

AMERICA'S DEADLY EXPORT: EVIDENCE FROM CROSS-COUNTRY PANEL DATA OF DEPORTATION AND HOMICIDE RATES

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Abstract

Changes in US Immigration laws that occurred during the mid 1980s to the late 1990s led to a sharp increase in criminal deportations. Using panel data for a sample of 38 developed and developing countries, I provide evidence for a statistically significantly positive causal relationship between increases in the numbers of criminal deportees and increases in intentional homicide rates. The magnitude of these effects is stable across model specifications and suggests that a 1 percent increase in the number of criminal deportees per capita leads to a 4 to 8 percent increase in the receiving country's homicide rate.

JEL classification: N46; K42; F22; C23

Keywords: Criminal deportees; Intentional homicides; Panel data

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1. Introduction

The rate of intentional homicides in many developing countries increased significantly between the mid 1980s and the late 1990s. In Jamaica, Honduras, El Salvador, Trinidad and Tobago, Thailand, as well as in several Middle Eastern and North African countries, the homicide rate more than doubled during this period. This increase in homicide rates coincided with a marked increase in the number of criminal deportees from the US. Between 1985 and 2004, the number of criminal deportees from the US to other countries increased from 1,702 to over 87,000, and 80 percent of these were sent to seven Caribbean and Latin American countries: Jamaica, Honduras, El Salvador, Colombia, Mexico, Guatemala and the Dominican Republic—places where jobs are scarce and police resources are limited. This paper investigates the extent to which the increase in the number of criminal deportees from the US has contributed to the increase in homicide rates in these countries.

There are several reasons why one would expect a country's criminal deportation reception rate from the US (defined as the number of incoming criminal deportees from the US divided by the country's population) to affect the country's crime rate. First, criminal deportations from the US are distinct from deportations for simple immigration violations like entering the country without a visa or permit.¹ Thus criminal deportees have generally committed acts that are also considered illegal in their home countries. Second, the US Bureau of Citizenship and Immigration Services demands from the receiving countries that criminal deportees not be arrested upon arrival because they have either served their prison sentences in the US or volunteered to be deported for crimes committed. Thus criminal deportees generally

¹ The ranks of criminal deportees do include those deported for crimes that are related to immigration, for example, smuggling or aiding illegal entry.

arrive as free citizens in their home countries, usually with little or no money, and with no prospects of work because they are often stigmatized in the legal labor market. Various studies have shown that a person's propensity for criminal behavior increases as wages and the probability of finding legal employment fall.² Contagion models of crime suggest that the behavior of criminal deportees may also substantially affect the behavior of non-deportees. Case and Katz (1991) find that a person's propensity to commit crime rises when his peers are also engaged in criminal activities. Glaeser *et al.* (1996) emphasize the role of social interaction in explaining the continuous prevalence of high crime rates in certain places and the significant variance of crime rate across space. In his analysis of the recent escalation of violent crime in Colombia, Gaviria (2000) develops several models that isolate different types of externalities among criminals. For example, criminals might make crime more appealing to nearby residents by congesting the law enforcement system and thereby lowering the probability of punishment, the interaction of career criminals and local crooks can speed up the diffusion of criminal know-how and criminal technology, and the daily contact of youths with criminal adults and criminal peers might result in the erosion of morals and thereby in a greater predisposition towards crime. All of these models support the hypothesis that an inflow of criminal deportees contributes to a country's crime rate.

Case studies of this hypothesis have yielded mixed results. Nolan and Rosales (1998) note that a large number of deportees are hardcore criminals and that their return to their home countries has contributed to gang violence and to increase drug-trafficking in the Caribbean. Zagros and Alleyne (2007), using data on Jamaican deportees, conclude that criminal deportees are responsible for about 5 percent of murders and reported rapes in Jamaica. On the other hand,

² See for example Raphael and Winter-Ember (2001), Gould *et al.* (2002), and Burdett *et al.* (2003).

Griffin (2000), using micro-level data in Barbados, concludes that deportees were not directly responsible for the increase in crime. Extending this work to Trinidad and Tobago and Belize, Griffin (2002) finds no statistically significant relationship between crime and deportation. Similarly, Headley *et al.* (2005) conclude from their analysis of descriptive statistics that deportees to Jamaica were not directly responsible for the increase in crime.

Such case studies that examine either a single country or a single year cannot account for hard-to-measure determinants of crime that are either country-specific or affect a group of countries at the same time—for example, a country’s legal environment or criminal activities like drug trafficking in Latin American countries. To accommodate such country- and time-specific events, I assembled a new data set on crime rates and criminal deportees based on information from the United Nations World Crime Surveys and the Deportable Alien Control System (DACS) of the US Department of Homeland Security. The data set consists of an unbalanced panel of 38 countries and covers the 35-year period from 1970 to 2004.

Underreporting is widespread in countries with low quality policing and judicial systems and with poorly educated populations. Soares (2004) finds that official sources in countries with low institutional development tend to underreport crime data. He also finds that underreporting is most pronounced for crimes carrying a social stigma for the victim and for low-value property crime. Because there is comparatively less underreporting for homicides than for other crimes, I restrict my analysis to homicides to reduce any biases caused by mismeasurement. I analyze how national homicide rates vary with the number of criminal deportees as well as several socioeconomic variables that the literature has identified as important determinants of crime.³ If the assertion that criminal deportees significantly affect a country’s homicide rate is correct, then

³ Fajnzylber *et al.* (2000) provide evidence that homicides are highly correlated with violent crime. To this extent my analysis provides information about the relationship between criminal deportees and violent crime.

countries that receive large numbers of criminal deportees need to account for this inflow of criminals in their strategies to combat crime.

In Section 2, I provide a brief overview of the changes in US deportations after 1985. I introduce my data in Section 3, and discuss the estimation technique and the results of OLS and GMM estimation in Section 4. In Section 5, I establish a causal relationship between the deportation of criminals from the US and the homicide rates in the receiving countries. I first present evidence that the changes in US deportations occurred in response to changed US legislation since 1986, rather than as a result of an increased inflow of criminals. I then identify several determinants of the deportation rate that do not directly affect homicide rates in the receiving countries, and which can therefore serve as instruments for the deportation rate. In all analyses throughout the paper, I find a positive and statistically significant relationship between an increase in the number of criminal deportees and the growth in homicide rates in the receiving countries. The magnitude of this relationship is reasonably stable across model specifications, suggesting that a 1 percentage point increase in the number of criminal deportees per capita leads to a 4 to 8 percent increase in the homicide rate in the receiving country.

2. Overview of US Deportations

In the late 1980s, the US began to enact legislation that facilitates the speedy deportation of foreign criminal offenders. The new legislation has led to increased deportation of non-citizens to other countries, mostly to countries in Latin America and the Caribbean. In 2004, the US Department of Homeland Security (DHS) undertook immigration enforcement actions involving 87,669 non-citizens, which include the arrest, detention, and removal from the United States of non-citizens who are in violation of the Immigration and Nationality Act (INA). These

violations include attempting illegal entry into the US, entering the US legally but subsequently losing legal status, and engaging in terrorist activity, violent crime, drug smuggling, and document fraud.

Table 1 shows the number of persons deported for different crimes in 2004. About one-third of all deported persons were charged with drug-related offenses, followed by immigration offenses, assault/wounding, and burglary. Roughly 3 percent were deported for robbery, larceny, sexual assault, and murder. Table 2 shows the relative size of the deportee population to the domestic prison population for the Latin American and Caribbean countries in 2004. For example, the inflow of criminal deportees into Jamaica was equivalent to releasing 42 percent of the prison population into the society that year. Similarly the number of criminal deportees into Mexico was equal to 32 percent of Mexico's prison population, and the inflow of criminal deportees in Guatemala, Guyana, Honduras, and El Salvador still exceeded 20 percent of their respective prison populations. Thus in many of the receiving countries, incoming criminal deportees represent a sizable percentage of the countries' prison populations.

During the past 25 years, US immigration law has evolved in response to public perceptions of a link between immigration and criminal activity.⁴ Before 1985, deportation was reserved for violent crimes and those crimes which carried long prison sentences. Figure 1 shows that the number of convicted criminals deported from the US has increased steadily between 1980 and 2004. The first five vertical dashed lines represent major changes in US immigration law that occurred since 1986, namely, the Immigration Reform and Control Act (IRCA) of 1986, the Anti-Drug Abuse Act (ADA) of 1988, the Immigration Act of 1990, the Immigration and Technical Corrections Act of 1994, the Illegal Immigration Reform and

⁴ Martinez and Lee (1990) provide a detailed review of public opinion about immigrants, especially as it relates to the criminal activities of immigrants.

Immigration Responsibility Act (IIRIRA) of 1996. The last dashed line represents the terrorist attacks of September 11, 2001.

The IRCA of 1986 requires the Attorney General to begin deportation procedures once a person has been convicted of a deportable crime. This policy changed criminal deportation from a discretionary to a mandatory action. Before 1988, non-citizens could be deported from the United States only after a hearing before an immigration judge in which the non-citizen could raise one of several bases for canceling their deportation orders. With the passage of the ADA in 1988, Congress increased the range of crimes that could render someone deportable, and limited the procedures available to non-citizens who wished to challenge their deportation.

In US immigration law, the term “aggravated felony” refers to a broad category of crimes that carry severe consequences for non-citizens seeking asylum, legal permanent resident status, citizenship, or avoidance of deportation proceedings. When the category of aggravated felonies was added to the Immigration and Nationality Act in 1988, it encompassed only murder and trafficking in drugs or firearms. Every subsequent change to US immigration law has included an extension of the aggravated felony act.⁵ The Immigration Act of 1990 expanded the category of crimes that required mandatory deportation to include crimes of violence for which the term of imprisonment that the court may impose is at least five years, as well as money laundering and trafficking in any controlled substance. The Immigration and Technical Corrections Act of 1994 added additional weapons offenses, some theft and burglary offenses, prostitution, tax evasion, and several categories of fraud as aggravated felonies. Concurrent with these changes in immigration law, the number of criminal deportees increased by over 300 percent from 7,379 in 1989 to 30,330 in 1995. The IIRIRA of 1996 was applied retroactively to all persons convicted

⁵ See Weissbrodt and Danielson (2005).

of deportable offenses, including US citizens who committed minor offenses decades ago as non-citizens but have been naturalized since. Under the 1996 law, every non-US citizen who is sentenced to a year or more in prison is subject to deportation, even if the sentence is suspended. Between 1996 and 1999, the average number of annual criminal deportations more than doubled to 68,519, and it increased by another 25 percent to 87,669 between 2000 and 2004.

3. The Data

To overcome the problems of earlier case studies that have focused either on single countries or single years, I assembled a multi-country panel data set that extends the data used in Lederman (2002a). This data set provides information about the rates of intentional homicides between 1970 and 1994 for 45 countries, and was constructed with information from the United Nations World Crime Surveys. Crime data often exhibit substantial year-to-year variation as the result of mismeasurement and incorrectly reported data, and such noise makes it difficult to identify determinants of crime. To reduce the year-to-year variation, cross-country studies of crime often use either three-year or five-year averages of all variables.⁶ Lederman's data set is aggregated into five-year intervals, and therefore contains up to five observations per country.

I eliminated 17 countries from Lederman's data set because I was unable to obtain US deportation rates for these countries, and I added another 10 countries for which deportation data are available.⁷ I then extended this modified data set to 2004, using deportation data from the US Department of Homeland Security and information from the United Nations World Crime

⁶ See, for example, Miron (2001), Fajnzylber *et al.* (2002a, b) and Neumayer (2003, 2005).

⁷ I eliminated Australia, Austria, Denmark, Finland, Greece, Netherlands, New Zealand, Norway, UK, Hong Kong, India, Indonesia, Japan, Malaysia, Nepal, and Singapore and added Ecuador, El Salvador, Guatemala, Guyana, Honduras, Panama, the Philippines, Portugal, Russia, and South Africa.

Surveys. Thus my data set consists of an unbalanced panel of 38 countries, covering the 35-year period from 1970 to 2004; 17 of these countries are in Latin America and the Caribbean. I follow previous crime studies and take five-year averages of all variables, which yield a maximum of seven observations per country. (I test the appropriateness of aggregating the data in this way in Section 4.2.) Table 3 reports summary statistics for the annual homicide rate and deportation rate for each country in the sample.

I also collected information on five variables that are frequently cited in the crime literature as potential determinants of crime: economic activity, income, the urbanization rate, the female labor force participation rate, and the percentage of males between 15 and 34 years of age.⁸ I use the rate of growth of real GDP, calculated on the basis of data expressed in 1997 prices to measure economic activity. To measure average income, I use the Gross National Product (GNP) per capita, in prices of 1997, and converted the values to US dollars based on an average of real exchange rates. I constructed the female labor force participation rate variable and the percent of males between 14 and 34 years of age using data from World Bank (2007). Table 4 shows summary statistics for all five variables.

To investigate whether there is a causal relationship between US deportations and homicides in the receiving countries, I collected information on eight additional variables that are likely to be directly correlated with US deportations but not with homicides rates in the receiving countries: the average education level of each country's citizens residing in the US, the share of each country's citizens residing in the US, the country's proximity to the US, the unemployment

⁸ While I would have liked to include information on deterrence, for example, police personnel per 100,000 people and the incarceration rate per 100,000 people, this information is only available for 29 of the 38 countries in my dataset. Similarly, although the crime literature generally uses information on unemployment, I exclude such information because differences in the definition of unemployment across countries make it difficult to derive a comparable measure for different countries.

rate of each country's citizens residing in the US,⁹ and the extent of drug trafficking. I measure the education level as the percent of the US foreign-born population between 20 and 29 years of age who have a bachelor's degree. I measure a country's proximity to the US as the minimum ticketed airlines mileage between a country's capital, or other major city, and the closest of the following four U.S. international airports: New York, Newark, Los Angeles, or Miami (OAG, 1986). I construct my four measures of drug trafficking as the average drug seizure of Cannabis, Cocaine, Opium, and Heroin in a country. These measures are then indexed by the world average drug seizure and each country's average population for the period 1990 to 2000. In Section 5 I show that the first three variables are directly correlated with US deportations but not with a country's homicide rate, which makes them suitable instruments for my analysis.

4. Methodology and Results

4.1 Methodological issues

The theoretical models by Sah (1991), Glaeser *et al.* (1996), and Fajnzylber *et al.* (2002a, 2002b) assume that crime rates are intertemporally dependent--for example, because criminals can learn by doing--which means that the cost of carrying out criminal acts may decline over time. To accommodate such temporal dependence in crime rates, I include a country's lagged crime rate among the regressors. First-differencing the regression equation eliminates the effect of correlation between some regressors and the individual effect but introduces correlation of the differenced lagged left-hand side variable with the country-specific disturbance which. While this correlation renders least-squares estimators inconsistent, the Arellano-Bond GMM estimator

⁹ Because the unemployment rates of foreigners residing in the US follow the US definition of unemployment, this variable does not have the problems posed by the use of the unemployment rate in each country.

leads to consistent estimates.¹⁰ While the GMM estimator also accounts for the possibility that the other covariates are partially endogenous, I follow Fajnzylber *et al.* (2002a, 2002b) in assuming that all right-hand side variables are at least weakly exogenous, that is, the right-hand side variables are endogenous to past and current, but not future, values of the homicide rates. I did not find evidence of non-linear relationships among the covariates and thus assume that all variables enter the regression linearly. I estimate the model in differences and levels jointly in a system (the “GMM system estimator”), and test the appropriateness of the specification of the regression equation through a Sargan-type test and a serial correlation test.¹¹ For comparison, I also estimate the model with OLS, without the lagged homicide rate but with fixed effect dummies.

4.2 Results

Table 5 presents the results of the OLS and GMM analyses. The OLS analysis in Column 1 that controls for country-specific effects yields a highly statistically significantly positive coefficient of the criminal deportation reception rate. However, the coefficients on the growth rate and average income are not consistent with those found in other crime studies that conclude that homicide rates fall with strong economic growth and rise in times of recession and that higher income levels are associated with lower homicide rates. These estimates might be biased because these regressions do not take into account the possibility that homicide tends to persist over time, because of the possibility that some regressors are endogenous, and because of the

¹⁰ See Manuel Arellano and Stephen Bond (1991) and Arellano and Olympia Bover (1995). This GMM estimator is designed for large cross section and small time series (T). An advantage of analyzing five-year averages rather than annual data for a 35-year period is that with large T , the instrument count can easily grow large relative to the sample size, making some asymptotic results about the estimators and related specification tests misleading (see Roodman, 2008).

¹¹ See Blundell and Bond (1998)

possibility that homicide rate is measured with error and that this error is correlated with some of the right-hand side variables.¹²

The specification in Column 2 includes the lagged homicide rate as a right-hand side variable, accounts for the types of measurement error described in Section 4.1, and allows for jointly endogenous right-hand side variables. This model is estimated with GMM. The highly statistically significant coefficient of the lagged homicide rate and the fact that the specification tests support the estimated model indicate that these issues are relevant and that the OLS regression in Column 1 is indeed misspecified. However, the fact that the estimated coefficients of criminal deportees on homicides are very similar for the OLS and GMM estimation methods suggests that the estimate is reasonably robust.

The analyses in Columns 1 and 2 are based on the assumption usually made in analyses of crime that aggregating the data into five-year averages reduces random variation and thus increases the precision of the estimates. Because five-year averaging reduces the number of available observations, it is relevant to assess the extent to which the results are affected by five-year averaging. I compiled a second data set for the 38 countries that contains annual data for the years between 1990 and 2004. (I was unable to extend the annual data set to earlier years because I could not obtain information on annual deportations before 1990.) Columns 4 and 5 of Table 5 report estimation results for the analysis of annual data between 1990 and 2004 and for the analysis of five-year averages of all variables for the same period.¹³ For all variables the 95 percent confidence intervals of the analyses of annual data and five-year averages overlap,

¹² See Becker (1968), Lederman *et al* (2002a), and Neumayer (2003) for a more complete review of the literature on crime and economic growth.

¹³ Table 5 also provides information about two important tests, namely Sargan, and autoregression order 2. The overall validity of the moment conditions is checked by the Sargan test. The results show that the instruments in all models cannot be rejected. The second test of the validity of the estimator examines the hypothesis that error terms are not serially correlated. In this case, the null hypothesis of no-second order serial correlation in first differenced residuals cannot be rejected.

although the analyses of annual data generally yield smaller standard errors of estimate relative to the size of the coefficient estimates than the analyses of five-year averages. While this suggests that five-year averaging may not be worth the reduction in the number of observations, there is no reason to question either the magnitudes or the tests of significance of the estimates in the full analyses of five-year averages between 1970 and 2004. Overall, the analyses suggest that a one percent increase in the deportation reception rate is associated with a five to eight percent increase in the receiving country's homicide rate. But they do not indicate whether deportations are responsible for the increase in homicide rates because the US deportation rate itself might be affected by changes in a country's criminal activity. In the following section, I investigate whether there is a causal link between deportations and homicides.

5. The Question of Causality

5.1. US legislation and deportations

Between 1996 and 1999, the average number of annual criminal deportations more than doubled to 68,519, and it increased by another 25 percent to 87,669 between 2000 and 2004. Morawetz (1999) argues that these increases occurred as a result of the IIRIRA of 1996, which was applied retroactively to all persons convicted of deportable offenses, including US citizens who committed minor offenses decades ago as non-citizens but have been naturalized since. Under the 1996 law, every non-US citizen who is sentenced to a year or more in prison is subject to deportation, even if the sentence is suspended. Figure 1 shows that three of the changes in US immigration law (1986, 1990, and 1996) as well as the September 2001 terrorist attacks were followed by immediate increases in the number of criminal deportees. To test whether these events are associated with statistically significant structural breaks in the deportation trend, I

regressed the total US deportation rate for each year on a linear trend and six dummy variables, one for each of the five immigration acts and one for the September 2001 terrorist attacks. These dummy variables take the value 1 from the year onwards after which the new law came into effect, and 0 otherwise. Column 1 of Table 6 presents the results of a regression with only the trend variable, and Column 2 the results of a regression with the trend and the six dummies. The dummy coefficients for all six events are positive, and the coefficients for the immigration acts passed in 1986, 1990, and 1996 are statistically significantly larger than zero at conventional levels, suggesting that the passage of these acts was indeed correlated with subsequent increases in the deportation rate. Adding the dummies raises the adjusted R-square from 91 percent to nearly 98 percent, indicating that these dummies account for almost seven percent of the variation in the deportation rate. Figure 1 as well as the regression results in Table 6 support the hypothesis that the increases in the US deportation rate after 1986 are the result of changes in US immigration law.

5.2. What affects US deportation rates?

While the results in Section 5.1 suggest that the overall change in US deportation policy was largely exogenous to any individual receiving country, they do not explain why deportation reception rates differ across countries. One possible explanation is that US deportation of criminals is affected by changes in the crime rates of the receiving countries. If more criminals move to the United States when crime in their countries increases—for example, to escape the higher competition or to apply their newly acquired skills abroad—and US deportation rates rise as a result, then higher crime rates abroad would be the cause rather than the effect of higher US deportations. If this argument is correct, then one would expect changes in homicide rates to

precede changes in deportation rates. Conversely, if higher US deportation rates cause homicide rates in the receiving countries to increase, then one would expect deportation rates to increase before homicide rates increase.

Figure 2 shows the average annual deportation reception rates and homicide rates for each of the 38 countries in the sample for the seven five-year periods between 1970 and 2004. The plots indicate that in all countries except Columbia, deportation reception rates began to increase before increases in homicide rates become noticeable.¹⁴ In receiving countries with high homicide rates, deportation reception rates and homicide rates move in the same direction after the mid 1980s. Even countries with very low homicide rates experienced an upward trend in the deportation reception rates since the mid 1980s, although unlike the countries with higher crime rates, these low-crime countries tended to be able to counter the effect of the post 1980s deportation shocks.¹⁵ Figure 2 provides little evidence that the increase in any country's deportation reception rate was the direct result of an increase in that country's homicide rate.

To further investigate whether there is a causal relationship between US deportations and homicides in the receiving countries, I collected information on eight variables that are likely to be directly correlated with US deportations and that can serve as instruments for deportations: the average education level of each country's citizens residing in the US, the share of each country's citizens residing in the US, the country's proximity to the US, the unemployment rate of each country's citizens residing in the US, a country's average drug seizures as a percentage of world total (a proxy for drug-trafficking) for cannabis, cocaine, opium, and heroin.

¹⁴ A likely explanation for the fact that the Columbian homicide rate began to increase in the late 1970s is the operation of the Medellin Cartel, an organized network of drug suppliers and smugglers that originated in the city of Medellin Colombia and operated throughout the 1970s and early 1980s.

¹⁵ Sah (1991) points out that part of the problem may be that persons living in countries with high crime participation rates can perceive a lower probability of apprehension than those living in countries with low crime participation rates, because the resources spent in apprehending each criminal tend to be low in high crime countries.

Figure 3 shows plots of the correlation coefficients between average deportation reception rates and (1) a country's proximity to the US, (2) the average unemployment rate among a country's nationals residing in the US, (3) the proportion of a country's population residing in the US, and (4) the education level of a country's nationals residing in the US,. The first three variables are strongly positively correlated with the deportation reception rate while higher education level is negatively correlated with the deportation reception rate. There seems to be a visibly positive relationship between deportation reception and cannabis and cocaine (See Figure 4). In contrast, there is no noticeable relationship between a country's average deportation reception rate and opium and heroin. Column 1 of Table 7 shows the bivariate correlation coefficients for average deportation reception rates (1990-2000) and all eight variables. In all cases the correlation is consistent with the earlier hypotheses. Column 2 presents OLS estimates of average deportation reception rates on all the factors (except average opium and heroin seizures) plus past homicide rates (1975-1985). The coefficient on past homicide rate is not statistically significant, suggesting that crime rates in the years 1975-1985 are not good predictors of deportations in the years 1990-2000. The immigrant education level, average immigrant population, proximity to the US and average unemployment rate are all statistically significantly different from zero. However, the coefficients on average cannabis seizure and average cocaine seizure are not statistically significant--thus, drug-trafficking, as measured by these variables, does not appear to have a noticeable effect on deportations.

Variables can serve as valid instruments for deportations only if they are uncorrelated with homicides, except through variables that are included in the equation explaining crime. The regression results presented in Columns 3 and 4 of Table 7 show that the correlation between the immigrant education level, the average immigrant population, and the proximity to the US and

homicides for the periods 1990-2000 and 1975-1985 is not statistically significant. In contrast, the unemployment rate is significantly positively correlated with current deportation and current and past crime, and average cannabis and cocaine seizures, although correlated with homicide rate (1975-1985), are uncorrelated with deportation and homicide rate (1990-2000). Thus neither of these last two variables would be a good instrument.

5.3. Instrumental variables results

Column 3 of Table 5 shows the results of a GMM analysis that uses the average education level of each country's citizens residing in the US, the share of each country's citizens residing in the US, and the country's proximity to the US as instruments for the country's deportation rate. The estimated coefficient in column 3 is 0.036, about half the size of the coefficient in the analysis without instrumenting in Column 2. As before, the effect is statistically significantly larger than zero at the 5 percent level.¹⁶

The instrumental variable results in Column 3 suggest that a permanent one percentage point increase in the rate of incoming criminal deportees is associated with a 4 percent rise in the homicide rate, and that a one-standard deviation reduction in a receiving country's deportation reception rate leads to a decrease in the homicide rate per 100,000 people by 0.7 percent.¹⁷ In comparison, a one-standard-deviation increase in the GDP growth rate is associated with a reduction in the homicide rate between 0.3 and 0.5 percent, a one-standard deviation increase in average per capita income with a reduction in homicide rate between 9.7 and 32.9 percent, and a one-standard-deviation increase in the urbanization rate with an increase in the homicide rate

¹⁶ The F-statistic, not shown in the table, is statistically significant at the 1% level, suggesting that the instruments are jointly significant in the first stage regression.

¹⁷ The percentage change is obtained by multiplying the slope coefficient and the standard deviation of the variable of interest. Note that Tables 5 and 6 show the standard errors SE , which are related to the standard deviations SD as $SD = SE * N^{0.5}$, where N is the number of observations.

between 0.02 and 0.04 percent. Thus when measured in terms of standard units, a decrease in the deportation reception rate is roughly one-tenth as effective as an increase in average per capita income, two times as effective as increasing the GDP growth rate, and almost an order of magnitude more effective than a decrease in the urbanization rate. The analysis also indicates that the homicide rate has a high degree of inertia, which supports policies of early intervention to prevent crime waves. The size of the coefficient implies that the half-life of a unit shock to the homicide rate is about 5 to 15 years (or 1 to 3 five-year periods).

To put these results into perspective, it is instructive to investigate how much of the increase in intentional homicides between the mid 1980s and the late 1990s in Latin American and Caribbean countries can be explained by the increase in criminal deportation. To present a conservative estimate of the potential contribution of the increase in the criminal deportation reception rate, I use the GMM estimate from the instrumental variables model specification in Column 3 of Table 5.

Between 1985 and 1996, the average rate of intentional homicides in the Latin American and Caribbean countries increased by about 75 percent. During the same period, the average criminal deportation reception rate in these countries increased from 1.34 per 100,000 to 6.39 per 100,000. The GMM instrumental variables estimate predicts that the increase in the number of criminal deportees of 5.05 per 100,000 persons (difference between 1.34 and 6.39) has caused an increase of 17.36 percent in intentional homicides. Expressed as a percentage of the actual increase, my estimate indicates that 23 percent of the increase in intentional homicides for the period 1985 to 1996 can be attributed to the increase in the criminal deportation reception rate.

Hence the magnitude of the homicide-deportation effects is a substantial fraction of the overall increase in the homicide rate, which suggests that policies aimed at improving the

resettlement and reintegration process of criminal deportees will be effective tools for combating crime. Similarly, given that homicide rates are considerably higher in countries that receive a higher number of criminal deportees and the fact that these criminal deportees are being stigmatized in the legal labor market, employment-based policies could be important strategies to combat the high crime rate.

7. Conclusion

This paper presents robust evidence for a positive causal relationship between deportation reception rates and homicide rates. The pattern of change in US deportation that leads to this increase in crime is predominantly caused by events in the US, rather than by events in the receiving countries. This result is robust to the model specification, the method of estimation, instrumental variable approach, and the set of control variables explaining crime rates.

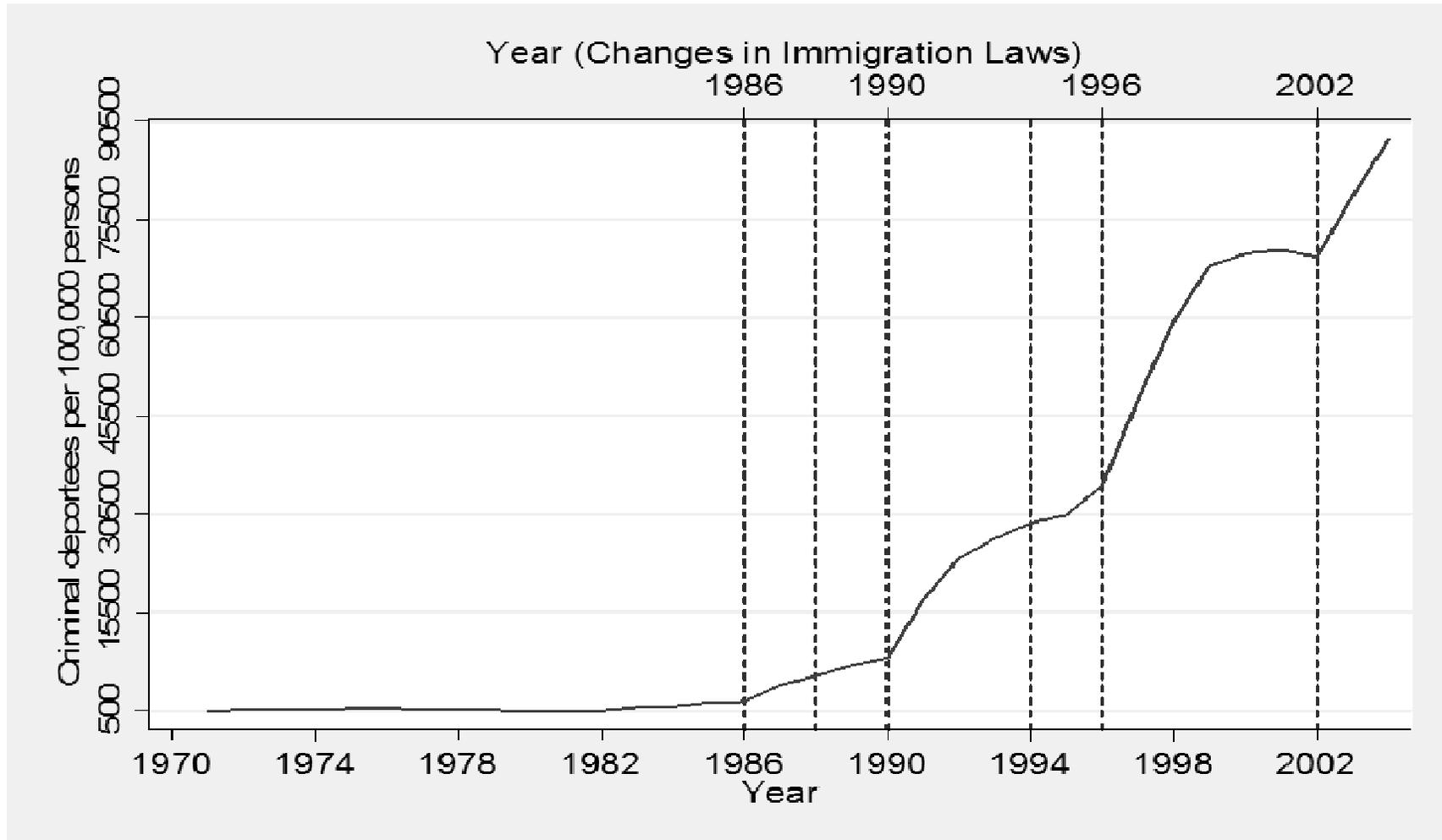
This study shows that crime and violence do not disappear when criminal offenders are moved from one country to another. On the contrary, this analysis highlights the harmful impact of increased deportation of criminal offenders to countries who are already struggling with high homicide rates. The increase in the number of deportees to Latin American and Caribbean countries since the mid-1980s has exacerbated the problems of crime and violence in the regions. These countries need to account for this inflow of criminals into their strategies to combat crime.

The Returning Nationals Secretariat in St Kitts and Nevis provide support to nationals returning home as deportees from the United States, Canada, and any other country. The Secretariat provides counseling and offer assistance in finding jobs, locating housing, and utilizing other social services. The Haitian Government, with the support of the International Organization for Migration (IOM), has formulated a programme to help with the reintegration

process of criminal deportees. The list of reintegrative services include counseling, HIV/AIDS testing, drug rehabilitation, and employment link-ups. In Jamaica, a church based group known as the Land of My Birth Association (LMBA) has recently started to offer similar services to a number of deportees while Citizens for a Better Trinidad and Tobago (CBTT) have also been assisting in the reintegration process of criminal deportees.

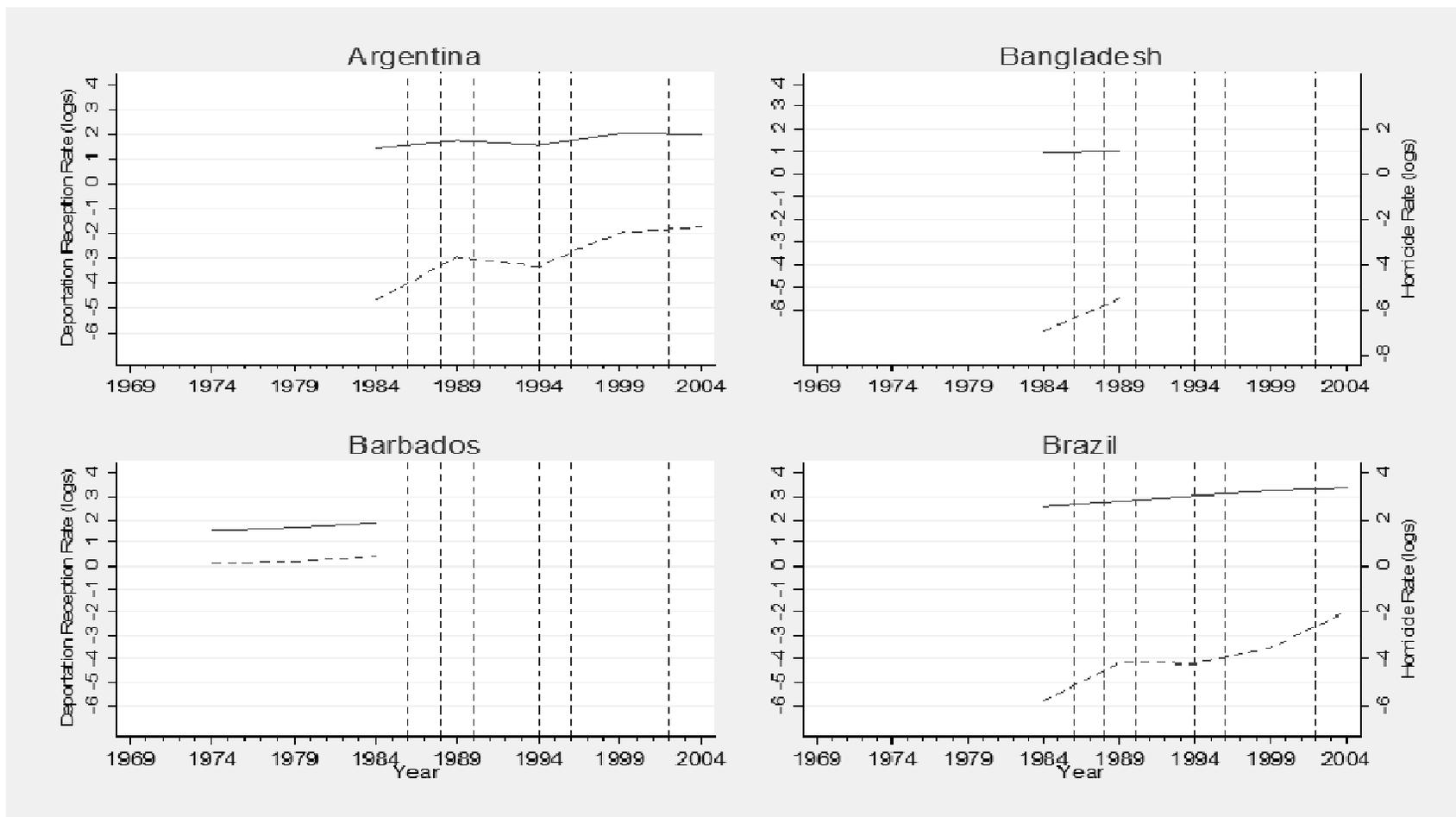
In 2007, the US has signed a contract with the Geneva-based IOM to work along with the United States Agency for International Development (USAID) to conduct consultations on the resettlement of deportees in Haiti, Guyana, Jamaica, and The Bahamas. The IOM is currently working with the governments of these countries and other local partners in the execution of the resettlement programs in Haiti, the Bahamas, and Guyana. Among the project objectives is assisting the governments of the respective countries in establishing permanent intake reception centers for deportees, which will serve as temporary residential facilities, and providing them with adequate social and financial assistance. My analysis indicates that programs like these are likely to be cost effective measures to reduce crime in the Caribbean countries.

Figure 1: Total number of Criminal Deportees from the USA to other Countries (1970-2004)



Sources: U.S. Department of Homeland Security, DACS and the United Nations World Crime Surveys

Figure 2 (a) – (d): Receiving Countries' Deportation Reception and Homicide Rates (1970-2004)



Sources: U.S. Department of Homeland Security, DACS and the United Nations World Crime Surveys

Notes: The vertical axis represents the log of deportation reception rates (broken line) and the log of homicide rates (solid line). Vertical lines depicts the years (1986, 1988, 1990, 1994, 1994, 2001) when there were changes in US Immigration laws.

Figure 2(e) – (h): Receiving Countries' Deportation Reception and Homicide Rates (1970-2004)

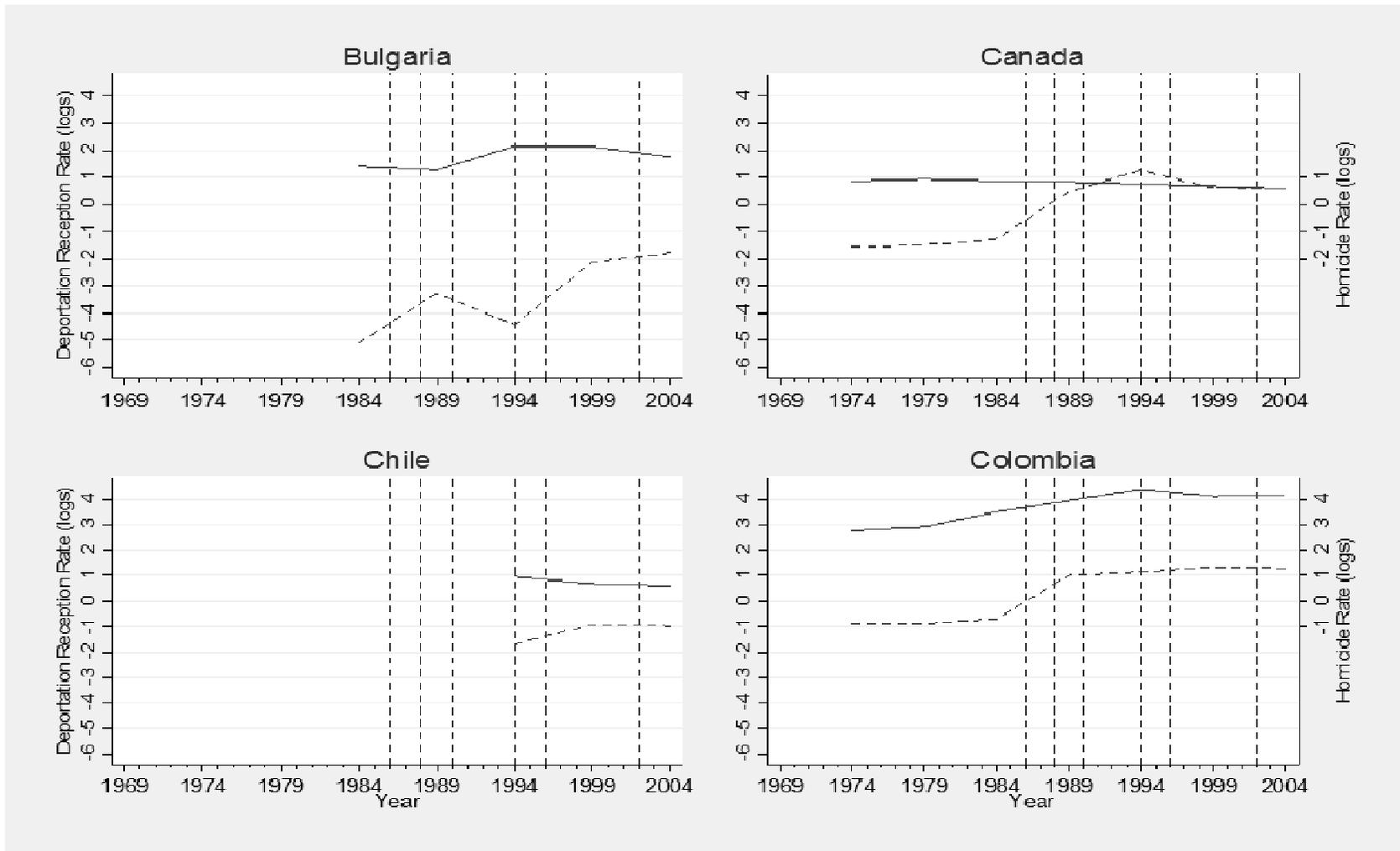


Figure 2(i) – (l): Receiving Countries' Deportation Reception and Homicide Rates (1970-2004)

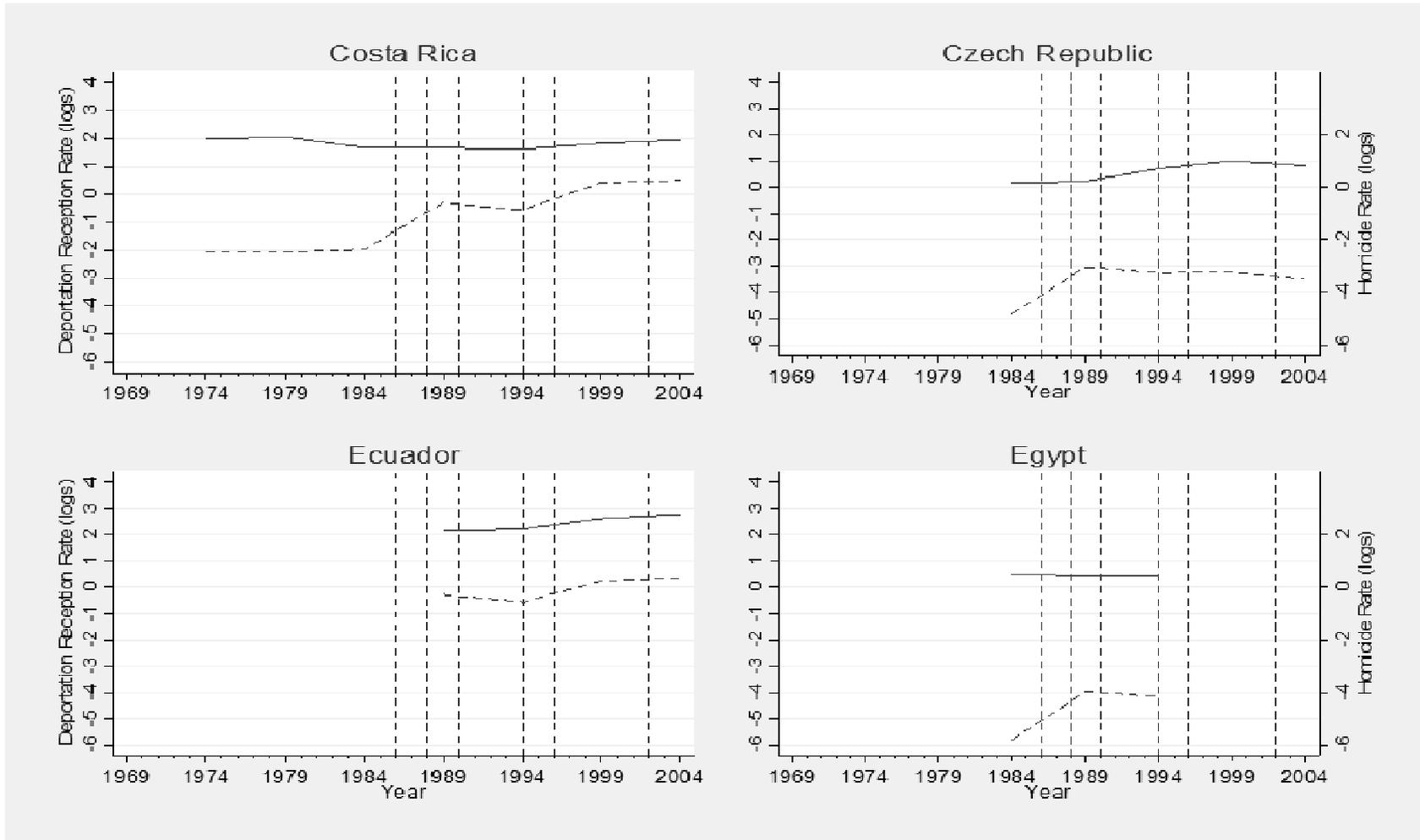


Figure 2 (m) – (p): Receiving Countries' Deportation Reception and Homicide Rates (1970-2004)

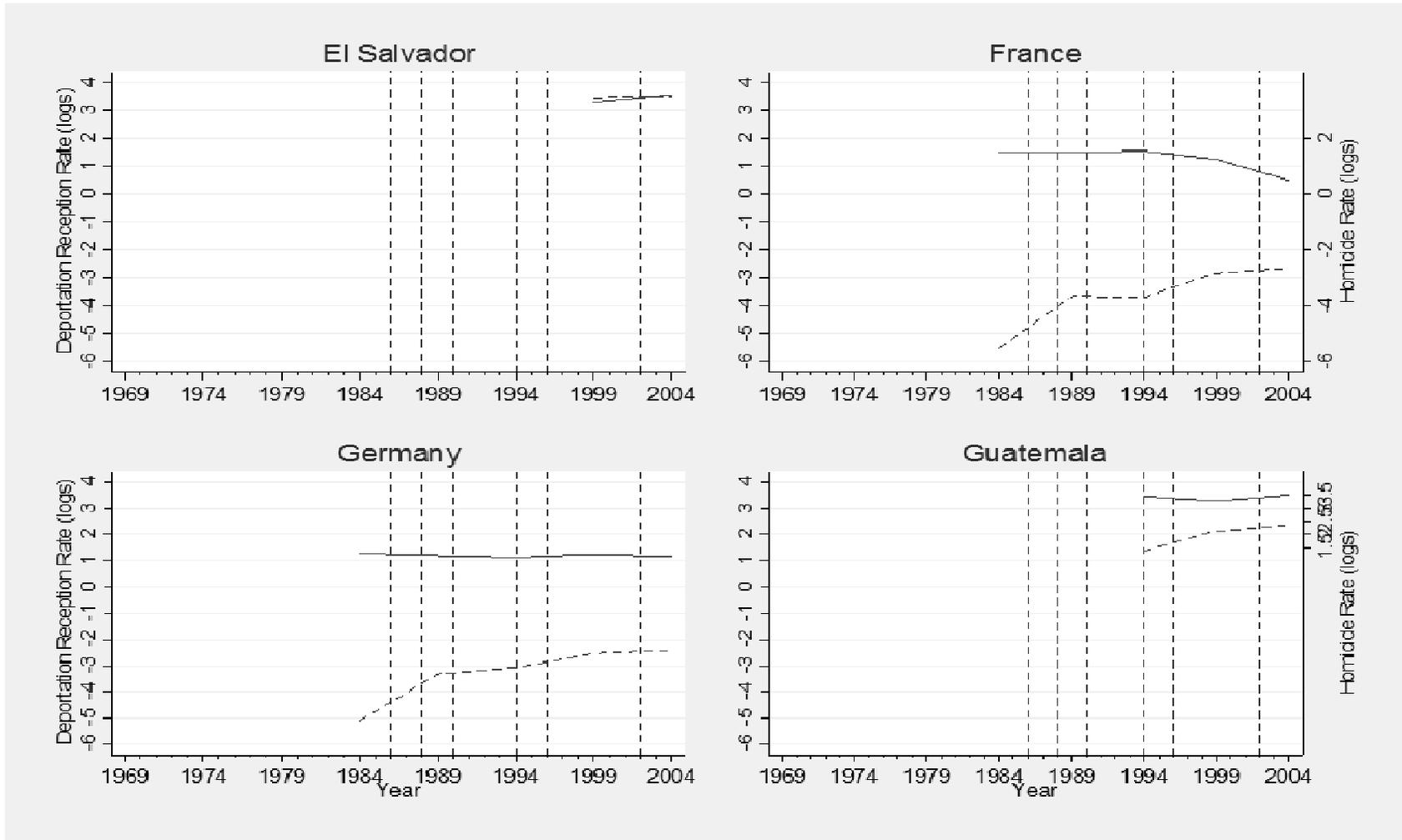


Figure 2(q) – (t): Receiving Countries' Deportation Reception and Homicide Rates (1970-2004)

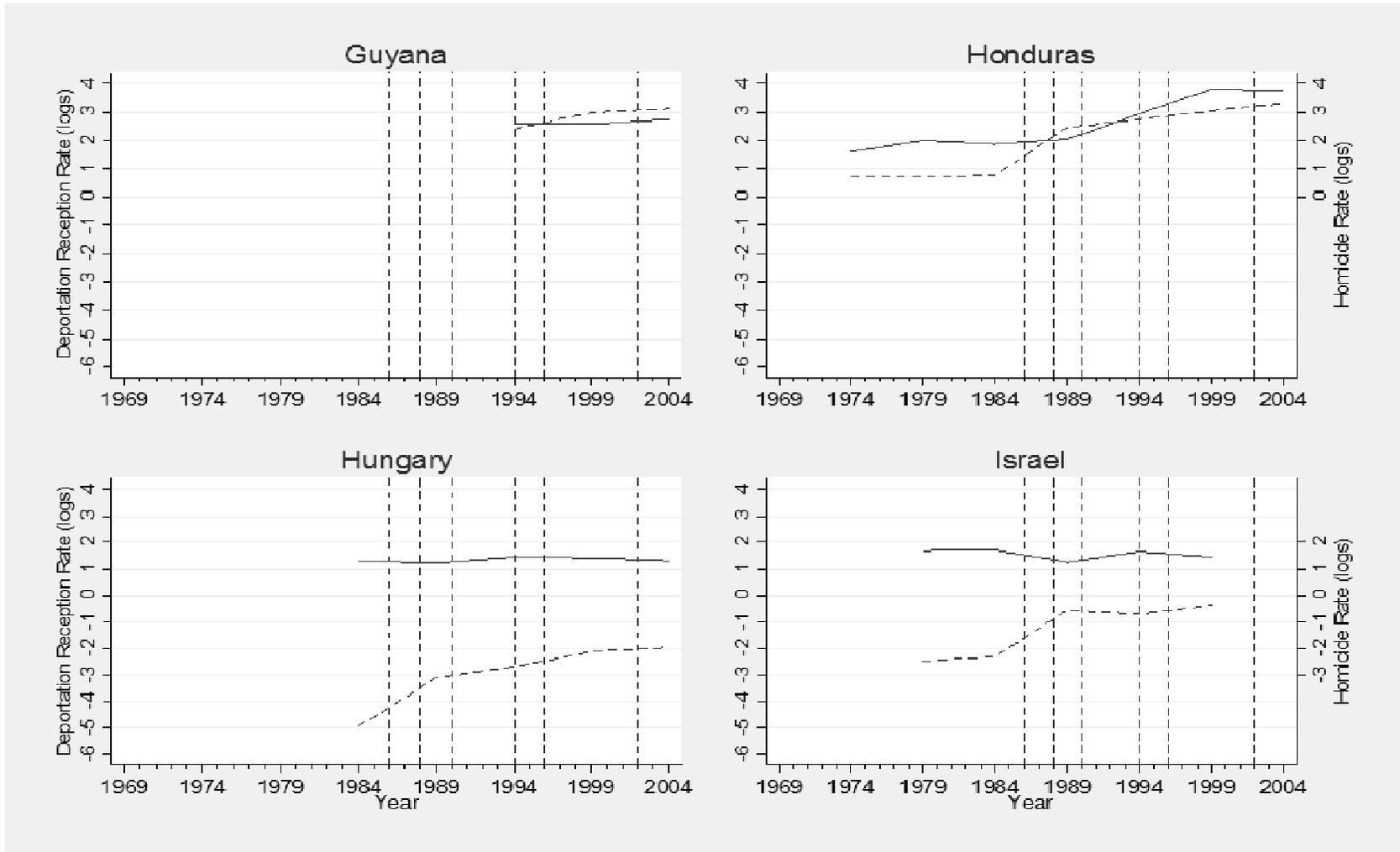


Figure 2 (u) – (x): Receiving Countries' Deportation Reception and Homicide Rates (1970-2004)

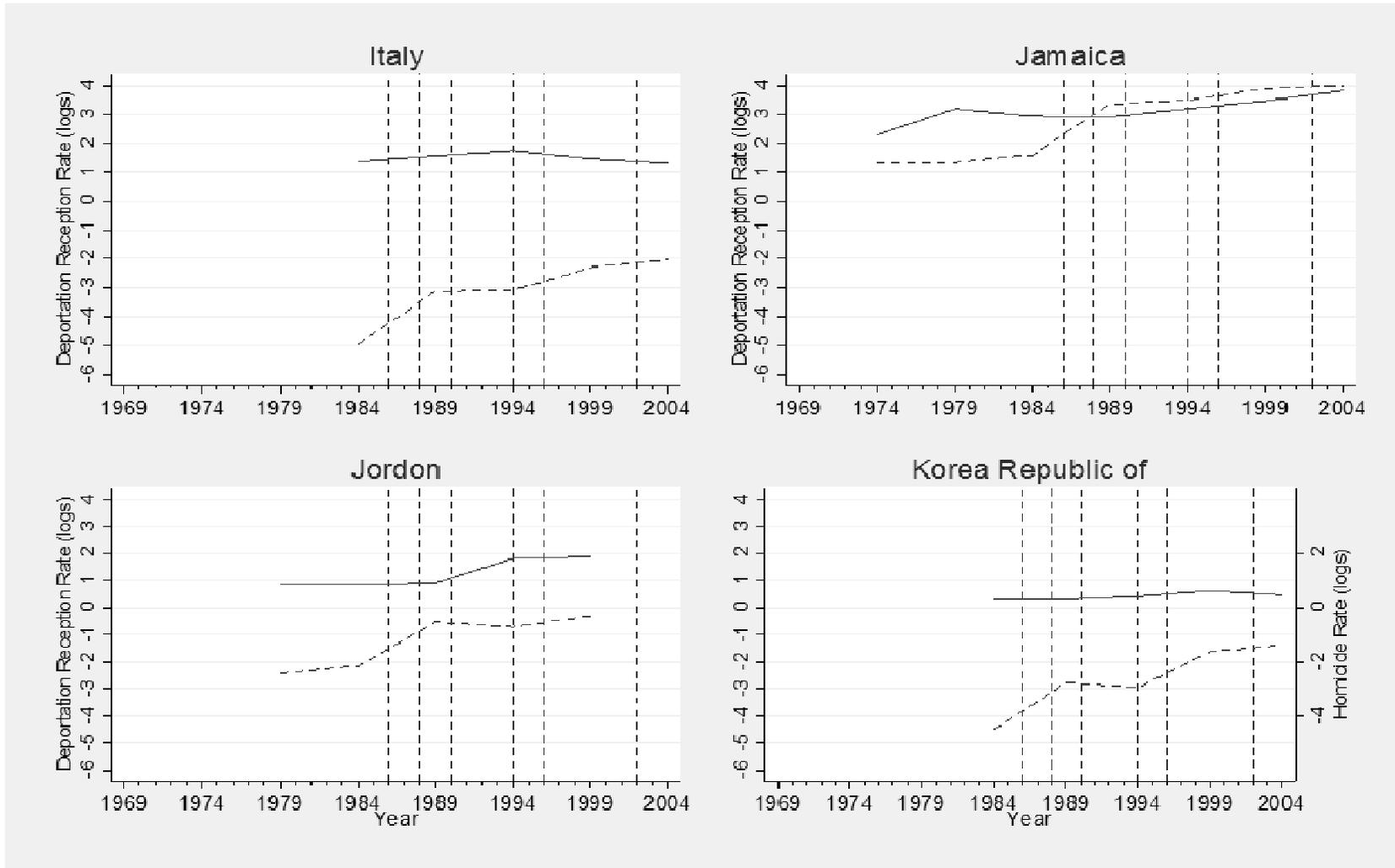


Figure 2 (y) – (ab): Receiving Countries' Deportation Reception and Homicide Rates (1970-2004)

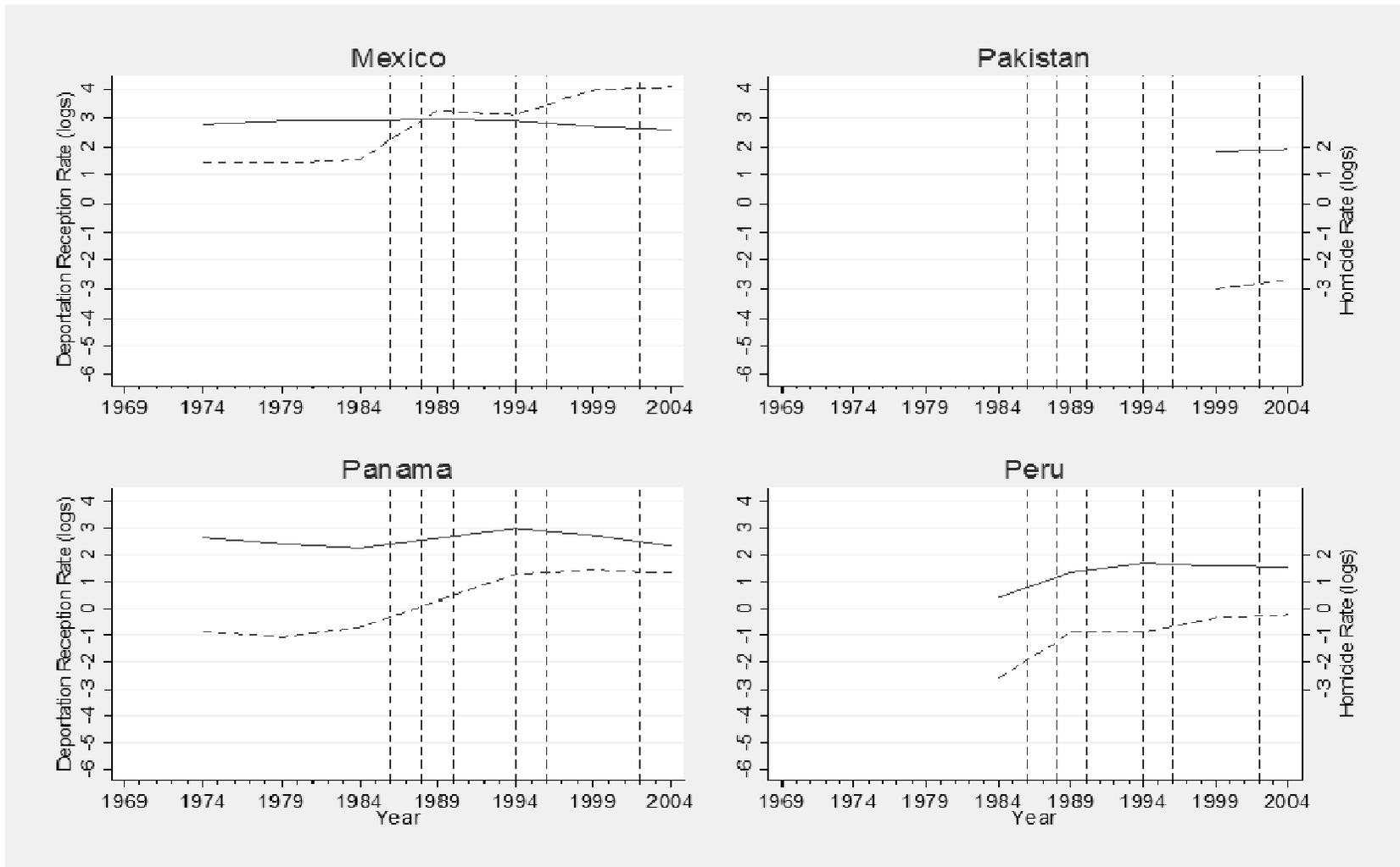


Figure 2(ac) – (af): Receiving Countries' Deportation Reception and Homicide Rates (1970-2004)

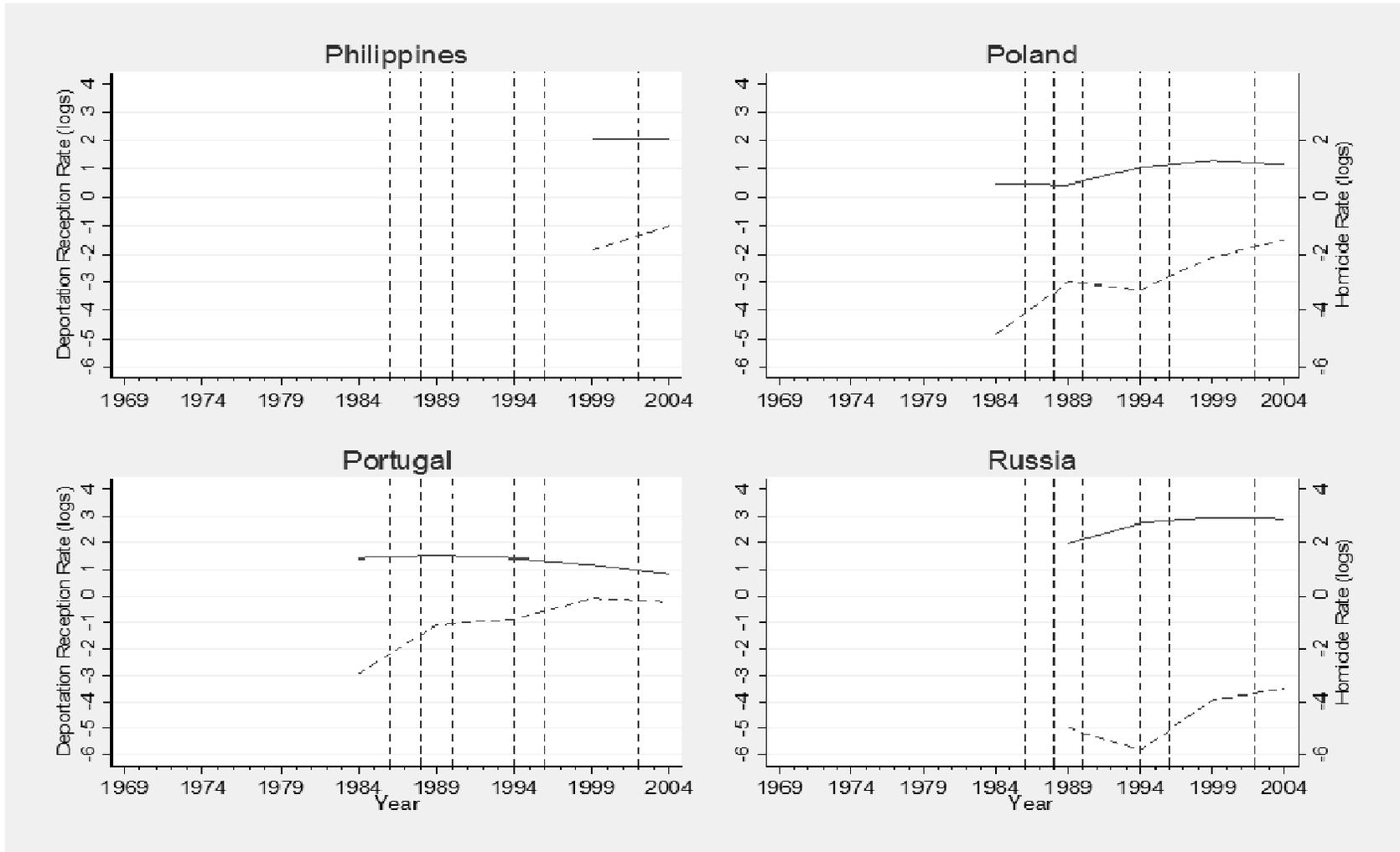


Figure 2(ag) – (aj): Receiving Countries' Deportation Reception and Homicide Rates (1970-2004)

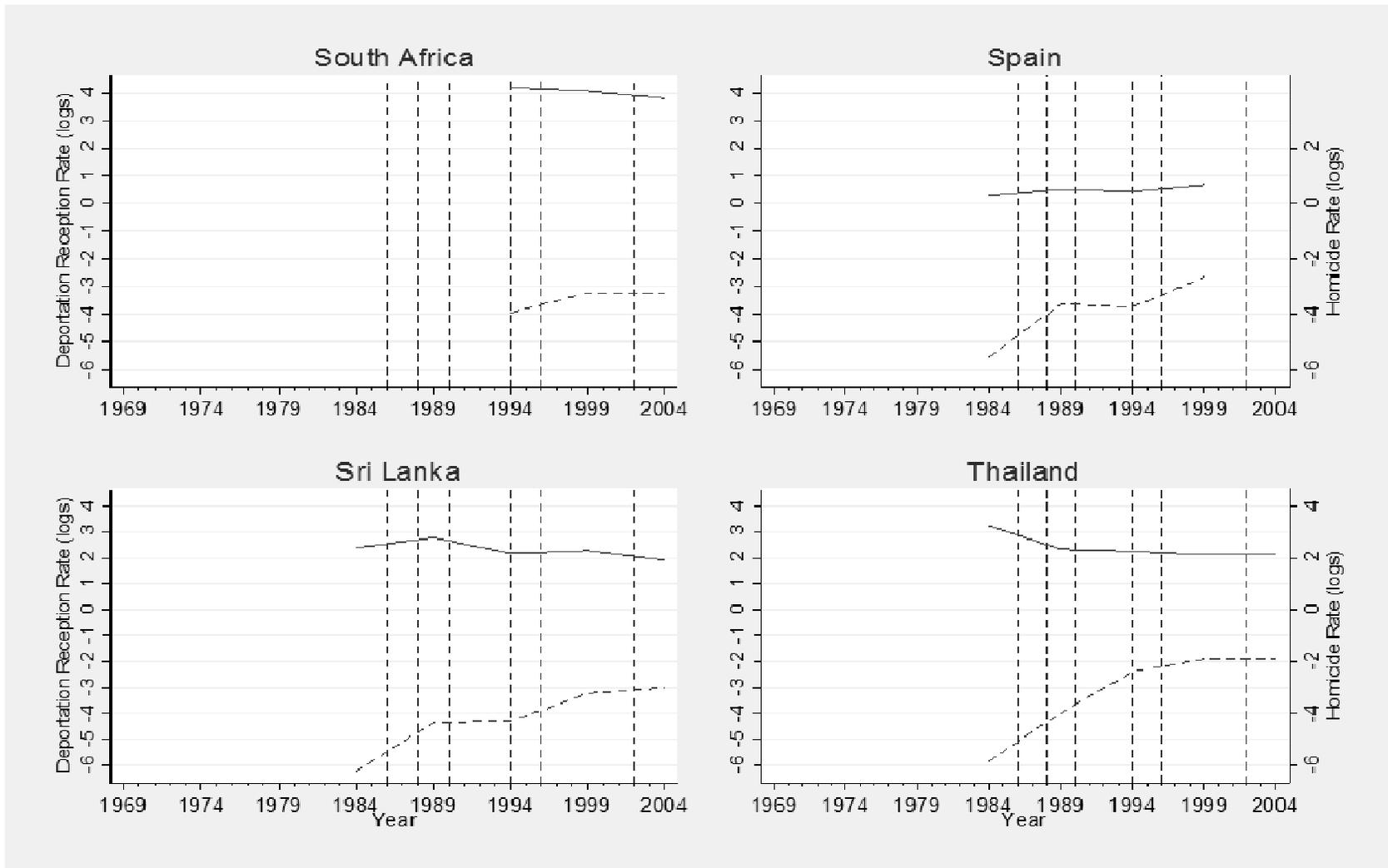
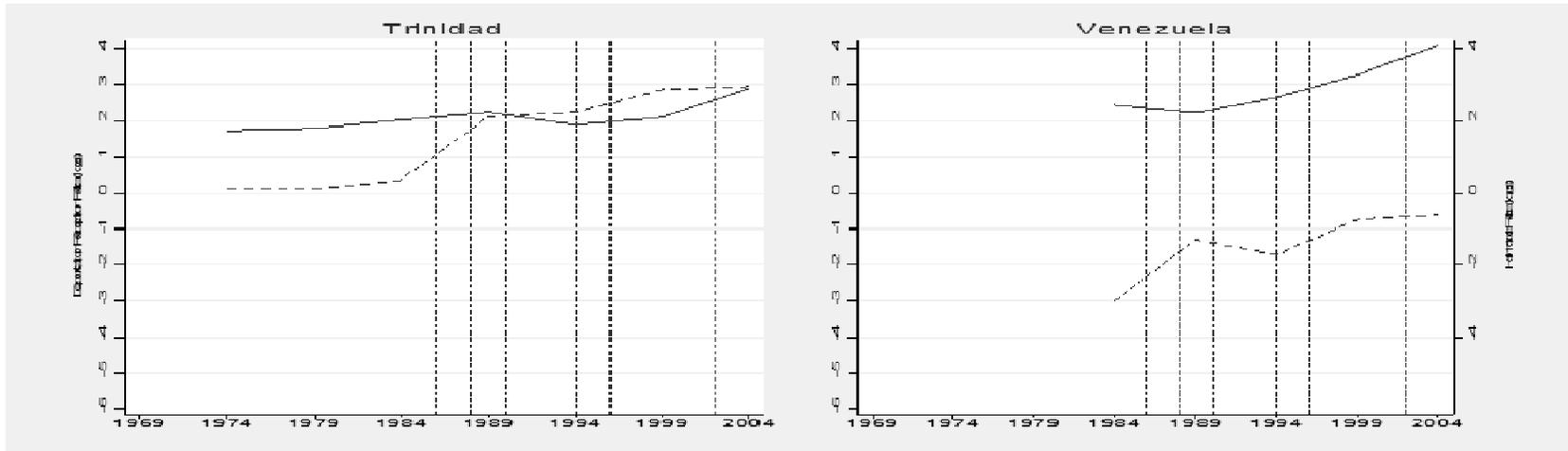


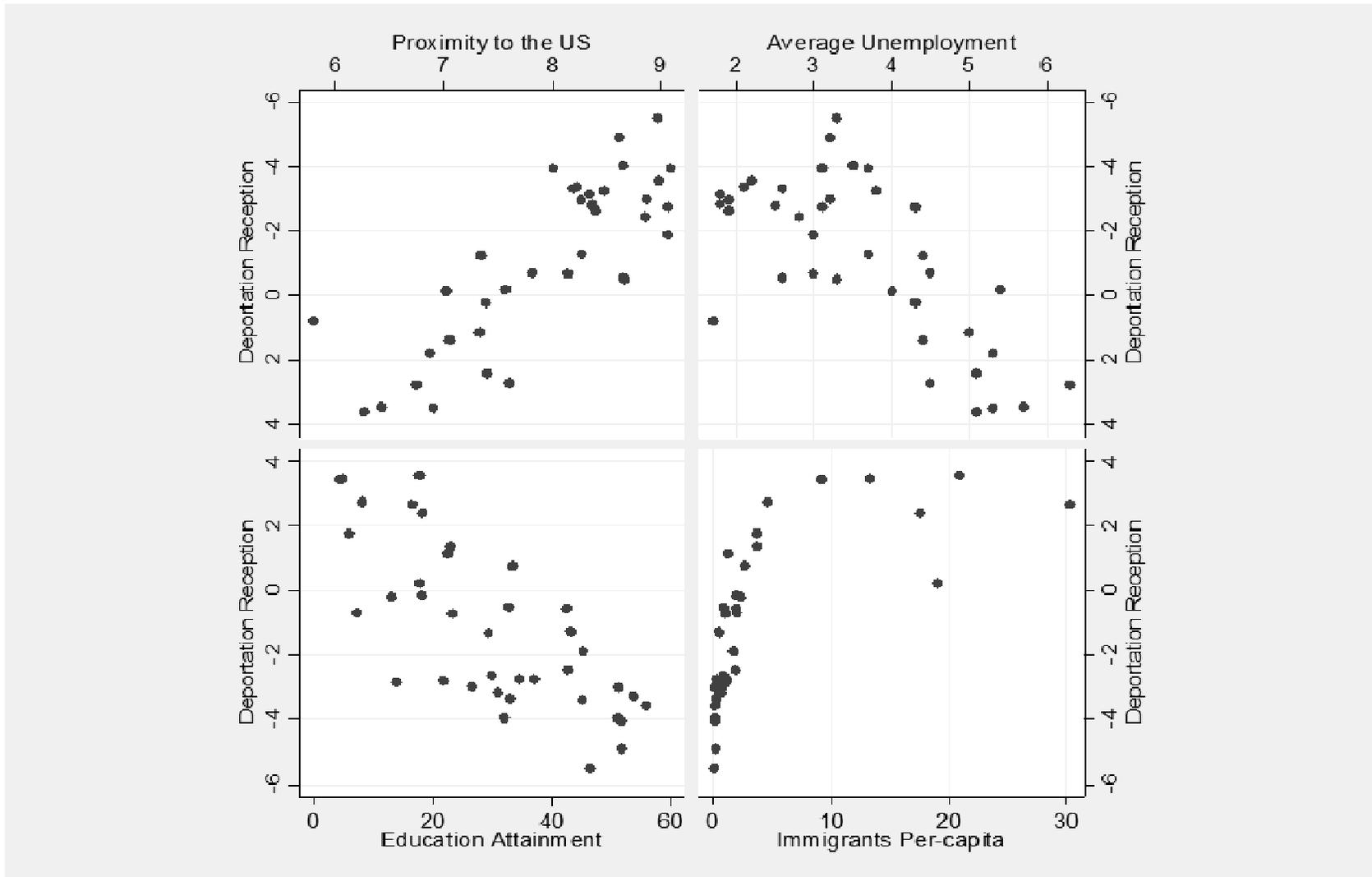
Figure 2(ak) – (al): Receiving Countries' Deportation Reception and Homicide Rates (1970-2004)



Sources: U.S. Department of Homeland Security, DACS and the United Nations World Crime Surveys

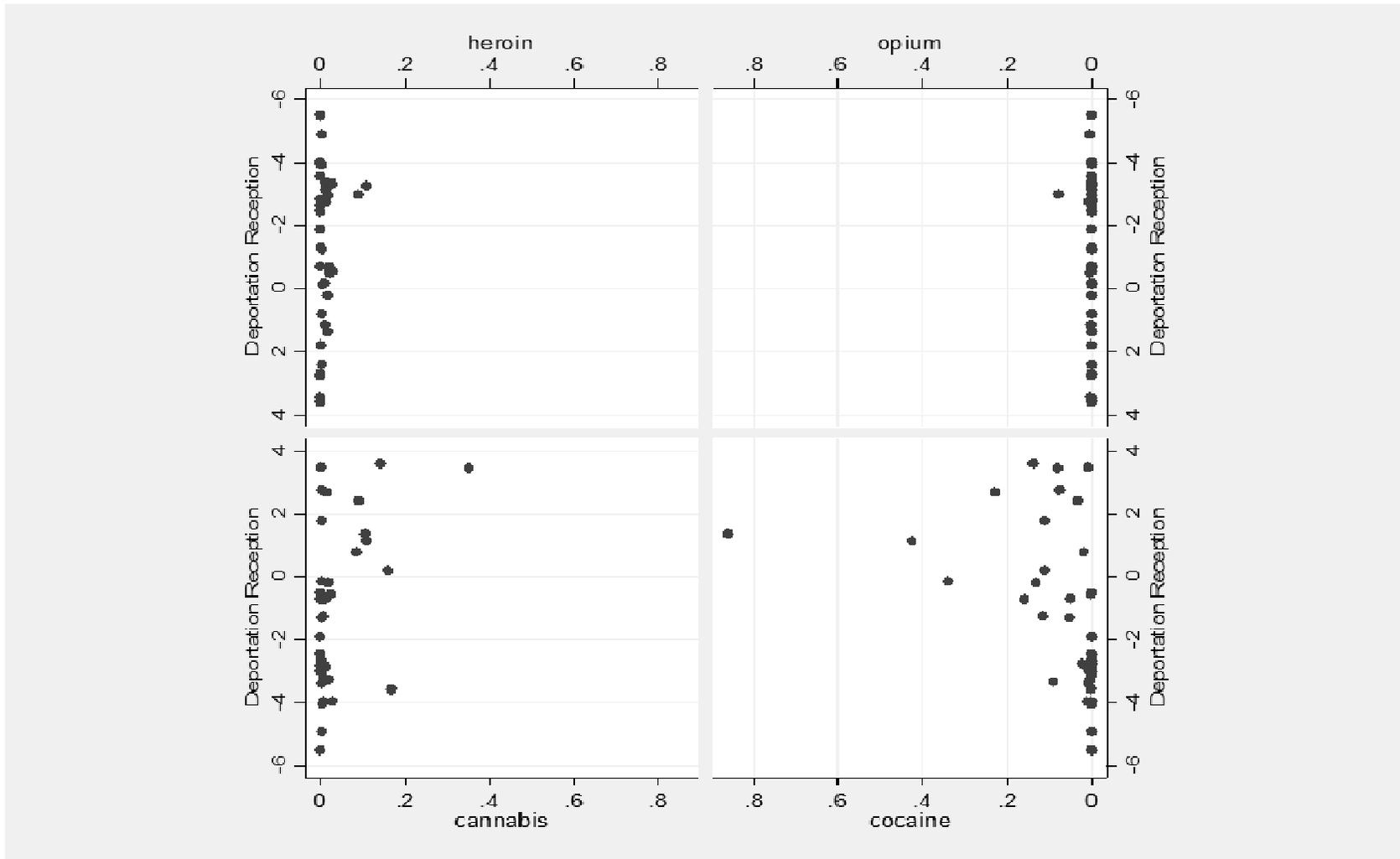
Notes: The vertical axis represents the log of deportation reception rates (broken line) and the log of homicide rates (solid line). Vertical lines depicts the years (1986, 1988, 1990, 1994, 1994, 2001) when there were changes in US Immigration laws.

Figure 3: Social, Demographic, and Economic Factors Affecting Deportation Reception Rates (1990-2000)



Source: US Census Bureau, Census 2000 Special Tabulations (STP-159) – *United States Foreign-born Population*

Figure 4: Average Deportation Reception Rate and Average Drug Seizure as a Percentage of World Total, 1990-2000



Sources: Source: Office for Drug Control and Crime Prevention (ODCCP) Studies on Drugs and Crime – *Global Illicit Drug Trends 2002*

Table 1: Deportation of Criminal Foreigners by Leading Crime Category: 2004

Crime category	Number removed	Percent of total
Total	88,897	100
Drug-related crime	33,367	37.5
Immigration	14,929	16.8
Assault	9,259	10.4
Burglary	3,335	3.8
Robbery	2,855	3.2
Larceny	2,718	3.1
Sexual Assault	2,716	3.1
Murder	2,708	3
Family offenses	2,442	2.7
Sex offenses	1,959	2.2
Stolen vehicles	1,773	2
Other	10,816	12.2

Source: U.S. Department of Homeland Security, DACS.

Table 2: Relative Size of Deportee Population to the entire Criminal Population for countries with high deportation reception rates: 2004

Country	Total Population (000)	Prison population per 100,000 persons	Criminal deportees per 100,000 persons
Bahamas	299	410	32
Barbados	291	367	24
Brazil	184,318	227	0.5
Colombia	44,317	150	4
Costa Rica	4,253	200	2
Chile	16,124	305	0.5
Ecuador	12,917	126	3
El Salvador	6,576	179	42
Guatemala	12,397	59	14
Guyana	739	130	33
Honduras	6,702	161	36
Jamaica	2,642	149	62
Mexico	102,050	207	66
Panama	3,175	299	5
Peru	26,959	150	2
Trinidad & Tobago	1,319	302	25
Venezuela	26,127	85	0.5

Sources: U.S. Department of Homeland Security, DACS and ICPS; School of Law: King's College London; World Prison Brief.

Table 3: Summary Statistics for Homicide and Deportation Rates (per 100,000 persons)

<i>Country</i>	<i>N</i>	<i>Homicides</i>			<i>Deportees</i>		
		<i>Mean</i>	<i>Min</i>	<i>Max</i>	<i>Mean</i>	<i>Min</i>	<i>Max</i>
Argentina	5	5.92	4.11	7.76	0.08	0.01	0.17
Bangladesh	2	2.72	2.60	2.83	0.01	0.01	0.01
Barbados	3	5.36	4.47	6.42	1.25	1.07	1.51
Brazil	5	20.53	12.86	27.82	0.04	0.01	0.14
Bulgaria	5	6.10	3.53	8.65	0.07	0.01	0.17
Canada	7	2.21	1.82	2.58	1.35	0.21	3.47
Chile	3	2.11	1.81	2.58	0.32	0.18	0.40
Colombia	7	46.69	16.4	80.6	2.07	0.42	3.76
Costa Rica	7	6.25	5.03	7.69	0.70	0.13	1.65
Czech Rep	5	1.90	1.17	2.74	0.03	0.01	0.05
Ecuador	4	12.19	8.65	16.55	1.03	0.58	1.47
Egypt	3	1.62	1.57	1.70	0.01	0.01	0.02
El Salvador	2	31.42	27.18	35.65	32.94	32.6	33.28
France	5	3.76	1.65	4.66	0.04	0.01	0.07
Germany	5	3.35	3.05	3.65	0.05	0.01	0.09
Guatemala	3	30.91	26.79	33.84	7.67	4.04	10.4
Guyana	3	14.07	13.00	15.60	17.86	11.12	22.54
Honduras	6	19.04	4.98	45.55	10.97	1.99	27.02
Hungary	5	3.85	3.39	4.27	0.08	0.01	0.14
Israel	5	4.77	3.54	5.54	0.38	0.08	0.68
Italy	5	4.60	3.78	5.87	0.07	0.01	0.13
Jamaica	7	24.18	10.10	42.08	25.76	3.88	55.27
Jordon	5	3.98	2.31	6.49	0.41	0.09	0.74
Korea, Rep	5	1.53	1.34	1.85	0.12	0.01	0.25
Mexico	7	16.89	13.24	19.68	24.94	4.18	59.48
Pakistan	2	6.61	6.35	6.86	0.06	0.05	0.07
Panama	6	13.53	9.56	20.16	2.17	0.34	4.33
Peru	5	4.21	1.51	5.64	0.48	0.08	0.80
Philippines	2	7.59	7.51	7.66	0.26	0.15	0.37
Poland	5	2.58	1.57	3.69	0.09	0.01	0.22
Portugal	5	3.66	2.29	4.49	0.50	0.05	0.92
Russia	4	14.99	7.29	19.01	0.02	0.01	0.03
South Africa	3	56.35	44.61	66.17	0.03	0.02	0.04
Spain	4	1.64	1.33	1.95	0.03	0.01	0.07
Sri Lanka	5	10.55	6.78	16.35	0.02	0.01	0.05
Thailand	5	12.39	8.25	25.26	0.08	0.01	0.15
Trinidad	7	8.89	5.67	18.60	8.39	1.12	19.43
Venezuela	5	24.36	9.28	60.00	0.30	0.05	0.54

Table 4: Summary Statistics

Variable	Mean	Standard	Minimum	Maximum
<i>Main Variables</i>				
Homicide rate	11.66	14.06	1.17	80.60
Deportation rate	3.89	10.17	0.00	59.48
% Growth Rate	3.16	2.83	-8.50	15.99
Average Income	7.98	1.06	5.35	10.23
% Urbanization	61.25	18.79	12.14	92.02
% Labor force participation rate	50.72	13.62	17.63	80.27
% Male population (15-34)	16.89	1.65	12.15	21.64
<i>Other Variables</i>				
Immigrant education level	29.93	15.42	4.30	55.80
Immigrant population	528,886	1,470,884	25,265	9,177,485
Proximity to the US (logs)	7.95	0.87	5.80	9.08
Immigrant unemployment rate	3.62	1.24	1.70	6.30
<i>Drug Trafficking Variables</i>				
% Seizures in Cannabis	0.04	0.07	0.00	0.35
% Seizures in Cocaine	0.08	0.16	0.00	0.86
% Seizures in Opium	0.00	0.01	0.00	0.08
% Seizures in Heroin	0.01	0.02	0.00	0.11

Table 5: Static and Dynamic Model (OLS and GMM systems estimation)

Left-Hand-Side Variable (logs)	Homicide Rate				
	5-year averages (1970 - 2004)			Yearly data (1990 - 2004)	
	OLS (1)	GMM (2)	GMM IV analysis (3)	OLS (4)	GMM (5)
Deportation Reception Rate (in logs)	0.087** (0.044)	0.081** (0.038)	0.036** (0.018)	0.047* (0.028)	0.068** (0.034)
Lagged homicide rate		0.500*** (0.201)	0.806*** (0.079)	0.744*** (0.081)	0.524*** (0.163)
Growth Rate (% annual change in GDP)	0.008 (0.014)	-0.030** (0.016)	-0.024* (0.014)	-0.018*** (0.004)	-0.034*** (0.017)
Average Income (log GNP per-capita in US\$)	-0.194* (0.110)	-0.308*** (0.095)	-0.186*** (0.046)	-0.189*** (0.073)	-0.352*** (0.105)
Urbanization (% population in urban centers)	0.008 (0.010)	0.009** (0.004)	0.007*** (0.002)	0.003* (0.002)	0.009** (0.005)
Female Labor Force Participation Rate	0.016** (0.006)	0.009 (0.007)	0.003 (0.003)	0.001 (0.003)	0.009 (0.006)
Male Population (15-34 as % of total population)	0.068* (0.041)	0.047 (0.042)	0.038** (0.019)	0.030*** (0.010)	0.043 (0.044)
Exogenous Instruments	None	None	Yes	None	None
Observations	156	128	128	281	90
Number of Countries	38	38	38	36	36
SPECIFICATION TESTS (P-Values):					
Sargan Test		0.144	0.123	0.471	0.257
Serial Correlation (Second-Order)		0.522	0.455	0.159	0.944

Note: All Right-Hand-Side variables are for the period 1970-2004. The instruments in Column (5) include the unemployment rate of foreign-born population, the immigrant education level, the immigrant population, and the proximity to the US. Standard errors are shown in parentheses. A * indicates statistical significance at the 10 percent level, a ** indicates statistical significance at the 5 percent level, and a *** indicates statistical significance at the 1 percent level.

Table 6: Cross Sectional OLS Regressions (Structural Breaks)

Left-Hand-Side Variable: US Deportation Rate (in logs)		
	(1)	(2)
Dummy1986 (IRCA)		1.492*** (0.2775)
Dummy1988 (ADA)		0.3499 (0.3143)
Dummy1990 (Immigration Act)		0.9304*** (0.2752)
Dummy1994 (Technical Corrections Act)		0.1438 (0.2752)
Dummy1996 (IIRIRA)		0.4667* (0.2678)
Dummy2001 (September 2001 Attacks)		0.0019 (0.2376)
Trend	0.1961*** (0.0109)	0.0551*** (0.0165)
Number of Years	34	34
Adjusted R-squared	0.906	0.977

Standard errors are shown in parentheses. A * indicates statistical significance at the 10 percent level, a ** indicates statistical significance at the 5 percent level, and a *** indicates statistical significance at the 1 percent level

Table 7: Cross Sectional OLS Regressions

Left-Hand-Side Variables (logs)	Average Deportation Rate (<i>Raw Correlation Coefficient</i>)	Average Deportation Rate	Average Homicide Rate	
	1990-2000 (1)	1990-2000 (2)	1990-2000 (3)	1975-1985 (4)
Average Homicide Rate (1975-1985)	0.426***	0.263 (0.267)	0.792*** (0.176)	
Average Unemployment Rate (1990-2000)	0.698***	0.354*** (0.157)	0.165* (0.107)	0.351*** (0.118)
Immigrant Education Level (1990-2000)	-0.754***	-0.043*** (0.012)	-0.003 (0.745)	0.014 (0.009)
Average Immigrant Population (1990-2000)	0.683***	0.092*** (0.023)	-0.019 (0.094)	0.021 (0.017)
Proximity to the US	-0.815***	-1.094*** (0.273)	-0.078 (0.167)	0.157 (0.167)
Average Cannabis Seizure (1990-2000)	0.453***	0.704 (2.094)	-0.059 (2.018)	4.512*** (1.826)
Average Cocaine Seizure (1990-2000)	0.417***	0.556 (0.699)	0.181 (0.433)	0.825 (0.496)
Average Opium Seizure (1990-2000)	-0.134			
Average Heroin Seizure (1990-2000)	-0.192			
Number of Countries		38	38	38
R-Squared		0.86	0.71	0.46

Standard errors are shown in parentheses. A * indicates statistical significance at the 10 percent level, and a *** indicates statistical significance at the 1 percent level.

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