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**Drug-Related Violence and Forced Migration**  
**from Mexico to the United States**

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**Abstract**

When President Felipe Calderón took office he declared a war on drug lords, thus initiating a war of attrition which has claimed more than 40,000 lives in the last 5 years. In this chapter I document how this escalation of violence has led Mexicans living close to the northern border to migrate to the United States. Using data from the American Community Survey to estimate migration, and administrative death records to estimate murder rates, I present evidence that the United States southern states have seen the largest increases in Mexican migration from 2005 to 2010. I also show that these new migrants are college educated, which is in high contrast with the archetypical Mexican migrant in the United States. My analysis also shows that there is a correlation between business openings and murder rates in

Mexico. I conclude that the war on drugs is making wealthy well-educated Mexicans leave the country, thus diminishing the available skilled labor force and investment needed for future economic development.

**Keywords:** Drug trafficking, violence, forced migration, Mexico, war on drugs.

**JEL:** J61, O15.

## 1. Introduction

It is a well-known fact that the drug-related violence in Mexico has seen an upsurge in recent years. This increase in violent crimes has been attributed to the so-called “war against drug trafficking” which was declared when President Felipe Calderón took office in 2006. According to a report from the *Procuraduría General de la República* (the Attorney General of Mexico) from 2006 to September 2011 there have been around 47,515 drug-related deaths in Mexico – 10% of which are considered civilian casualties (Camarena 2012).<sup>1</sup> As a result, Mexicans have been fleeing away from areas where the conflict between drug

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<sup>1</sup> As of October 2011, the Drug Enforcement Administration estimated that 43,000 casualties related to the Mexican drug war (Otero 2012). There have been several unofficial death tolls. According to a Tijuana newspaper, up to December 2011 there had been 60,420 deaths related to the drug war (Mendoza 2011).

cartels, or between drug lords and the Mexican army, has been more intense.

International migration is certainly an attractive option, especially for those living closer to the border. This chapter aims at documenting the effect of drug-related violence on Mexican immigration to the United States, as well as characterizing the violence-led immigrants.

The first issue that arises is whether the war on drugs caused an increase on violence in Mexico. Dell (2011) presents rigorous econometric evidence that those municipalities in which the National Action Party (the same as that in the federal government) won close elections are more likely to experience an increase in drug-related homicides. She establishes that those municipalities are more likely to ask for federal or military forces to combat drug lords. This crackdown in turn debilitates the “incumbent drug lord” and generates incentives for rival cartels to fight for the turf. As a result, homicides between members of rival drug cartels increase. She thus concludes that the war on drugs spearheaded by President Calderón and the National Action Party has indeed led to an upsurge in drug-related murder rates.

Previous literature has shown that violence caused by civil conflicts forces people to migrate to safer locations. This review of the literature will focus on Latin American case studies. Morrison (1993) studied whether violence from politically motivated conflicts is a determinant of migration in addition to economic factors

in neoclassical economic models of migration. He found that between 1976 and 1981, violence has a positive effect on Guatemalan migration, and moreover that escalating violence increases the magnitude of this effect: the more violence there is, the greater is the effect of violence on migration. Morrison and May (1993) also find a link between migration and political violence in Guatemala. Lundquist and Massey (2005) find a strong relation between Nicaraguan out migration to the United States and the Contra war. Alvarado and Massey (2010) study the relationship of violence and migration from the perspective of world systems theory, and linking economic openness to a rise in criminality. Using data from 1979 to 2003, they find a positive effect of violence on migration only in Nicaragua, but not in Mexico, Costa Rica and Guatemala. Finally, Wood *et al.* (2010) find evidence that crime victimization in Latin America induces people to seriously think about moving to the United States.

The Colombian case is particularly interesting since it shares many characteristics with the Mexican experience, despite having its origins in political opposition. There is evidence that crime and violence forced Colombians to migrate to safer locations within Colombia (Engel and Ibáñez 2007; Ibáñez and Vélez 2008; Lozano-Gracia *et al.* 2010). On their part, Rodríguez and Villa (2012) find evidence that the risk of kidnapping induces households to send some of their members to an international destination. They also find that wealthier households are at greater risk of becoming kidnap victims.

Therefore it is not surprising that Mexicans exposed to drug-related violence are fleeing away from the conflict zones and that they are finding in the United States a safe haven. This phenomenon has been publicized in the American news media: the U.S. cities in the southern border have seen a relative increase of middle-class Mexican migration. These new migrants have established new businesses in the United States (Becker 2009; Campoy 2009; Garza 2009; Sheridan 2011), and are therefore different from the archetypical Mexican migrants.

To my knowledge there is no research documenting this forced migration all across the U.S.-Mexico border. This chapter attempts to fill this gap in the literature. The objective of the chapter is twofold. First, it will provide evidence of the changes in demographics along the U.S.-Mexican border. Using data from Mexican administrative records of death certificates and the American Community Survey (ACS) from 2000 to 2010 I will document how the upsurge in violence, as measured by homicide rates, led to an increase of immigrants in the southern border states of the United States.

The border region will be the focus to this study because the war on drugs has affected more than proportionately the northern states in Mexico, particularly the border cities. Another reason to focus in the border region is that migration into the border cities in the United States is facilitated by the fact that Mexicans holding a Border Crossing Card can cross the border and travel up to 25 miles

into the United States –and 75 miles into Arizona– without the need of an I-94. This variation in the traveling limits will allow me to compare changes in the Mexican migrants’ characteristics between cities close to Mexico to those cities which are apparently “off limits”.

The chapter will also document if there are changes in the openings of businesses in the counties along the U.S. border using data from self-employment in the ACS and data from the County Business Patterns. The working hypothesis in this case is that Mexican migrants transfer their businesses to the United States or that they simply open businesses in the U.S. to make a living.

Using both a descriptive analysis and econometric estimations, we find that the upsurge in violence in Mexico did produce an increase in college-educated immigrants to the states in the southern U.S. border, and there is evidence of a correlation with business openings in the United States; hence, the immigrants’ investments were not limited to the southern border states. These findings suggest that drug-related violence in Mexico did produce a change in the type of immigrants from Mexico to the United States. The results imply that the violence spurred by the drug war has increased the cost of living in Mexico relative to the cost of migrating to the United States, so that many more Mexicans have been induced to migrate. These findings have very important implications for Mexico and the United States. The fact that college-educated immigrants, who are willing

to invest in businesses, are fleeing the country entails a loss of both human and physical capital. According to growth theories (Mankiw, Romer and Weil 1992; Roemer 1990; Solow 1956), these two types of investments are the main inputs for economic development. Hence, if the strategy against drug trafficking continues through this violent path, Mexico's economic growth will be eventually hampered.

Despite the fact that the United States is the largest market of the drugs distributed by Mexico's drug cartels, efforts to eradicate drug trafficking from Mexico are the result of the mounting American pressure on Mexican authorities (Chabat 2002 and 2010). Prior to President Calderon's period, cooperation between Mexico and the United States had been marked by distrust due to the rampant corruption among Mexican officials (Astorga and Shirk 2010; Chabat 2010). However, in the 2008 Department of Justice National Drug Threat Assessment, the U.S. government recognized that "Mexican drug trafficking organizations represent the greatest organized crime threat to the United States."<sup>2</sup> In 2008 a great advance on security cooperation was made when Presidents George W. Bush and Felipe Calderón Hinojosa signed the Merida Initiative, which authorized a transfer of 1.4 billion dollars to Mexico mostly in military equipment and technology, and to a second degree for the strengthening of Mexico's law enforcement institutions

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<sup>2</sup> Cited by O'Neil (2010), p. 3.



(Chabat 2010; O’Neil 2010). President Barack Obama supported the Merida Initiative, but he emphasized the need to address economic and social ills in the fight against drug trafficking and violence.<sup>3</sup> Despite these efforts, security cooperation between Mexico and the United States is still lacking. Demand of drugs in the U.S., arms trafficking and money laundering are still an issue that has remained relatively abandoned in security issues (O’Neil 2010). Those issues are crucial if the intentions to weaken the drug cartels and to address security concerns in both countries are serious.

The rest of the chapter is organized as follows. Section 2 describes the data sources used in the analysis as well as the construction of some key variables. Section 3 documents the upsurge in homicides in Mexico, as well as the changing dynamics of migration to the United States along the southern border. Section 4 presents the econometric analysis. Finally, Section 5 discusses the results and concludes.

## **2. Data**

In both the descriptive and econometric analysis we use data from many different sources. We use the causes of death in death certificates to tally the homicides in

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<sup>3</sup> Obama’s approach focuses on four pillars: “disrupting the ability of organized crime to operate, strengthening institutions to sustain the rule of law and human rights, building a 21<sup>st</sup> century border, and fostering strong and resilient communities” (Olson and Wilson 2010; O’Neil 2010). The ideas behind the first two pillars were already present in the Merida Initiative.

Mexico. Those administrative records have information on the exact date of death; municipality and state of residence of the deceased; cause of death described using the 10<sup>th</sup> version of the International Classification of Diseases;<sup>4</sup> age, gender and other socio-demographic characteristics. Given the topic of interest we only took into account those deaths of people 15 or more years of age. We also estimated homicides for two age groups of interest: those between 15 and 24 years old, and those between 25 and 44 years old.

The homicides rates were estimated as the number of homicides in a municipality over 100,000 inhabitants in the group of interest of that municipality. The population tallies were estimated using the 2000 and 2010 Mexican Censuses of Population, and the 2005 Population Count. The population for the years between surveys was extrapolated using a constant population growth rate.

Given that our main interest relies on the drug-related violence close to the border, the homicide rates were geo-referenced.<sup>5</sup> The geographical data was obtained from Mexico's National Statistics Institute (INEGI for its Spanish acronym).<sup>6</sup> In order to estimate the degree of exposure of US counties to Mexican

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<sup>4</sup> In particular, homicides are classified using the X85 to Y09 codes, which described assault inflicted with different objects, substances or actions.

<sup>5</sup> I would like to thank Gabriel Parada for his help georeferencing the data and estimating the distance to the border.

<sup>6</sup> "Catálogo de claves de entidades federativas, municipios y localidades - consulta y descarga", INEGI, <http://www.inegi.org.mx/geo/contenidos/geoestadistica/catalogoclaves.aspx>.

migrants fleeing from violence, we constructed a weighted homicide rate, where the weights were given by the square root of the distance between US counties and Mexican municipalities. The geographical coordinates of US counties were obtained from the Census Bureau.<sup>7</sup> We assumed that those counties farther than 500 kilometers from a Mexican municipality were not exposed to this kind of Mexican migration.

The characterization of immigrants in the United States was done using the 2000 Census of Population and the 2005 to 2010 American Community Surveys.<sup>8</sup> These surveys have information on socio-demographic characteristics, work behavior and job characteristics, country of birth, year of immigration, and much more. The descriptive analysis will use recent migrants; that is, those who have been in the United States during the last 5 years or less. The econometric analysis will focus on immigrants who arrived in the last year. That way we will be better enabled to relate immigration to violence in the last year.

Finally, the data on businesses comes from the County Business Patterns series compiled by the Census Bureau.<sup>9</sup> These series have data on the number of business establishments in US counties since 1986. The dataset has information

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<sup>7</sup> <http://www.census.gov/tiger/tms/gazetteer/county2k.txt>.

<sup>8</sup> “Integrated Public Use Microdata Series, census microdata for social and economic research”, IPUMS USA, <http://usa.ipums.org/usa/>.

<sup>9</sup> “County Business Patterns (CBP), ZIP Code Business Patterns (ZBP)”, United States Census Bureau, <http://www.census.gov/econ/cbp/index.html>.

on the industry of the establishment, total number of establishments, and number of establishments by employment-size classes. Unfortunately, the data does not specify whether the business belongs to an immigrant.

### **3. Violence and Changes in Mexican Immigration**

We will first document the rise in homicide rates in Mexico. Figure 1 presents the trends in homicide rates since 2000. Each of the panels in the figure compares homicide rates according to how close they are to the border. Panel A compares the municipalities in the northern-border states (denoted with a 1) with those in non-border states (denoted by 0). It is easily verifiable that there has been a marked increase in the homicide rates all over Mexico since 2008, but particularly in the northern-border states: by 2010 the mean homicide rates in the northern states was about 37 homicides per 100,000 people, whereas in the rest of the country it was around 21 homicides per 100,000 people.

**[INSERT FIGURE 1 HERE]**

Panel B, C and D in Figure 1 look more closely at the homicide rates in municipalities near the border. The trend observed in Panel A is mostly dominated by the violence exerted in municipalities closer to the border. Panel B compares municipalities in a radius of 150 miles from the border, Panel C in a radius of 75 miles, and Panel D in a radius of 25 miles. As we get closer to the

border the homicide rates show an increasing pattern since 2008. For instance, Panel D shows that municipalities within 25 miles from the border have a homicide rate of around 125 homicides per 100,000 people, while the rest of the municipalities in Mexico exhibit a homicide rate of less than 25. That is, the mean homicide rate in “border municipalities” is more than 5 times higher than the mean homicide rate in the rest of the country in 2010. Moreover, the mean homicide rate in these “border municipalities” has seen a tenfold increase since 2000.

Given these figures, it is not surprising that Mexicans are fleeing away from the border area. According to Mexico’s Census of Population figures, in 2000 only about 9.5 percent of Mexicans migrating within the country came from border states: Baja California, Sonora, Chihuahua, Coahuila, Nuevo León and Tamaulipas. By 2010, almost 24 percent of Mexico’s internal mobility was originated in the border states. Unfortunately, the census does not allow us to identify households that migrated to the United States. In order to characterize those immigrants, we will first present descriptive statistics of Mexican immigrants in the United States using data from the 2000 US Census of Population, and the 2005 and 2010 American Community Surveys.

Table 1 presents descriptive statistics of recent Mexican immigrants in the United States. Here recent immigrants are defined as those who migrated less than 5

years prior to the survey. The first trend that stands out is that Mexican migrants are older in 2000 than they were in 2010. Mexicans in the southern border states (California, Arizona, New Mexico and Texas) have a different age structure than those in the rest of the U.S.: they tend to be underage or between 36 and 64 with a higher proportion. We also find that a higher proportion of immigrants are females over time. Surprisingly, and contrary to the anecdotal evidence telling that wealthy *families* are the ones fleeing violence, over time less migrants were married in 2010 than in 2005, and the border exhibits only a slightly higher proportion of married immigrants.

**[INSERT TABLE 1 HERE]**

One of the recurring arguments in the media is not only that wealthy families are migrating, but that they are establishing businesses or otherwise investing in the United States. In order to find evidence of that, Table 1 also presents the proportion of self-employed immigrants. This proportion has increased since 2000, and it has always been higher in the border states. However the proportion increased by more in non-border states than in border states suggesting that businessmen are in fact establishing their economic activities away from the border and not in the border cities as the media suggests.

Another way to find evidence of a wealthier-than-average immigrant is to look at the educational structure. The last three rows in Table 1 present the proportion of

immigrants with secondary schooling, completed high school and whether they attended college or more. The statistics present evidence that immigrants are now better educated than in 2000, but also that there was a large influx of college educated immigrants in the border states. So at least in the border, we do find some evidence of a changing face of Mexican immigrants.

Table 2 presents the same descriptive statistics for Mexicans living in the southern border states by distance to the border. We find that the population of Mexican migrants in those areas is getting older, but more so the closer they live to the border. A larger percentage of migrants are female as we move towards the border. These figures are strikingly different to those found in non-border states: the percentage of female migrants in counties within 25 miles from the border is larger than 50 percent in 2010, whereas it is only around 40 percent in non-border states that same year. The percentage of self-employed increased more in those counties within 75 miles from the border, but the increase is still lower than that observed in non-border states. Finally, we find evidence that Mexican immigrants living closer to the border are much better educated suggesting that wealthier-than-average Mexicans did migrate close to the border after 2005.

**[INSERT TABLE 2 HERE]**

Table 3 estimates the growth rates in the number of business establishments and compares southern border states with the rest of the country. According to those

figures, the growth rate of business establishments has indeed been larger in border-states than the rest of the United States. The growth rate of businesses in the border has been more than 50 percentage points higher, despite the effects of the Global Recession of 2008. The businesses that exhibit the largest growth rates are those which employ between 10 and 19 workers, then those who employ between 20 to 49 people, and finally those who employ between 5 to 9 workers. So the businesses that are growing the most are not the smallest employment-size category.

**[INSERT TABLE 3 HERE]**

Finally, Table 4 compares the growth rates of number of establishments of counties which are closer to the border. According the table, the growth rate of the total number of establishments is the largest in the counties within 75 miles from the border. However, the establishments which employ between 20 and 49 workers grew more in the counties within 25 miles from the border. We conclude that the number of establishments in the border states in general, and those closer to the border in particular, grew more than in the rest of the country, even during the years of the Global Recession of 2008.

**[INSERT TABLE 4 HERE]**

#### **4. Econometric Analysis**



In order to strengthen the findings of the previous section, we estimated the following regression:

$$Y_{jt} = \alpha + \beta Homicide_{jt} + \gamma Urate_{jt} + \delta_j + \mu_t + \varepsilon_{jt}, \quad (1)$$

where  $Y_{jt}$  is the logarithm of the outcome of interest in county  $j$  and year  $t$ ;  $Homicide$  is the logarithm of homicide rate weighted by distance to Mexican municipalities within 150 miles from the border;  $Urate$  is the logarithm of the unemployment rate;  $\delta_j$  are county fixed effects which control for county characteristics that are time-invariant; and  $\mu_t$  are year fixed effects which control for the overall health of the U.S. economy. At this point it is worthwhile to remember that the weighted homicide rates are measuring the exposure to immigrants fleeing from violence. The working hypothesis in this chapter is that immigrants tended to flee to places relatively close to the border, given that this type of migration is “facilitated” by Border Crossing Cards and Mexicans still have easy access to Mexico. The outcomes of interest will be the number of Mexicans who migrated in the year prior to the survey, and the number of business establishments. These outcomes will also be restricted to either migrants’ characteristics or the employment size of the establishment.

Table 5 presents the estimates of equation (1) using the log of the number of Mexican immigrants. Our estimates suggest that the homicide rates caused an increase in the total Mexican immigrants in the United States. We find that a one

percent increase in the weighted homicide rates is correlated with an increase of 0.57 percent of Mexican immigrants. Contrary to what we expected, homicide rates are negatively related to immigration of self-employed Mexicans: a one percent increase in the weighted homicide rates is correlated with a decrease of 0.39 percent of self-employed Mexican immigrants. We do not find any significant effect of murder rates on immigration of Mexicans categorized by educational levels. The effect of county unemployment rates is negative as expected; that is, the higher the county unemployment rate, the lower is the influx of Mexican migrants into that county.

**[INSERT TABLE 5 HERE]**

The results found above could be a consequence of spurious correlation between immigration and murder rates. We rule out this possibility by estimating equation (1) using the weighted death rates from internal causes (diseases) as an explanatory variable instead of weighted homicide rates. The results of this estimation are shown in Column (1) of Table 6. As expected, death rates from internal causes are unrelated to Mexican immigrants in the United States.

The results found in Table 5 could also be a result of some counties having better economic conditions than others (where these conditions are somehow correlated to murder rates in Mexico and unmeasured by unemployment rates), and thus attracting immigrants from Mexico, Americans, and immigrants from other

countries. Columns (2) and (3) tackle this possibility. We do find a positive correlation between American immigrants and homicide rates in Mexico. Notwithstanding, we do not find any effect of homicide rates in Mexico to immigration from other countries. Finally, we estimate whether the murder rates by age groups of the victims have a differential effect on immigration. We do not find such a differential effect, though both of the coefficients in Columns (4) and (5) are smaller in magnitude than the effect of total murder rates.

**[INSERT TABLE 6 HERE]**

Table 7 presents the results of murder rates in Mexico on the number of business establishments in the United States. The results indicate that violence in Mexico has a small, but positive and significant, effect on business establishments: a one percent increase in weighted murder rates in Mexico leads to a 0.01 percent increase in the number of business establishments in the United States. We find a positive effect for establishments employing up to 19 workers. However, the results do not hold when we include internal death rates instead of homicide death rates (Table 8). There should be an omitted variable that is correlated to both the murder rates in Mexico and immigration in the United States, so those results should be taken with caution.

**[INSERT TABLE 7 HERE]**

**[INSERT TABLE 8 HERE]**

Since our working hypothesis establishes that immigrants mostly fled just across the border, we also estimated the following equation:

$$Y_{jt} = \alpha + \beta Homicide_{jt} + \pi Homicide_{jt} \times BorderSt_j + \gamma Urate_{jt} + \delta_j + \mu_t + \varepsilon_{jt}, \quad (2)$$

where all variables are defined as it was previously explained, and *BorderSt<sub>j</sub>* is an indicator variable that the county is in a southern-border state. The parameter  $\pi$  will identify the difference of the effect of homicides on border states. Given our working hypothesis, we would expect that  $\pi > 0$ ; hence, border states receive more immigrants and open more establishments as a consequence of violence in Mexico.

**[INSERT TABLE 9 HERE]**

Table 9 presents the estimates of equation (2). As expected, the coefficient on the interaction term is positive (except for immigrants with high-school education in Column (4), where it is negative, though not statistically significant). In Column (1) we find that an increase of one percent of the weighted homicide rate in Mexico produces an increase of 0.72 percent on the total immigration of Mexicans to the southern-border of the United States. What is more interesting, however, is the effect of violence on college-educated immigrants: one percent of the weighted homicide rate in Mexico produces an increase of 2.03 percent on the

immigration of college-educated Mexicans in the southern-border states. This last finding is consistent with the hypothesis that wealthier-than-average Mexicans are the ones fleeing violence in Mexico. We do not find a positive effect on the number of immigrants with high school, but we find a positive effect on secondary-educated immigrants.

**[INSERT TABLE 10 HERE]**

Table 10 presents the robustness checks for the estimation of equation (2). We do not find any evidence that the source of our results is merely spurious correlation. The results in Table 10 are more encouraging in the sense that we do not find an effect on the immigration of Americans any more. However, we now find a positive effect on immigration from non-Mexican foreigners all over the United States, with no particular effect on the southern-border states. The relative importance of murder rates by age groups continues to be smaller in magnitude than the effect of total murder rates in Mexico.

**[INSERT TABLE 11 HERE]**

Finally, Table 11 shows the estimation of model (2) using the logarithm of number of business establishments as a dependent variable. We find that homicide rates have smaller effect on businesses in border states than in the rest of the United States. These findings suggest that business openings are not exclusive of border states as the descriptive evidence suggest, but a general trend in the United

States. However, we need to have caution with these results. The robustness check using death rate from internal causes is more encouraging (not shown), but it still does not allow us to rule out the presence of omitted variable bias in these estimations.

## **5. Discussion and Concluding Remarks**

Since President Felipe Calderón took office in 2006, Mexico has been waging a war against drug cartels. The war on drugs has been found to lead to an increase in murder rates. We find that there was tenfold increase in murder rates all across the municipalities within 25 miles of the border between 2006 and 2010. This upsurge in violence has understandably become a powerful reason to flee those unsafe areas in search of a peaceful life. The American media has presented anecdotal evidence of the violence-led diaspora. According to the accounts, Mexicans who had fled the war are wealthier than the prototypical Mexican immigrant. The new immigrants are opening businesses to make a living, or even making huge investments in order to apply for an E-2 visa.

Using both a descriptive and an econometric analysis, this chapter documents how violence in the border caused a spur in immigration to the United States, and particularly to the southern-border states. According to our estimates, the Mexican immigration caused by violence is better educated than the economic Mexican migrants. We do not find however robust causal evidence on business openings or

self-employed Mexican immigrants. Our evidence points to a positive correlation between murder rates in Mexico and the number of establishments all over the United States (not exclusively on the southern border).

These results have very important implications for both Mexico and the United States. First, we found college-educated people are fleeing away from violence in Mexico. This type of immigration amounts to a loss of human capital in Mexico, which is still relatively scarce as compared to developed nations. Second, we found that homicide rates are correlated with a boom of businesses and all over the United States. To Mexico, this result means that investment is flying away from Mexico and into the United States. All in all, Mexico is losing both human and physical capital due to the upsurge in violence generated by the war on drugs. According to growth theories in economics, these losses will eventually hamper economic growth in Mexico. Mexico's loss is however the United States' gain.

Mexico is thus facing a large toll in human losses due to violence and migration. There have been great advances in U.S.-Mexico security cooperation through the Merida Initiative and its current emphasis on community economic and social development. However, Mexico and the U.S. still have three important issues pending in their security agenda: U.S. drug demand, arms trafficking and the transnational movement of drug money. These issues need to be addressed if the war against drugs is indeed a serious effort.

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