Fajnzylber et al., 2002; Ehrlich, 1975; Becker, 1968; Fleisher, 1966) have highlighted a significant positive relationship between poverty and crime.

[6] The WHO (2014b) defines heavy episodic drinking (HED) as the consumption of 60 grams or more of pure alcohol on at least one occasion monthly.

Evidence from the aforementioned studies indicates that the level of criminal practices is higher for poorer countries. Between these two proxies for income, per capita energy use is used in the regression analysis because of its lower correlation with the rest of explanatory variables.[7]

Education: Data on education are obtained from 'A New Data Set of Educational Attainment in the World' (Barro and Lee, 2014). As a proxy for immigrants' literacy, average total years of schooling of people aged 15 and over are used. Lochner and Moretti (2004) find a significant negative relationship between schooling and criminal activity. Using FBI data on arrests, they find significant negative relationships of education to murder, assault, and motor vehicle theft. On the other hand, Krueger and Maleckova (2003) and Ehrlich (1975) find a weak relationship between education and crime.

Traffic: The poorer the traffic safety culture in the home country, the more likely its immigrants are to violate traffic rules, leading to a higher incidence of traffic-related arrests in the host country. Data on traffic violations, which are assumed to be a reliable proxy for immigrants' illicit driving practices in their country of origin, are not available, and therefore data on the estimated number of road traffic deaths per 100,000 people are obtained from the WHO (2014a) database. According to the U.S. Government Accountability Office Criminal Alien Statistics (GAO, 2011), traffic violations account for the third-largest portion of total arrested criminal immigrants.

Prostitution: Because of a lack of numerical data on prostitution, a dummy variable is used to account for the legality of prostitution as a proxy for prostitution in the home country.[8] The variable is coded 0 (prostitution being illegal) or 1 (otherwise). Two sources are cross-checked to construct this binary measure: Prostitution.Procon.org (2010) and ChartsBin (2010). According to the National Arrests for Prostitution and Commercialized Vice (2001–2010) data, the number of arrests for prostitution is larger in states with larger foreign-born

[7] The correlation coefficient between GDP per capita and corruption exceeds 0.85, and that between energy use and corruption is about 0.62. The use of GDP per capita causes a multicollinearity problem in the regression, making some key variables insignificant.

[8] The practice of prostitution is banned by law in the U.S. except for some rural counties in Nevada.

populations.[9] California, for example, had the largest number of prostitution-related alien apprehensions (an annual average of 12,920 people arrested), followed by Texas (7,279), Florida (6,424), Nevada (4,503), Illinois (4,114), and Pennsylvania (2,502).

Drug: The total number of drug-related crimes per 100,000 people was computed using international data from Crime and Criminal Justice Statistics (e.g., UNODC, 2014b) to measure the effects of drug-related crimes in the country of origin on the apprehension level of immigrants in the U.S.[10] According to the GAO (2011), drug-related crimes account for the second-largest portion of total alien apprehensions in the U.S. after civil immigration violations.

Tourism: Exposure to foreign countries through travel abroad or through interactions with tourists from abroad may have positive effects on attitudes of locals toward respecting laws and regulations of foreign countries and their level of awareness of those laws and regulations. As a proxy for immigrants' prior exposure to foreign countries, tourist arrivals and tourism expenditures by inbound tourists are used, and data are obtained from World Bank Data Tables (World Bank, 2014c, 2014d).

Unemployment: International unemployment data are obtained from the Key Indicators of the Labor Market database (e.g., ILO, 2014). This variable measures the portion of the labor force that is without work but is available for and seeking employment. There exists many studies of unemployment and crime. Among others, Hooghe et al. (2011), Edmark (2005), Raphael and Winter-Ebmer (2001), and Farrington et al. (1986) find a significant positive relationship between unemployment and crime in a given country or region. Here the present study assumes that the unemployment situation in the home country may be a factor influencing how well emigrants abide by laws and regulations of the host country.

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[9] Seven of the largest sates in terms of foreign-born population are California, New York, Florida, Texas, Pennsylvania, New Jersey, and Illinois and together they account for about 44% of the total U.S. population.

[10] Drug crime data are not available for 30 countries in the sample. Separate regression analyses are conducted by omitting these 30 countries and the incidence of drug use in the home country is not significant at any conventional levels across all models. This may be because passports as well as entry visas to the U.S. are generally not accessible to those with a known history of drug use. Therefore, this variable is completely dropped from estimation result tables.

Investment: Also included in the set of potentially relevant variables is investment from the U.S. Here it is assumed that a country's trade and investment relationship with the U.S., which is sometimes dictated by geopolitical interests of the U.S., may influence its citizens' perception of the U.S., thereby affecting the level of compliance with local laws by immigrants. Data on investment from the U.S. are from the U.S. Direct Investment Abroad Position (2014) published by the U.S. Bureau of Economic Analysis.

Regional and Income Group Dummies: Immigrants' attitudes toward compliance with local laws and regulations are assumed to reflect varying characteristics that exist across regions and income groups that their country of origin belongs to. In this regard, the full country sample is divided into five regions and four income groups, and two sets of dummy variables are used to verify the existence of cross-county variations in alien apprehensions attributable to regional and income group differences. Regional dummies correspond to Americas, Africa, Asia, Europe, and the Middle East, and income group dummies correspond to high-, low-, lower-middle-, and upper-middle-income countries.

4 The Empirical Strategy

4.1 A Simple Linear Regression Analysis

A simple linear regression analysis is conducted to check correlation coefficients between the dependent variable and independent variables. Although the results for effects of individual explanatory variables on Log (APR), the dependent variable, are not conclusive, they provide some support for the validity of variables.

According to the results, most explanatory variables are highly significant with expected signs. Social ills such as Corruption, Theft, Homicide, and Traffic as well as dummy variables for Americas, Lower-Middle Income and Upper-Middle Income have significant positive effects on the dependent variable. Log (Income), Education, Log (Tourism), Investment, Log (Distance), Europe, and dummies for Asia and High Income have significant negative effects. On the other hand, Unemployment, Prostitution, Alcohol, Africa, the Middle East, and Low Income have no significant relationship with the dependent variable.

4.2 Estimation Methods

Different sets of independent variables are used to estimate a number of separate log-linear regression models of the following form:

$$\text{Log}\,(\text{APR}_i) = \beta_0 + \beta_j \text{SOCIALILLS}_i + \beta_k \text{X}_i + \varepsilon_i \text{ , } j, k \geq 2 \quad (2)$$

where Log (APR_i) is the logged ratio of the number of apprehended immigrants per 100,000 immigrants from country *i*; SOCIAL $ILLS_i$ is the set of variables representing social ills in country *i*; X_i is the set of control variables including some binary variables; and ε_i is the error term.

The analysis is limited to the ordinary least squares (OLS) estimation method without extending it to the two-stage least squares (TSLS) or generalized method of moments(GMM) estimator by assuming explanatory variables to be exogenous. In addition, no appropriate instrumental variables are found for the TSLS or GMM estimations.

A set of diagnostic checks is conducted for model adequacy on the results of each regression. White's heteroskedasticity tests return probability values that are insignificant at the 5% level for all models, indicating the absence of heteroskedasticity in the disturbance terms. The Jarcue-Bera test is conducted to check whether residuals are normally distributed, and the results reject the alternative hypothesis of non-normality. To check whether the analysis is affected by multicollinearity, variance inflation factors (VIFs) are calculated, and VIFs for all individual variables are found to be less than 2.5, with a mean less than 1.5.

In addition, outliers in the 104-country sample are checked to enhance the robustness of regression results. Standardized residuals are constructed by dividing regression residuals with estimates of their standard deviations to carefully examine the plot. A country is then considered an outlier if its standardized residual deviates by more than two standard deviations from zero.[11] The next section presents the regression results both with and without outliers.

[11] Three countries are identified as outliers in each model: Jordan (2.4), Mexico (2.6), and Myanmar (–2.5).

4.3 Estimation Results

This study considers a broad set of explanatory variables believed to be relevant in explaining cross-country variations in alien apprehensions in the U.S. They are selected to proxy social ills including criminality, the level of economic development, geographic proximity to the U.S., trade and investment relations with the U.S., and regional and income group characteristics of the home country, among others. Many sets of various independent variables are considered, and yet the estimation results are discussed using three summary tables as follows.

Table 1 provides the regression results for six models without regional and income group dummies. The first two models are for country samples without ([1-1]) outliers and with ([1-2]) outliers. Because Log (Income) and Education are highly correlated with a correlation coefficient of 0.77, the two models are regressed again by excluding Education (Models [1-3] and [1-4]) and Income (Models [1-5] and [1-6]).

Adjusted R^2 values exceed 0.5 in each regression, suggesting an acceptable model fit. F-statistics indicate the high joint significance of explanatory variables in all models.

As shown in Table 1, Corruption is significant at both 1% and 5% levels and has expected positive signs in all regressions. Based on the regression result for Model [1-3], the elasticity of the APR with respect to Corruption is 0.25, indicating that, with all other factors held constant, every one-point increase in country-level corruption produces a 0.25% increase in immigrants' apprehension ratio for the U.S. With this applied to Mexican immigrants, for example, every one-point increase in Mexico's corruption level produces 18 additional apprehensions per 100,000 Mexican immigrants. Despite significant negative correlations between Corruption and both Log (Income) and Education (correlation coefficients are –0.62 and –0.61, respectively), the coefficient estimate of Corruption is robust to the inclusion of either Log (Income) or Education.

Table 1: Multiple Regression Results without the Regional and Income Group Dummies

Dependent variable: Log (APR)	[1-1]	[1-2]	[1-3]	[1-4]	[1-5]	[1-6]
Corruption	0.244**	0.237**	0.252**	0.245**	0.283***	0.276**
	(0.026)	(0.046)	(0.021)	(0.038)	(0.007)	(0.016)
Theft	0.192*	0.276**	0.205*	0.286**	0.207*	0.29**
	(0.096)	(0.028)	(0.072)	(0.022)	(0.072)	(0.021)
Homicide	0.021**	0.01	0.021**	0.01	0.019**	0.008
	(0.013)	(0.242)	(0.012)	(0.232)	(0.021)	(0.314)
Alcohol	–0.013**	–0.012**	–0.014***	–0.013**	–0.013**	–0.012**
	(0.01)	(0.031)	(0.005)	(0.02)	(0.01)	(0.039)
Log (Distance)	–0.558***	–0.849***	–0.531***	–0.83***	–0.593***	–0.879***
	(0.003)	(0.0000)	(0.005)	(0.0000)	(0.002)	(0.0000)
Log (Income)	–0.145	–0.149	–0.206**	–0.193*	-	-
	(0.209)	(0.244)	(0.030)	(0.066)		
Education	–0.043	-0.031	-	-	–0.078**	–0.066
	(0.358)	(0.548)			(0.047)	(0.123)
Traffic	0.007	0.017	0.01	0.018*	0.006	0.015
	(0.459)	(0.137)	(0.296)	(0.086)	(0.542)	(0.169)
Prostitution	0.159	0.171	0.155	0.169	0.175	0.185
	(0.328)	(0.34)	(0.342)	(0.346)	(0.284)	(0.304)
Log (Tourism)	0.032	0.061	0.034	0.062	0.009	0.037
	(0.466)	(0.212)	(0.446)	(0.203)	(0.812)	(0.401)
Unemployment	–0.009	-0.005	–0.01	–0.006	–0.01	–0.006
	(0.504)	(0.716)	(0.424)	(0.645)	(0.453)	(0.665)
Investment	–9.28E-07	–1.04E-06	–9.27E-07	–1.03E-06	–9.46E-07	–1.07E-06
	(0.45)	(0.445)	(0.45)	(0.447)	(0.443)	(0.435)
Constant	11.17***	13.14***	10.98***	13.01***	11.08***	13.004***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Adj-R^2	0.56	0.52	0.56	0.52	0.55	0.51
F-Statistic	11.67***	10.31***	12.67***	11.3***	12.5***	11.08***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
# of Obs.	101	104	101	104	101	104

Notes: *, **, and *** indicate significance at the 10%, 5%, and 1%, respectively. Numbers in parentheses are p values. Models [1-1], [1-3], and [1-5] are estimated with three outliers removed.

Theft is also significant across all models with a positive sign. The regression result for Model [1-1] indicates that, with all other variables held constant, every one-point increase in Theft produces a 0.2% increase in the apprehension rate of immigrants.

Also positive and significant is Homicide in the three models with no outliers. In models using the total sample, however, Homicide is insignificant. Homicide reveals a high correlation with Log (Distance) and the exclusion of either one from the set of regressors increases the significance of the other without affecting the significance of Corruption. According to the estimation result for Model [1-1], every one-point increase in Homicide, with all other variables held constant, is associated with a 0.02 % increase in the apprehension ratio of immigrants.

While a simple bivariate regression of APR on Alcohol suggests no significant relationship between the two, Alcohol becomes significant as an explanatory variable across all multiple regression models. However, the sign of the coefficient estimate is negative, indicating that an increase in per capita alcohol consumption leads to a decrease in the APR.[12] With all other variables being equal, for example, every one-gram increase in the daily per person consumption of pure alcohol is associated with a 0.01% decrease in the incidence of alien apprehensions in the U.S. This suggests that per capita alcohol consumption is more a measure of a country's well-being than that of alcohol-attributable criminality and anti-social behavior. Correlations between Alcohol and Log (Income) and between Alcohol and Education are indeed positive and moderately significant whereas those between Alcohol and Corruption and between Alcohol and Theft are negative.

For example, the top 25 countries in terms of per capita alcohol consumption from the 104-country sample include 17 high-, 6 upper-middle-, and 2 lower-middle-income countries. In general, an increase in the economic wealth of a country increases alcohol consumption while reducing the number of abstainers (WHO, 2014b, p. 14). The regression results verify that, as expected and discussed in the Data section, per capita alcohol consumption is problematic if it is used as a proxy for alcohol-attributable crimes and offenses. That is, it simply does not

[12] An alternative data set from the same data source (WHO, 2014b), namely total (recorded + unrecorded) alcohol per capita consumption only for drinkers, is used, but the result is only marginally different. The use of a dummy variable for the group with high alcohol consumption per capita also produces consistent results.

capture the magnitude of alcohol use disorders and the prevalence of heavy episodic drinking, which can determine the level of alcohol-related problems in a given society. In addition, the socio-cultural environment surrounding drinking and legal tolerance towards drinking can be unfavorable for hard-drinking immigrants in the U.S.

Log (Income) and Education are strongly correlated with each other such that the higher the per capita income (as proxied by per capita energy use), the longer is the average total schooling for people aged 15 and over. In the regression model with the two variables, as in [1-1] and [1-2], both coefficient estimates are not significant at conventional levels. To control for collinearity, Log (Income) is excluded from Models [1-3] and [1-4], and Education from Models [1-5] and [1-6]. Regression results for Models [1-3] and [1-5] without outliers show that both Log (Income) and Education are moderately significant with negative signs. Estimation results for Model [1-3] indicate that for every 1% increase in living standards (proxied by energy use), immigrants' apprehension ratio will be 0.2% lower. Similarly, Model [1-5] indicates that every one-year increase in schooling is associated with a 0.07% decrease in apprehensions.

As shown in Table 1, among all explanatory variables, Log (Distance) has the greatest impact on the dependent variable with a highly significant negative sign across all models, indicating that the closer the home country to the U.S., the higher the immigrant apprehension ratio for that country. For example, estimation results for Model [1-1] indicate that for every 1% increase in the distance between the U.S. and the home country, the apprehension ratio will go down by 0.55% and vice versa. The distance effect is largely due to frequent illegal border crossings from Mexico and other Central American countries to the U.S.

Traffic is not significant in any models except for Model [1-4], in which the coefficient is positive and significant only at the 10% level. This implies that, with all other variables held constant, every one-point increase in road traffic deaths is associated with a 0.01% increase in the APR. To the extent that road traffic accident mortality is not a good proxy for traffic safety culture and illicit driving practices, Traffic is not a robust determinant of the APR, and any interpretation of these estimation results should be made with a caution.

Table 2: Multiple Regression Results with Regional Dummies

Dependent Variable: Log (APR)	**[2-1]**	**[2-2]**	**[2-3]**	**[2-4]**	**[2-5]**
Corruption	0.235**	0.251**	0.264**	0.237**	0.229**
	(0.03)	(0.019)	(0.02)	(0.033)	(0.039)
Theft	0.162	0.19*	0.179	0.2*	0.188
	(0.153)	(0.092)	(0.133)	(0.086)	(0.104)
Homicide	0.023***	0.017**	0.021**	0.02**	0.022***
	(0.004)	(0.035)	(0.014)	(0.021)	(0.009)
Alcohol	–0.012**	–0.01**	–0.014**	–0.013**	–0.012**
	(0.024)	(0.042)	(0.01)	(0.013)	(0.025)
Log (Distance)	-	0.571***	–0.57***	–0.613***	–0.562***
		(0.002)	(0.003)	(0.007)	(0.003)
Log (Income)	–0.145	–0.115	–0.134	–0.133	–0.185
	(0.206)	(0.311)	(0.257)	(0.265)	(0.139)
Education	–0.047	–0.034	–0.038	–0.047	–0.034
	(0.313)	(0.466)	(0.436)	(0.326)	(0.482)
Traffic	0.0008	0.0006	0.006	0.008	0.006
	(0.931)	(0.949)	(0.539)	(0.428)	(0.549)
Prostitution	0.099	0.161	0.174	0.157	0.164
	(0.547)	(0.311)	(0.298)	(0.336)	(0.315)
Log (Tourism)	0.037	0.04	0.032	0.031	0.036
	(0.398)	(0.357)	(0.471)	(0.482)	(0.415)
Unemployment	-0.005	–0.0003	–0.009	–0.006	–0.009
	(0.682)	(0.979)	(0.48)	(0.626)	(0.473)
Investment	–4.32E-07	–7.25E-07	–9.64E-07	–9.34E-07	–8.98E-07
	(0.723)	(0.546)	(0.436)	(0.45)	(0.466)
Americas	0.66***	-	-	-	-
	(0.002)				
Europe	-	–0.46**	-	-	-
		(0.021)			
Africa	-	-	0.133	-	-
			(0.656)		
Asia	-	-	-	–0.09	-
				(0.65)	
Middle East	-	-	-	-	0.247
					(0.391)
Constant	5.98***	10.98***	11.19***	10.92***	11.3***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Adj-R^2	0.56	0.58	0.55	0.55	0.56
F-Statistic	11.86***	11.74***	10.69***	10.68***	10.8***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
# of Obs.	101	101	101	101	101

Notes: *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Numbers in parentheses are p values.

Prostitution is not significant at any level across all models, suggesting that the APR in the host country remains the same regardless of whether prostitution is legal or not in the home country.

Tourism is also insignificant across all models regardless of the use of data on tourist arrivals or on tourism expenditures.

Unemployment and Investment are also not significant across all models, suggesting that the APR for the U.S. is not influenced by the home country's labor market conditions and FDI activity from the U.S.

Table 2 displays the estimation results for log-linear models excluding outliers with five regional dummies. These dummies are intended to account for possible differences in the APR from region-specific characteristics. As shown in the table, the inclusion of these dummies does not change the main results. Corruption, for example, still remains significant with a positive sign across all models.

The regional dummy for Americas in Model [2-1] is positive and highly significant. Log (Distance) is excluded from this model because of its strong correlation with the regional dummy (the correlation coefficient is 0.81). The coefficient estimate of the regional dummy for Americas suggests that the apprehension ratio is 0.66% higher for immigrants from Americas.[13] By contrast, the apprehension ratio is likely to be 0.46% lower for immigrants from European countries (Model [2-2]). However, regional dummies for Africa, Asia, and the Middle East are not significant (Models [2-3], [2-4], and [2-5], respectively).

Table 3 reports the estimation results for regression models excluding outliers with four income group dummies. The main findings remain largely the same. In Model [3-4], Corruption becomes insignificant because of its strong negative correlation with the high-income group dummy (the correlation coefficient is –0.77), suggesting the exclusion of one of the two variables.

[13] Apprehended immigrants from Central American countries account for the largest portion of total apprehensions in the U.S. (DHS, 2011–2013).

Table 3: Multiple Regression Results with Income Group Dummies

Dependent Variable: Log(APR)	**[3-1]**	**[3-2]**	**[3-3]**	**[3-4]**
Corruption	0.247**(0.022)	0.218**(0.048)	0.224**(0.044)	0.132(0.285)
Theft	0.193*(0.09)	0.174(0.132)	0.202*(0.082)	0.185(0.104)
Homicide	0.019**(0.021)	0.019**(0.021)	0.021**(0.014)	0.019**(0.021)
Alcohol	–0.012**(0.014)	–0.012**(0.016)	–0.014***(0.008)	–0.014***(0.007)
Log (Distance)	–0.531***(0.005)	–0.588***(0.002)	–0.528***(0.007)	–0.554***(0.003)
Log (Income)	–0.173(0.134)	–0.113(0.335)	–0.144(0.212)	–0.054(0.659)
Education	–0.065(0.182)	–0.044(0.351)	–0.053(0.277)	–0.053(0.26)
Traffic	0.005(0.574)	0.008(0.392)	0.005(0.587)	0.006(0.559)
Prostitution	0.174(0.279)	0.177(0.277)	0.153(0.347)	0.164(0.309)
Log (Tourism)	0.007(0.865)	0.02(0.659)	0.031(0.486)	0.024(0.574)
Unemployment	–0.013(0.326)	–0.007(0.568)	–0.012(0.386)	–0.011(0.387)
Investment	–6.81E-07(0.577)	–9.51E-07(0.438)	–8.43E-07(0.494)	–9.37E-07(0.44)
Low-income	–0.548*(0.083)	-	-	-
Lower-middle income	-	0.239(0.195)	-	-
Upper-middle income	-	-	0.162(0.355)	-
High-Income	-	-	-	-0.481*(0.068)
Constant	11.76***(0.0000)	11.3***(0.0000)	11.01***(0.0000)	10.91***(0.0000)
Adj-R^2	0.57	0.56	0.56	0.57
F-Statistic	11.26*** (0.0000)	10.99*** (0.0000)	10.82*** (0.0000)	11.33*** (0.0000)
# of Obs.	101	101	101	101

Notes: *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. Numbers in parentheses are p values.

Coefficients for high- and low-income group dummies are negative and marginally significant. However, income group dummies for upper- and lower-middle-income countries are not significant at any level. Estimates for Models [3-1] and [3-4] indicate that, with all other explanatory variables held constant, alien apprehension incidences in the U.S. for immigrants from high- and low-income countries are 0.48% and 0.55% lower, respectively, than those from other income groups. Regarding the significant negative relationship between the low-income group dummy and the apprehension ratio, a large income gap may serve as a healthy motivation for poor immigrants to avoid dubious activities and illicit practices.

5 Conclusions

Incidences of immigrant apprehensions in the U.S. vary widely across countries of origin, but few quantitative studies of underlying factors are found in the literature. This study fills this gap in the literature by providing cross-country analysis and offering new insights into country-level socio-economic determinants of widely varying immigrant apprehension ratios for the U.S. As expected, geographic proximity to the U.S. and the level of economic development (as proxied by either per capita energy use or years of schooling) have significant effects on the dependent variable. With these as control variables, the study focuses on a set of variables for social ills and tests the effects of other potential explanatory variables. The main findings are summarized as follows:

First, corruption in the home country is a significant factor in immigrant apprehensions in the host country. Every one-point decrease in the home country's corruption level produces a 0.25% decrease in the immigrant apprehension ratio for the U.S.

Second, effects of theft and homicide in the home country are significant. Per capita alcohol consumption, a weak and problematic proxy for the incidence of alcohol-attributable crimes and offenses, is negatively related to apprehension incidences.

Third, although traffic safety culture, investment and economic relations and exposure to the U.S. through tourism are not significant perhaps because of a lack

of suitable proxies, some regional (Americas and Europe) and income group (low- and high income) dummies are significant.

The results suggest a stratified and targeted approach to the design of immigration policies that can better reflect public security concerns and human capital needs in the host country by considering the determinants identified in this study.

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Appendix

Table A1: Descriptive Statistics

Variable	***Observations***	***Mean***	***SD***	***Minimum***	***Maximum***
APR	104	435.82	1108.24	17.79	7582.33
Corruption	104	-0.02	1.03	-2.45	1.50
Homicide	104	8.98	12.46	0.40	66.45
Theft	104	0.60	0.73	0	3.40
Alcohol	104	32.23	13.59	2.9	62.7
Prostitution	104	0.47	0.5	0	1
Income	104	2065.55	2209.79	35	13918.16
Unemployment	104	8.41	5.31	0.87	33.61
Tourism	104	6943575.14	12158045	500	78576583.33
Investment	104	23153.47	66192.5	-4.91	430806.16
Education	104	8.23	2.58923	1.85	11.85
Drug	74	117.79	175.93	0	827.63
Traffic	104	15.76	8.91504	3	48.4
Distance	104	8864.74	3640.50	1632.45	15289.17
High-income	104	0.32	0.47	0	1
Low-income	104	0.10	0.30	0	1
Lower-Middle Income	104	0.25	0.43	0	1
Upper-Middle Income	104	0.31	0.46	0	1
Americas	104	0.26	0.44	0	1
Europe	104	0.27	0.45	0	1
Asia	104	0.24	0.42	0	1
Africa	104	0.11	0.32	0	1
Middle East	104	0.09	0.29	0	1

Table A2: List of Countries by the Immigrant Apprehension Ratio in the U.S.

No.	Code	APR	No.	Code	APR	No.	Code	APR
1.	HND	7582.34	36.	CMR	270.86	71.	BRB	118.71
2.	MEX	7307.12	37.	CPV	258.68	72.	THA	116.86
3.	GTM	4097.04	38.	HTI	253.05	73.	LVA	111.80
4.	SLV	2583.49	39.	GHA	247.64	74.	HUN	102.00
5.	BRA	1992.75	40.	SAU	242.57	75.	POL	96.85
6.	NIC	997.18	41.	ARG	237.49	76.	BIH	96.64
7.	CRI	732.61	42.	NGA	231.04	77.	RUS	89.01
8.	ECU	669.37	43.	LAO	229.45	78.	ESP	87.06
9.	IDN	666.42	44.	LTU	218.71	79.	PRT	83.06
10.	JOR	657.43	45.	CHL	216.05	80.	UKR	83.04
11.	BHS	645.08	46.	ISR	212.66	81.	IND	83.03
12.	BLZ	538.34	47.	LBN	209.18	82.	AUS	82.21
13.	MAR	516.50	48.	BGD	204.60	83.	FRA	75.61
14.	DOM	511.77	49.	SYR	204.50	84.	BLR	75.14
15.	ALB	403.73	50.	MKD	203.97	85.	IRN	71.12
16.	CUB	401.43	51.	NPL	199.16	86.	VNM	69.89
17.	KEN	377.95	52.	TTO	198.57	87.	NLD	68.18
18.	SDN	376.87	53.	CAN	196.53	88.	BEL	62.35
19.	ERI	367.97	54.	MDA	183.19	89.	SWE	60.96
20.	BOL	366.77	55.	PAN	182.41	90.	GBR	58.65
21.	YEM	364.57	56.	VCT	177.47	91.	SGP	55.34
22.	PAK	359.41	57.	FJI	173.56	92.	KOR	53.78
23.	COL	358.08	58.	ARM	171.74	93.	IRL	50.43
24.	URY	343.38	59.	BGR	163.41	94.	PHL	49.37
25.	LKA	341.32	60.	KWT	161.97	95.	HRV	49.18
26.	SLE	337.68	61.	CHN	158.29	96.	CHE	36.98
27.	PER	325.64	62.	IRQ	155.32	97.	MMR	36.93
28.	JAM	318.52	63.	NZL	153.50	98.	DNK	35.63
29.	UZB	288.68	64.	KHM	137.08	99.	ITA	34.41
30.	LBR	283.62	65.	ZAF	132.42	100.	NOR	30.30
31.	VEN	277.40	66.	ETH	132.12	101.	GRC	27.95
32.	EGY	277.19	67.	GRD	125.52	102.	AUT	27.32
33.	TUR	276.63	68.	GUY	123.82	103.	DEU	26.95
34.	KAZ	273.29	69.	AFG	122.46	104.	JPN	17.80
35.	ROM	272.63	70.	MYS	122.10			

Note: These country codes are taken from the World Bank's International Standards Organization (ISO) three-digit alphabetic country code table:

(http://wits.worldbank.org/wits/wits/witshelp/Content/Codes/Country_Codes.htm).