

Efforts by DHS to Estimate Southwest Border Security between Ports of Entry

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**Homeland
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Securing the southwest land border against illegal immigration, smuggling of drugs and other contraband, and terrorist activities is a key part of the Department of Homeland Security's (DHS) mission, and a top priority for the White House, Congress, and the American public. On January 25, 2017, President Trump signed an Executive Order on "Border Security and Immigration Enforcement Improvements," reflecting these concerns.

In light of the effort and resources the Department has devoted to border security in recent decades, as well as the sustained public attention to the southwest border, Congress has directed the Department to provide more detailed reporting on southwest border security. The Consolidated Appropriations Act, 2017 directs the Department to publish "metrics developed to measure the effectiveness of security between the ports of entry, including the methodology and data supporting the resulting measures."¹

While DHS employs a number of concrete metrics to track border security operations, it is difficult to precisely quantify illegal flows because illegal border crossers actively seek to evade detection, and some flows are undetected. As a result, any effort to quantify illegal flows or calculate an overall enforcement success rate must rely on one or more estimation techniques. Measurement is also difficult because of the diversity and complexity of the enforcement mission along the United States' 2,000-mile land border with Mexico.

For many years, the legacy Immigration and Naturalization Service addressed these challenges by relying on alien apprehensions as its proxy measure of illegal immigration between ports of entry. More recently, the U.S. Border Patrol (USBP) and DHS have initiated a number of new estimation strategies to better model unknown flows.² Some of this research remains a work in progress as DHS is not yet able to validate certain modeling assumptions or to quantify the uncertainty around its new estimation techniques. This report describes an array of indicators that, taken together, provide additional insight into the state of southwest border security between ports of entry (POEs). These indicators fall within two broad categories:

Estimated enforcement outputs refer to the immediate impact of enforcement policies. In particular: *how difficult is it for immigrants to cross the border illegally?*

- Apprehension or interdiction rate: the estimated share of intending border crossers that is apprehended or interdicted while attempting an illegal entry.
- Deterrence rate: the estimated share of unsuccessful border crossers who, following an apprehension, choose to remain in Mexico or return home rather than make an additional crossing attempt.
- Border crossing costs: estimated average fees paid by illegal border crossers to migrant smugglers.

¹ P.L. 115-31, Division F, §107(b). The *Fiscal Year 2017 National Defense Authorization Act* (P.L. 114-328) also directs the Department to report on a more comprehensive set of border enforcement measures; the Department will publish the required Border Security Metrics Report in 2017.

² Preventing illegal immigration across the southwest land border is just one element of border security. CBP is charged with securing all U.S. borders, at and between POE, against terrorists, illegal drugs, and other contraband, and with facilitating legitimate immigration and trade, among other responsibilities. DHS' overall border security and immigration enforcement missions also include combatting visa overstays and detaining and removing certain aliens from the interior of the United States, among other priorities. The report focuses exclusively metrics of illegal migration between ports of entry, and does not address this broader set of border security and immigration enforcement issues.



Estimated enforcement outcomes describe the bottom line number: how many people succeed in crossing the border illegally between POEs?

- Migrant apprehensions: USBP’s count of migrant apprehensions serves as a long-standing proxy measure of illegal flows.
- Known got aways: the estimated number of intending border crossers whom USBP directly or indirectly observes making a successful illegal entry.
- Estimated illegal inflows: based on a statistical model, the total estimated number of illegal border crossers who successfully enter the United States between POEs.

In light of still-unresolved concerns about some of this research, USBP and DHS also continue to pursue additional analytical frameworks to produce the most accurate possible estimates of the current state of border security. As USBP continues to increase domain awareness, the Department anticipates more precise observational estimates over time. These additional methodologies are in line with both the NDAA and the Presidential Executive Order 13767, “Border Security and Immigration Enforcement Improvements.”

This report describes these recent and ongoing efforts by DHS and USBP to better estimate southwest border security between POEs. For each indicator identified above, the report summarizes available data sources and techniques, explains the measure’s strengths and limitations, and presents available data. The report also describes the latest efforts by USBP to increase situational awareness at the border—an effort with important operational implications that also yields increasingly robust observational estimates of border security. A concluding section reviews recent trends and assesses the current state of border security. This report focuses exclusively on these specific efforts by the Department to better model unobservable factors that reflect the difficulty of crossing the border and the level of illegal migration flows between ports of entry along the southwest border; two forthcoming reports by the Department will present a more comprehensive set of enforcement metrics as directed by the Fiscal Year 2017 National Defense Authorization Act (NDAA, P.L. 114-328) and a broader analysis of the Department’s enterprise-wide border security efforts as directed by Executive Order 13767.



I. Enforcement Outputs

Enforcement outputs describe the immediate impacts of border security policies: how difficult is it for unauthorized immigrants to cross the border? Estimation strategies and data are available for three types of output indicators: apprehension or interdiction rate, deterrence rate, and border crossing costs. Notably, while apprehension and interdiction rate depend entirely on actions by USBP to secure the border itself, deterrence rate and border crossing costs are also influenced by enterprise-wide enforcement efforts involving other components within DHS as well as other federal, state, and local actors.

Apprehension or Interdiction Rate

The apprehension rate refers to the share of intending border crossers that is successfully apprehended by USBP, and the interdiction rate refers to the share that is either apprehended or “turned back,” meaning the alien abandons his or her crossing attempt and returns to Mexico. These are intuitive indicators because a perfect apprehension or interdiction rate would result in a perfectly secure border, though analysts do not consider this goal to be realistic or cost effective.³

In principle, DHS would calculate the apprehension or interdiction rate by dividing the number of intending aliens who are apprehended or interdicted by the total number attempting illegal entry, i.e., by the sum of apprehensions or interdictions and successful illegal entries. As noted above, missing information about successful illegal entries—sometimes referred to as the “denominator problem”—rules out this direct approach. As a result, DHS currently relies on three main approaches to estimate apprehension or interdiction rates.

Survey Data on Apprehension Rate

Several government and academic institutions sponsor long-running migrant surveys that include questions about migrants’ experiences trying to cross the border, including how often they crossed illegally and how often they were apprehended when attempting to cross.⁴ Survey data can be used to estimate an overall apprehension rate by dividing the total number of illegal entries by the sum of illegal entries and apprehensions in the survey sample, but this remedy to the “denominator problem” only shifts challenges to survey design and its true coverage.

³ See for example, U.S. GAO Director of Homeland Security and Justice Issues Rebecca Gambler, Testimony before U.S. House Committee on Homeland Security, Subcommittee on Border and Maritime Security, “Border Patrol: Goals Not Yet in Place to Inform Border Security Status and Resource Needs,” GAO-13-330T, February 26, 2013, <http://www.gao.gov/assets/660/652331.pdf>; Edward Alden, “Immigration and Border Control,” *Cato Journal* 32, 1 (Winter 2012): 107-124, <https://object.cato.org/sites/cato.org/files/serials/files/cato-journal/2012/1/cj32n1-8.pdf>.

⁴ Key surveys include the Mexican Migration Project (MMP), a binational household survey by Princeton University and the University of Guadalajara (Mexico) conducted annually in Mexico and the United States every year since 1982; the Mexican Migration Field Research Program (MMFRP), a binational household head survey by the University of California – San Diego conducted every year since 2004 in a rotating set of three migrant-sending communities in Mexico and corresponding migration destinations in the United States; and the Survey of Migration at Mexico’s Northern Border (EMIF, by its Spanish acronym), sponsored by the Mexican government and the College of the Northern Border and conducted annually since 1993 among samples of north- and south-bound migrants, including deportees. See Alicia Carriquiry and Malay Majmundar, eds., *Options for Estimating Illegal Entries at the U.S.-Mexico Border*, National Academies Press, 2013.

The USBP also collects information from detainees for intelligence purposes, and since 2011 the Alien Smuggler Identification and Deterrence (ASID) unit has attempted to interview a sample of aliens from each group apprehended from each station in each southwest border sector to gain situational awareness and to support tactical operations and criminal investigations.



A key advantage to migrant survey data is that they provide first-hand information about the apprehension rate: unauthorized migrants know how often they are apprehended. Yet survey data should be treated as estimates and interpreted with caution given the difficulty of constructing a valid sample of successful and unsuccessful border crossers. Migrants also may intentionally misrepresent their histories, particularly when being interviewed by USBP. Academic surveys led by Princeton University, the University of California – San Diego, and the College of the Northern Border in Mexico have reported apprehension rates of between 30 and 50 percent.⁵

Interdiction Effectiveness Rate and Total Interdiction Rate

The Interdiction Effectiveness Rate (IER) and Total Interdiction Rate (TIR) are calculated by dividing interdictions by estimated total illegal attempts. Both terms define interdictions the same way, as the sum of USBP apprehensions and USBP’s observational estimate of turn backs (see text box on following page). The terms differ in how they define total attempts: IER defines the denominator as the sum of apprehensions, turn backs, and the USBP observational estimate of known illegal entries, or “got aways” (see text box on following page); and TIR defines the denominator as the sum of apprehensions, turn backs, and a model-based estimate of total illegal entries developed for DHS by the Institute for Defense Analyses (IDA):⁶

$$IER = \frac{\textit{Apprehensions} + \textit{Turn backs}}{\textit{Apprehensions} + \textit{Turn backs} + \textit{Got aways}}$$

$$TIR = \frac{\textit{Apprehensions} + \textit{Turn backs}}{\textit{Apprehensions} + \textit{Turn backs} + \textit{Estimated illegal entries}}$$

An advantage to examining these interdiction rates, rather than an apprehension rate, is that they capture USBP’s actual enforcement practices, which include efforts to turn back border crossers, in addition to efforts to apprehend them. On the other hand, some analysts consider IER and TIR to be ambiguous indicators of enforcement success since an unknown share of turn backs make additional entry attempts.

As noted, IER and TIR rely on a mix of several different types of data: apprehensions are based on USBP administrative data; turn backs and got aways are estimates based on USBP agent observations; and estimated illegal entries are calculated from a mix of administrative and survey data. Therefore, there is not a straightforward way to describe the statistical significance of these estimates.

An advantage to using USBP’s observational estimates of turn backs and got aways in the IER is that these data are based on methodology USBP has been refining for over a decade, and one that the agency relies on for operational planning purposes.⁷ By relying exclusively on agent

⁵ El Colegio de la Frontera Norte, EMIF North: 2015 Annual Indicators, <http://www.colef.mx/emif/eng/indicadores.php>; Argueta, “Immigration Enforcement between Ports of Entry.”

⁶ See John W. Bailey et al., “Assessing Southern Border Security,” Institute for Defense Analyses, IDA Paper NS P-5304, May 2016.

⁷ In addition, since 2015, USBP has reported the IER in its Annual Performance Report as a performance measure pursuant to the Government Performance and Results Modernization Act (GPRMA) of 2010 (Pub. L. No. 111-352 § 4, 124 Stat. 3866, 3871-73 (codified at 31 U.S.C. § 1116)).



observations—both direct and indirect—turn backs and got aways are concrete approaches to estimating flows. The primary disadvantage to turn back and got away data has already been identified: that they exclude an unknown number of unobserved got aways—though USBP’s recent work to increase situational awareness, including through the use of Geospatial Intelligence, gives the Department growing confidence in its got away count (see [Known Got Aways](#)). An additional limitation to turn back and got away data is that they aggregate potentially subjective observations from thousands of individual agents, though USBP has taken a number of steps to establish reliable turn back and got away methodologies (see text box).

USBP Methodology for Counting Turn Backs and Got Aways

Illegal crossings primarily result in one of four potential outcomes: (1) a failed attempt resulting in an apprehension, (2) a detected successful entry or known got away, (3) a detected turn back, or (4) an undetected, presumably successful entry or unknown got away.

Since 2006, CBP agents at the southwest land border have reported on turn backs and got aways. A got away is defined as a subject who, after making an illegal entry, is not turned back or apprehended, and is no longer being actively pursued by USBP agents. A turn back is defined as a subject who, after making an illegal entry into the United States, returns to the country from which he or she entered, not resulting in an apprehension or got away.

Since 2014, USBP agents use standard border-wide definitions for determining when to report a subject as a got away or turn back. Some subjects are observed directly as evading apprehension or turning back; others are acknowledged as got aways or turn backs after agents follow evidence that indicate entries have occurred such as foot sign, sensor activations, interviews with apprehended subjects, camera views, and communication between and among stations and sectors. The scope of these data includes all areas of the southwest land border at or below the northernmost law enforcement posture (typically a USBP checkpoint) within a given area of responsibility, and those individuals apprehended less than 30 days after entering the United States.

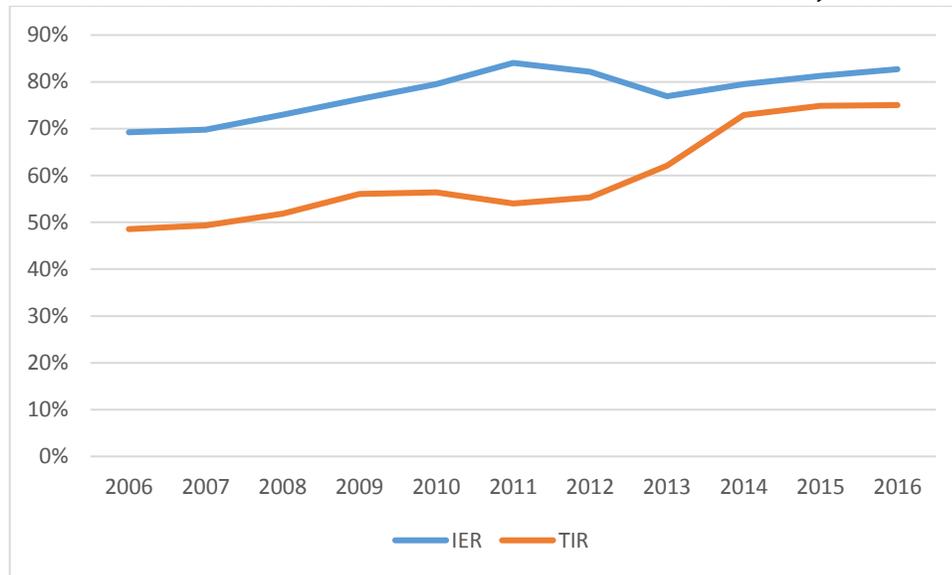
In an effort to maintain reliable best practices, command staff at all southern border stations ensure all agents are aware of and utilize proper definitions for apprehensions, got aways and turn backs at their respective stations. They also ensure the necessary communication takes place between and among sectors and stations to minimize double-counting when subjects cross more than one station’s area of responsibility. In addition to station-level safeguards, designated USBP Headquarters components validate data integrity by utilizing various data quality reports.

TIR, unlike IER, includes an estimate of total attempts in the denominator (i.e., estimated total illegal entries). However, the methodology used to calculate TIR makes a number of modeling assumptions that are difficult to validate or refine, as discussed below.

Figure 1 describes the IER and TIR for 2006 – 2016. As the figure indicates, IER increased from 69 percent in 2006 to 83 percent in 2016, while TIR increased from 49 percent to 75 percent during the same period. Notably, as long as some illegal entries evade USBP detection, the difference between known got aways and total illegal entries means that IER should always exceed TIR. The convergence of the two trends since 2006 suggests that as USBP works to increase domain awareness they are observing a larger share of border crossers.



Figure 1: Interdiction Effectiveness Rate and Total Interdiction Rate, 2006-2016



Source: U.S. Border Patrol; Office of Immigration Statistics calculations based on data provided by the IDA Corporation.
Notes: Data for 2006-2013 should be interpreted with caution since USBP first established uniform methodologies for estimating turn backs and got aways in 2014. TIR also should be interpreted with caution since DHS is still working to validate or refine a methodology for estimating total illegal inflows.

Partial Apprehension Rate

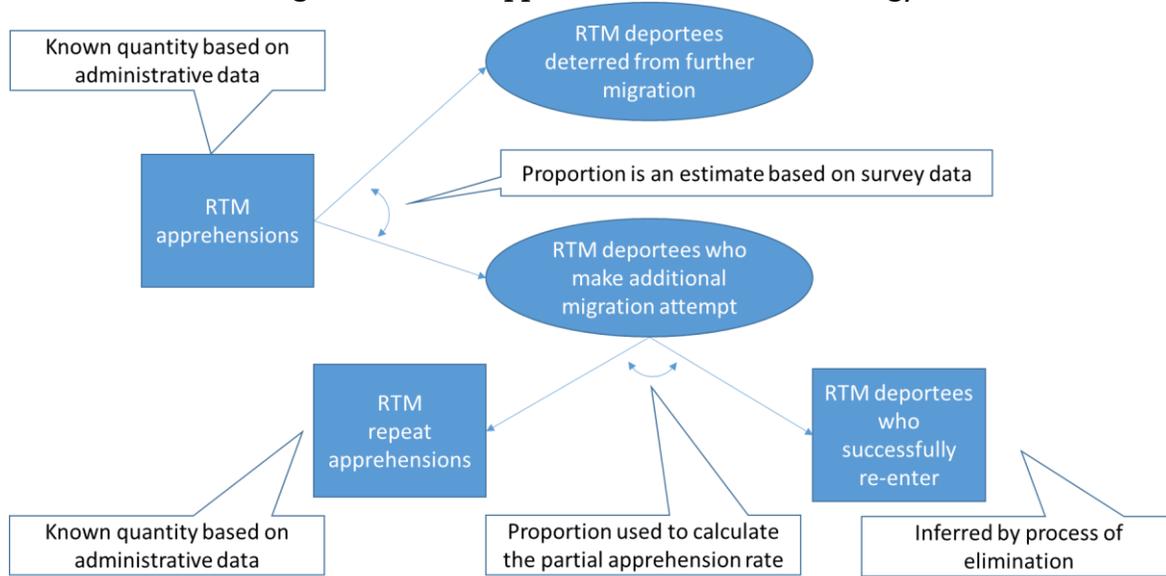
IDA’s methodology for estimating illegal entries is based on an estimated apprehension rate for only a particular subset of border crossers and is, therefore considered to be a partial apprehension rate (PAR). The PAR is estimated based on a long-standing social science methodology known as the Repeated Trials Model (RTM).⁸ The approach focuses on illegal border crossers who are apprehended and deported to the Mexican border and who make a subsequent re-entry attempt. The logic of the PAR is to use USBP biometric data to assess what share of migrants who make repeated entry attempts is subsequently re-apprehended, and to assume that this re-apprehension rate is an indicator of the overall apprehension rate.

The PAR methodology consists of three main steps (see Figure 2). First, the model identifies a subset of illegal border crossers who are candidates to attempt re-entry, the so-called RTM population. Under IDA’s methodology, this group excludes all non-Mexicans, those deported to the Mexican interior or remotely through the Alien Transfer and Exit Program, aliens who have ever requested asylum, those facing criminal charges, and children under 18 years old.

⁸ For a fuller discussion see Bailey et al. 2016.; Thomas J. Espenshade, “Using INS Border Apprehension Data to Measure the Flow of Undocumented Migrants Crossing the U.S.-Mexico Frontier,” *International Migration Review* (1995): 545-565; Joseph Chang, “CBP Apprehensions at the Border,” *Homeland Security Studies and Analysis Institute*, 2006.



Figure 2: Partial Apprehension Rate Methodology



Source: OIS adaptation of Bailey et al. 2016.

The second step in calculating the PAR is to distinguish between deportees who give up and return home or otherwise remain in Mexico versus those who attempt to re-enter the United States—i.e., the deterrence rate (see Deterrence Rate). IDA estimates this share based on an analysis of a survey of recent deportees conducted by the College of the Northern Border, the so-called EMIF survey (see Survey Data on Deterrence).

Third, by definition, RTM assumes deportees who are not deterred following an apprehension always make a subsequent reentry attempt. Thus, by observing in DHS administrative records how many migrants from the RTM population are re-apprehended, the model infers the number that successfully re-enters. The ratio of re-apprehensions to successful re-entries is used to estimate the partial apprehension rate.

The PAR takes advantage of USBP’s collection of biometric data since 2000, and represents an advance in the Department’s efforts to quantify the southwest border apprehension rate. Unlike IER and TIR, the model does not depend on agent observations; and it grapples with unobserved flows by assuming that aliens who are not apprehended fall into one of two meaningful outcome groups: those who are deterred or those who evade detection.

Nonetheless, the model confronts limitations at each point in the modeling process. The most notable and challenging to overcome is the assumption of the RTM that subjects who are not deterred will always attempt re-entry until successful. One problem with this assumption is the lack of reliable data on who is deterred. IDA relies primarily on the EMIF survey to estimate the deterrence rate. And while the EMIF is widely recognized as one of the best migrant surveys available, its results are still dependent on the characteristics of the sample, the quality of the survey instrument, and the honesty of the respondents. More fundamentally, the EMIF survey asks recent deportees about their intentions to re-enter the United States, and it therefore does not take account of shifting border enforcement efforts, potential changes in behavior by individuals who have been exposed to consequence programs, or other deterrent factors along the border. The structure of the RTM model means that any resulting undercount in the estimate of the deterred population results in a downward bias in the PAR.

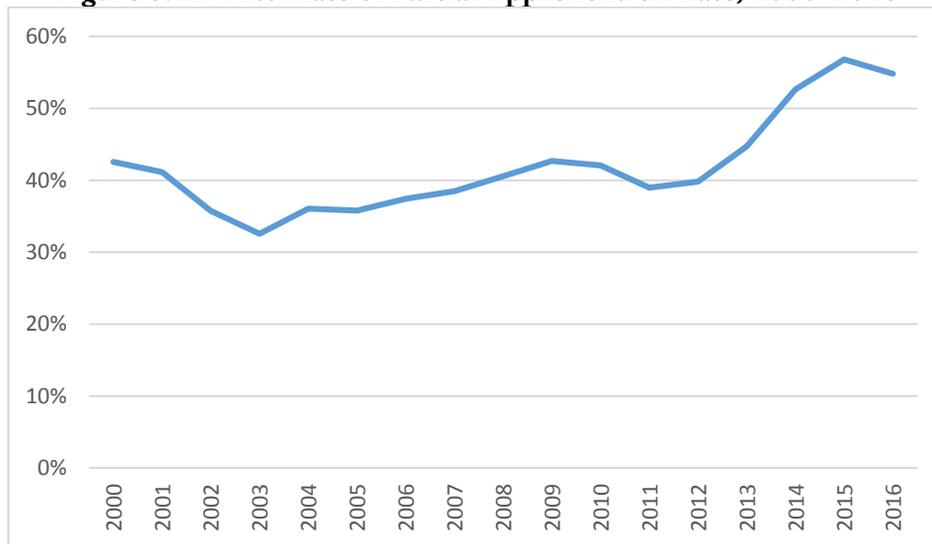


Second, the RTM population represents a shrinking share of southwest border apprehensions. Mexican adults quickly deported to the nearest border accounted for about 95 percent of apprehensions when the RTM methodology was developed in the 1990s. But changes in the composition of border flows (i.e., rising numbers of Central Americans and asylum seekers); changes in CBPs enforcement strategy to emphasize criminal charges, lateral repatriation, and other enforcement consequences; and IDA’s restrictive modeling choices mean that as little as 20 percent of USBP apprehensions in recent years are used to estimate the PAR. In addition, because the RTM sample excludes aliens who are more likely to surrender to USBP (i.e., aliens with a higher apprehension rate), the PAR is biased downwards as an indicator of the overall apprehension rate; this bias may be substantial given the number of aliens excluded from the RTM sample.

Third, IDA makes somewhat restrictive assumptions about which re-apprehensions to include in the final stage of the PAR calculation. In particular, IDA excludes apprehensions occurring at check points and other remote locations and those occurring more than four days after an illegal entry. Given USBP’s defense-in-depth strategy, which places resources at and behind the border, these assumptions result in a slight further downward bias in the PAR.

Figure 3 depicts IDA’s estimate of the PAR for the Mexican RTM population for 2000-2016, the years for which data are available. IDA estimates that the PAR fell from 43 percent in 2000, to a low of 33 percent in 2003, before climbing to an average of 55 percent in 2014-2016.

Figure 3: IDA Estimate of Partial Apprehension Rate, 2000-2016



Source: IDA Corporation.

Note: Data includes the estimated apprehension rate for Mexican adults in the RTM group of border crossers; see text for further explanation.



Deterrence Rate

A second indicator of enforcement outputs is the deterrence rate (also referred to as the at-the-border deterrence rate), defined as the estimated share of migrants who, following a failed unlawful entry attempt, are deterred from making a subsequent reentry and decide instead to return home or otherwise remain in Mexico. The deterrence rate is a powerful indicator of the difficulty of crossing the border because it reflects decisions by people who have already decided to migrate illegally to abandon their effort. As with the apprehension or interdiction rate, deterrence cannot be observed directly. DHS relies on two main estimation strategies.

Recidivism Rate

CBP's primary methodology for estimating deterrence is recidivism, defined as the percentage of deportable aliens that is re-apprehended in the same fiscal year, based on an analysis of fingerprint data captured at the time of apprehension. Recidivism is inversely related to deterrence because only migrants who are not deterred have the opportunity to be re-apprehended. Thus, CBP's Consequence Delivery System uses reductions in recidivism as an indicator of effective enforcement consequences.⁹

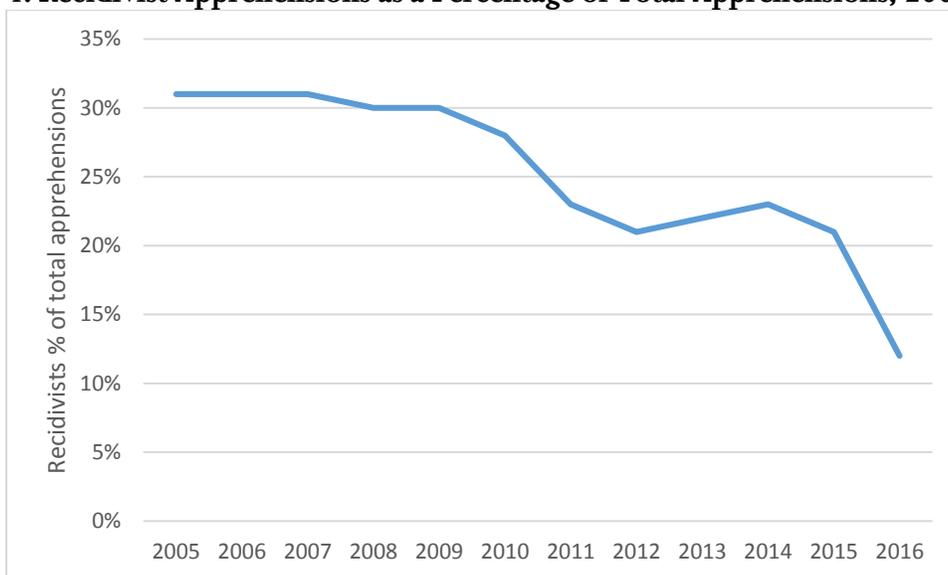
An advantage to relying on recidivism as an (inverse) indicator of deterrence is that it can be reliably measured (i.e., not just estimated) through CBP's fingerprint records. Recidivism is an imperfect metric of deterrence, however, because re-apprehensions are a function of both deterrence and the (re-)apprehension rate, as noted above. In other words, a drop in recidivism may reflect fewer deportees making re-entry attempts, or a higher success rate among those who make such attempts, or both.

As figure 4 illustrates, the southwest border recidivism rate declined from 31 percent in 2005 (the first year for which data are available) to 12 percent in 2016, a trend which suggests fewer deportees making additional re-entry attempts. The sharp drop in recidivism since 2014 likely also reflects the growing share of non-Mexicans among border apprehensions, as aliens deported to more remote countries face greater barriers to making a further migration attempt.

⁹ See DHS Office of Inspector General, "Streamline: Measuring Its Effect on Illegal Border Crossing," OIG-15-95, May 15, 2015, https://www.oig.dhs.gov/assets/Mgmt/2015/OIG_15-95_May15.pdf; Fisher 2011; Argueta 2016.



Figure 4: Recidivist Apprehensions as a Percentage of Total Apprehensions, 2005-2016



Source: U.S. Border Patrol.

Survey Data on Deterrence

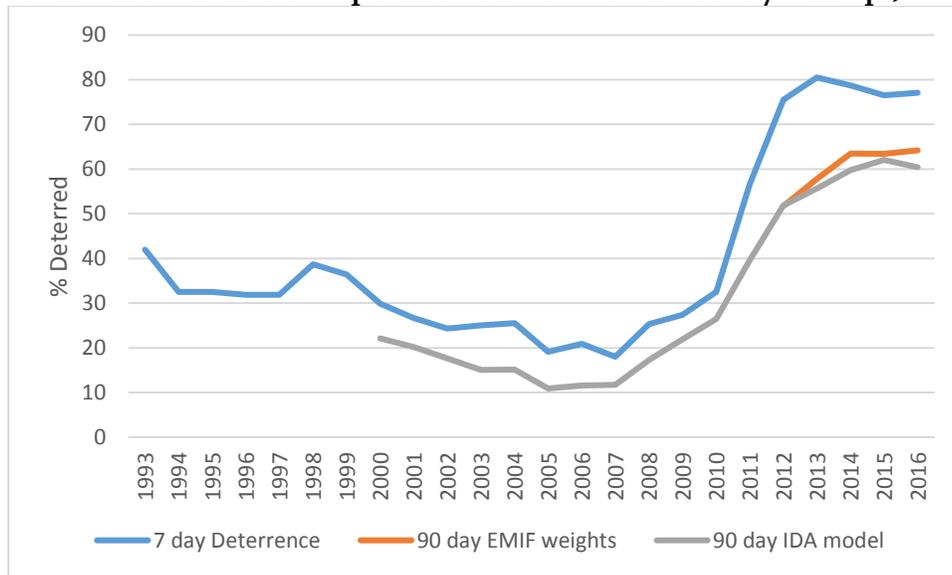
An alternative methodology for estimating deterrence is to rely on migrants surveys. The most important survey data on deterrence comes from the EMIF Devueltos survey, which interviews deportees immediately at repatriation facilities upon their return to Mexico and asks them about their intentions to return to the United States within the next 7-90 days. In its work for DHS, the IDA Corporation used a combination of EMIF and CBP data to build an econometric model of 90-day deterrence for all USBP apprehensions since 2000.¹⁰

An advantage to survey data is that surveys can specifically identify intending border crossers who describe themselves as being deterred as a result of U.S. enforcement efforts. Yet in addition to the standard concerns about the validity of survey samples and survey instruments, questions about deterrence are especially hard to measure accurately given the ever-evolving enforcement environment, as noted above. A further limitation is that the EMIF data is restricted to Mexican northern border deportees, and cannot be assumed to apply to migrants from other regions/countries because they face different trade-offs and geographic barriers when considering a re-entry attempt.

¹⁰ See Bailey et al. 2016.



Figure 5: Estimated Percent of Deportees Deterred from a Reentry Attempt, 1993–2016



Source: OIS analysis of EMIF Survey; the IDA Corporation.

Figure 5 depicts the EMIF and IDA estimates of deterrence. Unsurprisingly, 90-day deterrence is somewhat lower than 7-day deterrence. The data describe relatively limited deterrence levels prior to 2007 (20-40 percent in the 7-day survey and 10 – 30 percent in the 90-day model), and substantial growth in the deterrence rate since that time. As Figure 5 illustrates, estimated 7-day deterrence rates have exceeded 75 percent every year since 2012 and estimated 90-day deterrence rates hovered around 60 percent in 2014 through 2016.

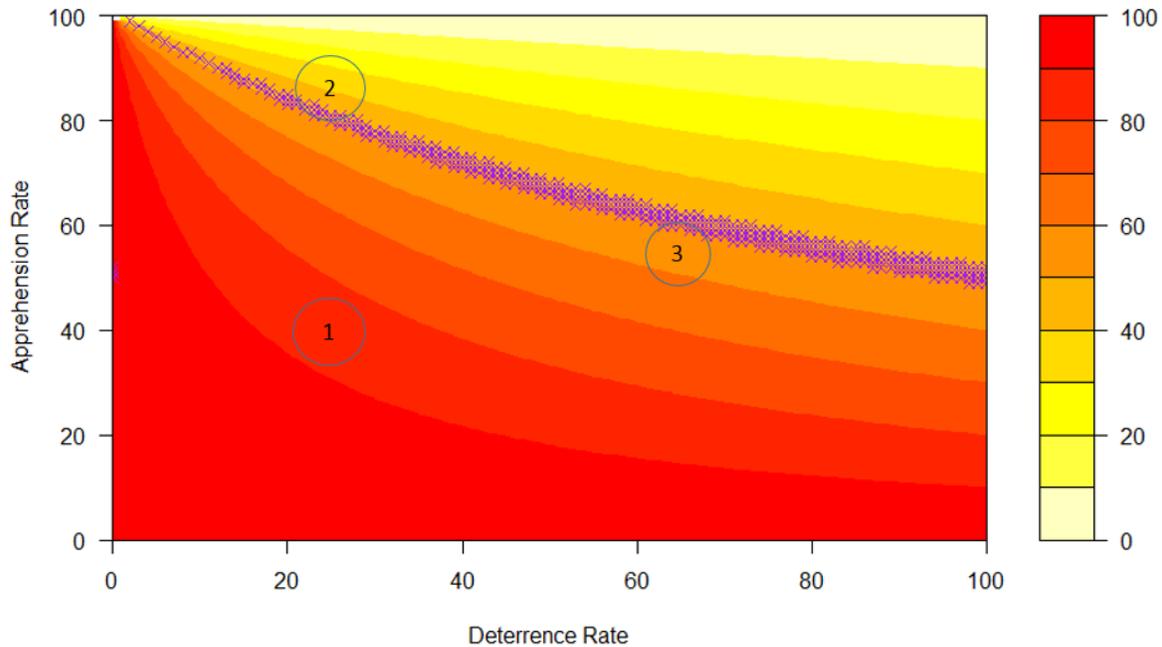
Apprehensions, Deterrence, and Illegal Inflows

Substantial attention focuses on the apprehension rate as a key measure of border security, but it bears emphasis that deterrence essentially is just as important as apprehensions in preventing illegal inflows. By definition, deportees who are not deterred will reattempt until they are either deterred on a subsequent effort or eventually succeed. When deportees are not deterred, even a high apprehension rate will only result in a “revolving door” model of enforcement, as was observed during the 1980s.¹¹ This analysis highlights the importance of CBP’s enforcement efforts and post-apprehension analysis of consequence recommendations to increase deterrence—efforts that require a whole of government approach.

¹¹ Philip Martin, “Mexican Workers and U.S. Agriculture: The Revolving Door,” *International Migration Review* 36.4 (2002): 1124-1142; Gambler 2013.



Figure 6: Contour Plot of Illegal Inflows as a Function of Apprehension and Deterrence Rates



Source: Office of Immigration Statistics.

Figure 6 illustrates this relationship by graphing the expected number of illegal inflows resulting from each crossing attempt as a function of the apprehension rate (on the Y axis) and deterrence rate (on the X axis). The light yellow band in the upper-right corner depicts apprehension and deterrence rates near their maximums and is the region in which fewer than 10 percent of intending crossers successfully enter the United States. The dark stripe in the middle of the graph is a region in which about half of intending migrants eventually succeed (i.e., after one or more attempts). Areas below and to the left of this region describe conditions under which a majority of intending migrants eventually succeed. For example, in the area marked as Zone 1, corresponding to an apprehension rate of 40 percent and a deterrence rate of 25 percent—the approximate conditions in the year 2000—over 90 percent of intending border crossers eventually succeed. Indeed, with a deterrence rate of 25 percent, the apprehension rate would have to approach 90 percent for a majority of intending immigrants to fail in their attempt, as in Zone 2. The situation for the RTM population as of the end of FY2016 was characterized by apprehension and deterrence rates of approximately 60 percent (according to the IDA PAR estimate and the EMIF survey). As illustrated by Zone 3, about 60 percent of intending RTM migrants eventually succeed under these conditions—a number that marks substantial progress from Zone 1, but still leaves room for improvement.



Border Crossing Costs

A third indicator of enforcement outputs is the costs to migrants of crossing the border: in particular the share of migrants who hire a smuggler and the average fees that smugglers charge.¹² Smuggling usage and average smuggling fees are useful indicators of the difficulty of crossing the border because migrants will only tolerate higher fees to the extent that smugglers provide an essential and successful service. Smugglers also compete to attract customers by offering their services at the lowest profitable rate, so higher fees indicate rising costs to smugglers. Rising smuggling fees also reflect an increased risk to smugglers of a criminal conviction; smugglers pass this risk along to customers in the form of higher fees.

The dynamic between an increasingly secure border and rising smuggler fees is driven by changes in smuggler behavior. For example, according to USBP custodial interviews, many smugglers have adapted to enforcement efforts by utilizing sophisticated scouting networks and observation posts to guide smuggling activities through increasingly isolated areas to evade detection. In addition, USBP routinely interdicted single smugglers leading dozens of migrants during the 1980s, but many smugglers now work with groups of just three or four migrants at a time. These adaptations mean improved border security translates into higher costs per crosser—and likely fewer crossing attempts as migrants are priced out of the market—rather than always into a higher apprehension or interdiction rate.¹³

Survey Data on Smuggler Fees

The only available data on smuggling fees come from migrant surveys (including interview data collected by USBP), with several surveys asking about whether illegal border crossers hire a smuggler and about fees charged by smugglers. These survey data also may be subject to response bias if migrants are reluctant to admit to hiring a smuggler, but once again such bias should be broadly consistent over time, so changes in survey/interview data should reflect changes in the difficulty of crossing the border.

One finding across multiple surveys is that smuggler usage rates have increased steadily over the last five decades. Previous research by the Office of Immigration Statistics found that smuggler usage rates climbed from 40-50 percent during the 1970s, to 59 percent in the late 1970s and early 1980s, 70-80 percent in the 1980s to 1990s, 80 to 93 percent in the 1990s to 2000s, and 95 percent for first-time crossers surveyed in 2006.¹⁴ According to USBP interviews, relatively few illegal border crossers hired a smuggler prior to 2001, but usage rates climbed to 80-95 percent among apprehended border crossers in 2015.

Survey results also indicate steady increases in fees paid to migrant smugglers. Custodial interviews conducted by USBP have found that smuggling fees are often paid in stages. Initial fees required to approach staging locations along the border were often lower than \$100 prior to the late 2000s, and an additional \$1,000-\$3,000 in fees were charged upon delivery to the final

¹² For a fuller discussion, see Bryan Roberts, Gordon Hanson, Derekh Cornwell, and Scott Borger, “An Analysis of Migrant Smuggling Costs along the Southwest Border,” U.S. Department of Homeland Security Office of Immigration Statistics Working Paper, November 2010, <https://www.dhs.gov/xlibrary/assets/statistics/publications/ois-smuggling-wp.pdf>. Also see Christina Gathmann, “The Effects of Enforcement on Illegal Markets: Evidence from Migrant Smuggling along the Southwestern Border,” IZA Discussion Paper 1004, <ftp://ftp.iza.org/dps/dp1004.pdf>.

¹³ Skerry, Peter, and Stephen J. Rockwell, “The Cost of a Tighter Border: People-Smuggling Networks.” *Brookings* (1998), <https://www.brookings.edu/opinions/the-cost-of-a-tighter-border-people-smuggling-networks/>

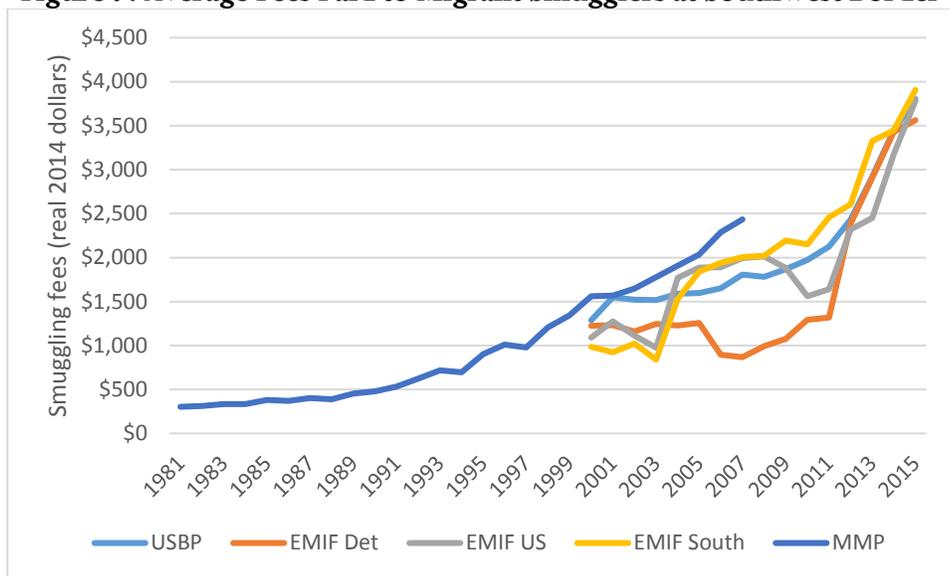
¹⁴ Roberts et al., p. 4. Also see Pia Orrenius, “Illegal Immigration and Enforcement along the Southwest Border,” Federal Reserve Bank of Dallas, June 2010, https://www.dallasfed.org/assets/documents/research/border/tbe_orrenius.pdf.



destination. More recently, smuggling fees for Mexicans and Central Americans reportedly have been as high as \$1,200 for the initial staging payment and up to \$8,000 at the final destination. Custodial interviews also find evidence of an increase in alternative forms of payment in exchange for passage, including migrants being required to participate in smuggling controlled substances or other illicit items across the border or to work off debts upon arrival in the United States, as well as reports of harsh negotiations concerning payment plans with family members.

Figure 7 plots average smuggling fees in inflation-adjusted dollars according to two academic surveys and USBP data. Averaging across the available sources, smuggling fees increased by five percent per year during the 1980s, 12 percent per year during the 1990s, and nine percent per year during the decade ending in 2015.¹⁵

Figure 7: Average Fees Paid to Migrant Smugglers at Southwest Border



Source: U.S. Border Patrol, El Colegio de la Frontera Norte Encuestas sobre Migracion en las Fronteras Norte y Sur de Mexico (EMIF), Princeton University Mexican Migration Project (MMP).

¹⁵ Figure 11 may understate actual smuggling fees since data are mostly collected from unsuccessful crossing attempts, and therefore may exclude final payments, and may be biased toward less successful smuggling operations. The figure also understates the real increase in border crossing costs because the typical smuggling contract during the 1980s-90s provided for as many entry attempts as necessary to succeed; but as entry has become more difficult contracts now cover a limited number of attempts, further boosting per-entry costs.



II. Enforcement Outcomes

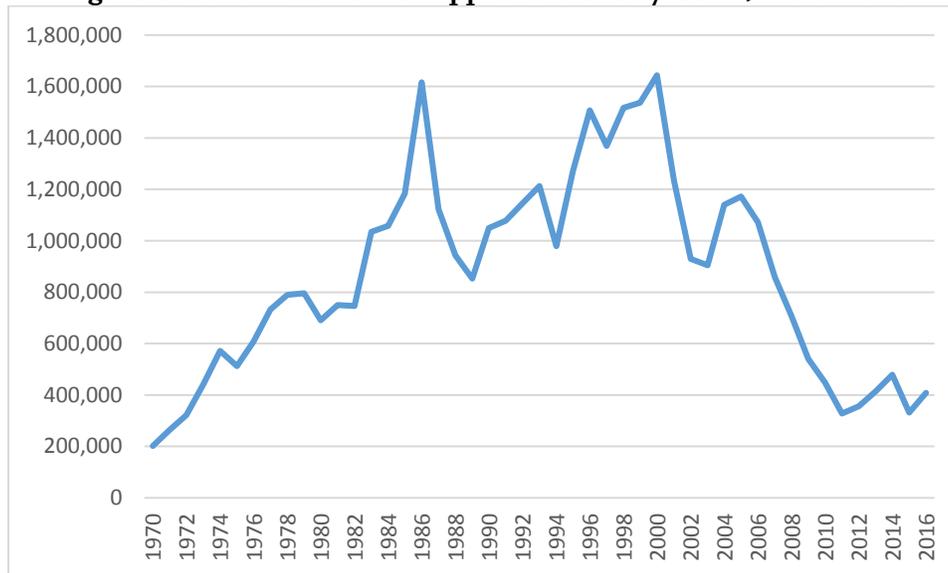
Enforcement outcomes describe how many unauthorized immigrants successfully cross the border—ultimately the indicator with the greatest impact on the U.S. public.¹⁶

For decades, the U.S. Border Patrol has used apprehensions of unauthorized immigrants as its primary proxy indicator of total illegal inflows. More recently, the USBP has begun systematically estimating the number of known got aways, as noted above, and IDA’s methodology estimates successful illegal entries based on apprehensions and the PAR.

Apprehensions

Apprehension data are available from USBP’s administrative records. As Figure 8 indicates, southwest border apprehensions increased from 202,000 in 1970 to 1.6 million in 2000, a period associated with rising illegal immigration to the United States. More recently, apprehensions fell to a 40-year low of 328,000 in 2011, before rebounding to 409,000 in 2016.

Figure 8: Southwest Border Apprehensions by USBP, 1970-2016



Source: U.S. Border Patrol.

To the extent that the *apprehension rate* is constant, changes in apprehensions are a direct indicator of changes in illegal inflows. Thus, if the apprehension rate were unchanged between 2000 and 2016, the observed drop in USBP apprehensions would suggest a 75 percent reduction in illegal inflows between ports of entry on the southwest land border during this period. If the apprehension rate has increased since 2000, as the IER, TIR, and PAR suggest, the actual drop in illegal inflows over this time period would be somewhat greater than 75 percent.

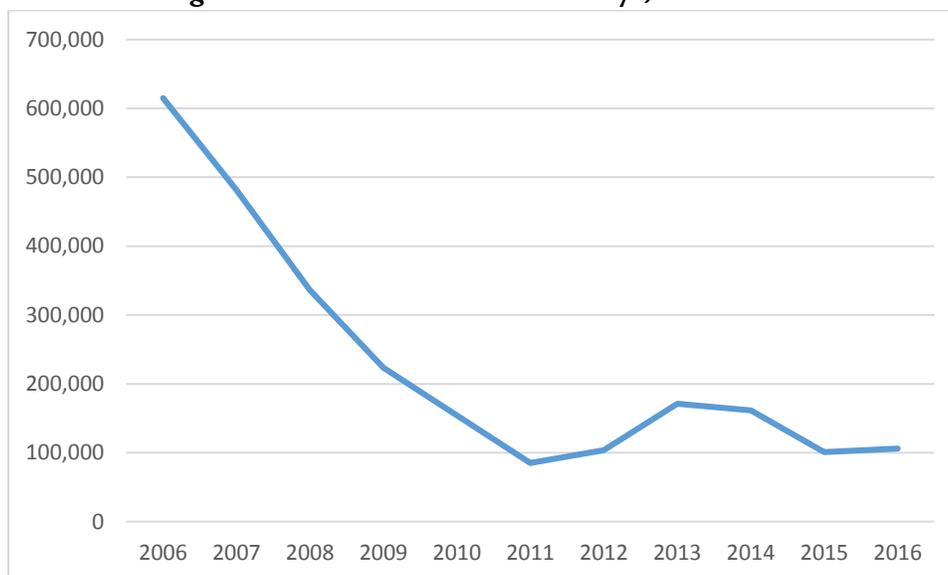
¹⁶ Notably, while apprehensions represent successful enforcement outcomes for USBP, apprehensions are only the beginning of the enforcement process for DHS as a whole. At the enterprise level, successful enforcement also depends on the ability of the Department along with its interagency partners to adjudicate claims for immigration benefits and, as appropriate, enforce post-apprehension removal orders.



Known Got Aways

U.S. Border Patrol agents estimate the number of got aways (i.e., subjects who, after making an illegal entry, are not turned back or apprehended) based on direct observation, physical evidence, and intelligence data, as discussed above. As Figure 9 indicates, estimated got aways declined from just over 600,000 in 2006 to a low of just under 100,000 in 2011. Estimated got aways increased to about 170,000 in 2013, before falling back to 106,000 in 2016.

Figure 9: USBP Estimated Got Aways, 2006-2016



Source: U.S. Border Patrol.

Estimated Illegal Entries

In work on behalf of DHS, IDA used the RTM-based partial apprehension rate and CBP’s administrative data on apprehensions to estimate total illegal entries. After estimating the PAR, the analysis proceeds in three additional steps. First, IDA divides the universe of border crossers into two groups. The larger group includes adults without children, who are not asylum seekers and not from Cuba; the smaller group consists of minors, family units, Cubans, and individuals who request asylum. Aliens in the larger group are subject to a full range of potential enforcement consequences, including expedited removal and criminal charges; but aliens in the second group historically are usually released into the United States with a notice to appear in immigration court—often only months or years later. Thus, the larger group of aliens are assumed to be potentially “impactable” by USBP enforcement policies, but the smaller group is assumed to be “non-impactable” by traditional enforcement policies because even if they are apprehended they are still likely to succeed in entering the United States.¹⁷

¹⁷ IDA refers to these groups as “traditional” and “non-traditional,” respectively. IDA includes Cubans in the second group because they were routinely allowed to enter the United States during the period under consideration under the wet-foot/dry-foot policy; the Obama administration terminated the wet-foot/dry-foot policy in January 2017.



Second, IDA makes different assumptions about the behavior of each group. IDA assume that aliens in the impactable group routinely attempt to evade detection, and that all aliens in this group are apprehended at the same rate as the RTM population (i.e., adult Mexican non-asylum seekers) as described by the PAR. With respect to the non-impactable population, IDA assumes that aliens make no attempt to evade detection, and that all aliens in this group surrender to the first USBP agent they encounter. Thus, IDA assumes aliens in the non-impactable group have an apprehension rate of 100 percent. The distinction between impactable and non-impactable aliens is especially important because with the surge of Central American child and family migration in recent years, among other factors, the share of non-impactables increased from less than two percent in 2003-2009 to over 33 percent in 2016.

Third, IDA uses the PAR apprehension rate to estimate the odds of successful entry,¹⁸ and then multiplies the odds of successful entry times the impactable apprehension count to estimate the total number of illegal entries. Because of the assumptions made in the second step, IDA only includes single adults who do not claim asylum in this equation because family units, children, asylum seekers, and Cubans are assumed to be apprehended 100 percent of the time—and therefore never to successfully evade detection:

$$\textit{Illegal Entries} = \textit{Odds of Successful Entry} * \textit{Apprehensions}^*$$

*Excludes most minors, family units, Cubans, and asylum seekers.

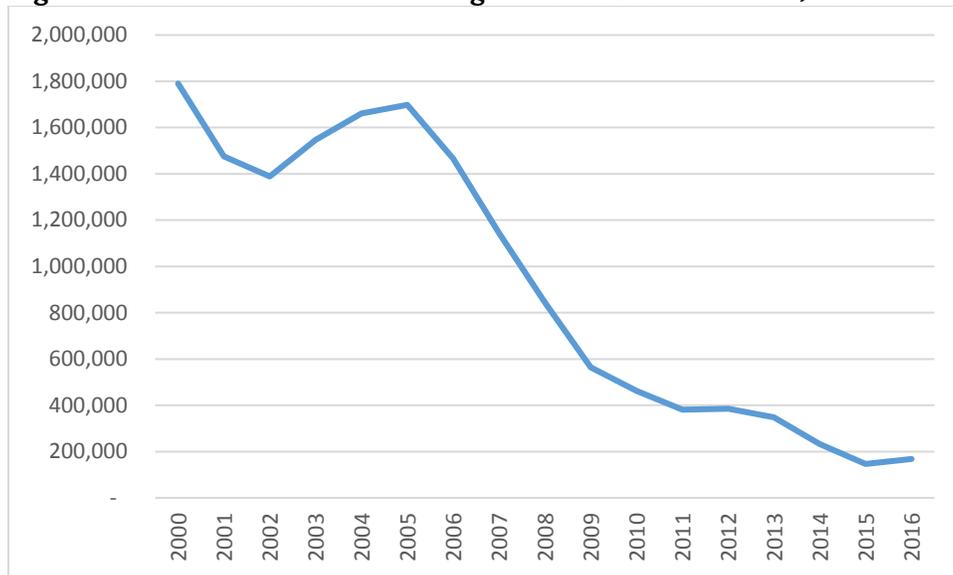
Like the PAR, the estimate of illegal entries represents an important step forward because it is the Department's first rigorous estimate of total illegal inflows—a number long sought by Congress and the public. But the estimate of illegal entries is limited by the same modeling assumptions that afflict the PAR, along with the additional assumption that apprehensions can be neatly divided into the two groups described above and that they consistently behave as the model assumes. DHS is working to relax certain aspects of IDA's modeling assumptions, to more fully describe the impact of each assumption on estimated illegal entries, and thereby to construct a range around the estimate that describe its uncertainty. As part of this effort, the Department is exploring additional data sources to quantify the differences between the RTM population and other illegal border crossers and conducting additional analysis on non-impactable border crossers.

IDA's estimate of illegal entries from 2000-2016 is depicted in Figure 10. As the figure illustrates, IDA estimates that 1.8 million aliens successfully crossed the border in 2000, versus 170,000 in 2016—a 91 percent decline over this period. Unlike border apprehensions, which have rebounded somewhat from the low point observed in 2011, estimated illegal entries remain well below 200,000 because a large share of recent apprehensions are UACs and asylum seekers who are routinely apprehended, and therefore have no impact on the number of successful illegal entries, as noted above.

¹⁸ Mathematically, *odds of successful entry* = $\left(\frac{1-PAR}{PAR}\right)$.



Figure 10: Estimated Successful Illegal Entries between POEs, 2000–2016



Source: The IDA Corporation.

III. Operational Control

Concurrent with these ongoing efforts to estimate Southwest Border Security, DHS is also pursuing alternative modeling and estimation methodologies that will further inform southwest border security, while also supporting implementation of Presidential Executive Order 13767. Notably, the Executive Order calls for “complete operational control (OPCON) of the southern border.” DHS employed OPCON as an enforcement outcome measure from 2004 until 2010. At that time, OPCON was a subjective and mostly qualitative measure of the degree to which DHS employed the proper mix of personnel, technology and infrastructure to deny or deter access of illegal entry at the immediate border. The U.S. Government Accountability Office, among others, cited the need for additional, more empirical measures of border security and OPCON was discontinued.

In the re-introduction of operational control pursuant to the Executive Order 13767, OPCON will be measured directly. USBP’s ability to ensure the physical security of the immediate U.S. Border with Mexico depends upon three major elements: impedance and denial, situational awareness, and law enforcement response and resolution. USBP is working to develop multiple subordinate metrics to describe each of these major elements.

Among the three elements, situational awareness is a cornerstone of OPCON because it combines domain awareness with intelligence data and other information. Over the past several years DHS has invested millions of dollars in technology that has facilitated the ability to see and detect more at the border. Improvements in situational awareness give DHS an ever-increasing, real-time ability to understand how much illegal activity agents are encountering at the immediate border and their ability to respond. As a result, despite the fact that overall border entries are substantially lower today than in any previous fiscal year, agents are currently interdicting slightly lower percentages of the total known flow. This observation reflects USBP’s increased domain awareness—i.e., that through technological advances, the agency has improved its awareness of illegal entry attempts (known got aways)—rather than a drop in enforcement effectiveness.



Beyond the operational implications of increased situational awareness, technological advances at the border also allow USBP and DHS to pursue modeling efforts based on the Department's more complete information about illegal entry attempts. Increasing situational awareness narrows the gap between the known and unknown flow, and puts DHS in a position to build ever better observational estimates of border security. The Department will continue to refine these observational estimates and to estimate their statistical reliability.

IV. Assessment of Border Security Trends

The six indicators of border security described in this report provide the Department's best available estimates of southwest border enforcement outputs—how difficult is it for aliens to cross the border illegally?—and of enforcement outcomes—how many successfully do so? As noted, this report is limited in scope to USBP's ability to prevent illegal entries across the southwest border; it does not address broader questions about the Department's overall ability to control illegal immigration, which depends on actions by a broader range of DHS and other enforcement agencies, as well as a number of social and economic factors outside the Department's control.

With respect to border enforcement outputs, available data indicate that the southwest land border is more difficult to illegally cross today than ever before. First, survey data, mathematical models, and USBP assessments suggest that a growing share of attempting crossers between POEs are apprehended or interdicted: 55 to 85 percent today (depending on the specific estimate), versus 35 to 70 percent a decade ago. Second, administrative and survey data suggest that a much higher share of unlawful immigrants are deterred from making a subsequent attempt after being repatriated: about 55 to 75 percent today versus 10 to 40 percent a decade or two ago. Third, survey data and USBP assessments indicate that almost all illegal border crossers resort to hiring a smuggler today, versus just over half 30 years ago. Meanwhile, average smuggler fees have increased from a few hundred dollars in the 1980s to almost \$4,000 today, accounting for inflation.

With respect to border enforcement outcomes, available data also indicate the lowest number of illegal entries at least since 2000, and likely since the early 1970s. First, the U.S. Border Patrol made 408,000 southwest border apprehensions in 2016, the fourth-lowest number since 1972, and a 75 percent drop from 1.6 million apprehensions in 2000. The drop in apprehensions likely understates the drop in illegal entries given the apparent increase in the apprehension rate. Second, USBP's observation-based estimate of known got aways fell 83 percent between 2006 and 2016, from 615,000 to 106,000, in spite of improved detection capacity. Third, the IDA Corporation estimates that successful illegal entries fell 91 percent between 2000 and 2016 (from 1.8 million to 170,000), though DHS is still working to validate and refine IDA's methodology.

DHS will continue to work to develop valid estimates of unobserved border flows between POEs. In the near term, DHS will consider an array of indicators as described above, while also analyzing more traditional operational data. The Department will continue to strengthen existing indicators by refining estimation methodologies and by improving their statistical reliability. In the long run, the Department also intends to achieve a level of situational awareness that can not only be used as a tool for strategic resourcing decisions and tactical resource deployment optimization, but that also provides more reliable estimates of total illegal flows.

