UC San Diego
Working Papers

Title

The Effect of Illegal Immigration and Border Enforcement on Crime Rates along the U.S.-Mexico Border

Permalink

https://escholarship.org/uc/item/2jh5h00q

Authors

Orrenius, Pia M.
Coronado, Roberto

Publication Date

2017-10-18

Copyright Information

Peer reviewed

The Effect of Illegal Immigration and Border Enforcement on Crime Rates along the U.S.-Mexico Border:

By Pia M. Orrenius and Roberto Coronado

Research Department
Federal Reserve Bank of Dallas

**The Effect of Illegal Immigration and Border Enforcement on
Crime Rates along the U.S.-Mexico Border** [*]

Roberto Coronado
Research Department
Federal Reserve Bank of Dallas–El Paso Branch
301 E. Main St.
El Paso, TX 79901
(915) 521-8235
roberto.coronado@dal.frb.org

Pia M. Orrenius
Research Department
Federal Reserve Bank of Dallas
2200 N. Pearl St.
Dallas, TX 75201
(214) 922-5747
pia.orrenius@dal.frb.org

December 2005

Abstract

In the 1990s, the border led the nation in the decline of property-related crimes, while violent crime rates fell twice as fast in the U.S. than in the median border county. This paper asks how changes in illegal immigration and border enforcement have played a role in generating these divergent trends. We find that while migrant apprehensions are correlated with a greater incidence of violent crime, they are not systematically associated with higher rates of property crime. Border patrol enforcement is associated with lower property crime rates but higher violent crime. Interestingly, it is local enforcement (same or neighboring sector) that is correlated with higher violent crime. Higher border enforcement overall is correlated with less violent crime. Several trends likely underlie these results. First, more enforcement in urban versus rural areas has pushed property crime rates down by keeping migrants and smugglers away from densely populated areas. Second, it is likely that more enforcement (and other factors) have led to an increased use of professional smugglers which in turn has led to more violence on the border.

The 1990s saw a remarkable decline in crime rates not only in the U.S. as a whole, but also along the U.S.-Mexico border. Between 1991 and 2000, the median border county crime rate fell 34 percent while the U.S. crime rate fell 30 percent. It is tempting to attribute the steeper decline in border crime to stepped-up border enforcement since over the same period, although the number of illegal immigrant apprehensions rose 121 percent, border patrol enforcement (as measured by officer linewatch hours) rose 331 percent.[1] The story is more complex, however, and requires a closer look at the types of crimes being committed. While the border led the decline in property-related crimes, violent crime rates fell twice as fast in the nation than in the median border county. Is the border becoming relatively more violent? How have immigration and border enforcement played a role in generating these divergent trends?

This paper attempts to sort out the confounding effects of changes in illegal immigration and enforcement on border crime, while controlling for other crime determinants such as U.S. and Mexico economic conditions and other forms of immigration. Observers point out that current border immigration policy, as exemplified by crackdowns such as Operations Hold-the-Line and Gatekeeper initiated in 1993 and 1994, has had drastic effects on unauthorized entrants, including increased incidence of violence and deaths (Cornelius 2001, Eschbach et al 1999). Migrants have been obliged to cross away from heavily enforced residential areas and utilize paths through dangerous waterways, deserts, and over mountains (Orrenius 2004). Exposure to harsh climates has led to record deaths. The increased difficulty of crossing has also led to more dependence on 'coyotes' or human smugglers (Massey et al 2002).

Smuggler's fees have risen along with the increase in demand and the heightened difficulty of crossing. According to the border patrol, migrants who cannot pay the higher smuggler fees in cash sometimes resort to covering their costs by transporting small amounts of drugs for the smuggler (Bersin 1997). But the nature of smuggling has also changed. While coyotes in the past were often a migrant's friend or relative, smugglers are increasingly sophisticated career criminals and more likely to be associated with organized crime groups and drug cartels (Andreas 2000, Ibarra 1999, Miró 2003, U.S. GAO 2000). Smugglers, and bandits posing as smugglers, prey on migrants and fight each other, committing violent crimes such as assault and robbery. In the media, smuggling is often reported on in the context of migrants who have died when they were abandoned in the wild or in locked containers.

Current levels of enforcement and the extensiveness of human and drug smuggling are the most likely dynamics linking illegal immigration flows to border crime. There is no evidence linking immigrant residents—legal or illegal—to higher crime rates more generally. Liu (2000) uses the 1996 immigration policy changes as a natural experiment to study whether immigration to Texas border counties leads to higher juvenile crime rates and he finds no effect. In analyzing prison survey data, Hagan and Palloni (1998) conclude that incarceration rates among Mexican immigrants are not notably different from native rates when age and gender are taken into account.[2] Butcher and Piehl (1998a), by using Census data on institutionalized individuals show that immigrant men, despite their lower education levels, have lower institutionalization rates than native-born men. In another study using Current Population

---

[1] Linewatch hours are the number of hours the border patrol officers spend each month patrolling the border with Mexico. See below for more detail.

[2] Hagan and Palloni go on to make the point that prison data may overstate immigrant incarceration rates since non-citizen immigrants are more likely to be convicted and less likely to qualify for early release than comparable natives. See also Horowitz (2001) for a review of pertinent research on immigration and crime.

Survey (CPS) data and FBI Uniform Crime Reports, Butcher and Piehl (1998b) find that immigration is unrelated to levels and changes in city crime rates.

The role of immigration and immigration policy in border crime rates is important for many reasons. Crime is not only costly to the victims, but also to taxpayers who fund police, courts, legal counsel and prisons to the tune of 167 billion (in 2001).[3] On the border, the cost of crime is particularly important since many border counties are already reeling under public expenses associated with high immigration and poverty rates. A study by the U.S./Mexico Border Counties Coalition (2001) estimates the total cost of illegal immigration to border counties was $108.2 million in 1999. The estimate includes the cost of law enforcement, criminal justice and emergency medical services. The effectiveness of current policies and immigration trends can also be used to evaluate policy alternatives, such as President Bush's temporary worker plan that would allow low-skilled Mexican workers to enter the country legally.

In this paper, we use monthly uniform crime reports from twenty border counties in California, Arizona and Texas and regress crime rates on border patrol migrant apprehensions (our proxy for illegal immigration) and border patrol linewatch hours (our proxy for enforcement intensity) and other controls including legal immigration, local law enforcement and economic conditions. We ask to what extent illegal immigration flows and higher border enforcement (in 'own' sectors as well as neighboring sectors) have contributed to changes in border crime rates. We consider both violent and property types of crime committed between October, 1991 and December, 2000. Violent crime includes assault, robbery, rape and homicide. Property crime includes larceny, auto theft and burglary and accounts for more than 85 percent of total crime. Our findings imply that migrant apprehensions are correlated with higher violent crime rates, while border enforcement has contributed to lower property crime rates. We also find, however, that increased enforcement hours in one sector can cause violent crime rates to rise in neighboring sectors. This is the first evidence of a direct link between 1990s border policies and relatively higher violent crime rates.

Illegal Immigration and Crime

There are two important issues in studying the impact of illegal immigration on crime. First, there is the question of the causal nature of the link. Second, there is an empirical question regarding the measurement of illegal immigration, specifically the extent to which INS (Immigration and Naturalization Service) apprehensions data capture changes in the volume of illegal immigration.[4] A relationship between illegal immigration and border crime might be expected for three reasons: illegal immigrants commit more crime; illegal immigrants are more likely to be victimized by crime; and/or illegal immigrants use smugglers whom commit more crime. As discussed above, there is little empirical evidence that immigrants—legal or illegal—commit more crime than natives (apart from immigration-related offenses which we are not considering here). Hence, the latter two reasons are the basis for the correlation we expect to find between illegal immigration and crime in this paper. It is widely known that immigrants are

---

[3] See U.S. Department of Justice, Bureau of Justice Statistics, Trends in Justice Expenditure and Employment, NCJ 202792, Table 1 [Online]. Available: http://www.ojp.usdoj.gov/bjs/pub/pdf/jeeus01.pdf [May, 2004].
[4] The INS was moved to the Department of Homeland Security, split up and renamed in March 2003. Since our data refer to the time period when the agency was still called INS, we refer to it as INS data here.

both more likely to be victimized by crime and less likely to report crime. The former suggests that immigrants are more vulnerable, while the latter suggests why that might be the case.

With regard to the third reason to expect a relationship between undocumented immigration and crime, it was touched on in the Introduction. Over 70 percent of Mexican migrants use coyotes, or guides, and the likelihood of hiring a smuggler to assist in a crossing increases when border enforcement rises (Singer and Massey 1997). Although smugglers were traditionally more like guides than seasoned criminals, evidence suggests that as border enforcement and penalties on smuggling have risen, and the drug trade has expanded, the nature of smuggling has become more violent (Rico 2003).[5] The earliest signs of the change may have come with the onset of the 'war on drugs' in the 1980s (Dunn 1996). Interactions between border patrol, Mexican police, smugglers and migrants were transformed from what had been characterized as a harmless 'cat and mouse game' to more dangerous, tense and increasingly armed conflict. Although the 1986 amnesty, by legalizing over two million Mexican immigrants, ushered in some years of relative calm on the border, tensions resumed in the early 1990s as illegal immigration picked up again.

A series of border crackdowns ensued which, by first shutting down traditional border crossings through El Paso, Texas (Operation Hold-the-Line) and San Diego, California (Operation Gatekeeper), increased the extent to which undocumented migrants rely on smugglers to make it across the border. It also increased pressure at staffed points of entry as unauthorized migrants (and drug traffickers) would increasingly try to 'blend in' and pass 'por la línea'. In general, the intersection between drug and migrant interdiction grew larger as the border grew tighter and, shortly after Gatekeeper, the INS and Drug Enforcement Agency (DEA) entered into a 'Memorandum of Understanding' which authorized INS agents to handle drug cases (Bersin 1997). The developments in drug trafficking are important since this is a significant source of violent crime. Partly to address this issue, we control separately for the volume of border patrol narcotics seizures in the regressions below.

From the above discussion, we expect a positive correlation between the volume of illegal immigration and crime.[6] The next issue is how to measure illegal immigration. This paper uses the number of linewatch apprehensions by the border patrol as a proxy for changes in the volume of illegal immigration from Mexico (where *linewatch* simply refers to apprehensions within a border patrol sector which are along the *line*—or border—between Mexico and the U.S). The number of apprehensions is, of course, not an ideal measure of the number of illegal migrants successfully entering the United States or even of the number attempting to enter. In addition to counting the number of failed attempted crossings instead of the number of successful crossings, the data include repeat apprehensions for the same individual. The apprehensions data also do not reflect illegal aliens who enter legally and then overstay their visas, who are believed to account for about one-quarter of illegal immigrants present in the United States (although a much smaller proportion of immigrants from Mexico).

---

[5] Spener (2002) uses case study evidence from South Texas to dispute the view that human smuggling on the Southwest border has become dominated by large criminal syndicates. Spener agrees however that migrants have become more dependent on smugglers as enforcement has intensified.

[6] The 1994 U.S. Commission on Immigration Reform, charged with assessing the effect of Operation Hold-the-Line on El Paso/Juárez, looked into the determinants of El Paso's crime rate and whether illegal immigration played a role. In a cross-sectional regression of city characteristics on crime, they find that border cities have lower rates of crime as compared with non-border cities. El Paso is found only to have an above average rate of larceny-theft. The decline in the crime rate following implementation of Hold the Line is seen as possible evidence that illegal immigrants increase crime rates. However, the analysis only controls for time trends and seasonal effects.

However, as noted by Bean et al. (1990), INS apprehensions data are believed to be correlated with illegal crossings and are useful for examining periodic changes in the number of such crossings. Espenshade (1995) concludes that the simple correlation between apprehensions and the volume of illegal immigration is about 0.90 and that the flow of undocumented immigrants is about 2.2 times the level of INS apprehensions.

Lastly, apprehensions are also a function of enforcement. The more border patrol for a given level of illegal crossings should yield more apprehensions. We deal with this issue by controlling separately for the level of enforcement.[7]

Border Enforcement and Crime

The effect of border enforcement on crime can be in two directions. Conditional on the amount of illegal immigration, higher enforcement can deter crime by increasing the probability of crime detection and apprehension of criminals. If enforcement has rerouted migrants out into the wild and away from residential areas as the evidence suggests, then this strategy might also have lowered property crime rates.[8] However, enforcement can also lead to an increase in crime if it leads to more smuggling and smugglers commit other crimes—particularly violent crimes—as postulated in the Introduction. In the first case, beefed-up enforcement has likely played a role in the reduction of some crimes on the border. In the second case, tougher enforcement may have been a countervailing force to otherwise falling violent crime rates on the border.

A key issue in studying the impact of law enforcement activity on the incidence of crime is the endogenous relationship of the two variables. While crime is generally modeled as a function of the payoff to crime, payoff to legal alternatives to crime such as work, the risk of apprehension and the severity of the expected punishment; enforcement is modeled as a function of, among other things, the incidence of crime (Ehrlich and Brower 1987). Levitt (1997) suggests that much empirical work showing a zero or positive effect of policing on crime is likely a result of the endogenous relationship of these two variables.[9]

The simultaneity problem is less severe when studying the impact of border enforcement on crime. Since changes in border enforcement are not directly driven by changes in the forms of crimes studied here, the border patrol measures we use are exogenously determined conditional on controlling for the volume of illegal immigration (apprehensions) and changes in local law enforcement such as police. The intensity of border enforcement is determined largely at the federal level, while local law enforcement agencies, such as police and sheriff departments, are charged with responding to changes in the local crime rate. While county and state coffers pay for local law enforcement, the U.S. Congress determines the budget of the

---

[7] There is still the issue of whether enforcement becomes more or less effective during this time, changing the probability of apprehension. New technology, for example, could make the border patrol more effective at catching migrants. We deal with this possibility by including both year and sector fixed effects.

[8] As McCormick and Tollison (1984) demonstrate, the effect of police on crime is ambiguous. As the likelihood of detection and arrest rises and measured crime increases, the deterrent effect of more police should lower arrests and crime should fall. If border patrol serves more as a deterrent to crime than an engine for more arrests, then the analysis should be more likely to capture a negative effect of more border patrol on the incidence of crime.

[9] Another complicating factor is the relationship of policing to the reporting of crime. Reported crime is an underestimate of actual crime, and the size of the bias is related to the degree of police presence.

INS, which in turn allocates funds to the U.S. border patrol.[10] Nevertheless, in the short run, controls for the volume of immigration and police are needed since immigration influences crime and changes in police and border patrol could be spuriously correlated. Hence we include these.

Congressional funding of the INS has largely depended on the volume of illegal immigration. Large increases in INS resources have come at times when illegal immigration has been perceived to be high, not during surges of border crime rates. The two biggest increases in the INS budget came, for example, in 1987 in response to the passage of the Immigration Reform and Control Act (IRCA) and in 1995, following implementation of Operations Hold-the-Line and Gatekeeper. IRCA mandated a doubling of border patrol manpower while Hold-the-Line and Gatekeeper included not only large increases in personnel but also in equipment and infrastructure such as cameras, motion sensors, walls, fences and lights.

Data

The sample consists of crime, police, demographic and economic data for twenty U.S. counties bordering Mexico for which data were available.[11] Apprehensions and enforcement data are by border patrol sector from the INS as discussed above. For the empirical analysis, the county data are aggregated to the border patrol sector level and regressions are run by sector.[12] Given the extent of economic interdependence on the border, we also include economic data for the relevant Mexican border states.

The crime data are monthly observations on reported crime spanning the years 1991-2000; they come from the state agencies that compile county crime data for FBI uniform crime reporting purposes and include annual observations on the number of sworn law enforcement officers.[13] Local police authorities gather and report crime data for seven types of crime: auto theft, larceny, burglary, assault, robbery, rape and homicide. The first three are generally referred to as property crimes, with larceny being the most common, while the more serious offenses against individuals are considered violent crimes (with assault the most common).[14]

---

[10] The agency currently in charge of the border patrol is the Bureau of Customs and Border Protection. See footnote 4.

[11] California counties include San Diego and Imperial; Arizona includes Yuma, Pima, Santa Cruz and Cochise. Texas counties include El Paso, Hudspeth, Jeff Davis, Presidio, Brewster, Terrell, Val Verde, Kinney, Maverick, Webb, Zapata, Starr, Hidalgo and Cameron.

[12] There are nine border patrol sectors along the Southwest border: San Diego, El Centro, Yuma, Tucson, El Paso, Marfa, Del Rio, Laredo and McAllen. These sectors consist of between one and five border-adjacent counties (as well as more inland counties which we ignore here). For those sectors that contain more than one border-adjacent county, we aggregate county crime, population and economic data up to the sector level. For sectors that contain only one border-adjacent county, we simply use the county-level values (these include San Diego, El Centro and Yuma).

[13] Crime and police data was provided by the following state agencies: Special Request Unit, Criminal Justice Statistics Center, California Department of Justice; Uniform Crime Reporting Program, Access Integrity Unit, Arizona Department of Public Safety; Uniform Crime Reporting, Crime Information Bureau, Texas Department of Public Safety.

[14] There are many problems with reported crime data such as the UCR. First, victims report only an estimated one-half of all crimes committed. Under-reporting introduces measurement error that varies by crime type and county of jurisdiction. Also, the methods of collecting and reporting data also vary across local authorities. Sector fixed effects should pick up most of the fixed differences in reporting methods across counties in the sample.

The dates for the analysis were constrained by the availability of monthly *sector-specific* INS data on apprehensions and enforcement. As stated above, we expect apprehensions to be positively associated with the sector crime rate while enforcement may be positively associated with violent crime but negatively associated with property crime. We use border patrol officer linewatch hours to measure the intensity of border enforcement in a given sector. In some specifications, we also include these measures for the neighboring sectors, recognizing that there are important geographical spillover effects.[15] As mentioned above, we also include the estimated market value of border patrol narcotics seizures, available by fiscal year.[16]

An important set of control variables are demographic variables and include annual observations of sector population (available at the county level from the Census Bureau), as well as measures of the inflow of legal immigrants and non-immigrants from Mexico. Non-immigrants measure the number of visas given to temporary visitors from Mexico, such as shoppers and tourists, and green card recipients captures the influx of lawful permanent residents (LPRs). The number of visas issued to Mexican non-immigrants are available in annual values for the nation as a whole, while the LPR data is annual tabulation of legal immigrants by state (in the regressions annual totals are divided by 12 so the sum of the months equals the yearly total).[17]

Economic conditions also affect the likelihood of committing a crime. The literature suggests both wages and unemployment rates play an important role. Gould, Weinberg and Mustard (2002) show that the improvement in wages for young unskilled men in the 1990s significantly reduced the crime rate among this group. Meanwhile, Grogger (1998) uses falling real wages to help explain rising youth arrest rates in the 1970s and 1980s. Mocan and Rees (1999) show that local unemployment rates and poverty also increase the probability of committing a crime. We include monthly measures of employment and the unemployment rate from the BLS. Personal income (from Bureau of Economic Analysis) are observed annually and the values are interpolated across months. All wage and income variables are deflated using the U.S. CPI.

Measures of economic conditions on the Mexican side of the border are also included. These variables include the rate of inflation (from Banco de México), the real peso-dollar exchange rate (from Federal Reserve Bank of Dallas), and two state-level measures of economic activity in the maquiladora industry. For each border patrol sector, we use the bordering Mexican state's level of maquiladora employment and average hourly wage (from Instituto Nacional de Estadística, Geografia e Informática, INEGI).[18] Since maquiladoras have been the driving force of the Mexican border economic growth, these are the most appropriate measure of changing economic conditions south of the border. All Mexican wage variables are deflated using the Mexican CPI. Summary statistics for the variables are presented in Table 1.

---

[15] Neighbor sectors are the geographically defined neighbors (immediately to the east and west for the interior sectors, and the sector to the east (west) for San Diego (Cameron).
[16] These data are available from the 2000 INS Statistical Yearbook. Values are deflated using the US CPI.
[17] The number of Mexican non-immigrants are based on the number of B1/B2 visas issued to Mexicans in a given year (available from the State Department). LPR data are available from the NTIS as "Immigrants Admitted into the United States as Legal Permanent Residents".
[18] The border patrol sectors are match with Mexican states as follows: San Diego and El Centro with Baja California, Yuma and Tucson with Sonora, El Paso and Marfa with Chihuahua, Del Rio with Coahuila, Laredo and McAllen with Tamaulipas.

Methodology

We regress the crime rate on linewatch apprehensions, linewatch hours, number of police officers with arrest powers, narcotics seizures, legal immigration, inflow of non-immigrants, employment, unemployment rate, per capita personal income, population, Mexican economic conditions, and month, year and sector fixed effects. State crime rates are also included as control variables. Regressions of violent, property and total crime are run separately and controls for apprehensions and enforcement in neighboring sectors, along with own sector measures, are added in some specifications. Each neighbor measure is a simple average of the two surrounding sectors. A border-wide average measure is also introduced in the third specification.

Regressions are estimated in log-levels using feasible generalized least squares (FGLS) regressions that allow for sector-level heteroscedasticity as well as an AR(1) error structure within sectors and across time. Month dummy variables control for the seasonal components of crime and immigration. Many of the control variables, such as apprehensions, have strong seasonal factors, with apprehensions peaking in the spring and bottoming out during the year-end holiday season.

Year fixed effects capture changes in economic conditions or implementation of new immigration policies or any other year-specific effects that are not otherwise captured by the included right-hand side variables. Sector fixed effects will capture any fixed county-level characteristics that might otherwise bias the association of crime and immigration and enforcement measures. These can be institutional factors contributing to systematic under-reporting of crime or quality of policing or other cross-sectional influences such as geographic location and severity of climate or terrain. In the regression analysis, observations are weighted by average sector population over the time period.[19]

Results

Effects of Apprehensions and Linewatch Hours on Crime

Table 2 contains the regression estimates for violent crime. The results indicate that apprehensions, our measure of the volume of illegal immigration, are significantly and positively related to violent crime rates. The estimates suggest that a 10 percent increase in apprehensions, for a given level of enforcement, leads to about a 0.6 percent increase in a sector's violent crime rate. In the same specifications, neighbor sector apprehensions and average sector apprehensions are not statistically significant. This indicates that there are no crime spillovers from increased migrant flows in other border areas (conditional on enforcement and the other controls).

Crime spillovers occur when enforcement responds, however, as the coefficients on linewatch hours apparently show. Linewatch hours, our measure of border enforcement, are not statistically significant in the baseline regression for violent crime (table 2, column 1). However, once we include controls for the neighbor and average sector enforcement in columns 2 and 3,

---

[19] There is one month for which there is no violent crime reported in the Yuma sector. In this case, we replaced the zero with 0.01 before taking logs.

own-sector and neighbor-sector hours become positively and significantly related to the violent crime rate. Average sector hours however, have a large negative correlation with violent crime rates. A 10% increase in average sector linewatch hours leads to a 2.3% decrease in the violent crime rate.

The two conflicting impacts of enforcement were discussed above, and there is evidence for it in these results. The interpretation is that more enforcement generally along the border likely reduces violent crime. However, for a given level of average enforcement, an increase in one's own enforcement or a neighbor's enforcement will lead to marginally higher violent crime rates in one's own sector as border crossers resort to smugglers to a greater extent or as confrontations with the border patrol become more likely. It stands to reason that in order to avoid crime spillovers, each sector should not differ too much from its neighbor's level of enforcement, and to deter violent crime more generally, there should be a high average level of enforcement.

The distinct nature of property crime is apparent in the table 3 regressions. Whereas apprehensions are correlated with the violent crime rate, they appear unrelated to the property crime rate. The coefficient on apprehensions is not statistically significant in any of the specifications. Conditional on enforcement, more apprehensions will not change property crime rates but will likely lead to more violent crime.[20]

Linewatch hours also have a distinct effect on property crime as compared with violent crime. Increases in own-sector hours deter property crime. In every specification in table 3, the coefficient on linewatch hours is negative and significant. The estimates suggest that a 10 percent increase in hours should lead to about a 0.4 to 0.5 percent decrease in the property crime rate. Underlying this effect, although not explicitly modeled, is likely the current enforcement strategy that has forced migrants out of cities and towns and into desolate areas where there is little opportunity to commit property-related crime such as larceny.[21] Since there is no relationship postulated between property crime and smugglers, we do not expect to find a correlation between enforcement and this type of crime.

Effects of Police, Drug Seizures, Demographic and Economic Variables on Crime

There are some interesting findings with regard to the remaining explanatory variables. Narcotics seizures are significantly negatively correlated with violent crime but have no effect on property crime. A 10% increase in the volume of border patrol drug seizures reduces the violent crime rate by about 1.0 %, as shown in table 2. This result is expected if drug seizures either deter narcotics traffickers or cause them to use other, less violence-prone methods. Also of considerable interest are economic conditions in Mexico and their impact on border crime rates in the United States. They do not seem to matter to property-related or overall crime, but from table 2, the results suggest that higher maquiladora wages, a lower real exchange rate (fewer pesos per dollar) and lower Mexican inflation are positively correlated with violent crime on the U.S. side. Perhaps higher wages and a higher value of the peso are correlated with access to the United States such as frequency of border crossings—which might increase the opportunity

---

[20] In a follow-up paper, we look more closely at the impact of apprehensions on type of property crime and find different effects of immigration depending on the type of crime.
[21] Modeling this would require data on apprehension and enforcement within sectors.

for cross-border crime—or with the demand for illicit drugs which is also correlated with violent crime on both sides of the border.

No other control variables (aside from the fixed effects), are statistically significant in the violent crime regressions. Legal immigration or Mexican non-immigrants do not have an effect.

With regard to property crime, the policing variable is positive and significant. This likely reflects the endogenous nature of the variable as police presence is beefed up in response to more property crime and more police may increase the reporting of crime. A 10 percent increase in the policing rate is correlated with a 5.3 to 5.8 percent increase in the property crime rate.[22] The other measures of people inflows, the number of LPRs admitted and the number of non-immigrant visas issued to Mexicans, have generally positive but not statistically significant results.

Population growth, however, is strongly positively related to higher property crime rates. Not only are more populated sectors wealthier on average, so there is more to steal, but a higher concentration of people may imply better chances of avoiding detection and arrest and greater ease with which to dispose of stolen goods. Notice that higher population is not associated with higher rates of violent crime, only property-related crime.

One of the most important variables in explaining the overall reduction in border crime during the 1990s is job growth. The employment coefficient is significant at 10 % and implies that a 10 percent increase in the number of jobs will lead to an 8.2 percent decline in property crime. Other economic variables are not statistically significant in this model. Unemployment rates are not significant here, although other studies have found they have an important role in determining crime. Higher personal income is not significant either in these regressions. There is some loss of precision in estimates as a result of aggregating from county to sector level. Also, due to the large role Mexican workers play in the border economy, the level and variation in border unemployment rates are often questioned.

Discussion

This paper attempts to sort out the confounding effects of immigration and enforcement on border crime rates in the 1990s. Not surprisingly, we find evidence of a positive and significant correlation between the volume of apprehensions of illegal immigrants and the incidence of violent crime. The underlying relationship is likely one in which the reliance of border crossers on smugglers, and the pervasiveness of drug smuggling, contribute to violent crime along the border. If that is the case, one might expect that enforcement leads to more violent crime, as more border patrol should increase smuggler usage. We find that yes, sector increases in enforcement may increase violent crime rates in the own sector as well as the neighboring sectors. At the same time, higher average enforcement along the border leads to significantly less violence.

---

[22] The endogeneity of the police variable biases the coefficient on police presence upward, but does not affect the other coefficients. As it is not our variable of interest, we do not address the endogeneity issue here.

One reason the coefficient on enforcement is hard to pin down in these equations is the fact that apprehensions are a function of linewatch hours as well as the volume of illegal immigration. In other words, the true impact of an increase in hours on crime has to be a linear combination of the hours and apprehensions estimates. Part of the negative impact of hours on crime operates through the deterrence not only of crime itself, but also of migrant flows. We know that migrant flows adjust to enforcement crackdowns and, following Hold the Line and Gatekeeper, began to bypass traditional migrant gateways such as Tijuana-San Diego and Juárez-El Paso for routes through Arizona and South Texas. As a result, crime is more evenly distributed across the border today as compared with the past. In 1992, El Paso and San Diego counties accounted for 61 percent of border crime. In 2000, this share had fallen to 46 percent. Meanwhile, counties such as Yuma and Cochise in Arizona, and Hudspeth, Jefferson Davis, Presidio and Webb in Texas, become more crime ridden during this period, even as the U.S. crime rate fell (see table below).

Crime rate, select counties and years

Cty #	County Name	1992	2000	% Change
1	San Diego	549.1	278.8	-49.2
2	Imperial	573.8	358.4	-37.5
3	Yuma	53.8	287.7	435.1
4	Pima	699.8	579.7	-17.2
5	Santa Cruz	499.3	264.0	-47.1
6	Cochise	341.3	346.4	1.5
7	El Paso	689.8	462.5	-33.0
8	Hudspeth	51.8	82.6	59.3
9	Jeff Davis	47.2	74.8	58.6
10	Presidio	46.2	52.4	13.4
11	Brewster	249.5	148.7	-40.4
12	Terrell	128.7	0.0	-100.0
13	Val Verde	498.9	307.0	-38.5
14	Kinney	31.5	17.2	-45.5
15	Maverick	578.3	277.4	-52.0
16	Webb	582.3	591.0	1.5
17	Zapata	159.1	51.0	-67.9
18	Starr	220.3	180.9	-17.9
19	Hidalgo	615.1	473.5	-23.0
20	Cameron	587.1	513.9	-12.5

There are several caveats to our analysis. Most importantly, if border patrol enforcement responds to changes in the sector's violent crime rate, then our measure of enforcement is endogenous. An endogenous measure would result in a spurious positive correlation between enforcement and violent crime even though the true relationship may be negative or non-existent. Another caveat is that crime affecting illegal immigrants is vastly underreported. This is especially true along the border where an illegal immigrant will probably only report crime if he or she is apprehended by the border patrol or other law enforcement personnel. Hence, not only are crime rates measured with error, but apprehensions are also endogenous to crime since apprehended migrants are both more likely to report crime and be victims of crime. Partly

for these reasons, we have been careful throughout this paper to refer to the correlation and not the causation between crime and illegal immigration at the border.

Another shortcoming of the analysis is that we have not controlled for socio-demographic variables besides the broad indicators of population and personal income. Factors such as race, age, education and family structure are known predictors of the probability of committing crime. If border county populations have undergone large demographic shifts that are correlated with levels of apprehensions and/or enforcement, then these factors could also bias the estimated coefficients. It is difficult, however, to find yearly detailed demographic data for counties that are not part of an MSA. Moreover, given the inclusion of year, sector and month fixed effects, it is likely that most county and time-specific variation has been accounted for with dummy variables. Moreover, demographic variables do not vary monthly so they may have limited explanatory power with regard to the month-to-month variation in crime rates.

Conclusion

Our results are consistent with the broader trends in border crime during the period of study. While property crime declined drastically on the border over most of the years under study, the fall in violent crime in the 1990s did not track the much deeper decline experienced at the national level. The result has been that a greater share of border crime is now violent crime, although total crime rates have fallen. Our results help explain these trends. Illegal immigration is correlated with higher violent crime rates, while greater border enforcement has had a role in reducing property crime rates. Interestingly, increases in border enforcement in one sector have had spillover effects that have led to higher violent crime rates in neighboring sectors. In regressions controlling for average enforcement along the entire border, we find that while higher enforcement generally is correlated with less violent crime, greater enforcement locally is correlated with more violent crime. This positive correlation could be *a result* of local border enforcement, *a response* of local enforcement to higher crime, or both.

The divergence with national trends with respect to violent crime, as well as the evidence suggesting more rural counties now contend with a greater share of border crime, suggests that sections of the border are becoming relatively more violent—this despite massive increases in enforcement since the middle of the 1990s. This evidence indicates that current border enforcement policies that cause migrants to cross through remote areas and have increased reliance on smugglers, may underlie some of the correlation between apprehensions and violent crime. Future work should look more carefully into the factors that determine the correlation between immigration policy and conditions on the border such as border crime.

References

Andreas, Peter 2000. *Border Games: Policing the U.S.-Mexico Divide*. Cornell University Press, Ithaca, New York.

Bean, Frank D., Thomas J. Espenshade, Michael J. White and Robert F. Dymowski, 1990. "Post-IRCA Changes in the Volume and Composition of Undocumented Migration to the United States." In *Undocumented Migration to the United States*, ed. Frank D, Bean, Barry Edmonston, and Jeffrey S. Passel, Santa Monica, CA; RAND: 111-158.

Bersin, Alan, 1997. Testimony to the U.S. House of Representatives Committee on the Judiciary, 4/23/97. Available at http://www.house.gov/judiciary/654.htm.

Butcher, Kristin F. and Anne Morrison Piehl, 1998a. "Recent Immigrants: Unexpected Implications for Crime and Incarceration." *Industrial and Labor Relations Review* 15 (July): 654-679.

Butcher, Kristin F. and Anne Morrison Piehl, 1998b. "Cross-City Evidence on the Relationship Between Immigration and Crime." *Journal of Policy Analysis and Management* 17 (3): 457-93.

Cornelius, Wayne A., 2001. "Death at the Border: Efficacy and Unintended Consequences of U.S. Immigration Control Policy." *Population and Development Review* 27 (December): 661-685.

Dunn, Timothy, 1996. *The Militarization of the U.S.-Mexico Border, 1978-1992*. (Austin: Center for Mexican American Studies, University of Texas at Austin).

Ehrlich, Isaac and George D. Brower, 1987. "On the Issue of Causality in the Economic Model of Crime and Law Enforcement: Some Theoretical Considerations and Experimental Evidence." *AEA Papers and Proceedings* (May): 99-106.

Eschbach, Karl, Jacqueline Hagan, Nestor Rodriguez, Ruben Hernandez, and Stanley Bailey, 1999. "Death at the Border." *International Migration Review* 33 (2): 430-454.

Espenshade, Thomas J., 1995. "Using INS Border Apprehension Data to Measure the Flow of Undocumented Migrants Crossing the U.S.-Mexico Frontier." *International Migration Review* 29 (2): 545-565.

Gould, Eric D., Bruce A. Weinberg, and David B. Mustard, 2002. "Crime Rates and Local Labor Market Opportunities in the United States: 1979-1997." *The Review of Economics and Statistics* 84 (February): 45-61.

Grogger, Jeff, 1998. "Market Wages and Youth Crime." *Journal of Labor Economics* 16 (October): 756-791.

Hagan, John and Alberto Palloni, 1998. "Immigration and Crime in the United States," in *The Immigration Debate: Studies on the Economic, Demographic and Fiscal Effects of Immigration*, James P. Smith and Barry Edmonston, eds., Washington, D.C.: National Academy Press: 367-387.

Hanson, Gordon H., and Antonio Spilimbergo, 1999. "Illegal Immigration, Border Enforcement, and Relative Wages: Evidence from Apprehensions at the U.S.-Mexico Border." *American Economic Review* 89 (December): 1337-1357.

Horowitz, Carl F, 2001. *An Examination of U.S. Immigration Policy and Serious Crime*, Washington, D.C., Center for Immigration Studies.

Ibarra, Ignacio, 1999. "Alien Smugglers Inc," *The Arizona Daily Star*. Sunday, July 11.

Levitt, Steven, 1997. "Using Electoral Cycles in Police Hiring to Estimate the Effect of Police on Crime." *American Economic Review* 87 (3): 270-290.

Liu, Samuel, 2000. *Essays on the Effects of Immigration on Education and Crime*. Ph.D. Thesis. Massachusetts Institute of Technology.

Massey, Douglas S., Jorge Durand and Nolan J. Malone, 2002. *Beyond Smoke and Mirrors: Mexican Immigration in an Era of Free Trade* (New York: Russell Sage Foundation).
Massey, 1987. Return to Aztlan.

McCormick, Robert E. and Robert D. Tollison, 1984. "Crime on the Court." *Journal of Political Economy* 92 (April): 223-235.

Miró, Ramon J., 2003. "Organized Crime and Terrorist Activity in Mexico, 1999-2002." *Library of Congress Federal Research Division,* available at http://lcweb.loc.gov/rr/frd/pdf-files/OrgCrime_Mexico.pdf

Orrenius, Pia M., 2004. "The Effect of U.S. Border Enforcement on the Crossing Behavior of Mexican Migrants." in *Behind Smoke and Mirrors: Research from the Mexican Migration Project* Jorge Durand and Douglas Massey, editors. Russell Sage Foundation.

Reyes, Belinda I., Hans P. Johnson, and Richard Van Swearingen, 2002. *Holding the Line? The Effect of the Recent Border Build-up on Unauthorized Immigration*. San Francisco: Public Policy Institute of California.

Rico, Gabriela, 2003. "Border Patrol Pressure Leads to More Violence." *The Tucson Citizen*, March 3. http://www.tucsoncitizen.com/local/3_3_03border_tension.html

Singer, Audrey and Douglas S. Massey, 1997. "The Social Process of Undocumented Border Crossing Among Mexican Migrants." *International Migration Review* 32(3):561-92.

Spener, David, 2002. "Migrant Smuggling as a Transnational Cottage Industry." Mimeo. San Antonio, Texas: Trinity University.

U.S. Commission on Immigration Reform, 1994. "U.S. Immigration Policy: Restoring Credibility." Washington, D.C.: U.S. Commission on Immigration Reform.

U.S. General Accounting Office, 2000. *Alien Smuggling: Management and Operational Improvements Needed to Address Growing Problem.* GAO/GGD-00-103 (Washington, D.C.: GAO).

U.S. Immigration and Naturalization Service. 2000. *Statistical Yearbook of the INS*. Washington, DC.Available at http://uscis.gov/graphics/shared/aboutus/statistics/ENF00yrbk/ENF2000list.htm

U.S/Mexico Border Counties Coalition. 2001. "Illegal Immigrants in U.S.-Mexico Border Counties: Costs of Law Enforcement, Criminal Justice and Emergency Medical Services." University of Arizon, Tucson (January).

Table 1
Sample Means

	Oct-91 – Sep-00
Border Patrol apprehensions, line watch	9,477.7 (11,068.8)
Border Patrol hours, line watch	45,895.0 (44,004.2)
Police officers (sworn) per 100,000 inhabitants	170.9 (24.9)
Narcotics seizures, millions of real $	137.44 (27.3)
Legal permanent residents admitted (state level)	6,363.0 (5,895.6)
Non-immigrant visas issued to Mexicans (U.S. total)	194,070.2 (91,337.4)
Employment	305,791.6 (444,983.4)
Unemployment rate	15.6 (8.7)
Personal income (millions of real $)	8,025.6 (12,941.2)
Population	632,041.8 (795,501.5)
Real exchange rate (pesos per $)	0.81 (0.12)
Mexican inflation rate (1994=100)	180.4 (83.9)
Maquiladora hourly wage (real pesos, Mexican border state)	9.4 (1.7)
Maquiladora employment (Mexican border state)	132,393.9 (66,508.4)

	Oct-91 – Sep-00
State total crime	488.2 (83.8)
State property crime	430.5 (79.8)
State violent crime	57.7 (13.0)
Sector total crime	423.8 (174.8)
Sector property crime	379.2 (159.1)
Sector violent crime	44.6 (21.3)

Note: Standard deviations are in parentheses. All variables are reported at the border patrol sector level unless otherwise noted. All crime measures are number of offenses per 100,000 people.

Table 2
Regression Results for Violent Crime along the U.S.–Mexico Border, 1991-2000

	Regression 1 FGLS	Regression 2 FGLS	Regression 3 FGLS
Apprehensions , own sector	.056** (.015)	.063** (.016)	.067** (.019)
Enforcement hours, own sector	.007 (.026)	.035 (.029)	.071** (.034)
Apprehensions, neighbor sector		.004 (.017)	.009 (.021)
Enforcement hours, neighbor sector		.064** (.029)	.096** (.033)
Apprehensions, average			-.024 (.058)
Enforcement hours, average			-.236** (.119)
Police officers	-.029 (.195)	-.001 (.194)	-.047 (.195)
Narcotics Seizures	-.106** (.050)	-.113 (.051)	-.100* (.051)
Legal permanent residents admitted	-.011 (.023)	-014 (.024)	-.014 (.024)
Non-immigrant visas issued to Mexicans	-.005 (.044)	.018 (.046)	-.004 (.047)
Employment	-.285 (.828)	-.133 (.844)	-.185 (.844)
Unemployment rate	.047 (.053)	.069 (.055)	.078 (.055)
Personal income	.271 (.581)	.005 (.591)	.180 (.598)
Population	1.257 (.901)	1.463 (.920)	1.331 (.922)
Real exchange rate	-.285** (.124)	-.321** (.126)	-.288** (.127)
Mexican inflation	-.408** (.187)	-.502* (.200)	-.397* (.210)
Maquiladora employment	-.130 (.122)	-.075 (.126)	-.095 (.127)
Maquiladora hourly wage	.272** (.106)	.255** (.106)	.251** (.106)

State violent crime rate	.686** (.094)	.700** (.097)	.697** (.096)
Number of Observations	972	972	972
Log-Likelihood	515.3	518.8	520.8

* p<.10; ** p<.05

Note: The time period is October 1991 to September 2000. All continuous variables are in logs. Month, year and sector dummy variables are also included. Standard errors are in parentheses.

Table 3
Regression Results for Property Crime along the U.S.–Mexico Border, 1991-2000

	Regression 1 FGLS	Regression 2 FGLS	Regression 3 FGLS
Apprehensions , own sector	.007 (.010)	.008 (.010)	.011 (.012)
Enforcement hours, own sector	-.038** (.017)	-.038** (.018)	-.047** (.021)
Apprehensions, neighbor sector		-.021* (.011)	-.017 (.014)
Enforcement hours, neighbor sector		.035* (.019)	.026 (.022)
Apprehensions, average			-.015 (.032)
Enforcement hours, average			.052 (.067)
Police officers	.530** (.110)	.582** (.111)	.581** (.112)
Narcotics Seizure	.004 (.028)	-.006 (.027)	-.007 (.028)
Legal permanent residents admitted	.017 (.014)	.014 (.014)	.014 (.014)
Non-immigrant visas issued to Mexicans	.034 (.025)	.025 (.025)	.021 (.025)
Employment	-.668 (.446)	-.815* (.467)	-.818* (.471)
Unemployment rate	.039 (.032)	.024 (.033)	.021 (.034)
Personal income	-.408 (.354)	-.457 (.370)	-.504 (.376)
Population	3.556** (.474)	3.732** (.475)	3.781** (.481)
Real exchange rate	.057 (.068)	.044 (.066)	.042 (.067)
Mexican inflation	.069 (.108)	.074 (.112)	.060 (.116)
Maquiladora employment	.027 (.080)	.037 (.080)	.030 (.082)
Maquiladora hourly wage	.067 (.060)	.050 (.060)	.051 (.060)

State property crime	.761** (.066)	.718** (.068)	.723** (.068)
Number of Observations	972	972	972
Log-Likelihood	1299.2	1302.1	1302.0

* p<.10; ** p<.05
Note: All continuous variables are in logs. Month, year and sector dummy variables are also included. Standard errors are in parentheses.

Table 4
Regression Results for Total Crime along the U.S.–Mexico Border, 1991-2000

	Regression 1 FGLS	Regression 2 FGLS	Regression 3 FGLS
Apprehensions , own sector	.013 (.009)	.014 (.009)	.017 (.011)
Enforcement hours, own sector	-.029* (.017)	-.027 (.017)	-.033 (.021)
Apprehensions, neighbor sector		-.018* (.011)	-.015 (.013)
Enforcement hours, neighbor sector		.033* (.019)	.028 (.022)
Apprehensions, sector average			-.014 (.031)
Enforcement hours, sector average			.031 (.066)
Police officers	.480** (.108)	.522** (.109)	.520** (.109)
Narcotics Seizures	-.013 (.027)	-.021 (.027)	-.022 (.027)
Legal permanent residents admitted	.016 (.014)	.013 (.014)	.013 (.014)
Non-immigrant visas issued to Mexicans	.023 (.024)	.015 (.024)	.012 (.025
Employment	-.804* (.436)	-.920** (.457)	-.917** (.460)
Unemployment rate	.040 (.032)	.027 (.033)	.025 (.033)
Personal income	-.280 (.340)	-.367 (.356)	-.369 (.361)
Population	3.431** (.472)	3.583** (.474)	3.614** (.479)
Real exchange rate	.013 (.066)	.000 (.065)	.000 (.065)
Mexican inflation	.011 (.106)	.015 (.109)	.009 (.113)
Maquiladora employment	.004 (.078)	.003 (.079)	-.003 (.080)
Maquiladora hourly wage	.101* (.058)	.084 (.058)	.086 (.058)

State total crime	.754** (.068)	.713** (.070)	.718** (.070)
Number of Observations	972	972	972
Log-Likelihood	1325.6	1328.7	1328.5

* p<.10; ** p<.05

Note: All continuous variables are in logs. Month, year and sector dummy variables are also included. Standard errors are in parentheses.