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Executive Summary

Measuring the level of security of our borders with respect to threats such as illegal migration and drug smuggling has been a long-standing and contentious challenge. Historic measures such as the apprehension of illegal migrants and seizures of drugs do not answer the key question of whether more or less illegal entry is occurring, nor do they inform the subsequent assessment of the effectiveness of law enforcement efforts designed to prevent this illegal entry. DHS has committed to providing the Congress and the public better measures of the level of border security that is being achieved. This report presents new measures that focus on key outcomes and the results of law enforcement efforts targeted at securing US borders.

The strategic outcome that DHS is tasked with achieving on the southern border is well-defined in its governing documents: prevent illegal entry. Although illegal entry levels are affected by a variety of factors such as economic conditions, DHS law enforcement activity directed towards border security is undertaken to prevent successful illegal entry. This is the key outcome performance measure for assessing border security.

DHS affects this outcome in many ways, including working with source and transit countries, dismantling transnational criminal organizations, and enforcing immigration laws in the interior of the United States. But at the line of the border, there are two key law enforcement activities that affect the level of successful illegal entry. First, DHS apprehends illegal migrants and seizes illegal drugs. Second, DHS, working with partner agencies, imposes consequences on those apprehended that raise the cost of breaking the law. The subsequent probability of apprehension and impact of consequences determine the cost of engaging in illegal activity and are thus two key strategic output measures that affect the level of successful illegal entry.

Estimating the successful illegal entry of migrants and drugs is challenging because these actions are not directly observed or captured in any government administrative records. To meet its performance measure challenge, DHS must estimate unobserved events. Fortunately, improvements in both data and estimation methodologies have now made it possible to produce reliable estimates. This report provides these estimates for migrants and cocaine.

Although this report is focused on several key measures related to illegal entry of migrants and drugs, it does not provide a comprehensive assessment of the state of the southern border with respect to all threats (e.g., gun and currency trafficking are excluded). For migrants, the report provides estimates of the historic and current level of

annual successful illegal entry for the southern land border between the ports of entry (POEs), at the POEs, and in the maritime domain. For each of these domains, it also provides estimates of the probability of apprehension and the deterrence rate, which is the rate at which those caught attempting illegal entry decide to abandon future illegal entry attempts rather than try again. For cocaine, estimates of successful illegal entry are less mature, and a range of potential successful illegal entry amounts is provided along with associated seizure rates.

The figure below summarizes estimates related to illegal migration in a potential BorderStat display modeled on the New York Police Department's CompStat program.

Fiscal Year 2015 — **BorderStat** — Southern Border and Approaches (SB&A)

State of Border Security	Prior Years					Current Year		
	2005	2007	2009	2011	2013	2014	2015	% Change
Illegal Migration (number of migrants)								
Estimated Inflow of Successful Illegal Entries								
at Ports of Entry	230,000	150,000	93,000	51,000	36,000	46,000	28,000	-39%
between Ports of Entry	1,700,000	1,100,000	510,000	340,000	360,000	210,000	170,000	-19%
in Maritime Domain			8,100	3,100	650	1,100	840	-24%
Total	1,900,000	1,300,000	620,000	400,000	400,000	260,000	200,000	-23%
Requests for Asylum	27,000	21,000	17,000	22,000	63,000	170,000	140,000	-18%

Fiscal Year 2015 — Southern Border and Approaches (SB&A)

Law Enforcement Activity	Prior Years					Current Year		
	2005	2007	2009	2011	2013	2014	2015	% Change
At Ports								
Illegal Migrants								
Number of Refused Entries	71,000	62,000	57,000	41,000	26,000	19,000	18,000	-5%
Estimated Apprehension Rate	24%	29%	38%	45%	42%	29%	39%	34%
Consequences - Estimated Deterrence Rate	27%	21%	26%	42%	55%	58%	67%	16%
Between Ports								
Illegal Migrants								
Number of Apprehensions	950,000	720,000	420,000	240,000	280,000	260,000	200,000	-23%
Estimated Apprehension Rate	36%	40%	45%	41%	44%	55%	54%	-2%
Consequences - Estimated Deterrence Rate	11%	12%	23%	38%	51%	58%	58%	0%
Maritime								
Illegal Migrants								
Number of Apprehensions			2,700	1,600	1,400	2,400	1,300	-46%
Estimated Apprehension Rate			25%	34%	68%	68%	61%	-10%

Potential BorderStat Display

Some initial results that can be seen in the display are that the successful illegal entry of migrants has significantly declined over the last ten years, the deterrence rate of

illegal migration at the border has risen substantially, and the probability of apprehension has also risen. The display also reveals that the challenges on the border are constantly evolving, as evidenced by the recent large increase in asylum seeking, and that DHS will need to effectively respond and adapt to emerging new challenges and threats. Note that the maritime estimates start in 2008 when more complete biometric data became available.

It is important to note that although the estimates presented in this report are empirically rigorous and represent the best estimates of these measures produced to date, they are not perfect. New research and data collection efforts will improve both the quality of these estimates and our understanding of the complex dynamics at play with respect to illegal entry on US borders.

The data and analyses in this report are focused on presenting estimates of strategic outcome and output performance measures for the border. A separate Technical Annex provides detailed technical information on the methodologies employed to develop the estimates. This report does not provide data or discussion on how DHS operates on the border, tactical and operational enforcement priorities, or the specific methods employed on the ground. These topics are discussed in detail in other DHS publications. The focus here is on estimation of strategic outcomes and outputs and is only a first step in beginning this process.

Contents

1.   Introduction

A. Background

Measuring the security of the United States (US) borders with respect to threats such as illegal migration and drug smuggling has been a long-standing challenge. Historically, the US government has reported two primary measures—the number of migrant apprehensions in the vicinity of the border, and the quantity of drug seizures. While both measure important outputs of border enforcement, they are inadequate for assessing performance in improving the level of control at the nation's borders. A strategic goal of the Department of Homeland Security (DHS), as spelled out in the Quadrennial Homeland Security Review (QHSR), the DHS Strategic Plan, and subordinate documents, is to "Secure and Manage Our Borders." The first goal identified by the 2014 QHSR within this mission area is to "Secure U.S. Air, Land, and Sea Borders and Approaches" by preventing illegal import and entry of goods and people. The traditional measures of border security, focusing only on arrests and seizures, do not in themselves address the question of whether DHS has become more effective in carrying out this mission.

Over the past two decades, in addition to the significant increase in resources devoted to border enforcement, DHS has made a series of efforts to respond to the challenge of better measuring the level of border security. The first US border control strategy, developed in 1994, called for "prevention through deterrence." It stated: "Although a 100 percent apprehension rate is an unrealistic goal, we believe we can achieve a rate of apprehensions sufficiently high to raise the risk of apprehension to the point that many will consider it futile to continue to attempt illegal entry." Measuring progress towards that goal of prevention through deterrence has been an ongoing challenge, however. To date, for example, neither DHS nor its predecessor agencies have officially reported on the rate of apprehensions at the border, nor has DHS been able to fully assess the deterrent effects of more effective border enforcement.

From 2005 to 2009, the Department reported what became known as the *operational control* measure for assessing progress on border security. A border mile was considered to be under operational control if US border enforcement had "the ability to detect, respond to, and interdict border penetrations in areas deemed as high priority for threat potential or other national security objectives." Operational control was deemed to be achieved in a border zone if the zone was classified as "managed" or "controlled." This measure ceased to be reported in 2009, in part because it failed to offer any

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quantitative measurement of the key challenges of reducing illegal entry, raising apprehension rates, and bolstering deterrence. DHS pursued an alternative set of measures, the border conditions index (BCI), which was under development in 2011–2012 The BCI aggregated together three sub-indices on control between ports of entry (POEs), conditions at POEs, and socioeconomic conditions in the border region, each of which in turn aggregated specific indicators related to those areas. The BCI was not ultimately adopted by the Department, however, and suffered from many of the same problems as the operational control measure—most importantly, it did not measure illegal entry, apprehension rates, or deterrence.

Neither of these initiatives produced quantitative assessments of the level of security along the southern border. And unfortunately, the absence of outcome performance measures helped to create an information vacuum about basic facts along the border. The Congress has repeatedly called for DHS to improve the quality of its border security measures—most recently in the proposed Secure Our Border First Act of 2015, which includes prescriptive measurement language.

When DHS retired the operational control measure, it committed to the Congress and the public that it would develop new measures of border security, and it has been moving forward to fulfill that commitment. Most recently, the US Border Patrol (USBP) has introduced a new performance measure known as the Interdiction Effectiveness Rate (IER), which marked a step forward towards a more quantitative approach. The IER is based on counts of illegal entry attempts made through border surveillance and individual agent observations. It records the number of apprehensions, the number of "turnbacks" (those who attempt to enter across the border but then go back), and the number of "gotaways" observed to enter the United States successfully despite interdiction efforts. USBP has also worked to improve its measures of deterrence as part of its Consequence Delivery System, an effort to disrupt the smuggling cycle and dissuade illegal re-entry attempts. Each USBP sector, for example, is now tracking and reporting the rate at which illegal entrants are caught more than once, as well as the average number of apprehensions per identified recidivist.

While the IER and other measures are an improvement over previous performance measures, they are unable to account for illegal entries that are not directly observed by US border agents, either through remote surveillance or direct observation. In other words, if an illegal border crosser enters successfully without being observed in any way by USBP, that crosser does not appear in the IER assessment of effectiveness. In order to take the next step towards a more complete picture of the state of border security, estimates need to be made as well of those unobserved entries of unauthorized individuals or smuggled goods. This report provides the first step towards that more complete assessment.

B.   An Outcome-Focused Border Security Performance Framework

Law enforcement agencies have been pioneers in the use of outcome-focused measurement, in using these data to support strategies to achieve goals and outcomes, and in reporting those outcomes to the public. Although important work preceded it, the New York City Police Department (NYPD)'s CompStat program is the first and most frequently cited example of a comprehensive, outcome-based performance management framework in modern law enforcement. CompStat, which began in 1994, uses real-time data collection and analysis of crime incidents to inform strategic, tactical, and resource allocation decisions and to ensure accountability at multiple levels of a complex government entity. Following successful implementation in New York, the CompStat model has spread to police departments across the country as well as to a host of local, state, and federal government non-police functions.

The key element of CompStat is its focus on outcomes (crime rates). In discussing CompStat after his service as mayor of New York City, Rudolph Giuliani stated that the shift in focus from outputs (arrests) to outcomes (crime reduction) had a major impact on the NYPD and helped it to focus on its core mission of crime reduction. Giuliani noted that, while the department had historically been focused on the total number of arrests, making arrests is "not the ultimate goal of police departments or what the public really wants from a police department. What the public wants from a police department is less crime." [1]

The same holds true for control of a nation's borders. The expectation from border enforcement is not more arrests of violators, but a reduction in violations—less illegal entry, and less smuggling. Yet the current measures of border enforcement success are the equivalent of counting arrests (outputs) rather than reduced illegal entry (outcomes).

The development of a performance management framework for border security should begin by clearly defining the strategic outcomes that are to be achieved. For DHS, these strategic outcomes are summarized in Figure 1. Performance measures can then be developed that measure progress towards achieving those outcomes. [2]

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[1] Rudolph Giuliani, "Restoring Accountability to City Government" in *The Business of Government*, ed. Ian Littman (Washington, DC: IBM Center for The Business of Government, 2000), 4–5.

[2] Performance management in government agencies and in large, complex mission areas of the government has been an area of intense focus for many years. A literature has developed evaluating the performance management experiences of government organizations and identifying best practices and general approaches to developing a performance measurement framework. Appendix A provides a summary of this literature.
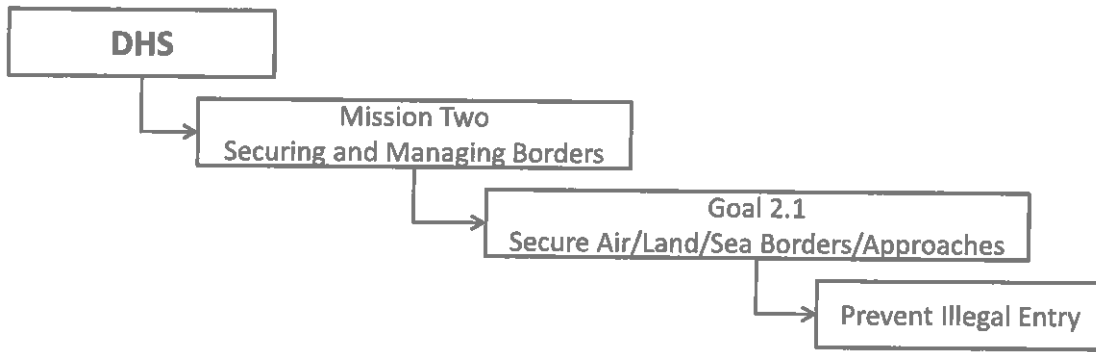
Figure 1. DHS Strategic Goal 2.1 in Context

The strategic goal for border control is to prevent illegal entry of people and goods. An effective performance management system requires a measurement of the rate at which illegal entries are taking place in order to then judge whether outcomes are improving. Illegal entry across US borders is a violation of US law and is thus a criminal act. The US government has long measured the rate of criminal acts taking place inside the country through a system that is widely accepted and applied consistently across states and cities.[3] However, it is more challenging to measure illegal border entries because of the nature of the violations involved. An illegal border entry does not directly victimize someone who then reports the crime to an enforcement authority, and a system for measurement of border security cannot be based on reporting of crimes by those who were victimized. Those entering illegally are also actively trying to evade observation, and while some successful illegal entries are detected by border enforcement agents, others are not. A critical challenge to implementing an outcome-focused approach to border security performance management is that the strategic outcomes of concern are not directly observed and must be empirically estimated.

This report, relying on analytical techniques that have been developed and refined by social scientists and border security experts over the past several decades, demonstrates the feasibility of an outcome-focused approach that mirrors what domestic law enforcement has achieved through CompStat and similar approaches. It presents preliminary estimates of the key measures of border enforcement success and shows how these measures can be derived and verified. These key measures include the total level of illegal entry, the probability of apprehension for those attempting to enter, and the effect of law enforcement in deterring illegal entry. This report provides estimates for each of

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[3] In order to track crimes that are reported to law enforcement authorities, including violent and property crimes, the Federal Bureau of Investigations (FBI) established the Uniform Crime Reporting program eight decades ago. The FBI has gone to great lengths to ensure that all law enforcement agencies use the same definitions of crimes and the same methodologies for recording them. Although challenges remain, detailed and consistent time series of data on reported crimes is available for towns, cities, counties and states across the country.

these three measures and demonstrates how they have changed over time in both the land and maritime domains. It also presents data on the growing number of asylum seekers entering across the southern land border—a new enforcement challenge. Finally, it presents preliminary estimates of the successful illegal entry and seizure rates of cocaine entering the United States (across the southern border).

To estimate these numbers, this report relies on DHS databases of border apprehension records, supplemented by direct observations from USBP agents, detection of illegal entries through surveillance, and surveys of the unauthorized migrants themselves. Using this variety of data, it is possible to establish credible, verifiable estimates of such key measures as total inflow and the probability of apprehension. Although the estimates can potentially be improved, the development of these methodologies demonstrates the feasibility of moving to outcome-focused border security performance measurement. While such estimates have more complicated methodologies than simple counting of border apprehensions or drug seizures, they are more valuable in assessing the effectiveness of border enforcement, and in tracking progress over time. The development of such estimates and their reporting to the public is far from unusual—indeed, it is a common occurrence within the government. Many (if not most) of the flagship US economic performance measures, for example, are estimates based on a variety of data sources. Such critical and widely cited economic indicators as gross domestic product (GDP), the consumer price index, and the unemployment rate are survey-based estimates known to be subject to systematic error and requiring periodic revision and each of these estimates has improved over time as both data collection and analytical techniques improve. The same will be true for border enforcement measures, which will also be refined and improved over time.

This report includes both current and historical estimates for the following:

- Illegal entries by individuals between the POEs on the southern land border.
- Illegal entries by individuals at the POEs on the southern land border.
- Illegal entries by individuals in the maritime domain.
- Illegal entry of cocaine into the United States.

2.   Illegal Entries between Ports of Entry (POEs)

As explained in Chapter 1, the key outcome that DHS is tasked to influence with respect to border security is the level of successful illegal entry. This chapter presents estimates of successful illegal entry, the probability of apprehension, and the degree to which those apprehended are deterred from making additional illegal entry attempts across the southwest land border between the POEs. After presentation and description of the estimates, a brief overview of the methodology used to produce them is provided, followed by a more detailed discussion of the estimates and their implications.[4]

A.   Estimates for Performance Measures between Ports of Entry

Figure 2 shows the estimated number of successful illegal entries of migrants that occurred annually from fiscal year (FY) 2000 to 2015. The estimated level of illegal entry falls from almost two million entries in 2000 to around 200,000 in 2015, about a 90 percent decline.[5]

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[4] The detailed Technical Annex to this report (forthcoming) will provide a complete presentation of the methodology.

[5] These estimates of illegal entry are not consistent with the perceptions of a large majority of Americans. A Pew Research Center poll conducted in June 2013 found that the percent of Americans who believed that the number of illegal immigrants had increased or stayed the same from 2003 to 2013 were 55 percent and 27 percent, respectively. A July 2015 Pew Research Center poll found that 69 percent and 5 percent of Americans believed that the number of illegal immigrants had increased or stayed the same, respectively, "over the past few years."
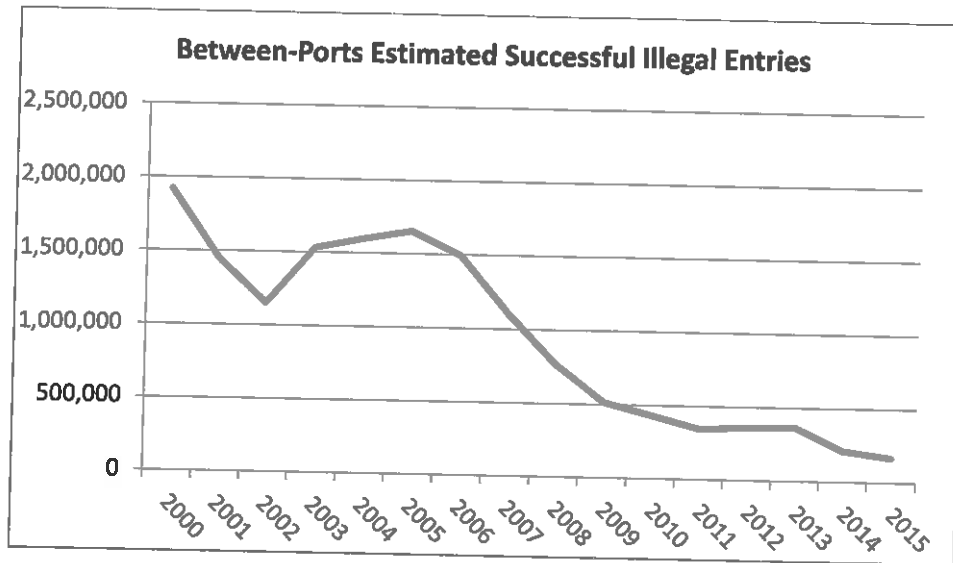
Figure 2. Successful Illegal Entries between Ports of Entry

The number of illegal entries is the primary outcome that DHS is tasked with influencing, and it is a positive result that the estimates show such a substantial decline. It is important to note, however, that this outcome is influenced by many factors, including US border enforcement investments and activities, US economic conditions that affect job opportunities for unauthorized migrants, economic conditions in Mexico and Central America, demographic trends in source countries, smuggling networks and the cost that migrants are charged by smugglers, the security conditions in source countries and transit routes for illegal migrants, and the availability of legal alternatives for immigrating to the US. Figure 2 presents only an estimate of the outcome, not an estimate of the degree to which the change is caused by each of these factors.[6]

The two primary ways DHS influences successful illegal entry at the border is through apprehending the illegal migrants and then exposing them to consequences, both of which make attempting illegal entry more costly for the migrant. Figure 3 presents the estimated probability of apprehension for the average migrant while crossing the southwest land border between the POEs by fiscal year from 2005 to 2015. The probability of apprehension is estimated to have been around 40 percent through the decade of the 2000s, but to have risen to the mid-50 percent range by 2015.

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[6] This is analogous to the dramatic fall in the rate of violent and property crime in the United States over the past two decades. The reasons for this decline have been extensively analyzed and debated. However, uncertainty over why crime rates have changed and the degree to which police enforcement has contributed to these changes have not been obstacles to the measurement of crime rates.
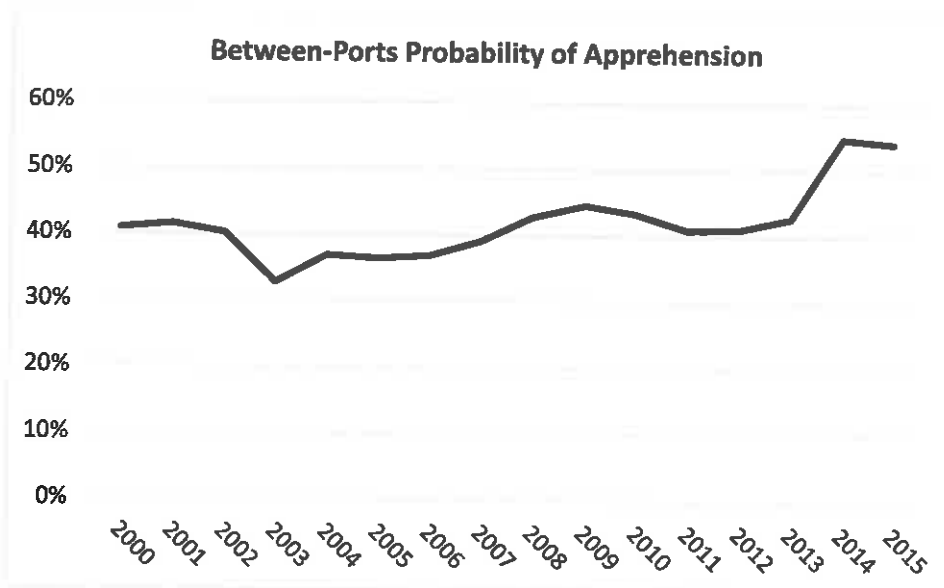
Figure 3. Probability of Apprehension between Ports of Entry

The probability of apprehension has become a major focus in the call for improved border security, and it is a key strategic measure that DHS should be estimating and tracking on a regular basis. One of the puzzles in assessing the effectiveness of border enforcement is why, given the steep fall in total illegal entry over the past fifteen years, the rise in probability of apprehension has not been proportional. There are several important things to note about this measure. First, the probability of apprehension is an output measure and not the outcome of interest. Successful illegal entry is the key outcome that DHS enforcement activities are undertaken to influence, and measuring the probability of apprehension is a means to that end.

Second, the probability of apprehension is only one way that enforcement affects the level of illegal entry. Increased enforcement intensity increases the overall cost of illegally crossing the border, but that increased cost is reflected in several variables, not just the probability of apprehension. The smuggling organizations that transport migrants across the border are an adaptive adversary, and they respond to increased enforcement in order to keep the probability of apprehension from rising, which negatively affects their business. For example, these organizations hire additional guides and decoys, invest more in surveillance, and adopt new technologies to support their smuggling activities. Although these activities have slowed the increase in the probability of apprehension, they raise smuggling cost because the smuggling organizations must increase their fees to pay for these adaptive responses. Higher smuggling cost makes attempting illegal entry more costly. Figure 4 presents estimates of smuggling costs along the southern border derived from four different surveys of migrants and shows that the estimates of these smuggling costs has basically tripled from 2005 to 2015. Evaluation of the effectiveness

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of border enforcement needs to take into account all of the variables enforcement affects that influence decisions to attempt illegal entry into the United States, including smuggling cost.[7]
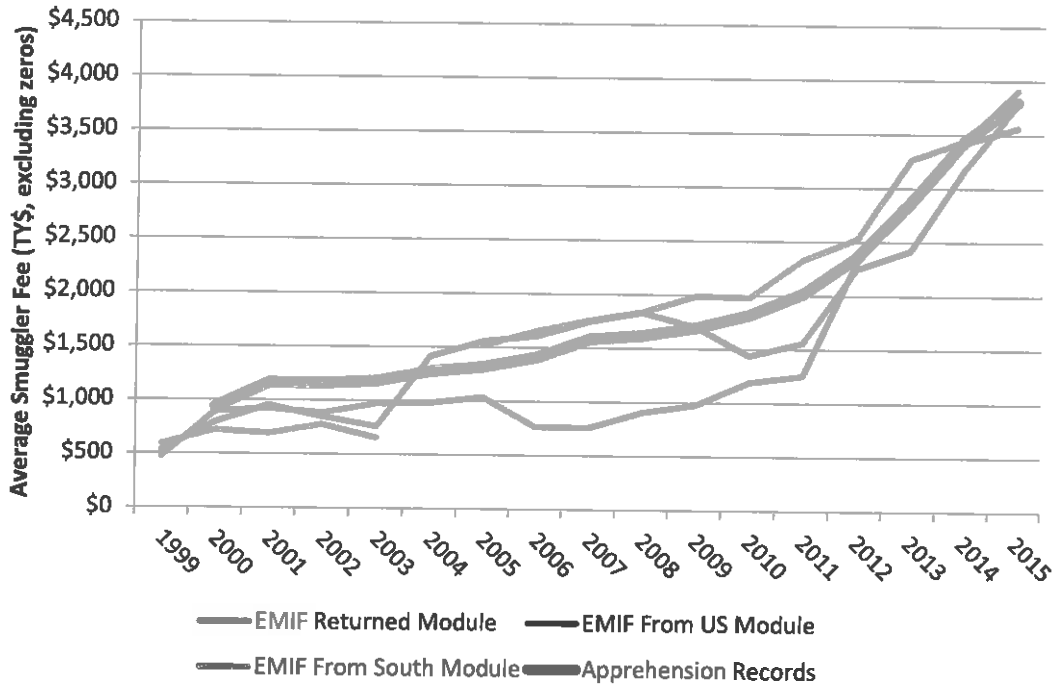
Sources: The Encuesta sobre Migración en las Frontera de México (EMIF) estimates are from three different modules of that survey (described in more detail in section B.2) and the fourth estimate is from interviews of apprehended migrants that are recorded in DHS apprehension records.

Figure 4. Estimated Smuggling Costs

Third, the probability of apprehension can be broken out into two essential elements: the probability that a migrant is detected and, given that he or she was detected, the probability that the migrant is apprehended (the "conditional" probability of apprehension). DHS has the ability to estimate the latter probability in recent years using its "known-flow" data, and this is discussed in more detail in section 2.C. The probability of apprehension estimates provided in Figure 3 reflect the probability that USBP both detects and subsequently apprehends illegal entrants. For example, if USBP detected about 80 percent of illegal entry attempts, and then apprehended about 70 percent of those that were detected, the probability of apprehension would be 56 percent (roughly

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[7] It should also be noted that the rise in smuggling cost suggested by Figure 4 may understate the true rise in expense that an illegal entrant expects to pay. In earlier years, a typical contract made with a smuggler would provide for as many illegal entry attempts as necessary to succeed. However, as illegal entry has become more difficult and costly, the number of attempts provided for in the typical contract may have fallen significantly, thus boosting even further the cost of attempting illegal entry.

what is reported in Figure 3). This illustrates the challenge USBP has in increasing the probability of apprehension—both detection and conditional probability of apprehension must be very high to get a high value.

The other primary way that DHS influences successful illegal entry at the border is through the consequences to which the illegal migrant is exposed if apprehended. Historically, most Mexican nationals caught crossing the southern border were simply returned back across the border, with no penalties imposed. The vast majority of those likely continued to try until they were successful. Since the late 2000s, the US government has been imposing steeper penalties on illegal crossers—including jail times under Operation Streamline, expedited removal, removal to the interior of Mexico, and harsher criminal sanctions for smugglers. The purpose of these consequences is to break the cycle of illegal entry followed by multiple re-entry attempts. The impact of consequences is reflected in whether an apprehended migrant decides to attempt illegal entry again after being returned to their home country, and this can be expressed as a deterrence rate. The deterrence rate that is estimated and presented here is the probability that a Mexican-national migrant who is apprehended, exposed to consequences, and returned to Mexico will leave the border region for home as opposed to remaining in the border region and making another attempt at illegal entry.[8] Figure 5 presents this estimated deterrence rate for the average Mexican illegal migrant by fiscal year from 2000 to 2015.[9]

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[8] In academic research, this is called "at-the-border" deterrence. This is in contrast to "behind-the-border" deterrence, which represents decisions of potential migrants to not even make a trip to the border region to attempt illegal entry in the first place. DHS is currently conducting research to estimate the impact of enforcement actions (and the buildup of enforcement) on behind-the-border deterrence.

[9] Almost all non-Mexican nationals who are caught attempting illegal entry and who do not make an asylum claim are detained and removed to their home country. This significantly complicates estimating the deterrence rate for this group. Separate estimates can be created for them, but these are less useful for analyzing border security and border enforcement investments because of the high costs of repeated trips for these other than Mexicans and the homogeneity of their consequences.
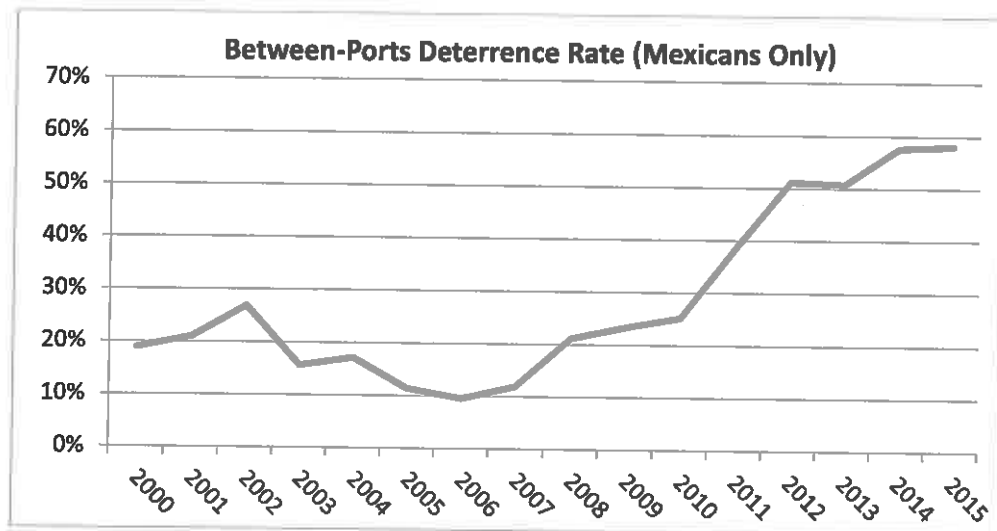
Figure 5. Deterrence Rate of Apprehended Mexican Migrants

Figure 5 shows that the estimated deterrence rate has increased significantly. In the early 2000s, between 10 and 20 percent of returned migrants went home after being caught, while the remaining 80 to 90 percent made subsequent illegal entry attempts on that particular trip to the border region. It is now estimated that over 50 percent of returned migrants return home, and less than half remain in the border region to make further attempts on that trip.

This is a dramatic change and may be one of the most underappreciated aspects of how enforcement has influenced border security outcomes. This change coincides with an escalation of the consequences to which Mexican-national migrants are exposed when apprehended. The degree to which this consequence escalation can explain the rise in deterrence is discussed in more detail below.

B.   Estimation Methodology

Creating estimates of strategic level outcomes and outputs related to border security requires estimating unobserved events. Although this is a challenging task, researchers have developed methodologies to make these estimates over several decades, and the estimates presented here are based on a methodology that was selected after comprehensive review and evaluation of all available methodologies.[10] This section briefly reviews the selected methodology used to create the estimates presented above.[11]

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[10]   See John Whitley, *Five Methods for Measuring Unobserved Events* (Washington, DC: IBM Center for The Business of Government, 2012), for a detailed discussion of analytic challenges.

[11]   A separate Technical Annex to this report provides more detail on available methodologies, the methodology used here, and the implementation of the methodology.

1. The Repeated Trials Model

In order to make an illegal entry into the United States, a border crosser makes an initial trip from their home to the border region. After arriving at the border, they carry out an initial attempt to enter illegally. The entrant faces a chance of being caught by border enforcement authorities, which is termed the *probability of apprehension*. If the first attempt is successful, no apprehension is made. If the first attempt is not successful, an apprehension is recorded and the person is potentially subjected to consequences for attempting to enter the United States unlawfully. This could include detention, criminal prosecution, or restrictions on the possibility of legally entering the United States in the future. The person is then returned to their home country, where they then choose whether or not to make another attempt. For Mexican nationals, the return point is usually in the border region near where they made their initial attempt. Non-Mexican nationals are usually detained in the United States and then flown to their home country. If a Mexican national does not try again and leaves the border region to return home, they are considered to have been "deterred at the border." If they do make another attempt, they again face a probability of apprehension, and if apprehended and returned, may give up after this second attempt. If a person is never deterred at the border, it is assumed that this process of repeated trials will continue until the person has successfully entered. [12]

This process is known as the repeated trials model (RTM), and it has been the core approach to modeling the process of illegal entry into the United States across land borders. [13] Figure 6 illustrates the logic of the RTM as a method to estimate the probability of apprehension and total number of illegal entries. The figure assumes that the true probability of apprehension is 50 percent, so that there is a fifty-fifty chance that anyone attempting an illegal entry is detected and caught by USBP. If 100 people come to the border and attempt entry, 50 of them are caught, as indicated by the cylinder on the left side of the figure. These people are processed, consequences are delivered, and they

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[12] This paragraph is adapted from Appendix B of Bipartisan Policy Center, *Measuring the Metrics: Grading the Government on Immigration Enforcement*, Staff Report, Immigration Task Force, February 2015.

[13] A simplified version of the RTM was first applied to illegal border crossing by Thomas Espenshade for the period 1977–1988, who relied on estimates by USBP agents of the proportion of people whom they caught who were recognized as "repeaters" who had recently been caught in the same area (see Thomas Espenshade, "Undocumented Migration to the United States: Evidence from a Repeated Trials Model," in *Undocumented Migration to the United States: IRCA and the Experience of the 1980s*, ed. Frank D. Bean, Barry Edmonston, and Jeffrey S. Passel (Washington, DC: The Urban Institute Press, 1990), 159–181). He estimated that the probability of apprehension during 1977–1988 ranged between 25 and 40 percent, with an average value of 32 percent. Joseph Chang extended Espenshade's model to include deterrence and used USBP apprehension records for 2001–2005 to estimate the probability of apprehension and the number of illegal entries (Joseph Chang, "CBP Apprehensions at the Border" (Arlington, VA: Homeland Security Studies and Analysis Institute, 2006) (not yet publicly disseminated)). His estimates of the probability of apprehension for this period ranged between 30 and 40 percent, but he did not have deterrence estimates available and had to assume values for it.

are returned to their home country. Some of them will be deterred from another attempt (i.e., they will give up and go home), and some of them will try again. If 20 of them try again, 10 of them will be caught, as the probability of apprehension is 50 percent. The probability of apprehension can be calculated as the ratio of recidivist apprehensions, which in this case equals 10, to the number that attempted again, which in this case equals 20. This example shows how important it is to take into account the deterrence rate. If it was assumed that this rate equals zero, the 30 people who returned home would have been mis-identified, and it would have been assumed that all 50 people tried again. This would have produced an estimate of the probability of apprehension of 10/50, which equals 20 percent and is much less than the true probability of apprehension in this example of 50 percent. Once the probability of apprehension is known, it is possible to calculate the total number of successful illegal entries, which in this case equals 10.[14]

In order to implement the RTM, it is necessary to develop estimates of the number of recidivist apprehensions and the deterrence rate. The number of recidivist apprehensions can be calculated because of the way that USBP processes the people it catches. Starting in 2000, USBP has taken the fingerprints of every adult aged 18 and over who is apprehended and included a fingerprint identification number in their apprehension records that identifies unique individuals. This identifier can be used to identify recidivist apprehensions.

Although biometric data makes possible the identification of recidivists, it is also important to identify a subpopulation of border crossers who best fit the characteristics of the RTM approach. Crossers who are engaged in smuggling activity and return to Mexico quickly (whether or not they are caught), crossers who are not returned relatively quickly after apprehension (e.g., unaccompanied children who's court cases may take several years), and other crossers who are not in the pool of repeat crossers after apprehensions should not be included in the population used to implement the RTM, because their crossing behavior is driven by different calculations than those focused on in the model. Chapter 5 describes asylum seekers and unaccompanied children in more detail. Both of these groups are removed from the population of those who are apprehended for the purposes of RTM calculations.

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[14] Figure 6 is a simplified version of the model that is presented only to explain its basic logic. The full model takes into account that people may attempt and be caught multiple times. The Technical Annex to this report (forthcoming) presents the full model and its mathematics.
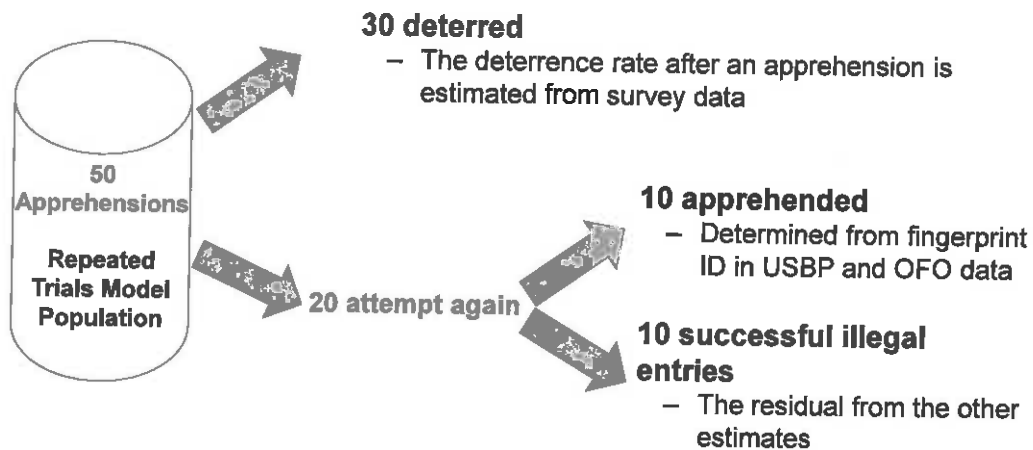
30 deterred
– The deterrence rate after an apprehension is estimated from survey data

50 Apprehensions

Repeated Trials Model Population

20 attempt again

10 apprehended
– Determined from fingerprint ID in USBP and OFO data

10 successful illegal entries
– The residual from the other estimates

Figure 6. Breakout of Returned Migrants

2.   Survey Estimation of Deterrence

In addition to identifying recidivist apprehensions of a population appropriate to the RTM, it is necessary to estimate the rate of at-the-border deterrence, which is the rate at which Mexican nationals who were caught by USBP decide to return home after being returned to Mexico. The RTM relies on this estimate of deterrence to estimate illegal entries and the probability of apprehension. One way to derive an estimate of the deterrence rate is from a migrant survey administered in Mexico.

The Encuesta sobre Migración en las Frontera de México (EMIF) Survey is a survey of migrants traveling to or returning from the United States that is administered by a Mexican research institute at transit points in Mexico and has been carried out since 1994.[15] The survey comprises several modules, in which each surveys a different population of migrants either en route to or returning from the United States. Estimates of the deterrence rate are based upon data from EMIF's "Returned" module, which questions migrants who were apprehended and returned to the border region of Mexico by US immigration authorities.[16] These interviews are conducted at sites on the Mexican side of the border where migrants re-enter Mexico after being released from US law

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[15] The EMIF survey is conducted by El Colegio de la Frontera Norte (COLEF). For detailed discussions of the EMIF survey in English, see Michael S. Rendall, Emma Aguila, and Ricardo Basurto-Davila, "Evaluation of Migration Between Mexico and the U.S. Estimated From a Border Survey: The 1993-2003 EMIF," Working Paper, May 7, 2009; Alicia Carriquiry and Malay Majmundar, eds., *Options for Estimating Illegal Entries at the U.S.-Mexico Border* (Washington, DC: National Academies Press, 2013); and Peter Brownell and Michael Rendall, "Previous Migration Experience and Legal Immigration Status Among Intending Mexican Migrants to the United States," University of Michigan Retirement Research Center Working Paper WP 2014-304, 2014. The EMIF survey website can be accessed at http://www.colef.mx/emif/.

[16] This includes USBP, Customs and Border Protection Office of Field Operations (CBP OFO), and Immigration and Customs Enforcement (ICE).

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enforcement custody. EMIF seeks a sample that most closely represents actual flows of migrants through relevant transit zones. Available analysis on EMIF's sample of migrants suggests that it is unlikely to contain large sampling bias.[17]

The "Returned" module asks a series of questions concerning the migrant's demographic background, historical work and migration experience, current migration trip, and future migration plans. An estimate of deterrence is developed from answers to questions on a migrant's stated intentions about whether they will remain in the border region and attempt to cross into the United States in the near future, or return home. The set of questions that the EMIF survey has asked about intention to cross again have been stable during 2000–2015.[18] In order to develop a deterrence rate from the EMIF sample that most closely matches the set of apprehended crossers used to implement the RTM, statistical models were estimated that relate deterrence to observable characteristics of migrants in the EMIF sample. These models were then used to project deterrence for the set of apprehended crossers used in the RTM. The resulting deterrence rate for this population is what is displayed in Figure 5 (page 12).[19]

3. Validation of Deterrence Estimates

The use of a survey-based estimate of deterrence is very powerful in improving DHS's understanding of migrant behavior and border security performance outcomes. It also raises questions such as "How reliable is survey-based information on intentions to engage in unlawful activity?" and "How much of the estimated change in deterrence is attributable to US government law enforcement activity versus other factors, such as victimization of the migrants by cartels while attempting illegal entry?". Because of the importance of these questions, IDA has engaged in additional analyses to begin addressing questions like these. Although there are several reasons to believe that the deterrence rate as measured by the EMIF survey is not subject to any systematic biases and is likely to capture both the trend in and level of the deterrence rate, validation of this estimate is clearly an important task.[20]

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[17] See the Technical Annex for a more detailed discussion of EMIF sample properties.

[18] Several assumptions and adjustments must be made to translate responses to EMIF questions into an estimate of at-the-border deterrence. These are described in detail in the Technical Annex.

[19] These models are described in detail in the Technical Annex.

[20] The key questions for assessing the quality of the survey in this regard is whether a significant number of migrants lie when responding to questions relating to deterrence, and whether any rate of lying has increased over time. There are several reasons to believe that neither concern is material. First, the large majority of respondents prior to 2010 reported that they intended to attempt illegal entry again (80–90 percent), suggesting that any rate of lying in that period was limited. Second, the survey has been conducted since the mid-1990s by a professional research organization that adheres to best practices on implementing surveys and uses a variety of techniques to make the survey non-threatening. The organization interviews migrants after they have been returned to Mexico and are no longer in the

Alternative estimates of deterrence between the POEs can be derived using only statistical analysis of apprehension records. These results represent preliminary attempts to answer the first of the questions raised above and to validate the EMIF-based deterrence estimates. The validation approach is based on identifying the impact of various CBP consequence programs on migrant re-apprehension rates, i.e., whether a returned migrant is subsequently re-apprehended on another illegal entry attempt. A model is estimated that relates the re-apprehension rate for a group of migrants that received the same consequence to the consequence received. The model is then used to simulate what the re-apprehension rates would have been in the absence of consequences and compare that to the current level of re-apprehension to determine the reduction in re-apprehensions attributable to CBP consequences. A brief overview of the rise of CBP consequence programs is presented here along with the results of the validation analysis.[21]

a. The Decline of the Voluntary Return

Until recently, the majority of Mexicans apprehended at the border were subject to no significant consequences for attempting illegal entry and were allowed to "voluntarily return" (VR) to Mexico, thus avoiding potential penalties associated with formal removal proceedings. Unsurprisingly, the lack of penalty did little to deter the migrants from making subsequent entry attempts—in fact, it was not uncommon for returned migrants to be apprehended again within hours of being returned to Mexico. While VR remains a CBP administrative consequence to be used at the discretion of agents, its use has dropped dramatically. In 2005, CBP introduced a new Consequence Delivery System (CDS) that permits Border Patrol agents to impose a range of administrative, programmatic, and criminal consequences in order to deter the migrant from subsequent illegal activity.

Figure 7 illustrates the steep decline in the use of VR between FY 2000 and FY 2015.[22] The share of the population receiving VRs fell from just below 100 percent in the early 2000s to under 5 percent in 2015. This drop began in 2005 with the

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presence of US law enforcement, reducing any incentives that migrants might have to lie. Third, there are no breaks or trends in answers to other survey questions that are also presumably sensitive, including whether a smuggler was used, the smuggling cost paid, and the number of times that a migrant was apprehended by US immigration enforcement in the past. If migrants began to systematically lie about their future crossing intentions, presumably they would begin to systematically lie when answering these questions as well.

[21] See Appendix B for a more detailed discussion of the validation exercise. A full discussion of the methodology is provided in a separate Technical Annex.

[22] Figure 7 displays the share of apprehensions receiving a VR in the RTM population. Apprehensions who received a VR as an administrative consequence but also received a criminal or Alien Transfer Exit Program (ATEP) consequence are excluded from Figure 7.

implementation of administrative consequences (Expedited Removals (ERs) and Reinstatement of Removals (RRs)), and accelerated sharply after the expansion of programmatic and criminal consequences in 2009.
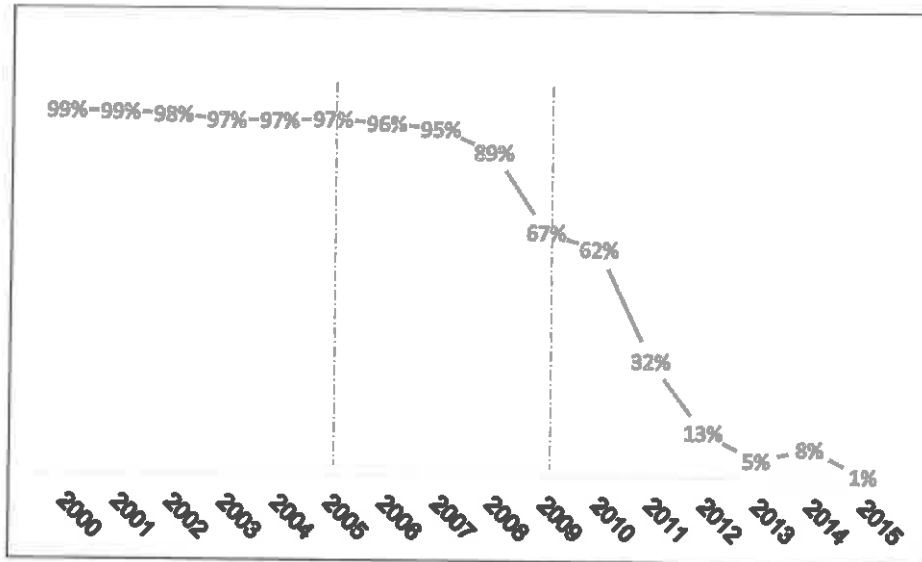

Figure 7. The Declining Use of Voluntary Returns

b. Validation Results

In order to evaluate the relationship between consequences and the re-apprehension rate, IDA estimated a statistical model in which re-apprehension is determined by a number of variables, including consequences. The estimates obtained from the model measure the impact on re-apprehension of changing the application rate of various consequence programs. Most consequences are found to have a negative and statistically significant impact on re-apprehension.[23] To estimate deterrence generated by CBP consequence programs, the model is used to predict the level of re-apprehensions (1) when consequences are applied at their actual levels, and (2) in the absence of consequences (under a VR-only consequence regime). Simulation results must then be corrected so that the simulated re-apprehension rate corresponds to an actual recidivism rate (driven by consequences), and the actual recidivism rate driven by consequences must be adjusted so that it is comparable to the EMIF survey-derived estimate of deterrence, which accounts for total deterrence from both law enforcement administered consequences and the other factors that generate deterrence during a migrant's initial

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[23] The stand-alone Technical Annex contains details on the construction of the re-apprehension measure and presents the actual parameter estimates. Here we focus on how the model can be used to generate estimates of the overall level of deterrence generated by consequences.

border-crossing attempt—harsh environmental conditions, lack of food and water, and exposure to various crimes and violence also create deterrence.

Simulation results are presented in Table 1. The first row shows predicted annual re-apprehension under a VR-only consequence regime (PR_{VR}). The following row shows predicted annual re-apprehension at the actual level of consequence application (PR_{AC}). Subtracting the second line from the first yields the reduction in re-apprehensions attributable to consequences (shown in row 3). Estimates indicate that the reduction in re-apprehensions attributable to CBP consequence was low at first but grew over time—with the largest increases occurring between 2010 and 2012. This is consistent with the deterrence trends estimated from the EMIF data and is not surprising, given that the administrative apprehension records data show the level of consequence application was low at first and grew over time.

Table 1. Predicted Re-apprehension and Reduction in Re-apprehension Due to Consequences

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
PR_{VR}	34%	35%	36%	36%	40%	38%	39%	41%	44%	44%	42%
PR_{AC}	34%	34%	35%	34%	35%	34%	28%	25%	25%	26%	22%
Reduction: PR_{VR}-PR_{AC}	0%	1%	1%	2%	4%	5%	10%	16%	19%	19%	20%

To change this impact on re-apprehension rate to an actual recidivism rate, the simulated change must be adjusted for the probability of apprehension. To illustrate this, the predicted reduction in re-apprehension due to consequences is divided by several assumed time-constant values of the probability of apprehension, P. Results are shown in Table 2.

Table 2. Predicted Deterrence Due to Consequences

Levels of P	Fiscal Years										
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
P(App)=.4	1%	1%	2%	4%	10%	12%	26%	41%	48%	47%	49%
P(App)=.5	1%	1%	2%	3%	8%	10%	21%	33%	39%	37%	40%
P(App)=.6	1%	1%	1%	3%	7%	8%	17%	27%	32%	31%	33%

These deterrence estimates only include deterrence due to consequence programs, while the EMIF deterrence rates include both deterrence generated from consequences and deterrence generated from other factors. To translate these consequence program-

driven deterrence estimates to total deterrence, we measure the difference between the two estimates in the VR-only period and adjust the estimates in Table 2 by this amount.[24] Figure 8 plots the results of this validation exercise. The black line is the EMIF-based series, while the blue, orange, and gray lines show apprehension record-based estimates for various assumed levels of the probability of apprehension. All series show similar trends in the growth of deterrence, and the levels of survey-based estimates are consistent with the levels of the apprehension record-based estimates.
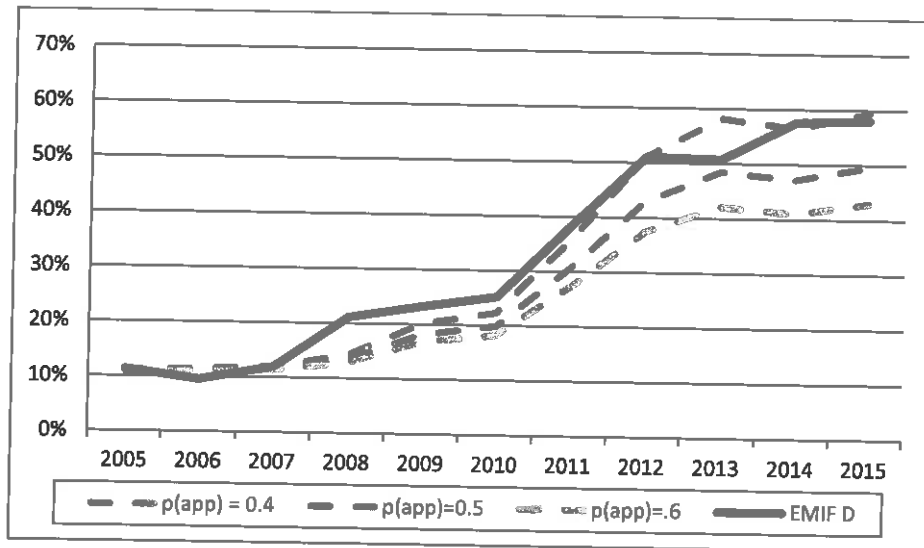

Figure 8. Comparison of EMIF and Apprehension Record Deterrence Series, FY 2005–2015

4. Estimates Related to Non-Mexican Nationals

The strategy taken in this study to estimate total illegal entries is to estimate the probability of apprehension by implementing the RTM for Mexican nationals only, and to then use estimated values of the probability of apprehension in conjunction with apprehensions of Mexican nationals and non-Mexican nationals to estimate total illegal entries of Mexican nationals and non-Mexican nationals, respectively. The core assumption of this approach is that the probability of apprehension is, on average, the same for both Mexican and non-Mexican nationals. This assumption will be valid if, for example, both groups are hiring the same or similar smuggling operations.[25] Developing further evidence to refine and mature this approach is a priority for future research.

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[24] This normalization is done for comparison purposes. The 11 percent value is obtained by subtracting the estimated deterrence due to consequences from the EMIF total deterrence rate in 2005.

[25] An adjustment is made to the probability of apprehension used to calculate non-Mexican illegal entries to account for the fact that illegal entry of non-Mexican nationals is more concentrated on the eastern

C. Discussion of Results

The primary purpose of this project was to develop estimates of these key measures. Important future work includes analyzing the key measures to determine their causes (e.g., the role of economic conditions versus enforcement investments in causing the change in successful illegal entries), projecting them into the future under various assumptions and scenarios, and identifying optimal investments for DHS to best deal with border challenges. Although these questions are beyond the scope of the work reported in this paper, IDA was able to develop some observations about these estimates and their uses. This section discusses how these measures relate to some key existing measures, the importance of separately identifying specific populations of migrants that are making illegal entry attempts, how the measures can be implemented in a performance management framework, and some of the most important next steps for improving the measures and future analyses.

1. Relationship with Other Public Performance Measures

Although there is no other current estimation and reporting of the outcome and output measures reported in this chapter, there are other performance measures publicly reported by DHS and other organizations that relate to these measures. Two important ones are the IER reported by DHS and the unauthorized immigrant population estimates reported by both DHS and the Pew Hispanic Center.

a. Probability of Apprehension and the Interdiction Effectiveness Rate (IER)

DHS currently reports several border security measures that are based on "known-flow" data. The most important of these measures is the IER, which is the ratio of the sum of apprehensions and "turnbacks" to the sum of apprehensions, "turnbacks," and "gotaways." Turnbacks are events in which someone who has been observed by USBP to illegally enter the United States turns around and goes back into Mexico. Gotaways are USBP estimates of successful illegal entries that are based on a variety of visual evidence. "Known-flow" data thus encompass all events related to illegal border entry for which USBP has some evidence indicating that it occurred.[26]

The apprehension rate presented in Figure 3 (on page 9) takes into account these known events, but also includes an estimate of the unknown events, i.e., the migrants who evade detection while making an illegal entry attempt and thus do not appear in the

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end of the border than entry of Mexican nationals. However, the estimates still rely on the assumption that the probability of apprehension for the two groups is the same in a given geographic location.

[26] Although known-flow data have been collected since at least the 1990s, USBP has made standardization of how these data are collected a priority since 2012. The quality of known-flow data thus may be higher after 2012 than in previous years.

"known-flow" data. There are three additional differences between the IER and the probability of apprehension reported in Figure 3. First, the IER includes turnbacks in the same way that it includes apprehensions (they are added together). Turnbacks are a valuable law enforcement result, but they are not apprehensions. Their value comes from the fact that they provide USBP another opportunity to apprehend the individual if/when they try again. The probability of apprehension includes this effect (getting another opportunity to apprehend), but does not imply an equivalence of a turnback with an apprehension as done by the IER. Second, the IER includes migrants who claim asylum to USBP (unaccompanied children, family units, and adults claiming credible fear). Apprehensions of asylum seekers are excluded from the RTM population that is used to calculate the probability of apprehension. Third, the IER includes interior apprehensions, and these are also excluded from the RTM population used to calculate the probability of apprehension. All four of these factors make the probability of apprehension lower than the IER. Table 3 provides a crosswalk from the probability of apprehension to the IER that adds in asylum-seeking and interior apprehensions (column P_1), then adds turnbacks (column P_2), and finally removes "unobserved gotaways," or successful illegal entries that USBP did not record as gotaways.

Table 3. Probability of Apprehension and the IER

Year	PA: Probability of Apprehension	P1: PA Plus Asylum Seeker and Interior Apprehensions	P2: P1 Plus Turnbacks	IER: P2 Minus Unobserved Gotaways
2006	37%	42%	48%	69%
2007	39%	44%	50%	70%
2008	43%	48%	54%	73%
2009	45%	51%	58%	76%
2010	44%	51%	58%	79%
2011	41%	49%	57%	84%
2012	41%	50%	57%	82%
2013	43%	53%	61%	77%
2014	55%	70%	75%	80%
2015	54%	67%	72%	81%

b. Estimated Illegal Entries and the Unauthorized Resident Immigrant Population

One of the most widely known measures related to illegal immigration is the estimate of unauthorized immigrants resident in the United States, which is available

starting in 1980 and is estimated by both the Pew Hispanic Center and DHS. This is the estimate of the stock of unauthorized resident immigrants. The number of illegal entries that is estimated in this report is only one component of the overall inflow of unauthorized immigrants. Of the other components of this inflow, the most important is those entering illegally by overstaying a legal visa. Although these inflows increase the size of the unauthorized immigrant population every year, there is also significant outflow of unauthorized immigrants every year, as people leave voluntarily or involuntarily. The net change in the unauthorized immigrant population is overall inflow minus overall outflow. It must also be emphasized that the number of illegal entries reported here includes both people coming to the United States for at least one year, in which case they are considered to be *residents*, and people coming for less than a year, in which case they are considered to be *visitors*. The estimates of the unauthorized immigrant population use data sources that capture only residents in the United States. The illegal entries estimated in this report are thus greater than the illegal entries across the southwest border by people intending to be residents.

2. Separately Identifying Populations of Migrants

As discussed in the methodology section (and in more detail in the Technical Annex), to create the estimate of successful illegal entry, IDA had to divide the population of apprehended migrants into categories according to their behavior and characteristics. In addition to being necessary for the methodology, this is also very helpful for gaining greater insight into what is happening on the border. Although there are many categorizations that can be applied and that provide further insight into border activity, IDA found three high-level categories to be a valuable starting point. These categories are:

- **Traditional Mexicans**: The historically typical Mexican migrants trying to enter the country for economic and other reasons. They are adults, do not have attached children with them, and do not claim credible fear or enter an asylum process.

- **Traditional Other-than-Mexicans (OTMs)**: OTMs who are similar to the traditional Mexicans (adults without children who do not claim credible fear).

- **Asylum Seekers**: Emerging trend of migrants who use asylum/visa processes, e.g., unaccompanied children, family units, Cubans, and migrants who claim credible fear to USBP.

IDA estimated successful illegal entries for traditional Mexicans and OTMs (see Figure 2 on page 8). IDA did not create an estimate for asylum seekers—this category is discussed in more detail in Chapter 5. Because of this difference, a direct comparison of successful illegal entries cannot be made across the three populations, but Figure 9

provides a comparison using apprehensions for the asylum seekers. Given the inconsistency in what is being estimated (illegal entry for some and apprehensions for asylum seekers), this is not meant to be an analytically rigorous comparison, but is instead provided for illustrative purposes to begin characterizing relative magnitudes of these border populations.
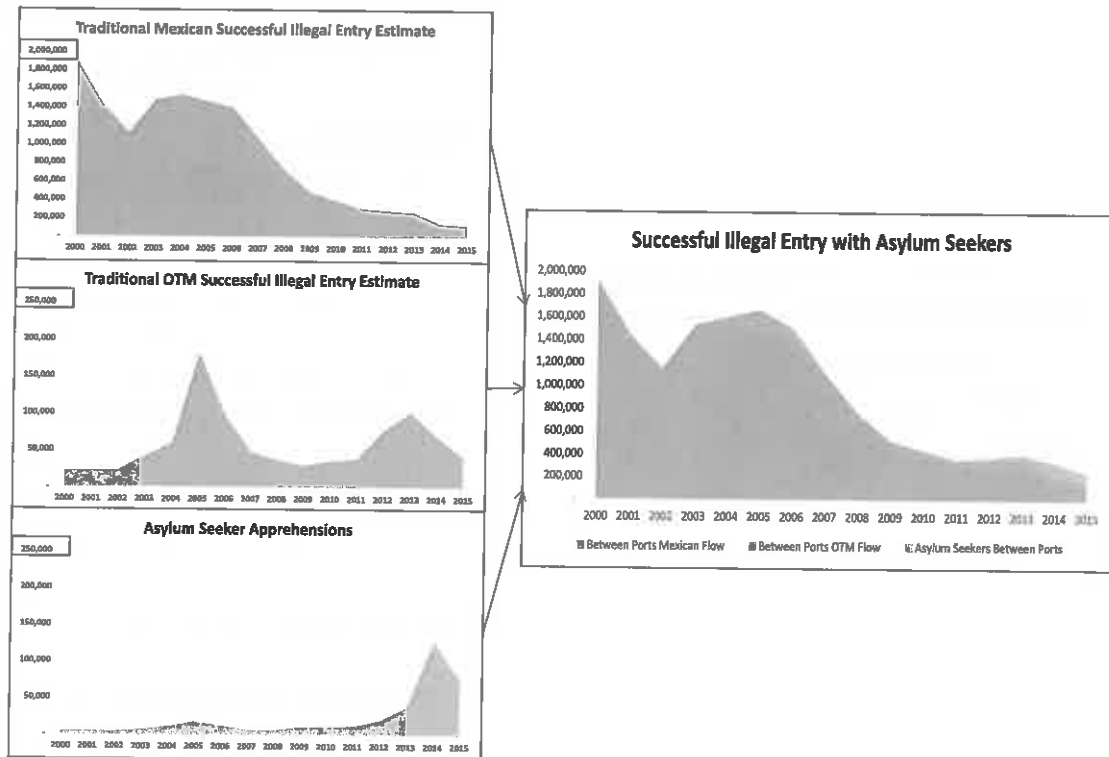

Figure 9. Key Populations of Migrants Crossing Border

3. Performance Management Framework

Appendix A defines a performance management framework as being composed of strategic goals; outcome performance measures that quantify achievement of these goals; strategies for achieving these outcomes and logic models that explain the organizational relationships of resources, activities, programs, strategies, and goals; and a hierarchical set of output, input, process, and efficiency measures that support the range of decision making that occurs at the different levels of the organization. The analysis in this report has begun to develop this framework for illegal immigration enforcement on the southern border and approaches.

Figure 1, on page 4, illustrates the strategic goal and Figure 9 illustrates the outcome measures quantifying achievement of the goal. The major strategies employed by DHS include dismantling of networks, border enforcement, consequences, and interior

enforcement (there are many other actions taken by the federal government and other entities such as the government of Mexico). Output measures for two of these strategies are provided in Figure 3 and Figure 5 (on pages 9 and 12, respectively). Figure 10 illustrates these strategies and the output measures in a single diagram (note that dismantling networks and interior enforcement were outside the scope of this paper and not a priority for measurement). The Technical Annex to this report includes a detailed algebraic development of a portion of the logic model connecting the strategies (outputs) to the outcomes.
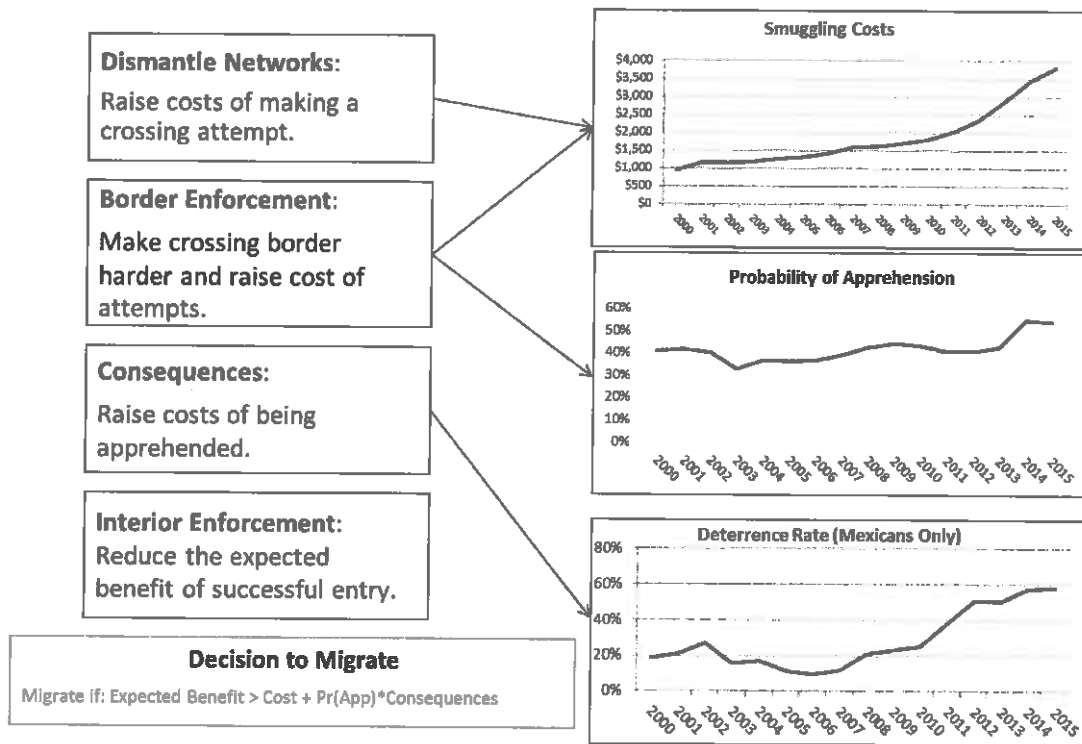

Figure 10. Border Enforcement Strategies and Their Output Measures

Additional work is required to fully develop a performance management framework for border security, but this report provides many of the key elements.

4. Way Ahead

Successful illegal entry, probability of apprehension, and deterrence are among the most important elements of measuring the security of the border, and this chapter has presented the most rigorous estimates of these variables created to date. This represents a major step forward in transparency and the use of analytic information to inform assessment of mission performance and engage in data-driven decision making. These estimates are not perfect, however, and a great deal more must be done over the coming

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years to further improve and institutionalize this more rigorous approach to understanding border security. Three key elements of this way forward are discussed below.

First, the estimates themselves must be continually improved. Although the estimates presented here are sound and, as stated above, the most rigorous attempt to date at measuring these unobserved events, they can still be improved. The estimates may change during this process as new and better methods are developed and new data sources become available. To provide a concrete example of potential improvements to the estimates, Figure 11 illustrates the probability of apprehension presented previously and highlights with circles two areas where the data used to create the estimate changed and the sharp changes in the estimates may be driven by imperfectly controlling for the data changes. These are areas for particular focus in future analysis.
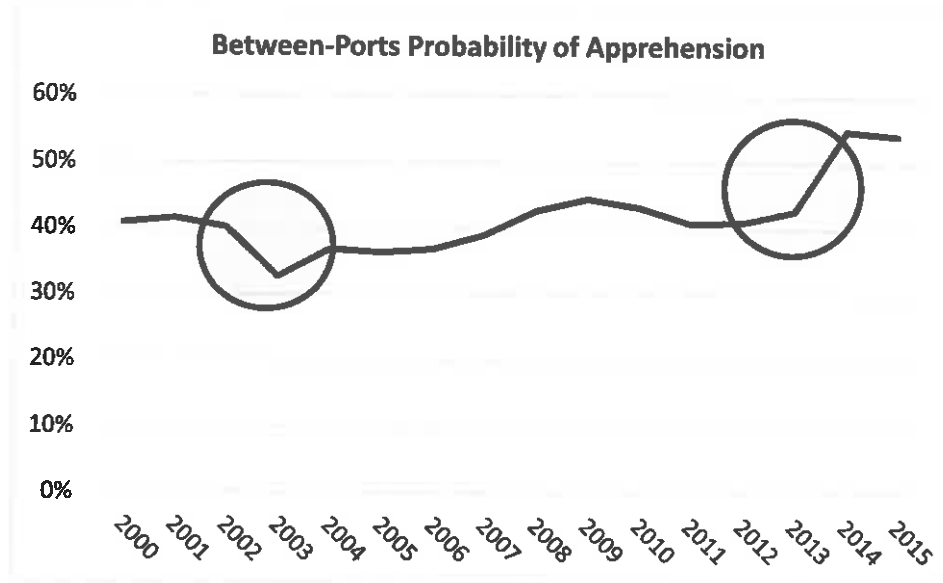

Figure 11. Probability of Apprehension over Time

Second, the estimates themselves are valuable in communicating the state of border security and being transparent with the Congress and the American people. But to truly use them to inform investment and operational decisions within DHS, further analyses are required. Understanding the relative influence of economic, security, and law enforcement changes on the observed changes in successful illegal entry is key to informing DHS investment plans. Understanding the relative importance of apprehension rate versus consequences is key to identifying where the next enforcement investments should be made. And further analyzing the value of agents versus technology versus tactical infrastructure to improve the probability of apprehension is vital to ensuring taxpayer resources are used most efficiently at the border.

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Finally, the examination of illegal migrants from this chapter and the later discussion of cocaine entry represent two of the most important elements of border security, but they do not provide a complete picture. Other threats such as gun and currency trafficking and additional steps to prevent terrorist entry on the border should also be studied in an empirically rigorous way, as this research has begun to do for migrants.

3.   Illegal Entries at Land Ports of Entry (POEs)

People also enter the United States illegally at POEs. Unlike the between-ports domain, where any attempt to enter is illegal, the vast majority of border crossers at ports are entering the United States legally. POEs are found on air borders (international airports), sea borders (seaports), the northern land border with Canada, and the southwestern border with Mexico. The enforcement authority at POEs, the Office of Field Operations (OFO), inspects those arriving at ports, and OFO officers are responsible for determining if a person has legal permission to enter the United States. This is a difficult mission at many land POEs, because the daily number of travelers who need to be inspected can be in the tens of thousands, and an OFO officer often has a relatively small amount of time to conduct an initial inspection of each person.

As in the case of the between-port domain, DHS prevents and deters illegal entry through apprehending those attempting illegal entry and then exposing them to consequences. This chapter presents estimates of successful illegal entry, the probability of apprehension, and the degree to which those apprehended are deterred from illegal entry for the southwest land border at POEs.[27] Although researchers have attempted to quantify between-port illegal entries and the probability of apprehension since 1990, there has been less work on POE estimation.

A.   Estimates of Performance Measures at Ports of Entry

The at-ports estimates were produced from FY 2005 to FY 2015. Figure 12 provides the estimated number of successful illegal entries that occurred per year during this period. The level of illegal entry at ports is significantly smaller than between ports, and was 15 percent of the latter on average during 2005–2015. The estimated level of illegal entry falls from about 250,000 entries in 2005 to under 30,000 in 2015, almost a 90 percent decline.

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[27]   The detailed Technical Annex to this report provides a complete presentation of the methodology.
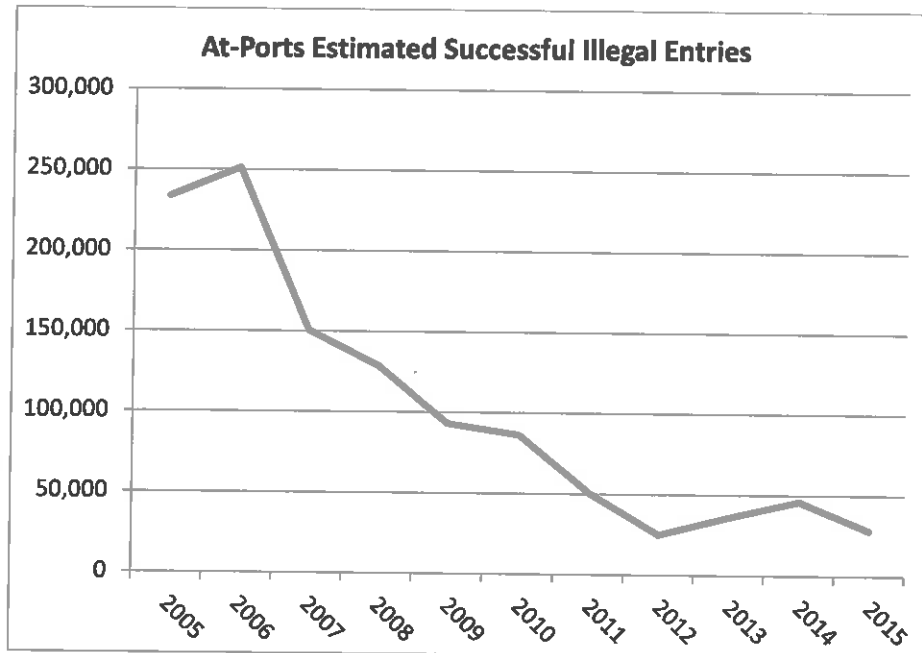
Figure 12. Successful Illegal Entries at Ports of Entry

As in the case of between-port illegal entries, the level of illegal entry is the primary outcome that DHS is tasked with influencing,[28] and the substantial decline is a positive result. DHS has significantly increased investments in at-port border security. As with the estimates for between POEs, this estimate is for traditional Mexican and OTM migrants. Asylum seekers are discussed separately in Chapter 5.

DHS influences successful illegal entry at ports primarily through interdicting illegal entrants and then exposing them to consequences. Figure 13 presents the estimated probability of interdiction for the average illegal entrant at southwest land border ports of entry by fiscal year from 2005 to 2015.

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[28] Although at the POEs, this outcome is combined with the additional goal of facilitating lawful travel.
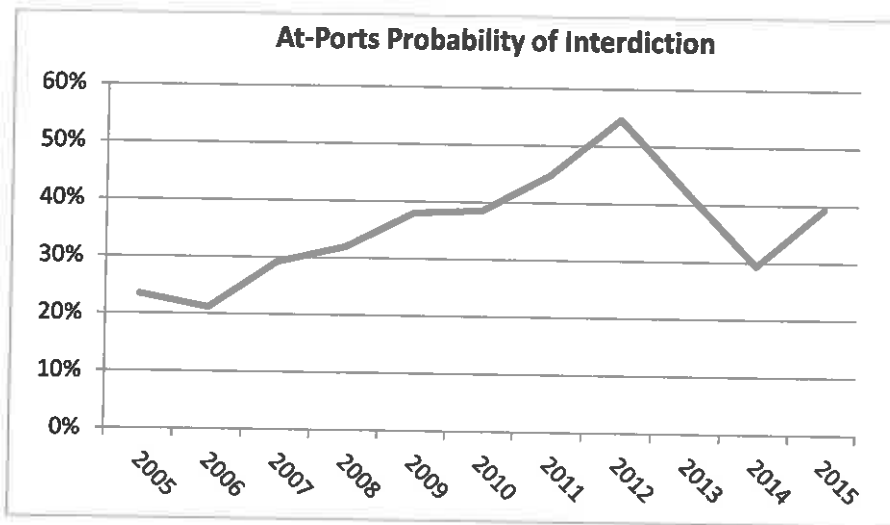
Figure 13. Probability of Apprehension between Ports of Entry

As in the case of the between-ports domain, the probability of interdiction is an output measure. Reducing successful illegal entry is the key outcome that DHS enforcement pursues, and the probability of interdiction is a means to that end.

The same dynamics present in between-port illegal entry also apply here. The probability of interdiction is only one way that enforcement affects the level of illegal entry, and increased enforcement intensity at the POEs has led smuggling organizations to adapt in an effort to evade law enforcement and mitigate the rise in the probability of interdiction. These activities cause an increase in the smuggling cost paid by the migrant. The limited intelligence information available on smuggling cost at POEs suggests that it is higher than for the between-ports domain. Evaluation of the effectiveness of at-port enforcement needs to take into account its impact on all variables that influence decisions to attempt illegal entry into the United States, including smuggling cost.

The other primary way that DHS influences successful illegal entry at the border is through the consequences the illegal migrant faces if apprehended. The nature of consequences imposed on those caught at ports is somewhat different from that imposed on those caught between ports, because USBP and OFO run their own consequence programs. The deterrence rate is defined in the same way, however, as the probability that a Mexican-national migrant who is apprehended, exposed to consequences, and returned to Mexico will leave the border region for home as opposed to remaining in the border region and making another attempt at illegal entry. Figure 14 presents this estimated deterrence rate for the average Mexican illegal entrant at ports by fiscal year from 2005 to 2015.
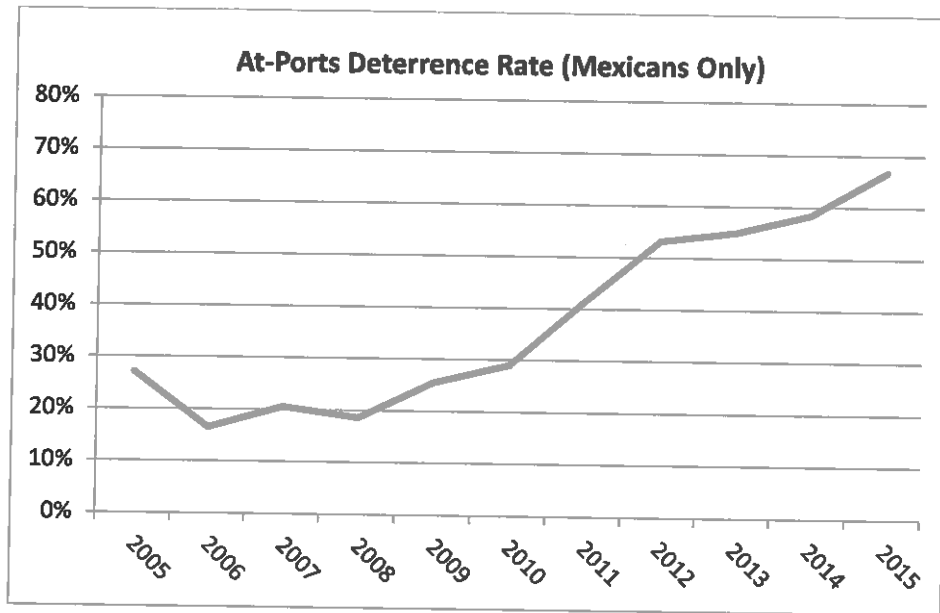
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At-Ports Deterrence Rate (Mexicans Only)

Figure 14. Deterrence Rate of Apprehended Mexican Migrants

Figure 14 shows that as in the case of the between-port domain, the estimated deterrence rate at ports has increased significantly. In the late 2000s, between 10 and 20 percent of returned migrants went home after being caught, while the remaining 80 to 90 percent made subsequent illegal entry attempts on that particular trip to the border region. It is now estimated that over 50 percent of returned migrants return home, and less than half remain in the border region to make further attempts on that trip.

B. Estimation Methodology

The methodology used to estimate illegal entries at ports is the RTM that is used to estimate illegal entries between ports. Mexican nationals attempting to cross at ports who are interdicted are subjected to consequences and then returned to Mexico. They may decide to cease attempting illegal entry and return home, or they may make another attempt. The logic of the RTM explained in Chapter 2 and summarized in Figure 6 applies also to at-port entries.

OFO terms those who are not permitted to legally enter the United States "inadmissibles." Similar to USBP apprehension records, OFO maintains records for each inadmissible event with data fields for information on the inadmissible person, the POE where they were inadmissible, and the date.[29] OFO also takes the fingerprints of every adult aged 18 and over who is deemed inadmissible and includes a fingerprint

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[29] USBP, OFO, and ICE share a database of records on apprehensions or inadmissibles, but each agency has its own interface. OFO uses an interface to this database called Sigma.

identification number in their inadmissibility records that identifies unique individuals. As in the case of those apprehended between the ports, this identifier can be used to identify recidivist apprehensions. Because OFO and USBP use the same fingerprint identification number for a particular individual, these agencies' records can be interlinked to identify someone who was apprehended between the ports and subsequently interdicted at a port, and vice versa.

As in the case of apprehensions between the ports, the population of inadmissibles must be refined so as to exclude individuals for whom the RTM does not fit as closely. OFO inadmissible records contain data on the specific violation with which a person is charged that led to inadmissibility determination. These charge codes are used to try to isolate those individuals using counterfeit documents, impostors using legitimate documents belonging to another person, those hiding in vehicles, and people making false claims of being a US citizen.

1. Survey Estimation of Deterrence

The deterrence rate for those caught trying to enter at ports is also estimated using data from the EMIF survey. Data from EMIF's "Returned" module, from responses to a series of questions concerning the intentions of a person who was interdicted at a port, are used to estimate the probabilities that the person will either continue attempting illegal entry or give up and return home. In order to develop a deterrence rate from the EMIF sample that most closely matches the set of interdicted at-port crossers used to implement the RTM, statistical models were estimated that relate deterrence to observable characteristics of migrants in the EMIF sample. These models were then used to project deterrence for the set of apprehended crossers used in the RTM. The resulting deterrence rate for this population is displayed in Figure 14.[30]

An important issue that arises in estimating the at-port deterrence rate is that the EMIF survey does not ask those who were apprehended, returned to Mexico, and then surveyed whether they had made their illegal entry attempt between the ports or at a port. For each person who responded to the survey, the likelihood that they had attempted between-port or at-port entry must be assessed. Differences in the observable characteristics of people in USBP apprehension and OFO inadmissibility records (e.g., gender, age, birth state in Mexico) are used to estimate the probability that someone with a particular set of these characteristics in the EMIF survey crossed between the ports or at a port. Because the large majority of the EMIF sample crossed between the ports, this methodology may be more reliable for estimating a deterrence rate for between-port crossers than for at-port crossers.

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[30] These models are described in detail in the Technical Annex.

2. Accounting for Displacement

Smuggling organizations and migrants view entering at POEs and between POEs as alternative methods of achieving their desired end. It is not surprising, therefore, that some migrants may attempt in one venue and then, if unsuccessful, attempt in another venue. If unsuccessful in both venues, the migrant will appear in both sets of apprehension/inadmissible records. These "displacement" apprehensions are a relatively small percentage of total between-port apprehensions, but a significant percentage of total OFO inadmissibility events. Illegal entry estimation should take into account this domain displacement, and a methodology was developed and implemented that corrects estimates for displacement.

C. Further Discussion and Way Ahead

As with the between-POEs estimates presented in Chapter 2, these estimates of successful illegal entry, apprehension rate, and deterrence are the most rigorous estimates produced to date. However, they are not perfect and will have to be continually improved so that we can gain greater confidence in them. A good example of future improvements is gaining a better understanding of the different methods used for illegal entry.

Focusing on non-commercial traffic, there are two primary "lanes" through which illegal entry occurs: passenger vehicle and pedestrian. Within these lanes, there are generally three broad categories of methods used: entering fraudulently on an otherwise legal document, using counterfeit documents, and being concealed in a vehicle (only applies to vehicle lanes). Gaining a greater understanding of the prevalence of these methods, their differential success rates, and the characteristics of migrants who use the different methods will greatly improve DHS's ability to counter these threats and improve security at the POEs. Intelligence information is currently incomplete, but our best estimate is that fraudulent use of otherwise legal documents is likely the most successful route and, presumably, would thus command a higher fee for smuggling.

Intelligence data do reveal information about how the smuggling organizations operate. In one major border city, some of the major smuggling organizations are known to work out of barber shops. A migrant is brought in, matched with a document that most closely resembles them, and then made up with hair, clothing, and other treatments to make them as passable as possible. As the analysis is refined to begin estimating the apprehension rate for each method in each type of lane, it will be better able to optimize its resource investments to counter these threats.

Another area in which improve the estimates at POEs is the modeling of displacement from at-POEs to between-POEs. The current model has an approximation of displacement. Figure 15 shows the sharp changes in the estimates may be due to

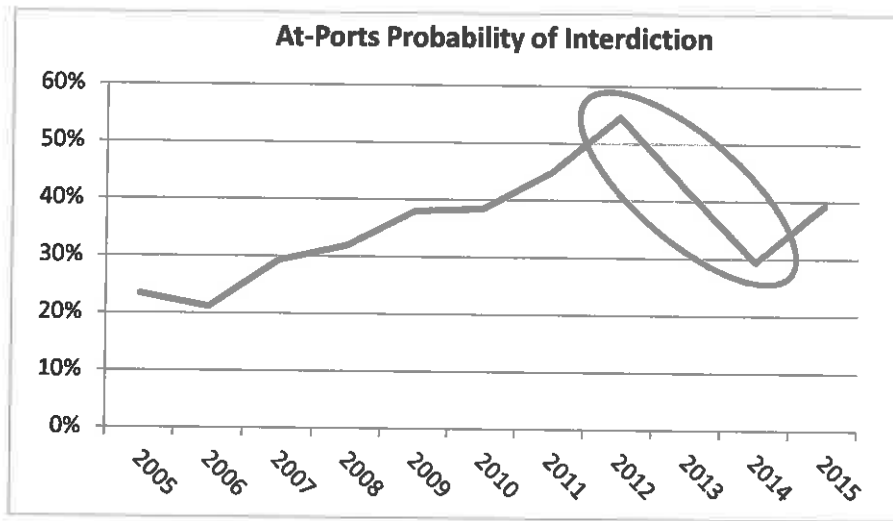imperfectly modeling the entry method and displacement. These are areas for future research.

At-Ports Probability of Interdiction

Figure 15. Probability of Apprehension at Ports of Entry

4.   Illegal Entries in the Maritime Domain

Although the maritime domain is an integral part of the southern border and approaches, for migrant flow it is a much smaller element of total flow. In the past, the government has reported flow estimates based upon observed at-sea interdictions, ashore apprehensions, and migrant gotaways. As with known-flow estimates in the land domain, the maritime estimates that have historically been presented have some key limitations. This report presents an estimate that includes unknown flow in the maritime domain. Broadly defined, the maritime domain for the southern border includes the coast of Southern California; the Gulf of Mexico regions of Texas, Louisiana, Mississippi, and Alabama; and the Caribbean regions of Florida and beyond. The vast majority of illegal immigration activity takes place in the Caribbean region, and that is the focus of this chapter.

A. Estimates of Performance Measures in the Maritime Domain

This report presents two measures of illegal maritime entry: Cuban migrant flow and non-Cuban migrant flow. Differences in the treatment of these groups by law enforcement require separate flow estimation techniques. With few exceptions, Cubans interdicted at sea are returned to Cuba, while Cubans who land in the United States are ineligible for removal to Cuba. Therefore, only at-sea interdictions can produce law enforcement "successes," and ashore encounters represent "successful" entry. Furthermore, Cubans who arrive in the United States are generally thought to self-report arrival because they cannot be removed. Therefore, the rate of unobserved flow for Cubans is thought to be extremely low.

Non-Cubans present different illegal entry challenges. Both interdictions at sea and apprehensions ashore represent law enforcement interdiction for non-Cuban maritime migrants. Unlike Cubans, non-Cubans apprehended ashore can be removed to their country of citizenship or the country from which they departed based upon bilateral treaty agreements. Like land migrants, non-Cubans apprehended or interdicted and brought ashore face various consequences, including expedited removal and criminal prosecution, based upon their attempted illegal entry.

The differences in flow dynamics between Cubans and non-Cubans require different methodologies for estimating illegal entry and apprehension/interdiction rates in the maritime domain. The subsections below provide these methodologies and their estimation results.

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1. Estimates for Cuban Illegal Entry in the Maritime Domain

An estimate of Cuban illegal entries occurring between the POEs in the maritime domain can be obtained by a count of USBP's administrative apprehension records, filtered by apprehensions that occur via the maritime domain and at the maritime border in the Miami and Ramey sectors. Figure 16 presents these data from 2005 to 2014. Unknown Cuban flow is not estimated as part of Figure 16 because it is assumed that most Cubans self-report their entry upon landing in the United States. Continuing to refine this work to take account of additional sources of data and migrant outcomes is an important area for future analysis.
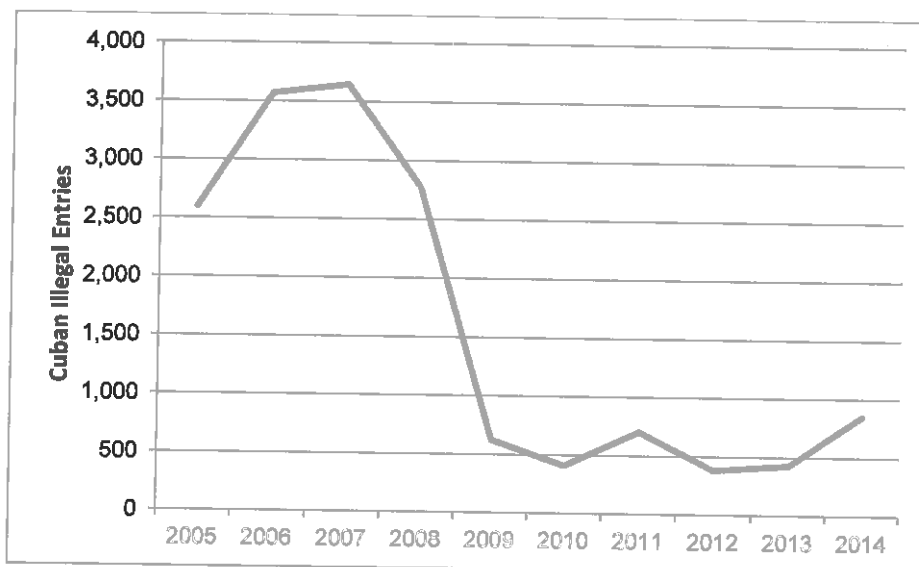

Figure 16. Cuban Successful Illegal Entries in the Maritime Domain

Estimating an interdiction rate for Cuban migrants is somewhat more difficult. Cuban migrants can be interdicted by the US Coast Guard (USCG) or partner nations, including Cuba. The USCG records its interdictions by the migrant's nationality, allowing a comparison between USCG interdictions at sea and successful Cuban flow ashore.

Figure 17 presents a US-only interdiction rate for Cubans attempting illegal entry in the maritime domain. This measure divides the total number of USCG interdictions of Cubans by the total number of Cuban interdictions plus shore-side landings that result in an apprehension. Consistent with the assumption of self-reporting, this rate again assumes no unobserved or unrecorded successful Cuban flow.
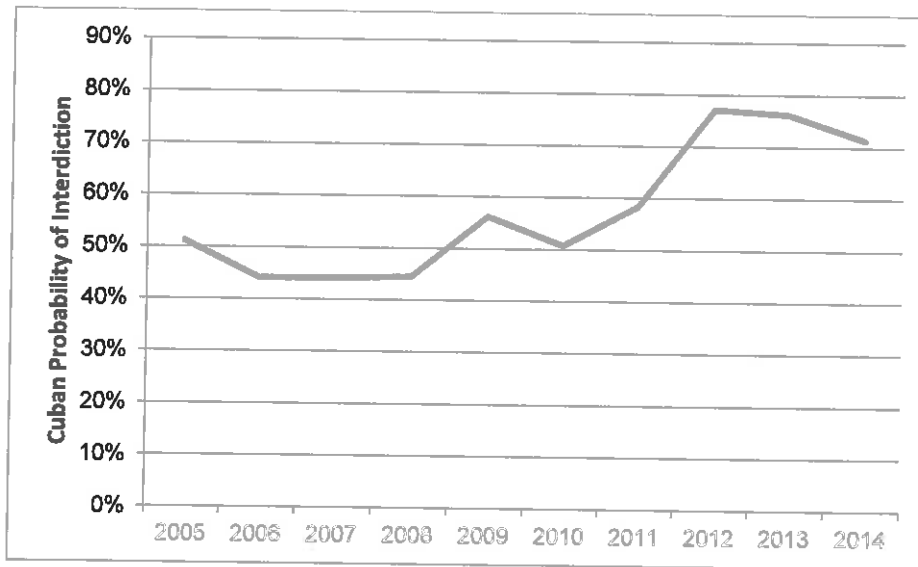
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Figure 17. Probability of Interdiction for Cubans in the Maritime Domain

Figure 17 shows the probability of USCG interdiction for Cubans rising from around 50 percent to above 70 percent from 2005 to 2014. However, this may underestimate the total probability of interdiction for Cuban migrants because it does not account for partner nation interdictions at sea. USCG tracks partner nation interdictions, but the data provided do not identify the nationality of the migrants. In part, this is due to partner nations' inconsistent data collection and reporting of interdictions to the USCG. Better data collection and reporting will allow for more accurate estimation of the Cuban interdiction rate.

2. Estimates for Non-Cuban Illegal Entry in the Maritime Domain

Unlike Cubans, non-Cubans must evade interdiction and apprehension both at sea and ashore to successfully illegally enter the United States. Thus, both at-sea interdictions and shore-side apprehensions must be counted as law enforcement outcomes. Furthermore, with migrant disincentives to self-report, a significant part of the non-Cuban successful flow will go unobserved.

The USCG and USBP track known successful flow based upon evidence of suspected illegal entry without an apprehension. These successful known-flow estimates are historically small and suffer from the standard challenges of known-flow data due to the challenges of gathering evidence of illegal entry across hundreds of miles of coastline with a high volume of lawful traffic.

As with the land domain, total successful flow (observed and unobserved) can be estimated by using the RTM. As discussed in section 2.B.1, the RTM estimates total

successful flow and the probability of apprehension based upon recidivist apprehensions and an independent estimate of deterrence.

Data in the apprehension records can identify appropriate populations for RTM estimation. When apprehending a non-Cuban, the USCG may either repatriate the migrant directly to their home country or country of departure or bring the migrant ashore in the United States for formal removal and/or application of consequences. Migrants repatriated directly to their home or departing country are able to make subsequent trips and are therefore part of the RTM population.

Migrants brought or apprehended ashore are recorded in the USBP apprehension records, which provide insights into their role in the migration event and subsequent disposition. As discussed in section 2.B.1, several indicators in the apprehension records determine whether the migrant belongs in the RTM population. Interior apprehensions, such as those at USBP checkpoints, are excluded from the RTM population.

However, using RTM for maritime migrants poses different challenges than in the land domain. Since 2007, both the USCG and USBP have fingerprinted a portion of the non-Cuban migrants they apprehend or interdict. This allows identification of recidivists in the maritime domain for RTM estimation. However, unlike USBP, which fingerprints all adults it apprehends, USCG fingerprinting rates vary greatly across migrant populations. Since 2008, aliens from Cuba, Haiti, and the Dominican Republic account for nearly 95 percent of total maritime interdictions. While USCG fingerprints virtually all Dominican nationals interdicted in the maritime domain, less than 20 percent of Haitians are fingerprinted. By policy, USCG does not fingerprint Cubans except under limited circumstances. Low rates of biometric data collection prevent identification of recidivists among Haitians (and Cubans), reducing the quality of RTM estimates.

Restricting RTM to populations with near-complete fingerprint records (i.e., Dominicans) overcomes this missing data problem. Probabilities of interdiction[31] estimated from a Dominican-only RTM can then be applied to other non-Cuban groups to estimate total successful flow. However, this approach has limitations. Choice of maritime vector varies with alien nationality. Ninety percent of Cubans are interdicted in the South Florida Straits; almost all Dominicans attempt entry in the Mona Island vector; about three quarters of Haitians are interdicted in the Windward Passage vector. Estimating the RTM on Dominicans and applying the results to Haitians, for example, assumes that the probability of interdiction is the same in Mona Island and the Windward

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[31] When referring to non-Cubans, the term "probability of interdiction" includes both the probability of at-sea interdiction and ashore apprehension (given no at-sea interdiction). Hence, this metric is a probability of a successful border security outcome in the maritime domain. For Cubans, the "probability of interdiction" includes only at-sea interdictions, as ashore apprehensions are successful flow.

Passage. If vectors have different probabilities of interdiction, the estimate of total maritime flow will include some amount of error.

Deterrence in the maritime domain is also more difficult to assess than on land. Unlike in the land domain, no independent survey or empirical model of deterrence exists for maritime migrants. A maritime repatriation to the nation of departure shares similarities with both a cross-border repatriation of a Mexican migrant in the land domain—for whom deterrence is estimated from survey data—and a remote repatriation of an OTM migrant. The possibility of greater hardships, dangers, and expense of maritime migration relative to migration in the land domain may create a higher level of deterrence for maritime migrants. Furthermore, interdictions and apprehensions both by American law enforcement and partner nations increase the number of opportunities to deter a maritime migrant along their journey. Unsurprisingly, the rate of recidivist apprehensions for Dominicans in the maritime domain is lower than that for Mexicans in the land domain. Finally, the maritime domain has not seen a systematic buildup of border enforcement resources and consequences over the period of time studied.

As a result of these considerations, DHS has assumed a simplified constant rate of deterrence at 75 percent for all migrants apprehended in the maritime domain. Departures from this assumed deterrence rate will raise (for lower deterrence) or lower (for higher deterrence) the estimated rate of successful illegal entry in the maritime domain.

Changes in the rate of partner nation interdictions can also influence RTM estimation over time. For example, increasing partner nation interdictions can lead to more opportunities for deterrence as well as an underestimation of the true number of recidivists. In this estimation, we have not accounted for these partner nation interdictions. Years with above average partner nation interdictions may underestimate the true deterrence and recidivist rate. This has the effect of lowering the probability of interdiction and increasing total estimated successful flow. For example, the increase in estimated flow introduced in Figure 18 occurred for years with high levels of partner nation apprehensions. Future work should incorporate the differences in partner nation interdictions into flow and probability of interdiction estimates.

Figure 18 presents estimates for total non-Cuban illegal entries in the maritime domain. An RTM probability of interdiction was originally estimated for Dominicans and then applied to non-Dominicans to generate total successful flow. The maritime estimates start in 2008 when more complete biometric data became available.
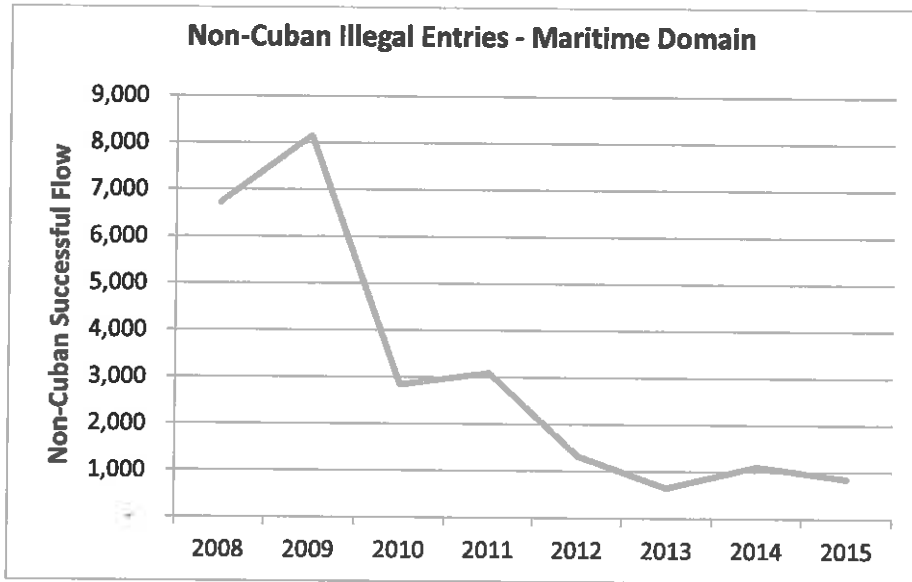
Figure 18. Non-Cuban Illegal Entries in the Maritime Domain

Figure 19 presents the probabilities of either apprehension or interdiction of non-Cubans estimated with the RTM.

Figure 19. Non-Cuban Probability of Apprehension/Interdiction

The results indicate that although some level of illegal entry occurs in the maritime domain, the numbers are very small, and illegal entry in the land domain remains the overwhelming source of successful flow. As noted above, to produce the estimates, IDA had to assume a deterrence rate instead of empirically estimate one from available data

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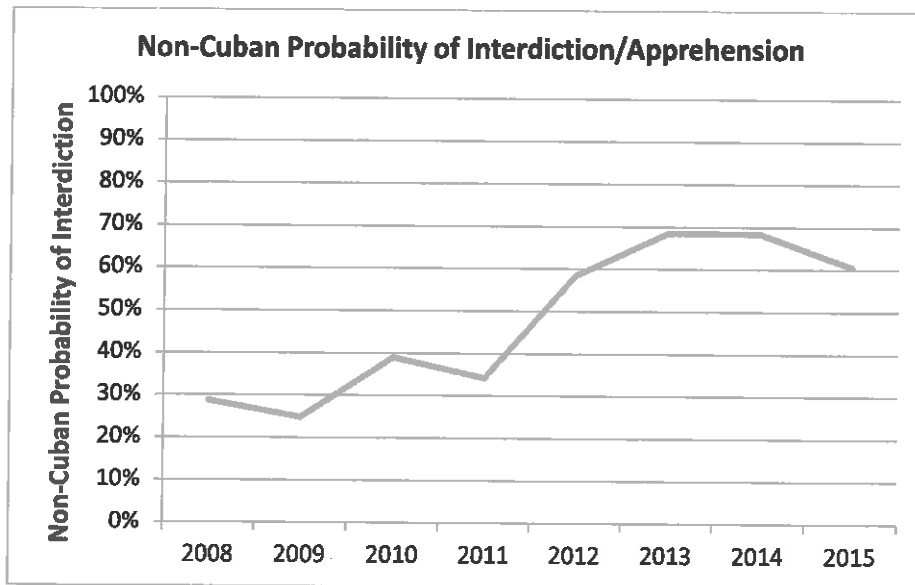sources as was done in Chapters 2 and 3. Fortunately the general conclusions identified here (small flow relative to land domain, declining flow, and increasing probability of apprehension) all remain true with different deterrence rates. For example, the estimated successful illegal entries of about 1,000 would increase to about 4,000 in FY 2015 with a 25 percent deterrence rate—still significantly smaller than the 200 thousand or so successful illegal entries in the land domain.

B. Further Discussion and Way Ahead

Illegal flow in the maritime domain is the least-developed of the three migrant flow estimates presented in this report. Unlike land-based flows, estimates of maritime flow cannot draw upon a legacy of past research, empirical analysis, or survey data. Furthermore, as the probabilities of apprehension and at-the-border deterrence in the land domain increase, illegal maritime entry becomes more attractive to prospective unauthorized migrants. Changes in the domestic politics and economy of Caribbean sending nations may also alter flow patterns over the coming years.

An improvement in flow measurement must start with improvements in data collection. The USCG has made great strides in implementing biometric data collection over the past decade, but DHS is working towards more consistent collection of biometric information that would aid future analysis. Most importantly, increasing fingerprinting rates for non-Dominican maritime migrants will greatly increase the reliability of RTM estimates. More complete biometric data would enable measurement and monitoring of maritime metrics for specific entry vectors or subpopulations.

In addition to collecting better data, the methodologies of measuring unobserved flow in the maritime domain need further improvement. If the RTM continues to be used for maritime flow, an independent, empirically based estimate of deterrence is needed to improve flow estimates and better understand migrant decision making. Greater insight into partner nation interdictions would also allow for better measurement of the various law enforcement contributions to maritime border security.

5.   Entries of Asylum Seekers

Migrants who make an illegal entry on the southwest border can subsequently make an asylum claim by either seeking out border agents/officers in order to make a claim of credible fear, or seek asylum (or similar forms of relief) after being caught.[32] The number of such entrants averaged roughly 20,000 annually during 2005–2011, but this inflow has risen dramatically since then. The increase in the number of asylum seekers is in large part due to the surge of unaccompanied alien children (UACs) and family member unit apprehensions (FMUAs), which peaked dramatically in the early summer of 2014.[33] A structural shift in entry on the southwest border may be taking place that could persist in coming years, and any assessment of entry on this border must include a review of this growing phenomenon. This report does not create empirical estimates of successful illegal entry or probability of apprehension for asylum seekers. This section uses apprehension data to begin quantifying the characteristics of this population.

A. Apprehension of Asylum Seekers

Figure 20 provides the apprehension level of asylum seekers by year from 2005 to 2015.

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[32] There are other possible ways to obtain legal status other than seeking asylum, but application for asylum is used here to generically refer to the various methods.

[33] Family member unit apprehensions are apprehensions of children with an accompanying family member or members.
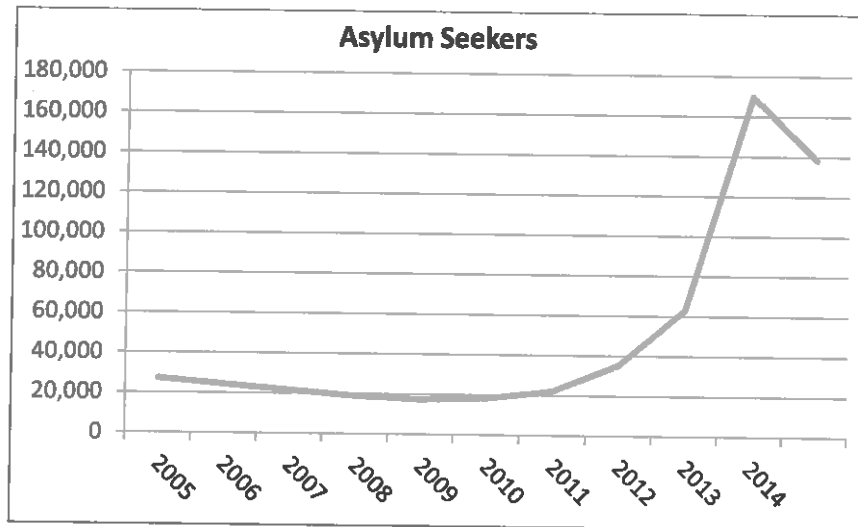
Figure 20. Estimated Asylum Seekers

B. Estimation Methodology

Asylum seekers cannot be perfectly identified in the current records. Data fields were used to identify categories of migrants that are mostly closely associated with claims of credible fear or asylum. Migrants included in the between-port population of asylum seekers consist of unaccompanied children from countries other than Mexico who are under the age of 18, unaccompanied children from Mexico who are under the age of 14, family units from countries other than Mexico, and all those apprehended with a disposition of expedited removal with credible fear.[34] Migrants included in the at-port population of asylum seekers consist of unaccompanied children, Cuban nationals, and crossers with a database status of entry of asylum or a disposition of expedited removal with credible fear.

These categorizations are not perfect. For example, it is not possible to say with certainty that a person who was caught attempting illegal entry and who subsequently claimed asylum was not someone more closely related to traditional Mexican and OTM flows and simply made the asylum claim opportunistically. It is not possible for enforcement authorities to determine an apprehended crosser's intentions. This concern is plausibly less of a concern for non-Mexican-national children, who are generally apprehended very close to the border line and are perceived to seek out US enforcement authorities. It is less clear that this is true for adults.

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[34] Apprehended Mexican children aged 15–17 are believed to often be acting as guides for smuggling organizations: these apprehensions are included in the residual population. Adults apprehended with a disposition of expedited removal with credible fear are by definition seeking asylum.

C. Further Discussion and Way Ahead

The dramatic increase in asylum seekers since 2011 may represent a structural change in illegal entry behavior at the southern border. This trend is driving significant changes in how to enforce immigration laws and the demands for resources for enforcement. Asylum cases require court time and other processing that can be different from that for traditional illegal migrants. If this trend does represent a structural change and continues to grow, DHS will have to make significant changes in its investment choices and operations in response. Gaining a better understanding of what is driving this trend and what the future will likely hold is a top priority of future analysis.

6. Illegal Entry of Cocaine

For many illegal drugs, the major source of domestic supply comes from outside of the United States, and interdicting the inbound flow is an important element of supply reduction strategies. Cocaine is one of these drugs; within the law enforcement community, it has historically seen the most interest and effort made to develop the data and analytic methods for understanding trends from cultivation to consumption. Cocaine analyses also benefit from a concrete production and distribution pattern—coca leaves are grown and processed in a small number of countries (the Source Zone), distributed through a global network of traffickers (the Transit Zone), and eventually smuggled across the US land and maritime borders (the Arrival Zone). For these reasons, the analytic understanding of drug flows across the federal government is significantly more advanced for cocaine than for the other major drug types and was the drug analyzed for this pilot report.

Even with these advantages, the estimation of successful illegal entry of cocaine into the US and the effectiveness of interdiction efforts is still less mature than estimation of the similar measures for migrants. This chapter presents estimates of illegal entry and removal rates for cocaine, describes the methodology used to develop them, and discusses steps DHS is taking with the rest of the government to improve the understanding of cocaine flows as well as the flows of other drugs.

A. Results

Figure 21 presents the results of two different methods for estimating successful illegal entry of cocaine into the United States. The first method, shown in the chart's shaded region, is based on the amount of cocaine that likely entered the country in order to support the level of domestic consumption derived from national surveys on illegal drug use. Because the most recent data for this survey are from 2013, there is no current estimate for 2014. The second estimate, shown in the solid curve, is based on both directly observed and intelligence-assessed events of cocaine movement that originate in South America (the Source Zone) and are destined for markets in the United States.
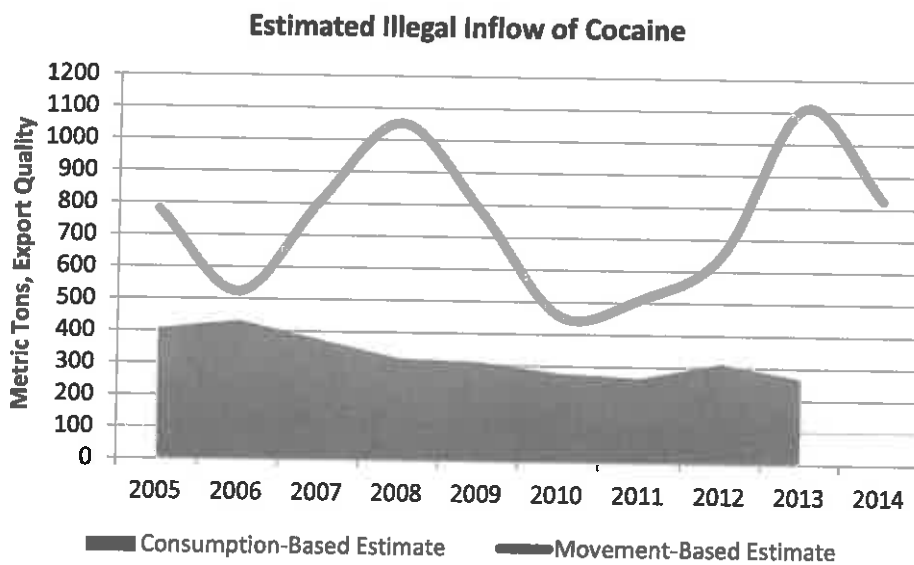
Estimated Illegal Inflow of Cocaine

**Figure 21. Estimates in Metric Tons of Net Inflow of Cocaine into the
United States, FY 2005–2014**

For the consumption-based method, the average estimate for the total volume of cocaine that successfully enters the United States per year is approximately 330 metric tons (MT), adjusted for export quality purity. Over the entire ten-year period, the estimates range from a minimum value of 264 MT in 2011 to a maximum value of 432 MT in 2006, and show a general reduction in the successful illegal entry of cocaine.

The movement-based method shows more variation than the consumption-based method, with a significant peak in 2008 and again in 2013. While some of the data that comprise these estimates come from direct observation and interdiction from law enforcement authorities, the majority of the volume represented by the movement-based estimate is driven by intelligence collection and is highly sensitive to the uncertainties and unknowns inherent in intelligence analysis, including asset allocation and distribution. We discuss this in more detail in Section C.1 of this chapter.

Figure 22 shows two different estimates for the aggregate removal rate for law enforcement authorities in both the land and maritime domains. Removal rates are defined as the amount of cocaine removed from the US-bound volume divided by the total volume of US-bound flow, and include removals that occur anywhere in the Transit Zone (typically maritime interdictions) as well as in the Arrival Zone (which includes coastal maritime interdictions and the southwest land border with Mexico). Cocaine removals are defined as direct seizures, where law enforcement authorities physically take illicit drugs into custody, and losses, or events that are the result of interdiction activities and, although no drugs are physically seized, cause them to be removed from

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the supply chain. As with the estimated illegal inflow, the volume of US-bound cocaine in the denominator is calculated using both movement- and consumption-based estimates.
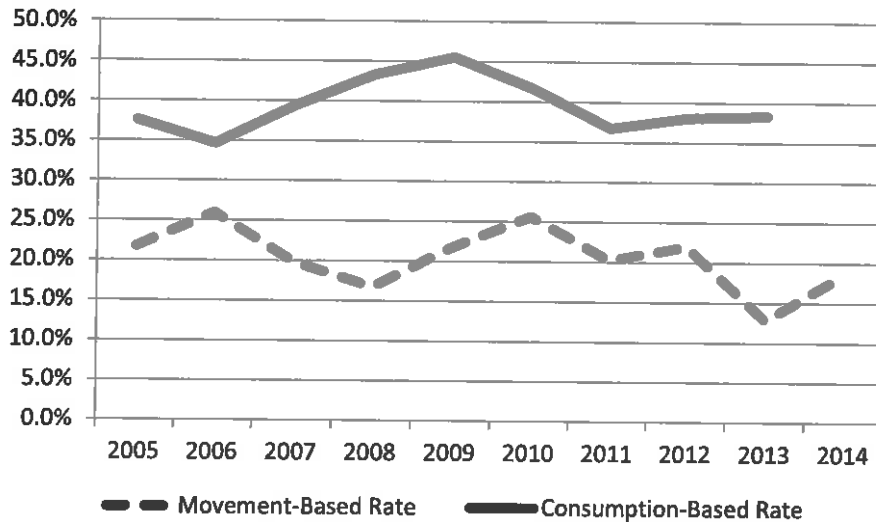

Figure 22. Estimated Removal Rate of Cocaine, Combined Land and Maritime Domains

Over the last ten years, although there is some fluctuation in these rates, they have remained in the same general range. For the movement-based rate, the ten-year average is 20.5 percent, with a high value of 25.9 percent in 2006 and a low of 12.7 percent in 2013. For the consumption-based rate, the ten-year average is 39.5 percent, with a high value of 45.5 percent in 2009 and a low of 34.6 percent in 2006.

The bulk of these removals occur deep in the Transit Zone, consistent with the overall strategy of interdicting illicit cargo movements as close to the Source Zone as possible in order to achieve the highest payoff, i.e., removing larger loads of cocaine from the supply chain before they have a chance to make landfall, where they become significantly more challenging to detect and interdict.

B. Methodology

1. Deriving the Movement-Based Estimate

The movement-based estimate is derived from the Consolidated Counterdrug Data Base (CCDB) for primary flow events in US-bound corridors at all confidence levels (*confirmed, substantiated, 1P,* and *2P*). We start with the total flow of cocaine departing Source Zone countries in South America and subtract all seizures, losses, and consumption that occur en route. The remaining quantity is then the estimated net inflow

of cocaine smuggled across the southwest land border as well as cocaine smuggled through the maritime domain.

Prior to 2013, the CCDB used a different confidence level convention that led to an inconsistent time series over the ten-year period for different confidence levels. The definitions for *1P* and *2P* movements changed, creating a higher threshold for an event to be categorized as *1P* and assessed at a higher validity than a *2P* event. As a result, an unknown proportion of the *1P* events that occurred before 2013 would, under the new definitions, fall into the *2P* category, leading to a lower movement-based estimate of successful illegal entry for those years than the original data would indicate. Although the all-confidence estimates may overstate the total volume of cocaine moving through the Western Hemisphere, they are currently the only consistent estimate of flow volume available as a result of the 2013 definition change. Restricting the estimate to the higher confidence *1P* events may be a more reliable way to develop the estimate for the future; future work should reconcile the earlier data with the new definitions for *1P* and *2P* events.

2. Deriving the Consumption-Based Estimate

Another way to derive an estimate for the net illegal inflow of cocaine is to begin with the amount of cocaine consumed domestically and add interior seizures, which, by definition, successfully entered the country. After discussions with experts in the counter-narcotics community, we also add Canadian consumption and seizures based on the assumption that cocaine enters Canada via road and rail networks through the United States. These are small quantities that do not significantly affect the overall trend.

On average, the estimates for US domestic consumption account for more than 70 percent of the total value for each year in Figure 22. These data are based on national population surveys of drug use and make a number of assumptions regarding the proportion of chronic, moderate, and recreational users and how much each type of user consumes per dose. The final consumption values for 2005–2013 come from the annual Interagency Assessment on Cocaine Movement (IACM) report. There is no value for 2014 as the 2014 IACM report was not yet available at the time of this writing.

Interior seizures in the United States account for approximately 17 percent of the total consumption-based estimate per year and are taken from the National Seizure System (NSS) database maintained by the El Paso Intelligence Center (EPIC). They include seizures made at checkpoints, through investigations, and other law enforcement counter-narcotics activity.

3. Removal Rates

Aggregate removal rates are calculated by taking the sum of all seizures and losses in the maritime and land domains and dividing by the total volume in US-bound corridors. The removals include direct maritime interdictions, losses, and jettisons as well as seizures at and between the land POEs, and are taken from the CCDB and NSS data sets.

For the movement-based removal rate, the total volume of cocaine in the denominator comes from the all-confidence, primary flow events in US-bound corridors in the CCDB. For the consumption-based rate, we take the sum of all domestic seizures (interior and at the southwest border) from the NSS and add the IACM domestic consumption estimates as well as Canadian consumption and seizures. Lastly, we include the maritime removals in US-bound corridors as they were also intended for US markets and comprise an element of the total volume.

C. Further Discussion and Way Ahead

1. Understanding the Cocaine Movement

As shown in Figure 21, there are a range of possible estimates for successful illegal entry of cocaine, and they vary greatly depending on the method. This complicates efforts of DHS and the government as a whole to gain a better understanding of the trends in drug movement and to respond appropriately. Regardless of which method is chosen, the range of estimates suggests that a large amount of cocaine is crossing the border and additional work is required to gain a better understanding of exactly how these drugs are successfully evading US law enforcement interdiction efforts. Gaining a better analytic understanding of these challenges to inform investment and operational decision making is a key priority.

2. Improving the Movement-Based Estimates

The inconsistency in the definition for *1P* and *2P* events in the CCDB movement data creates a challenge for developing accurate estimates for illegal entry. One way to adjust the data would be to look at the distribution of *1P* and *2P* events in 2013 and 2014 (under the current definitions) and apply an average proportion between them to the previous years. This would assume, however, that the proportion of *1P/2P* events was constant for all years. A more rigorous adjustment would require going back and reexamining the narrative summary and context of each *1P* event to determine if, under today's definition, it should have been classified as *2P*. Although this would be a significant effort, the movement-based illegal inflow estimates would greatly benefit from a consistent time series rather than a linear trend model.

It is also crucial to recognize the inherent limitations of an intelligence-driven estimate for cocaine movement events. The CCDB is as much a measure of situational awareness as of actual movements and is sensitive to resource allocation and distribution of intelligence and collection assets. Developing a method to account for this distribution may also improve the movement-based estimates by revealing intelligence gaps that are not readily apparent in the data set. For example, the interdiction community had known about the use of self-propelled semi-submersibles long before one was finally interdicted in 2006. These vessels can move significant quantities of cocaine, and were likely deployed by drug traffickers before law enforcement authorities began to detect them with greater frequency in 2007 and 2008. Thus, the movement-based estimate for 2005–2006 may be lower than the actual flow of cocaine during that time because the interdiction community did not yet have the right resources to detect and counter them.

3. Including Other Drug Types

Although this report focuses on cocaine, recent trends regarding other drugs, like the increased concerns with heroin, must also be considered. The interagency methodology used to derive these estimates may benefit from future attempts to conduct a similar analysis for other drugs, even if they do not have the known supply chain from cultivation to consumption common to cocaine.

7. Conclusions

This report has provided the first major estimates of the strategic performance measures of border security with respect to illegal immigration and cocaine. The report is only a first step and does not include many important elements of border security. This concluding chapter discusses how these measures may be presented in the future for ease in visualizing and conveying, and further discusses the next steps that should be undertaken to continue building on this work to develop a complete performance measurement system for border security.

A. Putting the Performance Measures Together

Chapter 1 and Appendix A discuss the importance of the CompStat revolution in law enforcement performance measurement- and data-driven management. Appendix A provides an example of a typical CompStat display. The display is simple and has few frills or embellishments, systematically presenting the strategic outcomes of New York City law enforcement activities.

Figure 23, BorderStat Display on Illegal Immigration, presents a similar display for illegal immigration and border security. The figure represents a simple way to display the estimates presented in Chapters 2 through 5 of this report.

State of Border Security								
	Prior Years					Current Year		
	2005	2007	2009	2011	2013	2014	2015	% Change
Illegal Migration (number of migrants)								
Estimated Inflow of Successfull Illegal Entries								
at Ports of Entry	230,000	150,000	93,000	51,000	36,000	46,000	28,000	-39%
between Ports of Entry	1,700,000	1,100,000	510,000	340,000	360,000	210,000	170,000	-19%
in Maritime Domain			8,100	3,100	650	1,100	840	-24%
Total	1,900,000	1,300,000	620,000	400,000	400,000	260,000	200,000	-23%
Requests for Asylum	27,000	21,000	17,000	22,000	63,000	170,000	140,000	-18%

Law Enforcement Activity								
	Prior Years					Current Year		
	2005	2007	2009	2011	2013	2014	2015	% Change
At Ports								
Illegal Migrants								
Number of Refused Entries	71,000	62,000	57,000	41,000	26,000	19,000	18,000	-5%
Estimated Apprehension Rate	24%	29%	38%	45%	42%	29%	39%	34%
Consequences - Estimated Deterrence Rate	27%	21%	26%	42%	55%	58%	67%	16%
Between Ports								
Illegal Migrants								
Number of Apprehensions	950,000	720,000	420,000	240,000	280,000	260,000	200,000	-23%
Estimated Apprehension Rate	36%	40%	45%	41%	44%	55%	54%	-2%
Consequences - Estimated Deterrence Rate	11%	12%	23%	38%	51%	58%	58%	0%
Maritime								
Illegal Migrants								
Number of Apprehensions			2,700	1,600	1,400	2,400	1,300	-46%
Estimated Apprehension Rate			25%	34%	68%	68%	61%	-10%

Figure 23. BorderStat Display on Illegal Immigration

B. Next Steps

As discussed throughout this paper, the estimates presented are the most rigorous estimates produced to date, but they are also imperfect estimates. Research should continue to improve and expand the estimates, integrating them into DHS's data collection methods to improve the Department's ability to communicate these outcomes and outputs to the Congress and American public.

First, DHS must continue to improve and expand the estimates. Several specific examples were provided in this report on how the estimates can be improved, e.g., better integration of inter-agency data on migrant experience in custody. They must also be expanded to the full range of threats DHS is countering on the border. This includes other

drug types, guns, currency, and high-threat individuals. Doing all of this work represents a long-term research agenda, but DHS should begin to undertake it and systematically work through the many things that need to be accomplished.

Second, DHS should integrate these measures and analysis of them into its investment and operational decision making. An example provided in this report was the use of these measures to empirically estimate the return of additional agents, technology, and tactical infrastructure on the border. By systematically analyzing investment options, DHS can deliver a higher level of border security with its available resources.

Third, DHS should improve its ability to communicate these measures and explain how its decisions are informed by analysis of them. The BorderStat display provided above is a first step towards developing simple, systematic displays to communicate with the Congress and the American public what performance outcomes are being achieved on the border. DHS should continue to work with key stakeholders to refine this display and begin regular communication on results and what they mean.

Appendix A.
Outcome-Focused Performance Management

Performance management in government agencies and in large, complex mission areas of the government has been an area of intense focus for many years. Most recent Administrations have had management initiatives focused on improving performance and delivery of results.[1] A literature has developed evaluating the performance management experiences of government organizations and identifying best practices and general approaches to developing a performance measurement framework.[2] This section outlines a standard performance measurement development framework based predominantly on these references and provides an example of some of the best practices identified in the literature.

A. Performance Measure Development Process

The process starts with strategic planning. The organization's strategic plan or strategic planning process identifies the key strategic goals or objectives that are to be achieved.[3] For DHS, these strategic goals are documented in the Quadrennial Homeland Security Review (QHSR), the DHS Strategic Plan, and subordinate documents. The strategic goals are then translated into quantifiable outcomes and evaluated for how they will be measured. In developing performance measures for these strategic goals, it is important to not only consider measures for which the organization already has data. Harry Hatry states:

> Do not only include performance [measures] for which the data are already available. Consider new measurement approaches. It is a great temptation to only seek performance [measures] for which data are already collected or can be easily obtained. Unfortunately, some of the most important outcome [measures] may require data not previously collected.

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[1] Philip Joyce, "Linking Performance and Budgeting: Opportunities in the Federal Budget Process" (Washington, DC: IBM Center for The Business of Government, 2003).

[2] A traditional guide is General Accounting Office, "Executive Guide: Effectively Implementing the Government Performance and Results Act," GAO/GGD-96-118 (Washington, DC: Comptroller General of the United States, 1996). A recent addition is Harry Hatry, *Transforming Performance Measurement for the 21st Century* (Washington, DC: The Urban Institute, July 2014).

[3] Hatry, in *Transforming Performance Measurement*, emphasizes the importance of seeking input from key stakeholder groups in establishing organizational strategic objectives.

...Organizations are reluctant to introduce new measurement procedures. A major reason has been their perception of the (high) cost of collecting the new information.... Certainly, data collection costs need to be considered in selecting [measures]. However, also to be considered is the added value of obtaining key information.[4]

With the highest level strategic outcome performance measures identified, a full performance management framework can then be developed that includes subordinate measures. The attributes of these subordinate measures include such things as:

- **Measure Type**: In addition to outcome measures that focus on societal outcomes the organization is trying to effect, there are output measures, input measures, process measures, and efficiency measures.[5]

- **Measure Level**: Performance measurement frameworks can often be thought of as a pyramid with a small number of strategic outcome measures at the top, a larger number of operational measures in the middle, and the largest number of tactical measures at the bottom. These different levels overlap and may contain a variety of measure types (e.g., output and input), but are used at different levels of the organization to support the appropriate level of decision making.

- **Decisions Supported**: While the strategic outcome measures should be traceable throughout the major management decision-support processes of large, complex organizations (e.g., strategic planning, capabilities planning, programming, budgeting, and budget execution), additional subordinate measures are required for different types of decisions. Requirements determination and acquisition oversight will require technical measures of performance for systems, and operational planning will require more granular measures that relate to geographic regions and domains. Budget execution will require measures that can be reported more frequently.

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[4] Ibid., 11.

[5] See Government Accountability Office, "Performance Measurement and Evaluation: Definitions and Relationships," GAO-11-646SP (Washington, DC: Comptroller General of the United States, 2011) for a discussion of performance measure types. Put simply, outcomes are the societal changes the organization is trying to effect (ends), outputs are the direct results of government activity that are intended to effect the outcomes (ways), and inputs are the resources expended by the government activity (means).

To guide development of these subordinate performance measures, a logic model or some other analytic derivation of the relationships from activities and resources (inputs) to programs (outputs) to strategic goals (outcomes) is frequently used. Logic models help the leadership and performance analysts understand the relationships between performance measures and the priority measures that need to be developed. As Hatry states:

> Logic models are diagrams that trace the sequence of expected/desired outcomes from planned program activities through the ultimate end outcomes desired. Logic models have become common in federal agency studies, such as program evaluation. They can be just as useful for helping program managers identify performance [measures] for performance management systems. They can be used for programs that have not yet identified outcome [measures]; when a new program is being implemented; or when an agency is not happy with its [measures].[6]

In summary, a performance management framework is composed of strategic goals; outcome performance measures that quantify achievement of these goals; strategies for achieving these outcomes and logic models that explain the organizational relationships of resources, activities, programs, strategies, and goals; and a hierarchical set of output, input, process, and efficiency measures that support the range of decision making that occurs at the different levels of the organization.

B. United States Coast Guard Example

The United States Coast Guard (USCG) has often been held up as an example of an organization with a very mature and well-designed performance management system. The General Accounting Office (GAO) used the USCG marine safety program as an example of the importance of starting with strategic outcomes and measuring them directly to provide the proper information and incentives for effective mission accomplishment:

> Traditionally the Coast Guard based its marine safety efforts on inspections and certifications of vessels. It measured its performance by counting outputs, such as the number of prior inspections and outstanding inspection results. But the data on marine casualties indicated that accidents were often caused, not by deficiencies in the vessels or other factors, but by human error. For example, towing industry data for 1982 through 1991 showed that 18 percent of reported casualties were caused by equipment and material failures, 20 percent by environmental and other factors, and 62 percent by human factors.

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6   Hatry, *Transforming Performance Measurement.*

Putting this information to use, the Coast Guard changed the focus of its marine safety program from outputs to outcomes in its first business plan, dated January 1994. After all, it came to recognize, the mission of the marine safety program was not to do more and better inspections of vessels, but to save lives. As a result, the Coast Guard shifted its resources and realigned its processes away from inspections and toward other efforts to reduce marine casualties. In addition, it identified a significant role for the towing industry in the marine safety program and looked for opportunities to work with its stakeholders in the towing industry to reduce casualties in the field.... This joint effort contributed to a significant decline in the reported towing industry fatality rate: from 91 per 100,000 industry employees in 1990 to 27 per 100,000 in 1995.[7]

In a more recent study, the USCG performance management framework was used as an example of a best practice for its focus on outcomes and ability to analytically support multiple decision-making processes. John Whitley stated:

The United States Coast Guard (USCG) has a diverse set of missions including search and rescue, navigation aids, migrant and drug interdiction, environmental protection, fishery law enforcement, and direct military operation support to DoD [Department of Defense]. It performs these missions with capital-intensive, long-lived air and marine assets that make resource allocation decisions particularly long-term and complex. In dealing with these challenges, USCG has developed a rigorous suite of data products and performance measures and integrated them into the full range of governance decision-making processes, including its budget formulation.[8]

USCG performance function starts with capturing extensive data on its mission outcomes:

- **Search and rescue**: The number of people saved and not saved by circumstances, location, and time.

- **Migrant and drug interdiction**: The number of migrants and drugs interdicted by type, location, and time.

- **Environmental protection**: Environmental incidents by type, location, and time.

From these databases, USCG can generate a variety of outcome and output performance measures, such as:

- Percent of people in imminent danger saved in the maritime environment,

- Average number of commercial mariner deaths and injuries,

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[7] GAO, "Executive Guide."

[8] John Whitley, *Four Actions to Integrate Performance Information with Budget Formulation* (Washington, DC: IBM Center for The Business of Government, 2014).

- Percent of undocumented migrants attempting to enter the United States by maritime routes who are interdicted, and

- Average number of oil spills in the maritime environment.

There are three key features of the USCG performance function. The first is that by maintaining comprehensive data in unified databases, the performance function can modify these measures (including developing whole new measures with complete historical trends) as needed to meet specific decision-making needs. This flexibility is valuable in the fast-paced, dynamic world of budget decision-making.

A second feature of the performance function is that USCG has developed models to forecast each of these performance measures under different scenarios. For example, USCG can use past trends in distress calls and search and rescue events, along with other factors, to project the likely distribution and frequency of such events in the future. This allows USCG to use its performance measures to directly support the full range of governance decision-making. For example:

- **Strategic planning and requirements determination**: USCG can project different sizes and compositions of its maritime fleet and then evaluate these alternatives against its suite of performance measures. With its forecast of distress calls, USCG can simulate its ability to respond under different configurations of its fleet (e.g., a small number of bigger boats and a larger number of smaller boats) and rigorously project target values for this performance measure for each alternative. Replicating this across its suite of measures, USCG can rigorously and quantitatively evaluate the fleet mix alternatives across its full range of missions.

- **Budget formulation**: USCG can assess alternative resource allocations (e.g., different levels of resources as well as different allocations, such as funding more steaming hours in prime fishery areas or prime recreational boating areas) and make performance-informed judgments about the merits of each alternative.

A third feature is that, in addition to measuring realized performance at the close of each year, USCG has an integrated cost accounting system (e.g., log books on boats) that enables actual expenditure estimates for each mission area. This allows precise comparison of actual spending and performance results, which can be used for both management accountability and to refine the forecast models for future cycles.

In summary, USCG's performance function exemplifies how performance information can be structured and used as a decision-making aid. It is collected and stored as a flexible data product. Investments have been made to develop forecast models for the performance measures, and the performance information can be integrated directly with resource data. These features illustrate that the performance function should be first and foremost an analytical function:

- The key use of performance data is to compare alternatives (point estimates are not enough)

- Performance data can be developed and delivered on a timeline that meets the needs of the budget formulation process (and other governance processes)

C. CompStat Model

The law enforcement community has been a pioneer in the outcome-focused measurement and reporting of performance, and in using these data to guide enforcement activities and investments to support strategic goals and outcomes.[9] Although important work preceded NYPD's CompStat program (e.g., development of the Uniform Crime Reports by the FBI goes back to 1929),[10] CompStat is the first and most frequently-cited example of a comprehensive outcome-based performance management framework in modern law enforcement.[11] CompStat, which began in 1994, uses real-time data collection and analysis to inform strategic, tactical, and resource allocation decisions and ensure accountability at multiple levels of a complex government entity. Following successful implementation in New York,[12] the CompStat model (generalized to PerformanceStat) spread to over half of the metropolitan police departments in the United States as well as a host of local, state, and federal government entities.[13]

The CompStat model and its successors are based upon several core principles: (1) articulation of goals and objectives; (2) identification of performance indicators; (3) accurate, timely intelligence and analysis; (4) rapid deployment of resources; (5) effective tactics; and (6) relentless follow-up and assessment.[14] The NYPD version of CompStat implemented these principles in the following manner. First, local precinct commanders would submit a standardized report of crimes committed within their jurisdictions to NYPD headquarters. As shown in Figure A-1, these reports contained

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[9] This section is adapted from Alden et al., "External Evaluation (Validation and Verification) of Draft Border Security Strategic Metrics for the DHS Southern Border and Approaches Campaign," IDA Paper P-5225 (Alexandria, VA: Institute for Defense Analyses, January 2015).

[10] "Uniform Crime Reports," The FBI: Federal Bureau of Investigation, http://www.fbi.gov/about-us/cjis/ucr/ucr.

[11] Robert D. Behn, *The PerformanceStat Potential: A Leadership Strategy for Producing Results*, Ash Center for Democratic Governance and Innovation (Washington, DC: Brookings Institution Press, June 2014); and Harry Hatry, *Transforming Performance Measurement*: "The PerformanceStat approach began in 1994 when the New York City Police Department introduced its CompStat program."

[12] Implementation of CompStat in New York coincided with a substantial drop in crime rates.

[13] See, e.g., Harry Hatry and Elizabeth Davies, *A Guide to Data-Driven Performance Reviews* (Washington, DC: The Urban Institute, 2011), 7.

[14] Paul E. O'Connell, *Using Performance Data for Accountability: The New York City Police Department's CompStat Model of Police Management* (PricewaterhouseCoopers Endowment for the Business of Government, 2001).

data on seven felony crimes and seven misdemeanors for a specific week, month, and year, and compared current crime statistics to crime statistics of prior years.

CompStat

Citywide

Report Covering the Week 12/22/2014 Through 12/28/2014

Crime Complaints

	Week to Date 2014	2013	% Chg	28 Day 2014	2013	% Chg	Year to Date* 2014	2013	% Chg	2Year % Chg (2009)	5Year % Chg	21Year % Chg (1993)
Murder	4	6	-33.3	28	23	21.7	321	334	-3.9	-22.7	-31.0	-83.2
Rape	25	15	66.7	104	90	15.6	1,344	1,374	-2.2	-7.1	12.9	-58.1
Robbery	322	366	-12.0	1,318	1,504	-12.4	16,326	18,994	-14.0	-18.4	-11.3	-80.8
Fel. Assault	301	421	-28.5	1,271	1,511	-15.9	19,971	20,207	-1.2	3.2	19.8	-51.2
Burglary	292	351	-16.8	1,241	1,482	-16.3	16,541	17,364	-4.7	-13.5	-14.1	-83.5
Gr. Larceny	706	821	-14.0	3,292	3,806	-13.5	43,317	45,144	-4.0	1.9	10.6	-49.1
G.L.A.	163	147	10.9	608	593	2.5	7,608	7,311	4.1	-4.9	-27.9	-93.1
TOTAL	1,813	2,127	-14.76	7,862	9,009	-12.73	105,428	110,728	-4.79	-4.91	-0.27	-75.33
Transit	41	53	-22.6	169	251	-32.7	2,197	2,592	-15.2	-18.9	8.4	xxx.x
Housing	91	125	-27.2	347	433	-19.9	4,945	5,281	-6.4	0.4	22.2	xxx.x
Petit Larceny	1,243	1,536	-19.1	5,950	6,326	-5.9	84,398	84,731	-0.4	2.7	5.3	xxx.x
Misd. Assault	671	801	-16.2	2,917	3,151	-7.4	43,681	43,599	0.2	-2.5	1.0	xxx.x
Misd. Sex Crimes	33	29	13.8	239	156	53.2	2,818	2,648	6.4	-9.9	-6.8	xxx.x
Shooting Vic.	29	29	0.0	109	79	38.0	1,380	1,287	7.2	-14.4	-19.6	-76.3
Shooting Inc.	26	26	0.0	92	72	27.8	1,162	1,096	6.0	-14.7	-17.6	-77.8

Historical Perspective
(Historical perspective is a complete calendar year of data.)

	1990	1993	1998	2001	2013	%Chg '13 vs '01	%Chg '13 vs '98	%Chg '13 vs '93	%Chg '13 vs '90	
Murder	2,262	1,927	629	649	335	-48.4	-46.7	-82.6	-85.2	Murder
Rape	3,126	3,225	2,476	1,930	1,378	-28.6	-44.3	-57.3	-55.9	Rape
Robbery	100,280	85,892	39,003	27,873	19,128	-31.4	-51.0	-77.7	-80.9	Robbery
Fel. Assault	44,122	41,121	28,848	23,020	20,297	-11.8	-29.6	-50.6	-54.0	Fel. Assault
Burglary	122,055	100,936	47,181	32,694	17,429	-46.7	-63.1	-82.7	-85.7	Burglary
Gr. Larceny	108,487	85,737	51,461	46,291	45,368	-2.0	-11.8	-47.1	-58.2	Gr. Larceny
G.L.A.	146,925	111,622	43,315	29,607	7,400	-75.0	-82.9	-93.4	-95.0	G.L.A.
TOTAL	527,257	430,460	212,913	162,064	111,335	-31.30	-47.71	-74.14	-78.88	TOTAL

The above CompStat figures are posted on Monday, one week after the closing date.

Figure A-1. CompStat Report from 12/22/2014 through 12/28/2014

Second, NYPD headquarters analyzed this weekly data to identify emerging trends in criminal activity. Third, precinct commanders and NYPD leadership used this analysis to inform resource and strategic decision making at bi-weekly "Crime Control Strategy Meetings" with precinct commanders. CompStat's use of multiple outcome measures enabled identification and targeting of specific problems through timely interventions, developed and implemented primarily by precinct commanders. Finally, the NYPD subsequently used CompStat data to evaluate the effectiveness of these NYPD interventions and the performance of precinct commanders.

An important element of CompStat is its focus on outcomes (crime rates). In discussing CompStat after his service as mayor, Rudolph Giuliani stated that the shift in

focus from outputs (arrests) to outcomes had a major impact on the NYPD and its focus on producing results. His comments are very similar to the finding of the GAO in the discussion of the USCG's marine safety program in Section B of this appendix. Mayor Giuliani stated:

> We were equating success with how many arrests were made. A police officer was regarded as a productive police officer if he made a lot of arrests. He would get promoted. A police commander in a precinct would be regarded as a really good police commander if his arrests were up this year. This wasn't the only measure of success, but it was the predominant one.
>
> Arrests, however, are not the ultimate goal of police departments or what the public really wants from a police department. What the public wants from a police department is less crime. So it seemed to me that if we put our focus on crime reduction and measured it as clearly as we possibly could, everybody would start thinking about how we could reduce crime. And as a result, we started getting better solutions from precinct commanders.[15]

Police Commissioner Bratton has used an even more direct statement of this: CompStat focused commanders on

> crime trends with the same hawk-like attention private corporations pa[y to] profits and losses. Crime statistics have become the [police] department's bottom line, the best indicator of how police are doing precinct by precinct and citywide.[16]

The CompStat and PerformanceStat revolution provides examples of how outcome-based performance management frameworks are used in practice and how the data may be displayed for senior leadership and public use. Key examples of the use of the outcome performance measures illustrated in the CompStat example (and the USCG example in Section B of this appendix) include:

- **Operational and investment decision making**: By clearly identifying and measuring outcomes, decisions over operational tactics and priorities and resource investments can be based on how they affect the desired outcomes.

- **Unity of effort and cultural change**: By clearly identifying and measuring outcomes, decision making up and down the organization can be unified to focus on these outcomes. Some of the IDA researchers involved in this paper have conducted numerous interviews of border security officials over many

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[15] Rudolph Giuliani, "Restoring Accountability to City Government."

[16] Dennis C. Smith and William J. Bratton, "Performance Management in New York City: CompStat and the Revolution in Police Management," in *Quicker Better Cheaper? Managing Performance in American Government*, ed. Dall W. Forsythe (Albany, NY: Rockefeller Institute Press, 2001), 453–482.

years. One comment heard with some regularity is that "our job is not really to address the flow of illegal migrants (or drugs). We have never been resourced to seal the border, so our strategic objectives are not about migrant (or drug) inflow. Success for us might be measured by disrupting criminal smuggling networks or substantial modification of smuggling tactics." Besides being contrary to the goals identified in DHS strategic documents (QHSR and Strategic Plan) and governing statutes,[17] this reasoning demonstrates the unity of effort challenges of not focusing on outcomes. Dismantling criminal networks and modifying smuggling tactics are not ends in themselves; they are means to an end. Failure to focus an organization up and down its levels of command and decision making on unified objectives risks driving inefficient and uncoordinated decision making.

- **Accountability**: With clear, objectively measured outcomes, a clear chain of accountability can be established in a consistent way from the operators in the field to the Secretary, President, and the Congress. It should be noted, however, that setting quantitative out-year performance measure targets for flow, apprehension rate, and consequences is not necessary for achieving this accountability and could even be counterproductive.[18]

The CompStat display also offers some key insights into the display of the performance measures, including:

- **Column structure**: The columns in the CompStat display provide a meaningful time series of values so that trends can be identified and specific comparisons, such as two similar weeks and two similar years, can be made. This aids the reader in understanding and using the data to understand crime in New York.

- **Row structure**: The rows in CompStat are "parallel" in their construction. Each row is an outcome measure for a specific mission and the display does not put an outcome measure (crime rate) on one row, juxtaposed with an output measure (e.g., apprehensions or apprehension rate) on another, juxtaposed with an operational measure (e.g., average dollar value of robberies) on yet another. This demonstrates a logical coherence to the display rooted in its rigorous understanding of the law enforcement challenges it is informing.

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[17] IDA performed a high level review of these laws as part of its evaluation (Alden et al., "External Evaluation (Validation and Verification) of Draft Border Security Strategic Metrics") and found them to be consistent with the language of the 2014 QHSR (see Title 8 U.S.C., §1325).

[18] See Whitley, *Five Methods*, 29, for a discussion of this. It states, "[p]erhaps targets should not be used in the initial years of developing and socializing the data, both because of data quality and maturation concerns and because of the cultural changes that introducing the estimates create[s]."

Although CompStat provides a valuable example of outcome-focused, data-driven law enforcement management and performance measurement, there are differences between NYPD and DHS law enforcement. Two key differences are:

- **Less observable outcomes**: Federal crimes such as illegal immigration and drug smuggling often go undetected—failing to leave a trail of administrative records for estimation of crime rates. The perpetrators of these crimes prefer not to get caught, and few directly affected victims exist with incentives to notify law enforcement officials. Federal law enforcement organizations are left with the challenge of how to estimate unobserved events. This is the reason for this paper—crime rates for border security are unobserved and have to be estimated.[19]

- **Broader geographic and temporal scope**: The southwest land border is over 1,900 miles long; the maritime border is similarly dispersed. Although operational and investment decision making for the NYPD may be equally complex, it is different in nature. This, combined with the above challenge in estimating crime rates, means that a PerformanceStat approach to border security will likely have a longer time period to its reporting (e.g., quarterly instead of weekly). In addition, informing decisions over long-lived resource investments involves in-depth analytic understanding of the effect on outcomes of investment alternatives driving a more deliberative and analytically based decision-making process.

Another difference is the nature and degree to which various non-enforcement factors affect the crime rate. The rates of all crime, whether violent and property crimes at the local level or illegal immigration and drug smuggling at the federal level, are affected by many factors outside of the control of law enforcement officials. But the importance of different individual factors like economic, safety and security, and social influences is different for illegal immigration than for crimes of predominantly state and local jurisdiction. It has been argued that these non-law enforcement factors are more important in determining illegal immigration and drug smuggling rates than in determining local crime rates, but this has not been empirically tested and it remains unknown if this is correct. To emphasize the role law enforcement is playing in effecting the strategic outcomes, the BorderStat display includes the strategic output measures related to law enforcement activity (apprehension rate and consequences) in addition to the outcome measures (inflow of migrants).

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[19] It is important to note, however, that this measurement challenge is not unique to federal crimes. No criminal wants to be detected and apprehended. State and local law enforcement organizations struggle with the accurate measurement of crimes such as rape, drug use, and prostitution within their jurisdictions—even murder can be surprisingly hard to measure. This difference is one of degree, not of kind.

Appendix B.
Consequence-Generated Deterrence

The econometric-based estimates of deterrence presented in the main body of this paper are developed using a methodology that exploits variation in the application of high-impact consequence programs across time and border patrol sectors. The variation was created by the expanded use of consequences beginning in FY 2005.

A.   The Introduction of High-Impact Consequence Programs

The consequences administered through the Consequence Delivery System (CDS) can be grouped into three categories: (1) administrative, (2) programmatic, and (3) criminal. The administrative consequence programs were introduced to all sectors in FY 2005, while programmatic and criminal consequence programs were introduced in the mid-2000s in certain sectors and expanded to others through FY 2009. Not all programs operate within every sector. All apprehended migrants will receive one of the several administrative consequences (which include voluntary returns (VRs)). Application of a programmatic or criminal consequence depends upon the circumstances of the subject's arrest.

The CDS was designed to create deterrence both "at the border" (discourage apprehended migrants from making a subsequent crossing attempt) and "behind the border" (discourage Mexicans from leaving their homes and coming to the border to attempt a first crossing). The focus of this analysis is on at-the-border deterrence. While deterrence is not a variable directly observable by DHS, we can estimate the impact of consequence programs on re-apprehension rates. We can also examine how the self-reported survey deterrence levels changed as the CDS went into effect. Figure B-1 shows trends in these variables over time. From FY 2000 through FY 2004, re-apprehension rates remained stable, hovering between 34 and 36 percent, while the EMIF-based deterrence rate declined gradually from 21 to 11 percent. Between FY 2005 and FY 2009, the period during which administrative consequence programs were operating and programmatic and criminal programs slowly expanded, re-apprehension rates continued to remain stable while deterrence rates began a gradual rise. Post-FY 2009, when criminal and programmatic consequences reached their full extent, re-apprehension rates began a gradual decline while self-reported deterrence rose sharply—increasing from 15 to nearly 60 percent.
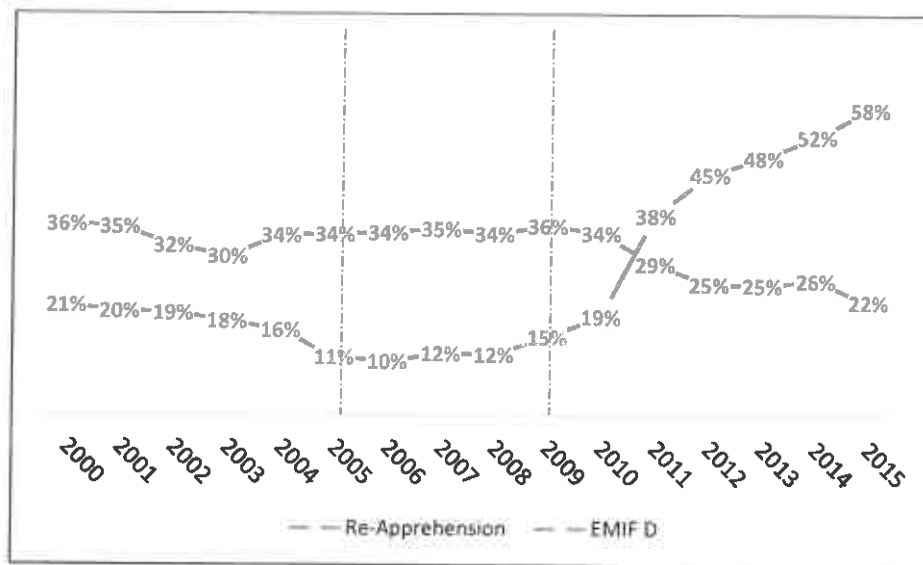
Figure B-1. Trends in Re-Apprehension and EMIF Deterrence, FY 2000–FY2015

The fall in re-apprehension rates and rise in self-reported deterrence correspond with the introduction and rise of CBP's consequence programs. While suggestive, this simple trend analysis cannot prove the relationship is a causal one given the many other factors that were changing at the same time.[1]

To obtain causal evidence on the impact of the various consequence programs on migrant recidivist behavior, an econometric model was developed. The following sections include a description of each of the administrative, programmatic, and criminal consequence programs that, together, have largely ended the VR regime. This includes basic program information, times series trends in program application, a discussion of how the mix of consequence programs and their use varies by border sector, and a discussion on how various consequence programs are combined. For each category of consequence programs (administrative, programmatic, and criminal) we also present results from simulation exercises that use the econometric model to estimate the impact of these programs on recidivist behavior. For full details on the current econometric methodology, data, and a discussion of modeling challenges and future improvements, see the stand-alone Technical Annex to this report.

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[1] These factors include things directly affecting the probability of apprehension (changes in tactical infrastructure, level of agents, technology deployment), economic conditions in the United States and Mexico (relative wage differences, demand for labor), crime rates on the Mexican side of the border, and smuggling cost.

1. Administrative Consequences

The four main administrative consequences received by apprehended migrants include VR, Expedited Removal (ER), Reinstatement of Removal (RR), and Warrant of Arrest/Notice to Appear (WA/NTA).[2] Our analysis will focus on the first three of these, which collectively account for over 90 percent of all administrative consequences and 100 percent of the administrative consequences assigned to the migrants included in the RTM population.[3]

ERs and RRs are considered formal removals from the United States and come with a ban on reentry for a period of five years or longer. The first time a migrant is apprehended, they receive an ER (unless the agent decides to let them return voluntarily). If a migrant is apprehended a second time, their ER may be reinstated (becoming an RR) and the ban on reentry may be increased. While these consequences do not come with a jail sentence on their own, having formal removals on a migrant's record increases the potential for future prosecution and more severe sentencing. For instance, a migrant who has been formally removed from the United States (via an ER or RR) becomes eligible for prosecution under section 1326 of the US Code (Reentry of removed aliens), which is a felony offense. Migrants who have never been formally removed from the United States, including those granted VR, are only eligible for prosecution under section 1325 (Improper entry by an alien), which is a misdemeanor offense.

Figure B-2 shows the breakdown of administrative consequences over time for the RTM population. In FY 2009, roughly 10 percent of the RTM population received an ER. This grew at a good rate until 2013, when it leveled off at just under 60 percent. As the number of formal removals increased, growth in RRs also naturally occurred.

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[2] Administrative consequences are captured by the Disposition data field.

[3] Aliens who receive a WA/NTA are subjects who CBP agents process with the intent that the alien should be detained in DHS custody pending a hearing before an immigration judge. These individuals are not included in our RTM population for reasons described in the Technical Annex.
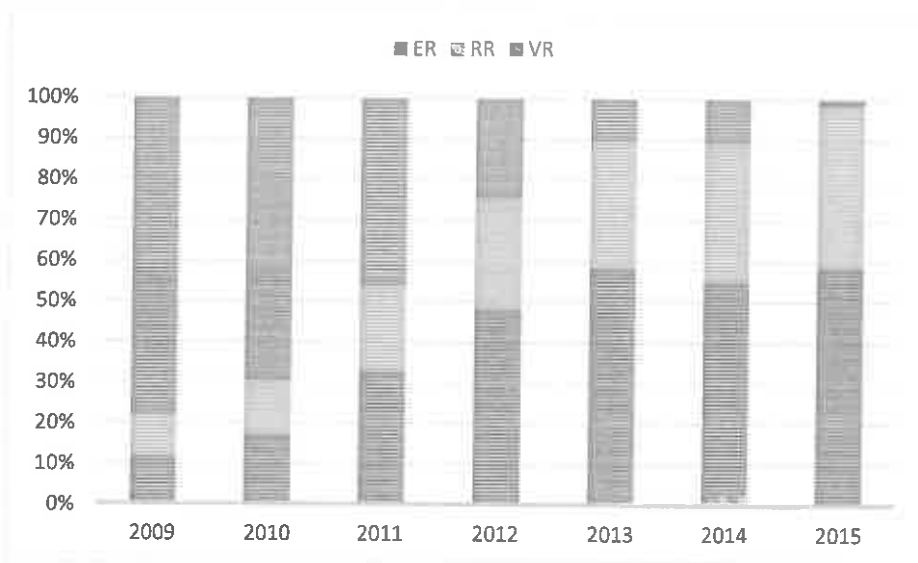
Figure B-2. Administrative Consequence Application, FY 2009-2015

While little evidence on the true impact of these programs exists, preliminary results from our model suggest re-apprehension would have been significantly higher without the increased use shown above. Figure B-3 plots the actual one-year re-apprehension rate (blue line) versus the simulated re-apprehension rate that would have occurred if ERs and RRs were not in use (red line). The green line shows the simulated re-apprehension rate if no CDS programs were in use. Results suggest administrative consequences may have lowered the one-year re-apprehension rate by as much as 14 percent, once they were being utilized at high rates.
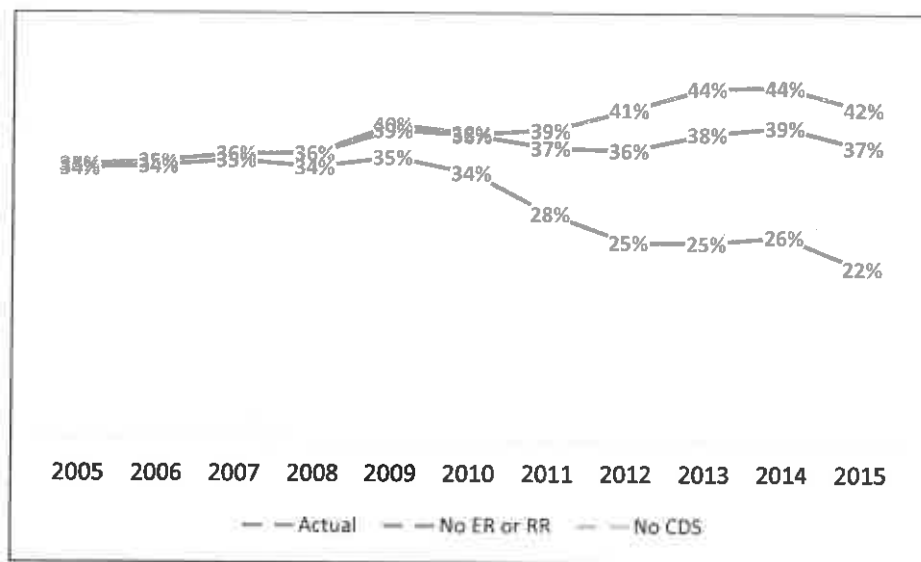
Figure B-3. Simulated Re-apprehension without Administrative Consequences

2. Programmatic Consequences

CBP has used two programs to repatriate Mexican nationals to geographic areas different from that of their entry location. These programs are designed to disrupt the coordination between the migrant and their smuggler and thus increase the migrant's cost of making a subsequent entry attempt. Today, only one of the programs remains in effect.

Systematic nationwide recording of data on the Alien Transfer Exit Program (ATEP) began in FY 2009. Sectors using the ATEP at that time were El Centro, San Diego, Tucson, and Yuma. Additional sectors began using ATEP in FY 2011; today it is used in seven of nine sectors (with only Big Bend and El Paso abstaining). Only Mexican males over the age of 18 are eligible for participation in the program. The program was referred to as a lateral transfer program as aliens were transferred by bus across the US-Mexico border. For instance, in 2015, Tucson had the highest number of ATEP cases, followed by San Diego. The majority of migrants who received ATEP in the Tucson sector were transported to Calexico, CA, roughly 300 miles away, while those apprehended in the San Diego sector were transported to San Luis, AZ, roughly 200 miles away.

The Mexican Interior Repatriation Program (MIRP)—only in effect until 2011—was used exclusively in Tucson and Yuma, with over 90 percent of applications coming from the Tucson sector. This program was referred to as a vertical transfer program, because migrants were flown back to the interior of Mexico. While generally believed to be effective, this program was very costly to operate.

Figure B-4 shows the application of programmatic consequence over time for the RTM population. In 2009, approximately 10 percent of the RTM population were sent through the ATEP program, while 3 percent were sent through MIRP. Use of the MIRP program increased slightly in 2010 to roughly 7 percent and then declined in 2011—its final year. The share of the RTM population being sent through the ATEP program expanded through 2012, when it peaked at roughly 48 percent, and has since then fallen to approximately 30 percent.
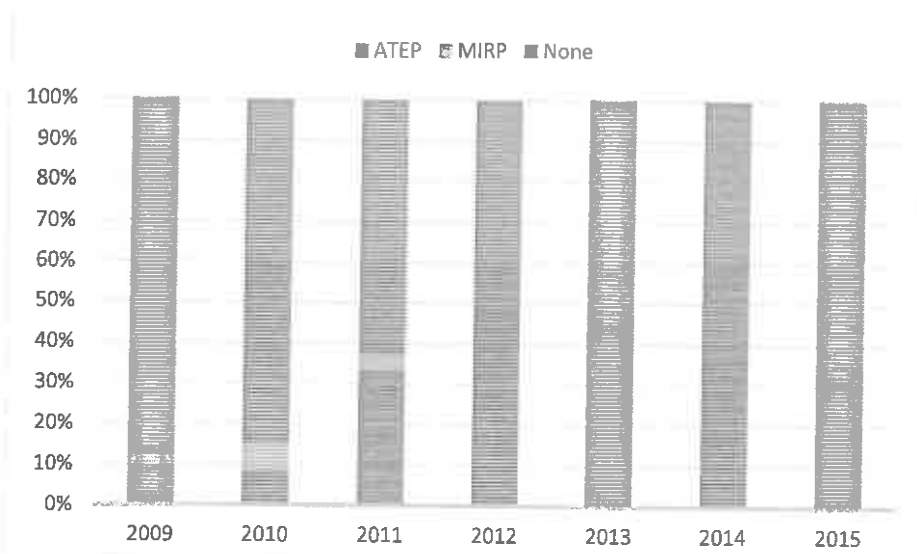
Figure B-4. Application of Programmatic Consequences, FY 2009-2015

Our estimates suggest that re-apprehension would also have been higher in the absence of the ATEP and MIRP programs, although not as high as it would have been in the absence of the administrative consequence programs.[4] See Figure B-5.

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[4] The use of programmatic consequence programs such as ATEP and MIRP began in some sectors prior to 2009, often on a small scale or experimental capacity. The apprehension records, however, do not record the receipt of these consequences until FY 2009. Therefore, a small share of apprehension records do not correctly reflect the migrant's true consequence experience. While this could have some impact on model predictions prior to 2009, the small number of observations affected make this unlikely.
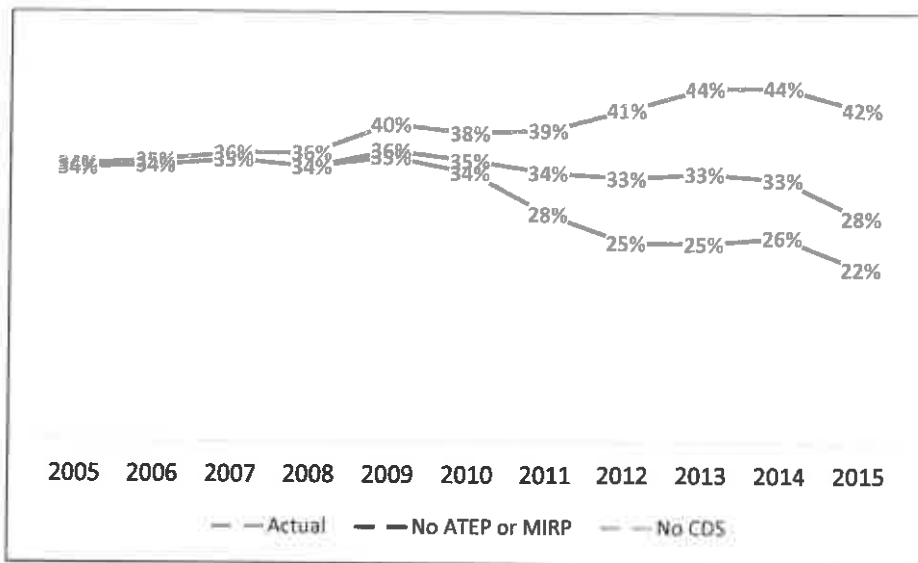
Figure B-5. Simulated Re-Apprehension without Programmatic Consequences

3. Criminal Consequences Program

The two main criminal consequences included in the CDS are Operation Streamline (OS) and Standard Prosecutions (SP).[5] OS went into effect starting in the Del Rio Sector in FY 2006 and expanded to other sectors through FY 2009.

OS is typically utilized for section 8 U.S.C. §1325 (misdemeanor illegal entry and felony illegal reentry) prosecutions. The program relies heavily upon the collaborative efforts of CBP, the Federal Judiciary, the US Attorney's Office, the US Marshal's Service, US Immigration and Customs Enforcement, and the Department of Justice Executive Office of Immigration Review. It is not active in all nine border sectors.

A standard prosecution is the criminal prosecution of a subject for violation of US immigration laws and/or any other federal laws that CBP has the authority to enforce; any criminal prosecution not otherwise defined as a Streamline prosecution in participating sectors is a standard prosecution.

Figure B-6 shows the application of criminal consequence over time for the RTM population. The share of the RTM population being prosecuted through OS was approximately 7 percent during the first year of operation. This share increased gradually to 14 percent by 2013 and 2014 and then declined slightly to 12 percent for FY 2015.

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[5] A third criminal program, called Operation against Smugglers Initiative on Safety and Security (OASISS), also exists. This program is a bilateral criminal prosecution agreement between the United States and Mexico. We do not estimate the impact of this program because known and suspected smugglers are removed from our RTM data sample.

Less than 1 percent of the RTM population received standard prosecutions in FY 2009 and 2010, but application of this consequence program grew slowly over time to its current peak of 12 percent.
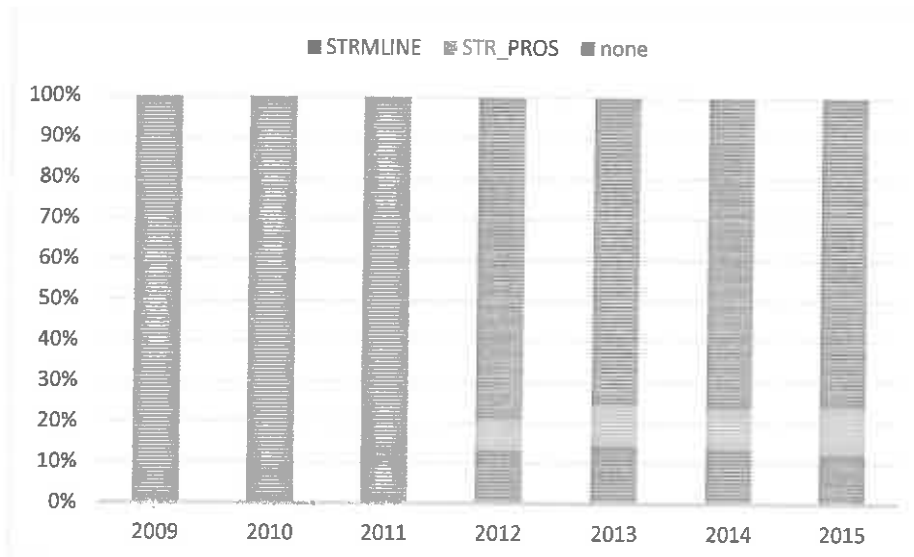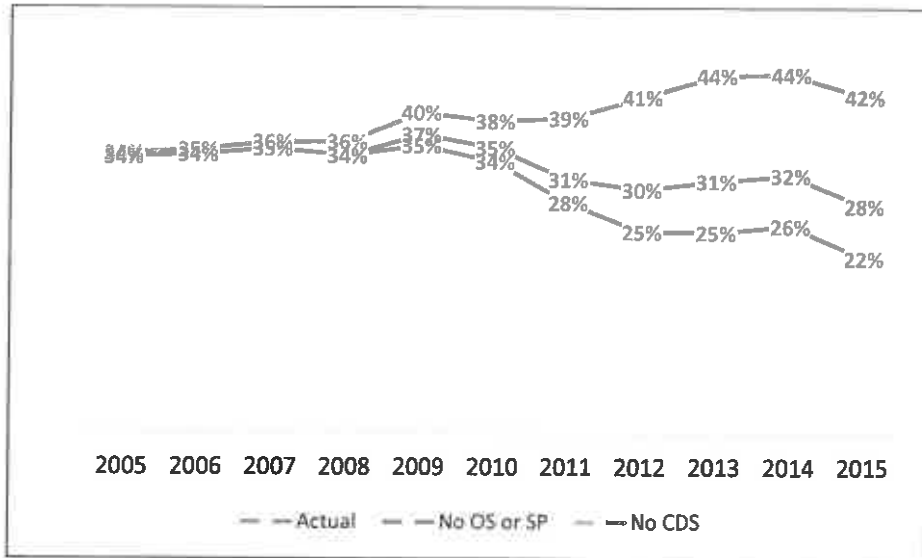

Figure B-6. Application of Criminal Consequence Programs, FY 2009–2015

Preliminary estimates suggest re-apprehension would have been higher without the criminal consequence programs. Figure B-7 plots actual re-apprehension rates versus the simulated re-apprehension rate that would have occurred if OS and SPs were not in use.[6]

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[6] The use of the criminal consequence program OS began prior to 2009 in some sectors on a small scale basis. Standard prosecutions were in use in all sectors over our entire sample period. The apprehension records, however, do not record the receipt of these consequences until FY 2009. Therefore a small share of apprehension records do not correctly reflect the migrant's true consequence experience. While this could have some impact on model predictions prior to 2009, the small number of observations affected make this unlikely.

Figure B-7. Simulated Re-Apprehension without Criminal Consequences

a. Variation in Consequence Application across the Southwest Border

It is important to note that the southwest land border spans over 2,000 miles, crossing four US states (Arizona, California, New Mexico, and Texas), three circuit court districts, and nine border patrol sectors. The different jurisdictions introduce a fair amount of variation in the mix of consequences deployed in a given sector. Recall, some consequence programs are not operated in all sectors. Other consequences, particularly MIRP, were only in effect for a short period of time in a limited area. OS began in only a few sectors, but expanded to others over time. More recently, its use appears to have been suspended in the Rio Grande Valley (RGV) sector.

Figure B-8 provides a geographic snapshot of the consequence mix each sector deployed for FY 2015. The variation is quite clear. For instance, some sectors, like San Diego, make very little use of criminal consequence programs but have a high use of programmatic consequences (mainly ATEP). Other sectors, such as Yuma, Del Rio, and Big Bend, have a very high utilization of consequence programs. The two highest flow sectors, RGV and Tucson, also apply criminal consequences, but their application rates are lower, perhaps due partially to processing and capacity constraints.
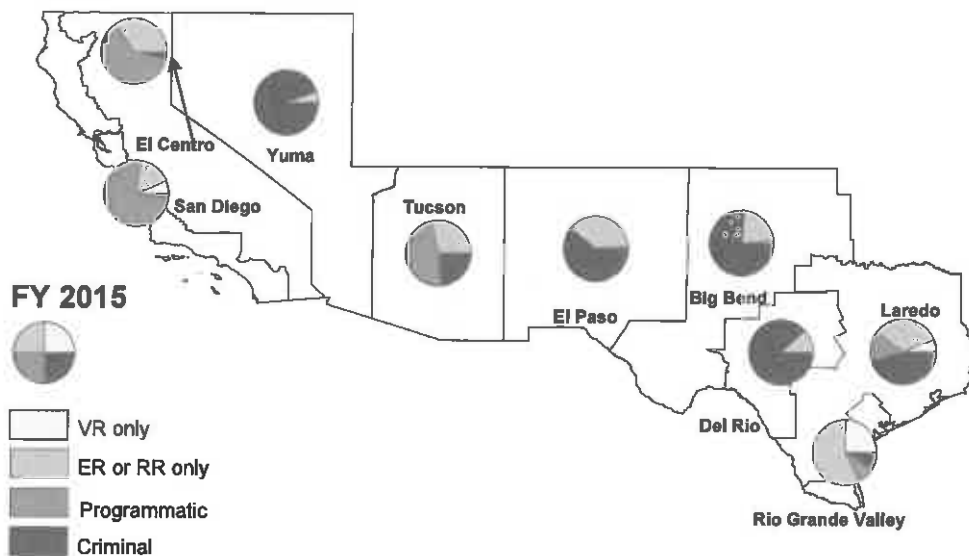
B-9

FY 2015

VR only
ER or RR only
Programmatic
Criminal

Figure B-8. Consequences by Sector for FY 2015

b. Combining Consequences

Each of the consequence programs discussed above may be assigned as a stand-alone consequence or in conjunction with several others. For instance, one individual may receive an ER, while another receives an ER combined with an ATEP. Similarly, a migrant recommended for a criminal prosecution (OS or SP) might also receive an ER or RR as their administrative consequence, but they could also receive a VR.

Figure B-9 illustrates the various pairings of administrative consequences with the programmatic and criminal consequences for 2009–2014. Each bar represents a programmatic or criminal consequence program (or a combination of the two). They move from the least severe (no criminal or programmatic consequence) to most severe (ATEP or MIRP combined with criminal consequences). The shading represents the accompanying administrative consequences. It is clear from the figure that the majority of individuals receiving criminal consequence programs will also be subject to formal removals (ER or RR). Just over 30 percent of migrants who receive the ATEP programmatic consequence received a VR, while the remainder are formally removed. The use of VRs is highest among the group that receives no programmatic or criminal consequences (just under 60 percent).
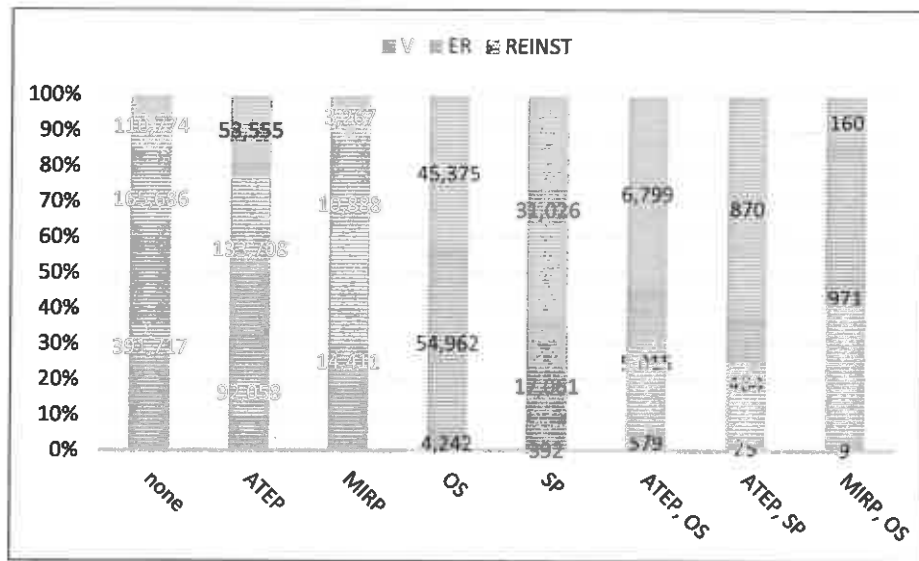
Figure B-9. Pairing of Administrative Consequences with Programmatic and Criminal Consequences for 2009–2014

Accounting for these interactions is important to DHS as its researchers attempt to determine the marginal impact of each consequence program in isolation as well as synergies that may be gained by applying them together. The econometric estimates presented here take these interactions into account.

Illustrations

Figures

Tables

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Abbreviations

ATEP	Alien Transfer Exit Program
BCI	Border Conditions Index
CBP	Customs and Border Protection
CCDB	Consolidated Counterdrug Database
CDS	Consequence Delivery System
COLEF	El Colegio de la Frontera Norte
DHS	Department of Homeland Security
DoD	Department of Defense
EMIF	Encuesta sobre Migración en las Frontera de México
EPIC	El Paso Intelligence Center
ER	Expedited Removal
FBI	Federal Bureau of Investigation
FMUA	Family Member Unit Apprehension
FY	Fiscal Year
GAO	General Accounting Office/Government Accountability Office
IACM	Interagency Assessment on Cocaine Movement
ICE	Immigration and Customs Enforcement
IDA	Institute for Defense Analyses
IER	Interdiction Effectiveness Rate
INS	Immigration and Naturalization Service
MIRP	Mexican Interior Repatriation Program
MT	Metric Ton
NYPD	New York City Policy Department
OASISS	Operation against Smugglers Initiative on Safety and Security
OFO	Office of Field Operations
OS	Operation Streamline
POE	Port of Entry
QHSR	Quadrennial Homeland Security Review
RGV	Rio Grande Valley
RR	Reinstatement of Removal
SP	Standard Prosecution

UAC	Unaccompanied Alien Children
US	United States
USBP	United States Border Patrol
USCG	United States Coast Guard
VR	Voluntary Return
WA/NTA	Warrant of Arrest/Notice to Appear

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14. ABSTRACT

Measuring the level of security of US borders with respect to threats such as illegal migration and drug smuggling has been a long-standing and contentious challenge. This report provides estimates of key border security outcomes and enforcement outputs. The report is focused on outcomes specific to illegal migration and one illegal drug (cocaine) and, as such, does not provide a comprehensive assessment of border security with respect to all threats (e.g., heroin inflow and gun and currency trafficking are excluded). The initial results provided in this report are that the successful illegal entry of migrants across the southern border has significantly declined over the last 10 years, a large increase in deterrence of illegal migration has taken place, and the probability of being caught attempting illegal entry has risen. The report also reveals that the challenges on the border are evolving—in particular, with an increase in asylum seeking. The report is focused on presenting estimates of strategic outcome and output performance measures for the border and does not provide data or discussion on how DHS operates on the border, tactical and operational enforcement priorities, or the specific methods employed on the ground.

15. SUBJECT TERMS

BorderStat, southern border, border security, illegal migration, drug smuggling

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