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THESIS

DECISION MODEL FOR U.S.-MEXICO BORDER SECURITY MEASURES

by

Matthew L. Lavender

September 2017

Thesis Advisor:	Rodrigo Nieto-Gomez
Second Reader:	Christopher Darnton

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13. ABSTRACT (maximum 200 words)

The Department of Homeland Security (DHS) has invested billions of dollars to prevent illegal drugs, immigration, weapons, and currency from transiting across the U.S.–Mexico border. DHS has not created a sufficient standardized method to measure whether an investment in a security measure is cost-effective when combining assets. To take it one step further, DHS has not created a model that combines cost-effectiveness of a security asset while simultaneously determining how it will contribute to achieving operational control of the border.

This study provides an in-depth look into the current risk-based model DHS uses, the administrative and physical infrastructure of U.S.–Mexico border security, and a critical view of DHS' annual budget. A decision model is presented that will give policymakers a process to choose a combination of border security investments that will achieve operational control of the border while remaining within budgeting constraints. A lot of work needs to be done for DHS to determine the correct security assets to be placed at the U.S.–Mexico Border to maintain operational control and cost-effectiveness. This study does not determine which security assets need to be put into place, but it provides a decision process that will be an asset for policymakers to save federal time and money assigned to border security investments.

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DECISION MODEL FOR U.S.-MEXICO BORDER SECURITY MEASURES

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Submitted in partial fulfillment of the
requirements for the degree of

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The Department of Homeland Security (DHS) has invested billions of dollars to prevent illegal drugs, immigration, weapons, and currency from transiting across the U.S.-Mexico border. DHS has not created a sufficient standardized method to measure whether an investment in a security measure is cost-effective when combining assets. To take it one step further, DHS has not created a model that combines cost-effectiveness of a security asset while simultaneously determining how it will contribute to achieving operational control of the border.

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LIST OF ACRONYMS AND ABBREVIATIONS

ABCI	Arizona Border Control Initiative
ADIS	Arrival and Departure Information System
AoA	analysis of alternatives
ASI	America's Shield Initiative
BEST	Border Enforcement Security Task Force
BORFIC	Border Field Intelligence Center
BP	Border Patrol
BVIC	Border Violence Intelligence Cell
CBP	Customs and Border Protection (DHS)
CIA	Central Intelligence Agency
DEA	Drug Enforcement Agency
DHS	Department of Homeland Security
DOD	Department of Defense
DWV	dental weighted value
EPIC	El Paso Intelligence Center
EVA	economic value added
FAA	Federal Aviation Administration
FAMS	Federal Air Marshals Service
FAST	Free and Secure Trade
GSA	General Services Administration
HIR	Human Intelligence Report
HSTA	Homeland Security Threat Assessment
HSTC	Human Smuggling and Traffic Center
I&A	Office of Intelligence and Analysis (DHS)
IAFIS	Integrated Automated Fingerprint System
IBIP	Integrated Border Intelligence Program
IC	intelligence community
ICE	Immigration and Customs Enforcement (DHS)
IDENT	Automated Biometric Identification System
IFT	Integrated Fix Tower

INS	Immigration and Naturalization Service
IRR	internal rate of return
LAX	Los Angeles International Airport
LPR	license plate reader
ME	marine engineers
MOE	measures of effectiveness
MVSS	Mobile Video Surveillance System
MSC	Mobile Surveillance Capability
NGA	National Geospatial-Intelligence Agency
NPPD	National Protection and Programs
NSA	National Security Agency
OAM	Office of Air and Marine (DHS)
OIOC	Office of Intelligence and Operations Coordination
OPM	Office of Personnel Management
RNZN	Royal New Zealand Navy
ROA	return on assets
ROE	return on equity
ROI	return-on-investment
RVS	Remote Video System
SSE	strong Stackelberg equilibrium
TACCOM	tactical communication
TARS	Tethered Aerostat Radar System
TECS	Treasury Enforcement Communication System
TSA	Transportation Security Administration (DHS)
UAV	unmanned aerial vehicle
USPS	United States Postal Service
WMD	weapons of mass destruction
VADER	Vehicle and Dismount Exploitation Radar

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This thesis is dedicated to my wife, father, mother, and brother. Thank you to my wife for making sacrifices that allow me to pursue my naval career. Thank you to my father and mother for always supporting me and guiding me in the right direction in life. Thank you to my brother for being there for my parents when I am not able to.

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I. INTRODUCTION

A. RESEARCH QUESTION

This thesis answers the following question: How should the Department of Homeland Security build a model to evaluate impact and return-on-investment (ROI) on U.S.–Mexico border security expenditures?

B. SIGNIFICANCE OF THE RESEARCH QUESTION

The diversity of threats at the U.S.–Mexico border is highly complex and constantly evolving to defeat new technologies and other security resources placed at the border by policymakers. This is due to the economic incentives illegal markets offer for criminals who successfully transit the border. Threats include illegal migration, drugs, illegal weapons, and counterfeit products; policy makers have also been charged with preventing transnational terrorists and terrorist weapons from transiting across U.S. borders.[1] The Department of Homeland Security (DHS) is the primary federal agency tasked with defending the U.S.–Mexico border.

To cope with resource limits, DHS currently relies on risk management models to determine border defense resource allocation.[2] Economic theory dictates that these models best determine return on investment of border expenditures by including calculations of risk, success rates of attacks, and potential consequences of a defense expenditure. Using its current system of risk calculation, DHS has conducted risk assessments for a multitude of threats, but its existing documents do not analyze the opportunity costs of border security investments. This gap in assessment has resulted in conflicting border security priorities and has motivated Congress to request that DHS develop clear models that will assist in creating strategies to secure the border.[3]

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[1] Homeland Security Act of 2002, Pub. L. No. 107–296, 116 Stat. 2135 (2002).

[2] Marc R. Rosenblum, Jerome P. Bjelopera, and Kristin M. Finklea, *Border Security: Understanding Threats at U.S. Borders* (CRS Report No. R42969) (Washington, DC: Congressional Research Service, 2013), 13, https://www.hsdl.org/?view&did=731927.

[3] Ibid., 18.

The security measures implemented at the U.S.–Mexico border have many peripheral effects on the environment, foreign relations, legal travel, culture, opportunity costs of other expenditures, among other things. The local communities near the U.S.–Mexico border depend on cross-border traffic for economic and sociocultural ties and are vulnerable to changes in border security policy and technologies implemented.[4] For example, border security implementations have led to decreased enrollment at universities near the border and dampened binational relationships due to the psychological divide these physical border security measures have created.[5] The current method DHS uses to measure risk and the cost effectiveness of an investment does not calculate impact on any of these items.

Every DHS border expenditure has an opportunity cost, defined as the value of an alternative investment lost when choosing to invest in an asset at the border. The illegal transiting of goods and personnel at the U.S.–Mexico border exists due to the demand of these products in the United States. The decision of the federal government to invest in border security to counteract threats creates an opportunity cost of alternate investments in social, economic, or other security programs that may have a greater impact on reducing illegal importation to the United States than current physical assets at the border. For example, additional investment in border walling creates an opportunity cost of additional funding in drug education programs that may reduce the demand for drugs in the United States. More personnel stationed at the border creates a potential opportunity cost of assigning additional personnel to conduct workplace enforcement on businesses that hire illegal immigrants, which may reduce the attractiveness of coming into the United States to find work. Modifications need to be made to any model that evaluates border security policies and fails to take into account opportunity costs of border security expenditures to provide policymakers with more complete information on the actual impact of a border security expenditure.

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[4] Jason Ackleson, "Border Security Technologies: Local and Regional Implications," *Review of Policy Research* 22, no. 2 (2005): 138, doi: 10.1111/j.1541-1338.2005.00126.x.

[5] Ibid.

A decision model that lists security measures and their costs along with an effectiveness measure in achieving operational control of the U.S.–Mexico may allow policymakers in Congress and at DHS to determine the best way to prioritize the uses of resources, technologies and personnel at the border. This decision model will provide policymakers with a tool to make sound decisions going forward concerning the U.S.–Mexico Border.

C.   LITERATURE REVIEW

1.   Current Demand of Decision Model for Border Defense

The multitude of threats faced at the border make DHS' border security management a challenge for policy making and planning.[6] DHS in fiscal year 2017 has budgeted over $13.84 billion to secure and manage U.S. borders.[7] In order to best allocate its resources, DHS measures the effectiveness of an investment based on risk management. The calculation of risk is important because it allows DHS to best determine the potential effects of mission failure at the border and quantifiably measure the benefit of a given investment.[8] DHS can then use its method to compare between alternate investments and determine which will most efficiently complete its mission at the border.[9]

An effective ROI approach for border security is important because there is a limited amount of resources to fund projects that address the multitude of threats at the border. The public's awareness of the growing national debt contributes added pressure

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[6] Rosenblum, Bjelopera, and Finklea, *Border Security: Understanding Threats*, 18.

[7] U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2017* (Washington, DC: U.S. Department of Homeland Security, 2017), 4–5, https://www.dhs.gov/sites/default/files/publications/FY2017_BIB-MASTER.pdf.

[8] Henry H. Willis, Joel B. Predd, Paul K. Davis and Wayne Brown, *Measuring the Effectiveness of Border Security Between Ports-of-Entry* (Santa Monica, CA: RAND, 2010), 9, http://www.rand.org/pubs/technical_reports/TR837.html.

[9] Ibid., 8.

to policymakers to implement efficient use of tax payer's money in border defense expenditures.[10]

2. Opportunity Cost of Homeland Security and Defense Spending

Since the attacks on 9/11, "federal expenditures on domestic homeland security have increased by some $360 billion over those in place in 2001."[11] Global military expenditures total more than $1,739 billion per year, with the United States contributing to more than $700 billion of that amount.[12] The large amounts of government spending directed at national and homeland security issues neglect economic and social development problems countries' face.[13]

The opportunity costs of homeland security spending have been dramatic. A study done by John Mueller and Mark Stewart quantified some of the many opportunity costs of homeland security spending. From 2001–2011, terrorism risk premiums, have cost $40 billion, passenger delays from increased security during airport screenings have cost $100 billion, increase in traffic fatalities for people avoiding airport delays have cost $32 billion, and other deadweight losses have contributed to over $245 billion.[14] Additional opportunity costs not quantified by their study but listed include cutbacks to education, healthcare, social security, tourism, property and stock market values, and expenditures on the war in Iraq and Afghanistan.[15] Specifically for border control, each year approximately $500 billion in goods enter and $200 billion in good exit the U.S. ports.[16] Imports and exports of these goods that are perishable items are severely affected by

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[10] LR Jones, "Return on Investment Analysis: Applying a Private Sector Approach to the Public Sector," *Prime Journal of Business Administration and Management* 2, no. 1 (January 2012): 428, http://hdl.handle.net/10945/40469.

[11] John Mueller and Mark G. Stewart, "Balancing the Risks, Benefits, and Costs of Homeland Security." *Homeland Security Affairs* 7, Article 16 (August 2011): 1, https://www.hsaj.org/articles/43.

[12] Colin Archer and Willi Annette, *Opportunity Costs: Military Spending and the UN's Development Agenda*, Geneva, CH: International Peace Bureau, 2012, 14, https://sustainabledevelopment.un.org/getWSDoc.php?id=3260.

[13] Ibid.

[14] Mueller and Stewart, "Balancing Costs of Homeland Security," 2.

[15] Ibid.

[16] K. Jack Riley, *Strategic Planning for Border Security*, Santa Monica, CA: RAND, 2014, 6, http://www.rand.org/content/dam/rand/pubs/testimonies/CT400/CT415/RAND_CT415.pdf.

changes in cargo security and the costs companies incur to adjust to new control measures are included in opportunity costs.[17] Restrictive measures on obtaining visas since 9/11 have affected tourism and legitimate workers coming to the United States, a negative effect on the U.S. economy.[18]

The large amounts of funding allocated to military spending incurs opportunity costs on items that could benefit the environment and mankind. For the price of an "aircraft carrier ($5 billion), an area three times the size of Costa Rica could be reforested in the Amazon ($300 per hectare)."[19] The expense of "one battle tank ($780,000), 26,000 people could be treated for malaria ($30 per person)."[20] Even if funding creates the world's strongest army, that country will still be susceptible to social costs and climate change.[21]

Border security threats are not stand-alone issues and have broader economic and social implications when security measures are put into place. Therefore, when proposing a border defense expenditure, policymakers must take into account opportunity costs of an investment.[22] Terrorist Attack occur infrequently, and with the large amount of money spent on homeland security, the U.S. government is neglecting "the opportunity to spend those same resources on regulations and processes that can save more lives at the same cost, or even at a lower one."[23] The government must have a strong argument to spend large amounts of money on security measures that are hard to prove their worth while programs that are proven to save lives are neglected.[24] Therefore, a model that takes into account opportunity costs will help policy makers in deciding what border controls will best benefit society.

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[17] Riley, *Strategic Planning for Border Security*, 6.

[18] Ibid.

[19] Colin Archer and Willi Annette, *Opportunity Costs: Military Spending*, 16.

[20] Ibid.

[21] Ibid., 30.

[22] Riley, *Strategic Planning for Border Security*, 5.

[23] Mueller and Stewart, "Balancing Costs of Homeland Security," 15.

[24] Ibid.

3.　　　Measuring ROI for DHS' Border Security Expenditures

Calculating ROI for DHS' border security expenditures or any other public expenditure is more challenging compared to a more direct calculation approach that private companies take. In the private sector, ROI is a measure of the overall profit or loss of an investment, expressed in percentage.[25] For a private business, ROI is a decision-making tool to evaluate not only the past or present value of an investment, but also to provide companies with insight into future decision-making.[26] The private sector would calculate ROI, "by dividing a company's net profit (also called net earnings) by the total investment (total debt plus equity), then multiplying by 100 to arrive at a percentage:"[27]

$$\text{Net profit/total investment x } 100 = \text{ROI} \tag{1}$$

The private sector has two primary methods for determining profitability: measuring Return on Assets (ROA) and Return on Equity (ROE).[28] ROA is an important measurement because it allows a company to measure the effectiveness of the usages of its assets; the company can then compare ROA to other companies or with previous years.[29] ROA is shown as a percentage by dividing net income by its total value of assets, and then multiplied by 100:[30]

$$\text{Net profit/total assets x } 100 = \text{ROA} \tag{2}$$

ROE is a measure of how well a business is using the money invested by outside shareholders to produce profit. This is an important measure that demonstrates how a effectively a company is using money invested in the company to produce earnings.[31]

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[25] Editors of Perseus Publishing, *Business: The Ultimate Resource* (Cambridge, MA: Perseus, 2002), 837.

[26] Jones, "Return on Investment Analysis," 426.

[27] Editors of Perseus Publishing, *Business: The Ultimate Resource*, 837.

[28] Jones, "Return on Investment Analysis," 427.

[29] Editors of Perseus Publishing, *Business: The Ultimate Resource*, 836.

[30] Ibid.

[31] Editors of Perseus Publishing, *Business: The Ultimate Resource*, 836.

Return on equity is measured by dividing net income by shareholders' equity and then multiplying by 100:[32]

$$\text{Net income/shareholders' equity x } 100 = \text{ROE} \qquad (3)$$

If a company wanted to calculate whether a future project would be worth the investment, calculating Internal Rate of Return (IRR) would assist in this effort. IRR lets a business know at what interest rate borrowing money at for an investment makes the project profitability based on expected cash flows.[33] The company can compare the IRR to other projects that may be more profitable.[34]

The ROI valuations in the private sector are not applicable to the public sector.[35] DHS does not expect income generated from its investments in border security. DHS is providing a public service and quantifying its ROI would be difficult in terms of dollars. One method of determining ROI for a public enterprise would be to compare its investments to the private sector; however, due to the uniqueness of DHS' mission it is impossible to do this. A different metric to determine ROI for DHS is required.[36]

The closest method to making an economic decision by DHS is the use of its risk model to determine the cost-effectiveness for a given border defense expenditure. The risk formula used by DHS is:[37]

$$R(\text{terrorist attack}) = p(\text{Attempted Attack}) \text{ x } q(\text{Success/Attempt}) \text{ x } [-u(\text{consequences})] \qquad (4)$$

R is measured as the risk of a terrorist attack, p is the probability of an attack, q is the probability that an attack is successful, and u is the utility function for consequences of a successful attack.[38] The threat of an attempted attack is very difficult to measure,

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[32] Editors of Perseus Publishing, *Business: The Ultimate Resource*, 836.

[33] Ibid., 832.

[34] Ibid.

[35] Jones, "Return on Investment Analysis," 428.

[36] Ibid.

[37] Ralph L Keeney and Detlof von Winterfeldt, "A Value Model for Evaluating Homeland Security Decisions," *Risk Analysis* 31, no. 9 (2012): 1471, doi: 10.1111/j.1539-6924.2011.01597.x.

[38] Keeney and Winterfeldt, "A Value Model for Homeland Security," 1471.

given the constantly changing threat environment and the abilities of criminals to adapt to new technologies.[39] The probability that an attack if successful is measured by the likelihood that an adversary can defeat the current countermeasures and complete a successful attack.[40] The consequences are the potential losses that can be faced given a successful attack.[41] The assessment of p and q can be done using various risk analysis methods; the most appropriate one is still a debated topic among the risk analysis experts.[42] The metrics for consequences are determined by developing a list of possible impacts of a successful attack on an element of border security. This measure is quantified in annual dollars by using sound judgement and empirical data when available.[43]

The risk of a terrorist attack given a specific countermeasure that is put into place is measured as:[44]

R_c (Terrorist Attack with Countermeasure C) = p_c(Attempted attack) x q_c(Success of Attempt) x $[-u(x_c)]$ (5)

The benefit of the countermeasure would be determined by:[45]

$$B \text{ (countermeasure)} = R(TA) - R_c(TA) \qquad (6)$$

The cost effectiveness can therefore be determined by taking the difference in the annual benefit of risk mitigation and dividing it by costs:[46]

$$\text{Benefit/Cost} = R(TA) - R_c(TA)/\text{Cost} \qquad (7)$$

Given that the inputs are accurate, this value model gives DHS an appropriate model for determining what assets to use for border security by determining which option

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[39] William L. McGill, Bilal M. Arrub, and Mark Kaminsky, "Risk Analysis for Critical Asset Protection," *Risk Analysis* 27, no. 5 (2007): 1266, doi: 10.1111/j.1539-6924.2007.00955.x.

[40] McGill, Ayyub, and Kaminsky, "Risk Analysis," 1269.

[41] Ibid., 1268–69.

[42] Keeney and Winterfeldt, "A Value Model for Homeland Security," 1471.

[43] Ibid., 1474.

[44] Ibid., 1483.

[45] Keeney and Winterfeldt, "A Value Model for Homeland Security," 1483.

[46] McGill, Ayyub, and Kaminsky, "Risk Analysis," 1274.

of security provides the greatest benefit relative to cost.[47] Additional approaches to measuring border security expenditures and cost-effectiveness based on risk of attack has been attempted by other scholars. Scott Farrow developed a model to demonstrate how an expenditure used for one site will have positive impact on border controls at another.[48] His model is still limited to using only risk calculation in determining cost-effectiveness, ignoring externalities.

4. Current ROI Model Deficiencies

DHS policy-makers appear to seldom use its DHS risk model using cost-effectiveness to determine resource allocation. This may be the case because proper metrics are hard to determine due to the constantly changing threat environment and little experience in valuing the actual consequences of threats.[49] Therefore, empirical evidence cannot be relied upon solely in developing impact of a potential future event; causing this model to be valuable to only those who believe in its method.

The size of the border and the fact that there are multiple agencies competing for limited resources further complicates evaluating ROI for a border defense expenditure.[50] When multiple agencies independently conduct their own measures of ROI and impact, it is possible that resources could be inappropriately pulled from each other or an enduring mission.[51]

The goals of policymakers are not taken into account under the current cost-effectiveness model. These opposed goals range from creating a "stronger" border, a "weaker" border, maintaining deterrence at the border while using alternate methods, or

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[47] Keeney and Winterfeldt, "A Value Model for Homeland Security," 1485.

[48] Scott Farrow, "The Economics of Homeland Security Expenditures: Foundational Expected Cost-Effectiveness Approaches," Contemporary Economic Policy 25, no. 1 (January 2007): 19, doi: 10.1111/j.1465-7287.2006.00029.x.

[49] Ibid., 14.

[50] Ibid.

[51] Willis et. al, *Measuring the Effectiveness of Border Security*, 4.

taking purely a cost-effective approach.[52] The cost-effectiveness of a border security expenditure also ignores opportunity costs of investments that may provide impact on threats transiting the border. Studies suggest that decision makers largely ignore the value of opportunity costs or do not value them highly enough. This is due to incomplete information on an opportunity costs' value and that the nature of a policymaker is to be risk averse, therefore policymakers will not give appropriate proper value to alternative investments without complete information.[53]

5.   ROI in the Public Sector

Various return-on-investment models have been completed to assist policymakers in determining the value of government programs. In 1991, the Office of Personnel Management (OPM) conducted an ROI study on the value of its management curriculum. It is a five-day course that is meant to increase productivity of the personnel who attend it.[54] The ROI formula OPM used:[55]

$$\text{ROI} = (\text{Net Program Benefits/Program Costs}) \times 100 \qquad (8)$$

The program benefits were an estimation of skills gained by the training and the costs included the total costs associated with the course, including salaries, tuitions, and other associated expenses. The overall ROI was calculated to be 150 percent.[56]

The RAND corporation conducted a study to evaluate ROI for the U.S. Navy funding graduate education programs for its officers. The model used inputs for the costs of providing the education along with the benefits of the increased utility the officer

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[52] Rodrigo Nieto-Gomez, "Walls, Sensors and Drones: Technology and Surveillance on the US-Mexico Border" in Borders, Fences, Walls: State of Insecurity? ed. Elisabeth Vallet (New York: Routledge, 2016), 208.

[53] Robert E. Hoskin, "Opportunity Cost and Behavior," Journal of Accounting Research 21, no. 1 (Spring 1983): 78–79, http://www.jstor.org/stable/pdf/2490937.pdf.

[54] Todd L. Chmielewski and Jack J. Phillips, "Measuring Return-on-Investment in Government: Issues and Procedures," *Public Personnel Management* 31, no. 2 (2002): 233, doi: 10.1177/009102600203100208.

[55] Ibid., 231.

[56] Chmielewski and Philips, "Measuring Return-on-Investment in Government," 233.

would provide to the Navy as a result of the graduate education.[57] The result of the study provided the amount of years an officer would need to serve in a billet coded for that education requirement to break-even on the Navy's investment. The amount of years needed for repayment varied by job type.[58]

The U.S. Navy Dental Corps created a model for evaluating ROI for each branch location using the following formula:[59]

$$\text{ROI} = (\text{DWV x } 100) - [(\text{APF x Milab}) \text{ x } 0.25] / [(\text{APF} + \text{Milab}) \text{ x } 0.25] \qquad (9)$$

The Dental Weighted Value (DWV) is the dental procedural value of services added converted into 100 dollars of services. The investment in funding (APF) and military labor (Milab) are the annualized amounts provided to a branch converted to a quarterly amount.[60] This formula has since been modified to include items such as equipment depreciation and bonuses provided to dentists to continue service.[61] The U.S. Dental Corps uses this model to compare the efficiency that each branch location is operating at and allows policymakers to adjust resource allocation to ensure maximum efficiency.

From 1999 to 2002, the United States Postal Service (USPS) used a model call Economic Value Added (EVA) to determine ROI.[62] This model evaluates the net cash flow of an investment by calculating the value added of an investment and subtracting the costs to produce that income.[63] The USPS would offer bonuses to employees that produced high value income based on programs implemented. This program was discontinued in 2002 because USPS was paying out bonuses that resulted in a net loss for

[57] Kristy N. Kamarck, Harry J. Thie, Marisa Adelson, and Heather Krull, *Evaluating Navy's Funded Graduate Education Program* (Santa Monica, CA: RAND, 2010): 47, http://www.rand.org/content/dam/rand/pubs/monographs/2010/RAND_MG995.pdf.

[58] Ibid., 51.

[59] Jones, "Return on Investment Analysis," 433.

[60] Ibid.

[61] Ibid.

[62] Ibid., 432.

[63] Ibid.

the company.[64] Conventional private business ROI processes previously discussed have since been implemented in USPS. The USPS is different from most other government agencies because it operates more like a private business and generate income from their services.[65]

The Royal New Zealand Navy (RNZN) created an ROI models to evaluate the ROI of bonuses distributed to retain their marine engineers (MEs).[66] An approach RNZN took included questionnaires that were completed by personnel who were retained because of the bonus. The estimated retention impact (represented by **F** in Equation 10) was calculated by multiplying the 41% of personnel stated they remained in service because of the bonus and 93% stated they were confident that this was the reasoning.[67] The costs of an engineer leaving service (**B**) and training a new engineer (**C**) multiplied by the personnel retained (**A**) were the benefit inputs to the model. The cost input was the value of the bonuses paid (**H**). The following formula was used:[68]

$$ROI = ([(B + C) \times A \times F] - H) / H \tag{10}$$

This method determined a 43% return on investment for the ME bonus. The RNZN used another model based more on empirical data instead of survey results that produced similar results.[69]

6.   Game Theory and Social Sciences

In building a model that reflects social change you must begin with situation that is mathematically based and has logical consequences.[70] Game theory is a mathematical model that analyzes possible interactions among people for given situations. The people are defined as actors. A model can be created with a finite or infinite number of actors.

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[64] Jones, "Return on Investment Analysis," 432.

[65] Ibid., 433.

[66] Ibid., 431.

[67] Ibid.

[68] Ibid.

[69] Ibid.

[70] R. Robert Huckfeldt, C.W. Kohfeld, and Thomas W. Likens, "Dynamic Modeling: An Introduction," in *Quantitative Applications in the Social Sciences Series 07–027*, ed. John L. Sullivan and Richard G. Niemi (Beverley Hills, CA: SAGE, 1982), 7.

An example of actors in a security situation would be security forces as one group and adversaries as another.[71] Milind Tambe uses a special class of games called the Bayesian-Stackelberg Games to help determine asset allocation for security problems. A simplified version of this is demonstrated with two actors: adversary and defenders.[72] The adversary could attack two different terminals at an airport and the defenders have a limited amount of resources to defend their assets. The goal for each party is to determine an action that will maximize their utility, or payoff. The amount utility gained by attacking or defending either terminal is determined by experts in the field.[73] There are underlying assumptions into this model, such as each party has perfect knowledge of the other.[74]

The goal Tambe has in this type of approach to security game is to find what allocation of resources will benefit the defenders the most, labelled the strong Stackelberg equilibrium (SSE).[75] This model can be further complicated to incorporate multiple actors and adversary types. Tambe applied this method to three real-world applications used today. She developed the ARMOR system at Los Angeles International Airport (LAX), which helps the airport determine when and where to set up vehicle checkpoints; the IRIS system for the Federal Air Marshals Service (FAMS) to randomize assignment of agents on flights to counteract surveillance; and GUARDS system to help the Transportation Security Administration (TSA) to allocate resources to different airports.[76]

Many uses of game theory do exist and have been researched in depth on their effects on public policy. Aumann and Kurz developed a model that uses game theory foundations of the Harsanyi–Shapley–Nash value for non-transferable utility games, to develop a process to determine, "where the power of each individual is reflected both in

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[71] Milind Tambe, *Security and Game Theory: Algorithms, Deployed Systems, Lessons Learned* (Cambridge: Cambridge University Press, 2011), 4–5.

[72] Ibid., 4–6.

[73] Ibid., 5.

[74] Ibid., 6.

[75] Ibid., 8.

[76] Ibid., 9–10.

the political and economic spheres."[77] This is a dynamic model incorporating purely an economic output. Dynamic models are most beneficial to be used when determining human affairs because it allow for an infinite number of outcomes and time span, allowing for more flexibility to changes in laws, institutions, and other factors.[78]

A dynamic model rooted in game theory was developed by Lewis Richardson to determine arms races among nations.[79] The purpose of his model was to determine armament behavior by individual nations based on the economic burden of the military, perceived threat of other nations building up their arms, and the effects of internal politics regarding arms building.[80] This model is applicable if assumed that the actions of one nation effect another nation's decision to increase its arms.

D.   POTENTIAL EXPLANATIONS AND HYPOTHESES

The Secure Fence Act of 2006 gave the authority to the Secretary of Homeland Security the right to enforce all actions to achieve complete operational control of the border, defined as prevention of all unlawful entries to the border.[81] This goal is unreasonable due to limited resources allocated to border defense expenditures, forcing DHS to assess tradeoffs in determining how to effectively secure the border.

For singular investments, it is possible to apply the current model to any potential border defense measure to determine whether an investment is cost-effective. For example, if policymakers want to eliminate drug trafficking in a particular stretch of the border, given the inputs are good, they can make a reasonable decision on the best investment to eliminate it by comparing investment opportunities and choosing the one that results in the lowest total threat. However, the lowest total threat decision will not always be the most cost-effective.

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[77] Robert Aumann and Mordecai Kurz, "Power and Taxes," *Econometrica* 45, no. 5 (1977): 257–8, doi: 10.2307/1914063.

[78] Martin Shubik, *Game Theory in the Social Sciences* (Cambridge: MIT Press, 1983), 8.

[79] Huckfeldt, Kohfeld, and Likens, "Dynamic Modeling: An Introduction," 46.

[80] Ibid.

[81] Secure Fence Act of 2006, Pub. L. No. 109–367, 120 Stat 2638 (2006).

The risk based model will only determine cost-effectiveness of an investment, based on reducing the likelihood of an attack. This model does not assess cost-effectiveness in achieving operational control of the border. A model that includes these effects would allow policymakers to evaluate the complete impact of a border security expenditure. This new model will assist policymakers in making sound decisions when deciding upon how to allocate funding that is meant to reduce or eliminate threats faced at the border.

E.   RESEARCH DESIGN AND THESIS OVERVIEW

The current ROI model that DHS employs falls short of accounting for the effect of combining assets and does not acknowledge that policy can affect operational control of the border. In this thesis, I attempt to create a new model that will be a tool for policymakers to use when deciding on future border security expenditures.

This thesis examines the administrative infrastructure charged with protecting the U.S.–Mexico border. This examination provides context for a review of technological and other physical assets placed at the border. This thesis examines current border security measures in place at the U.S.–Mexico border and publicly available enforcement data. The current security measures are outlined in detail to create an understanding of how taxpayer money is spent to support my argument that spending is done with little thought to cost-effectiveness and achieving operational control of the border. The decision model proposed for border security expenditures is then outlined in detail with justification for each input.

The goal of this thesis is to create a new decision model that is a tool for policymakers to achieve operational control U.S.–Mexico border, understand what this total cost is, and present the level of operational control possible under the current budgeting level. A new model that calculates effectiveness of a specific security measure is beyond the scope of this thesis. The restructuring of the decision process for determining assets at the border will be the output of the model created.

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II. EVOLUTION OF U.S.–MEXICO BORDER SECURITY LEGAL AND PHYSICAL INFRASTRUCTURE

A. INTRODUCTION

Defending the U.S.–Mexico border against a multitude of threats is a constantly evolving process for the United States. Prior to the Cold War, the United States had, "secure borders, large oceans as moats, and an offensive capability abroad, the United States could shield the homeland. That era is over."[82] The 1990s saw an increase in illegal immigration and drug trade transiting the U.S.–Mexico border, as well as an increase in terrorist actions within U.S. borders. Terrorist attacks include the 1993 World Trade Center bombing, 1995 Oklahoma City bombing, and the 1996 Centennial Olympic Park bombing. The terrorist attack on 9/11 demonstrated the need for reorganization to better defend the U.S. homeland. The federal government shifted focus from threats abroad to threats transiting our borders and initiated the, "most extensive government reorganization in the past 50 years in creating the Department of Homeland Security."[83]

The purpose of this chapter is to create an understanding on how complicated U.S.–Mexico border security is and how expenditures have evolved to become a massive economic consideration. The physical infrastructure of the U.S.–Mexico border has continually evolved to support the legal framework established to control flow of goods and people at the border. The laws put in place to control flow have evolved to mitigate perceived threats at the U.S.–Mexico border.

This chapter will examine the physical infrastructure evolution of the U.S.–Mexico border along with the different government agencies tasked with controlling the flow of goods and people and mitigating the risk of illegal flow of traffic. This exploration of the agencies involved and their tasks will demonstrate the complexity of border security budgeting.

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[82] Henry A. Crumpton, "Intelligence and Homeland Defense," in *Transforming U.S. Intelligence*, ed. Jennifer E. Sims and Burton Gerber (Washington, DC, Georgetown University Press, 2005), 199.

[83] Ibid., 202.

B. U.S.–MEXICO BORDER

The U.S.–Mexico border spans 1,989 miles in length. Annually, "more than 500 million people cross the borders into the United States, some 330 million of whom are non-citizens."[84] The heavily trafficked borders leave DHS to deal with threats "ranging from terrorists who may have weapons of mass destruction (WMD), to transnational criminals smuggling drugs or counterfeit goods, to unauthorized migrants intending to live and work in the United States."[85] The U.S. Customs and Border Patrol (CBP) is the federal entity that is given the majority of resources for border security. Proper border protection is however, a complicated joint effort among multiple federal, state, and local agencies.

C. DEVELOPMENT OF PRESENT DAY BORDER SECURITY INFRASTRUCTURE

Prior to the 20th century, the United States did not have any formal border protection on the border, and then, "in 1904, Teddy Roosevelt created the United States Immigration Service, which consisted of 75 men on horseback, based in El Paso, Texas, responsible for the patrol of the entire 2,300-mile southwest border."[86] The Emergency Quota Act of 1921 limited immigration to the United States to 3 percent of each nationality present in the United States, based on the 1910 census.[87] The immigration limit outlined in the Emergency Quota Act of 1921 created a, "dramatic increase in illegal immigration, which led to the creation of the U.S. Border Patrol in 1924."[88] The U.S. Border Patrol at that time was a part of the Department of Labor and was created, "to prevent illegal migration across our southern border with Mexico and our northern

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[84] CBP Info Center, U.S. Customs and Border Protection, last modified November 7, 2015, https://help.cbp.gov/app/answers/detail/a_id/578/~/border-in-miles.

[85] Marc R. Rosenblum, Jerome P. Bjelopera, and Kristin M. Finklea, *Border Security: Understanding Threats at the U.S. Borders* (CRS Report No. R42969) (Washington, DC: Congressional Research Service, 2013), Summary, https://www.fas.org/sgp/crs/homesec/R42969.pdf.

[86] U.S. Department of Homeland Security, "Remarks by Secretary of Homeland Security Jeh Johnson: 'Border Security in the 21st Century' As Delivered," news release October 9, 2014, https://www.dhs.gov/news/2014/10/09/remarks-secretary-homeland-security-jeh-johnson-border-security-21st-century.

[87] Ibid.

[88] Ibid.

border with Canada."[89] The U.S. Border Patrol remained a part of the Department of Labor until the formation of DHS in 2003.

Following the attacks of 9/11, immigration reform and border enforcement has become a primary mission set of the United States; however, to say that 9/11 completely changed border enforcement would be inaccurate.[90] The current day enforcement of the borders is a product of the Chinese Exclusion Acts from the post-civil war era. The Supreme Court reviewed the Chinese Exclusion Acts and concluded "that the power to regulate immigration should be an unequivocally federal mandate and that it could not be subject to constitutional or judicial oversight."[91] This landmark decision by the Supreme Court has since made it an understanding that the Legislative Branch holds the power to immigration control. The Immigration and Naturalization Act of 1952, along with its amendments in the 1990s, further strengthened Congress' grasp on immigration regulation, separating it further from formal judicial review.[92] An important detail of the immigration reform in the 1990s came when Congress expanded the list of what is considered an aggravated felony. Aggravated felonies are crimes that automatically lead to deportation of illegal immigrants.[93] Prior to the 1990s, an aggravated felony included only murder, firearms and weapons trafficking; until this list was expanded to include misdemeanors and other minor offenses.[94] This led to deportations rising dramatically throughout the 1990s. The primary perceived threat during this time was the loss of U.S. jobs. This changed post-9/11, where immigration reform and enforcement at the borders has been done primarily in the name of national security.[95]

The turmoil of the 1990s and the vulnerabilities exposed to the homeland from the attacks on 9/11; forced the federal government to refocus its defense efforts on the home

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[89] U.S. Department of Homeland Security, "Border Security in the 21st Century."

[90] Matthew Coleman, "Immigration Geopolitics beyond the Mexico–U.S. Border," *Antipode* 39, no. 1 (2004), 55, doi: 10.1111/j.1467-8330.2007.00506.x.

[91] Ibid., 61.

[92] Ibid., 58.

[93] Ibid.

[94] Ibid.

[95] Ibid., 55.

front. In November 2002, Congress passed the Homeland Security Act and, "the Department of Homeland Security formally came into being as a stand-alone, Cabinet-level department to further coordinate and unify national homeland security efforts, opening its doors on March 1, 2003."[96] The formation of DHS integrated 22 federal agencies into one department, including the U.S. Border Patrol, now formally named U.S. Customs and Border Patrol. The purpose of DHS was to create a, "strengthened homeland security enterprise and a more secure America that is better equipped to confront the range of threats we face."[97]

D.   CUSTOMS AND BORDER PROTECTION (CBP)

CPB's establishment in 2003 marked the future of border protection in the United States. CPB "is itself one of the largest agencies of our government, with a budget of $3.5 billion, a total of 23,000 personnel, 20,833 border patrol agents and the largest-ever level of technology and equipment."[98] The primary purpose of CBP, "is to prevent the entry of terrorists and the instruments of terrorism into the United States."[99] CBP has other areas of focus besides terrorism including, "the responsibility to prevent illegal immigration; regulate and facilitate international trade; collect import duties; enforce U.S. trade and drug laws; and protect Americans and U.S. agriculture and economic interests by preventing the importation of harmful pests, diseases, and contaminated, diseased, infested, or adultered agriculture and food products."[100] CBP has a complicated and varied mission set. CBP executes its mission by conducting inspections at the border while it, "enforce[s] more than 400 laws and regulations at the border."[101]

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[96] U.S. Department of Homeland Security, "Creation of the Department of Homeland Security," last modified September 24, 2015, https://www.dhs.gov/creation-department-homeland-security.

[97] Ibid.

[98] U.S. Department of Homeland Security, "Border Security in the 21st Century."

[99] Mark A. Randol, *The Department of Homeland Security Intelligence Enterprise: Operational Overview and Oversight Challenges for Congress* (CRS Report No. R40602) (Washington, DC: Congressional Research Service, 2010), 20, https://www.fas.org/sgp/crs/homesec/R40602.pdf.

[100] Randol, *Homeland Security Intelligence Enterprise*, 20.

[101] Ibid.

The complexities faced by our CBP agents on a daily basis led to the organization of its own intelligence personnel. The CBP in October 2007, "reorganized its intelligence and anti-terrorism functions by establishing the OIOC [Office of Intelligence and Operations Coordination] headed by an Assistant Commissioner."[102] This office, "does not engage in traditional foreign intelligence activities," but it does coordinate with the intelligence community (IC) to prevent terrorists from entering the United States.[103] The headquarters for the OIOC is the Border Field Intelligence Center (BORFIC) in El Paso, Texas. Established in 2004, BORFIC, "conducts all intelligence activities to support the border security mission of the BP [Border Patrol] and other DHS and CBP elements."[104] BORFIC, "exchanges intelligence and law enforcement information with numerous federal, state, local, and tribal organization agencies and actively participates in several interagency and bilateral groups."[105]

1.   Office of Air and Marine (OAM)

The CBP's Office of Air and Marine (OAM) provides maritime and aerial support for CBP's border security mission. Its force asset stands at "approximately 1,660 federal employees, 240 aircraft and 400 marine vessels."[106] OAM aircraft consist of manned and unmanned aerial vehicles that extend the range of Border Patrol agents' ability to detect illegal border crossings. Its marine vessels navigate waterways that would otherwise be not be surveilled. OAM is essential to border protection and have achieved highly successful enforcement numbers. In FY 2015, CBP's Air and Marine Operations "resulted in the seizure or disruption of 230,579 pounds of cocaine; 719,549 pounds of marijuana; 1,427 weapons and $49.3 million; 4,485 arrests and 51,130 apprehensions."[107]

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[102] Randol, *Homeland Security Intelligence Enterprise*, 20.

[103] Ibid.

[104] Ibid., 26.

[105] Ibid.

[106] U.S. Customs and Border Protection, "Air and Marine Operations Fact Sheet," Date Accessed 9 February 2017, https://www.cbp.gov/sites/default/files/assets/documents/2016-Sep/FS_2016_AMO_Fact%20Sheet_FINAL.pdf.

[107] U.S. Customs and Border Protection, "Air and Marine Operations Fact Sheet."

E.   IMMIGRATION AND CUSTOMS ENFORCEMENT (ICE)

Established in 2003 as a result of the Homeland Security Act of 2002, ICE is another important element of border protection along the U.S.–Mexico border. ICE "was incorporated into DHS by consolidating the investigative elements of the former U.S. Customs Service and Immigration and Naturalization Service (INS) and by transferring the Federal Protective Service from the General Services Administration (GSA)."[108] The primary mission of ICE is to "enforce trade and immigration laws through investigative activities, persons, and events that may pose a threat to the safety or security of the United States and its people."[109] ICE investigates include human trafficking, WMD, and smuggling of drugs and other illegal goods. Its ability to work with the CBP in protecting the U.S. border takes a collaborative effort.

Just as CBP developed an intelligence entity, the Office of Intelligence and Operations Coordination, ICE needed an intelligence cell of its own. ICE developed the Border Violence Intelligence Cell (BVIC) in 2008, which is located in the El Paso Intelligence Center (EPIC).[110] BVIC provides intelligence support for ICE to counter threats specifically on the U.S.–Mexico border. Due to increases in threats transiting the southern border, ICE partnered with the Mexican government to increase border security, coordinated out of BVIC.[111] The results of this partnership were the development of the Border Enforcement Security Task Forces (BEST), *Armas Cruzadas*, and Operational Firewall.[112]

BEST is a multi-agency task force that partners with the DEA, FBI, ATF, and the Mexican law enforcement agency Secretaria de Seguridad Public to combat crime on the U.S.-Mexico border. *Armas Cruzadas* is a partnership between the U.S. and Mexican law enforcement agencies whose, "objective is to synchronize bilateral law enforcement and intelligence sharing operations in order to identify, disrupt, and dismantle trans-border

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[108] Randol, *Homeland Intelligence Security Enterprise*, 28.

[109] Ibid.

[110] Ibid., 30.

[111] Ibid., 31.

[112] Ibid., 30.

weapons smuggling networks."[113]"Operational Firewall is a joint effort with the CBP to target the full array of methods used to smuggle bulk cash," across the border.[114] The three bilateral agreements with Mexico demonstrates the Mexican government desire to reduce crime not only transiting the border, but among its own borders.

ICE's collaborative efforts to fight crime, cash, and weapons from transiting the border does not address the threat of illegal immigration. The development of the Human Smuggling and Traffic Center (HSTC) was ICE's way of addressing illegal immigration. The HSTC was established by the Intelligence Reform Act and Terrorism Prevention Act of 2004 and, "serves as the U.S. Government's intelligence fusion center and information clearinghouse for all federal agencies addressing human smuggling, human trafficking, and the facilitation of terrorist mobility."[115] ICE is a major contributor to HSTC, but the center also brings together, "federal agency representatives from the policy, law enforcement, intelligence, and diplomatic areas to work together on a full-time basis to convert intelligence into effective law enforcement and diplomatic action."[116]

ICE is an investigative unit within DHS that works with multiple different agencies to combat crime transiting the U.S.–Mexico border. The development of BVIC and the bilateral agreements with Mexico allow them to be an effective federal agency when it comes to border defense.

F.   DHS OFFICE OF INTELLIGENCE AND ANALYSIS (I&A)

In 2005, DHS went through a restructuring and created the DHS I&A office. DHS I&A "manages its intelligence and information sharing responsibilities."[117] The I&A was the main focal point of communication between the IC and DHS. The I&A does not partake in foreign intelligence collection; as other members of the IC do. The I&A completes all parts of the intel process for homeland security; including collection,

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[113] Randol, *Homeland Intelligence Security Enterprise*, 31.

[114] Ibid., 32.

[115] Ibid., 33.

[116] Ibid.

[117] Ibid., 2.

analysis, and dissemination of products to various customers.[118] Customers of the I&A vary from the President, all the way down to the border patrol agents.

All of the I&A primary missions could pertain to border security. The five missions that the I&A focuses on is, "border security, including narcotics smuggling, alien and human smuggling, and money laundering; radicalization and extremism; particular groups entering the United States that could be exploited by terrorists or criminals; critical infrastructure and key resources; and weapons of mass destruction (WMD) and health threats."[119] To have success in these missions, coordination is mandatory among federal, state, and local entities.

The I&A is responsible for multiple intelligence products that are used in border defense. The *Homeland Security Threat Assessment (HSTA)* "is an annual threat assessment that represents the analytical judgments of DHS and assesses the major threats to the homeland for which the nation must prepare and respond."[120] I&A provide more urgent warnings with the *Intelligence Warning* and *Intelligence Note*. The *Homeland Security Monitors* address border security interests directly. I&A also releases bulletins that are in conjunction with the FBI in the *Joint Homeland Security Assessment/FBI Intelligence Bulletin*.[121] They regularly publish *Homeland Intelligence Reports* (HIR), which "contains information that has yet to be evaluated."[122] The reports generated out of the I&A are used by multiple federal, state, and local agencies and they are typically unclassified or labeled, "For Official Use Only."[123]

The I&A established the Integrated Border Intelligence Program (IBIP) and its purpose is to, "enhance its support of border security activities."[124] The IBIP created the Homeland Intelligence Support Team stationed in El Paso, TX. The mission of I&A

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[118] Randol, *Homeland Intelligence Security Enterprise*, 5.

[119] Ibid., 8.

[120] Ibid., 9.

[121] Ibid., 10

[122] Ibid.

[123] Ibid., 9.

[124] Ibid., 15.

intelligence officers is to "coordinate and facilitate the delivery of national intelligence and enhance information infusion to support DHS operational missions at the border."[125] The increased participation at the border by the I&A has led to the increased production of HIRs that utilized by multiple agencies to assist in border protection.

G. INTELLIGENCE COMMUNITY AND BORDER DEFENSE

The Intelligence Community (IC) in the United States is a separate entity then what has been developed within DHS. The term IC refers to agencies such as the Central Intelligence Agency (CIA), National Security Agency (NSA), National Geospatial-Intelligence Agency (NGA), among others. Most IC contributions to border security are classified. It is "not possible based on unclassified materials to provide a metric for the value of intelligence information on border security efforts."[126] The undefined element of the IC's contribution to border security is when and where does the IC get involved? The IC has jurisdictional limits when it comes to collecting on U.S. citizens, which makes it difficult to clearly define the role of the IC in protecting our borders.

The relationship between DHS and the IC must be effective in order to properly protect the U.S.–Mexico border. The role of DHS with the IC is to, "serve as a bridge between federal intelligence agencies of all sorts and the first responders, helping translate national intelligence down to the first responders and helping pass along detailed local knowledge from first responders to intelligence agencies."[127] The IC can benefit DHS with providing valid information that will help allocate resources. DHS has limited resources and incorporates risk-based uses of those resources. Without contribution from the IC, "DHS will never have the resources to defend America. This is not only an operational imperative but a budgetary one: intelligence enables homeland defenders to use limited resources effectively and save taxpayer dollars."[128] DHS needs "focus

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[125] Randol, *Homeland Intelligence Security Enterprise*, 15.

[126] Richard A. Best Jr., *Securing America's Borders: The Role of the Intelligence Community* (CRS Reports No. R41520) (Washington, DC: Congressional Research Service, 2010), 2, https://www.fas.org/sgp/crs/intel/R41520.pdf.

[127] Mark M. Lowenthal, *Intelligence from Secrets to Policy,* 6ᵗʰ ed. (Thousand Oaks, CA: CQ Press, 2015), 371.

[128] Crumpton, "Intelligence and Homeland Defense," 206.

sharpened by intelligence. For example, the Department of Homeland Security must know where to increase border patrols and where to concentrate customs investigations to defeat strategic threats in the form of microtargets."[129]

The IC can provide information to DHS that will help reduce reaction times to foreign threats transiting the U.S.–Mexico border. The intelligence community can help combat, "foreign threats through accurate, timely, and relevant intelligence, enabling homeland consumers of intelligence to respond with precision and speed."[130] The IC is helping DHS by increasing efficiency in resource allocation and reduced reaction times is helping find solutions to threats faced on the border.

The IC's contribution to fighting the threats on the border is complicated but useful. In some instances, the threats United States faces, may be outside the focus of a collecting IC, when to get involved has been an undefined measure that is crucial to creating effective border defenses. When it comes to border security issues they, "often involve U.S. persons as well as foreign nationals and the U.S.–Mexico and U.S.–Canada borders are surrounded by individual families with ties to both countries."[131] The war on, "narcotics crosses the line established in the United States between foreign and domestic intelligence and between intelligence and law enforcement. The point at which an issue is handed from one agency to another is not always clear but it is important, raising both practical and legal questions."[132] President Obama attempted to clarify the IC communities' involvement in the war on Drugs by publishing the National Southwest Border Narcotics Strategy in June 2009, which directly states that the IC will be involved in battling illegal narcotics smuggling.[133]

Illegal immigration along the U.S.–Mexico border is a threat that is of high concern to the country but may not be the focus of the IC. The IC will focus on

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[129] Crumpton, "Intelligence and Homeland Defense," 205.

[130] Ibid., 198.

[131] Best Jr., *Securing America's Borders*, 3.

[132] Lowenthal, *Intelligence from Secrets to Policy*, 384.

[133] Office of National Drug Control Policy, *National Southwest Border Counternarcotics Strategy,* Washington, DC: Office of National Drug Control Policy, June 2009.

immigration when "illegal immigrants include terrorists, drug smugglers, or foreign agents or reflect significant levels of organized human trafficking."[134] When immigrants are not threats to national security the IC's provides limited contribution to countering those threats.

Fusion centers have been an attempt at better collaborative efforts among federal, state, and local law enforcement agencies and the IC.[135] The Department of Justice established the El Paso Intelligence Center (EPIC) in 1974 and has grown to include over 20 federal agencies. EPIC's purpose is to gather and share information focused on counternarcotics and counterterrorism.[136] The NGA, DHS, Drug Enforcement Agency (DEA), Coast Guard, and FBI all provide intelligence inputs to the EPIC workforce.[137] Joint Task Force North in El Paso, TX is a DOD led fusion center developed to help coordinate among federal, state, and local law enforcement agencies against the fight on the illegal flow of drugs across the Southwest Border.[138]

The U.S. IC has a complicated involvement in Border Security, but many assets available to counter the threats faced along the U.S.–Mexico border. Timely, accurate information shared with federal, local, and state law enforcement and can help reduce the amount of personnel and goods transit the U.S.–Mexico Border. The exact role of the intelligence community in border security has not been defined. There is effort from the Federal Government to improve the contributions of the IC, but there is still more to do. Due to jurisdictional restraints, the contributions of the IC to border patrol is also restricted. Protecting civil liberties of U.S. citizens is an important recognition of policy makers; however, if information collected by the IC inadvertently violates civil liberties but can prevent a threat from transiting the border, that information should still be shared and acted upon by federal, state, or local law enforcement.

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[134] Best Jr., *Securing America's Borders*, 3.

[135] Ibid., 6.

[136] Ibid., 7.

[137] Ibid., 6.

[138] Ibid., 7.

H. STATE AND LOCAL LAW ENFORCEMENT

The Constitution governs that immigration is enforceable by the federal government because it is a matter that affects all states.[139] The relationship between federal agencies and local law enforcement comes through formal means such as fusion centers and BEST. The informal relationship occurs during day-to-day routine law enforcement operations.[140] State and local law enforcement cannot by themselves enforce immigration laws and must do it under the purview of federal agencies. State and local law enforcement "assistance must be rendered within any parameters set by DHS so that DHS can exercise control over enforcement."[141] This is to assure that state and local law enforcement do not violate the provisions under the Immigration and Nationality Act of 1952.

I. TECHNOLOGICAL AND PHYSICAL BORDER SECURITY INVESTMENT

Investment in technological and physical border security by DHS has dramatically increased since the beginning of the 21st century. The "significant border-wide investments in additional enforcement resources and enhanced operational tactics and strategy have enabled CBP to address the changing composition of attempted border crossers to maintain border security."[142] The increase in Border Patrol agents along the southwest border has increased from 8,619 in fiscal year (FY) 2000 to 18,127 in FY 2014.[143] This increase in manpower has directly contributed to less attempted crossings. Arrests or apprehension due to illegal border crossing attempts in FY 2000 were over 1 million, and that number today has been reduced to approximately 400,000 a year.[144]

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[139] U.S. Department of Homeland Security, *Guidance on State and Local Governments' Assistance in Immigration Enforcement and Related Matters* (Washington, DC: U.S. Department of Homeland Security, July 16, 2015): 4, https://www.dhs.gov/sites/default/files/publications/guidance-state-local-assistance-immigration-enforcement.pdf.

[140] Ibid., 5.

[141] Ibid., 8.

[142] U.S. Customs and Border Protection, Department of Homeland Defense, *CPB Border Security Report Fiscal Year 2014,* December 19, 2014, 3, https://www.cbp.gov/sites/default/files/documents/FINAL%20Draft%20CBP%20FY14%20Report_20141218.pdf.

[143] U.S. Department of Homeland Security, "Border Security in the 21st Century."

[144] Ibid.

Primary fencing along the U.S.–Mexico border in FY 2000 was 57.9 miles, and that number has been increased to 352.7 miles today. Secondary fencing during this time period has increased from 10 miles to 36.3 miles today. Vehicle fencing in FY 2000 was only 10 miles and that has been increased to 299 miles today.[145] The United States now has over 700 miles of fencing along the U.S.–Mexico border. Border lighting increased from 17 miles in FY 2000 to 70 miles today.[146] Border fencing and proper lighting is an effective physical deterrent to personnel attempting to cross the border. Personnel may have the means to climb a fence, but the process slows their crossing and makes it difficult to transport goods and other heavy equipment over it.

Technological investment to increase surveillance has assisted DHS in the improved physical security of the U.S.–Mexico border. In FY 2000, there were no underground sensors at the border, that number has increased to 11,863 devices.[147] Two years ago, "CBP completed the restoration of eight Tethered Aerostat Radar Systems (TARS). TARS, a network of long-range radars, is the only wide-area persistent air, maritime, and land surveillance capability specifically designed for CBP's border security mission."[148] This long-range radar "detects … approximately 200 miles out, well beyond the physical border, thereby significantly increasing domain awareness and the time with which to plan and make decision."[149]

CBP has also increased investment in air assets pertaining to border defense. The CBP now has over 107 aircraft compared to 56 in FY 2000.[150] President Obama "has agreed to support Mexican counternarcotics efforts with the use of unmanned aerial vehicles (UAVs) over the shared border."[151] Today, the CBP has 8 UAVs compared to none in FY 2000.[152] There are currently two UAVs equipped with the Vehicle and

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[145] U.S. Department of Homeland Security, "Border Security in the 21st Century."

[146] Ibid.

[147] Ibid.

[148] U.S. Customs and Border Protection, *CPB Border Security Report FY 2014,* 3.

[149] Ibid., 3.

[150] U.S. Department of Homeland Security, "Border Security in the 21st Century."

[151] Lowenthal, *Intelligence from Secrets to Policy*, 383.

[152] U.S. Department of Homeland Security, "Border Security in the 21st Century."

Dismount Exploitation Radar (VADER) that is "a side-looking airborne radar system designed to detect, identify, and classify moving tracks of interest over land."[153] VADER accounted for 7,616 detections of illegal activity in FY 2014.[154]

Since FY 2000, increased investment in CBP and the DHS as a whole in physical and technological advances have had an impressive contribution to enforcement at the U.S.-Mexico border. In FY 2015, CBP had a total of 331,335 apprehensions; 2,137,428 pounds of drug seizures; $19,990,371 of currency seizures; and 113, 573 persons determined to be inadmissible.[155] The CBP would not be able to have success without the increased assets at the border. This number is impressive, but it is not due to physical border assets in its entirety. Intelligence and coordination with state and local law enforcement is a major portion of border protection that contributes to this enforcement data. The next chapter will cover statistics of border patrol enforcement more in depth.

J.   CONCLUSION

This chapter examined the primary federal agencies in DHS tasked with maintaining operational control of the U.S.–Mexico border and the relationship DHS has with the IC, State, and Local law enforcement pertaining to border security. The complex relationships demonstrate the complexities of the budgeting process for DHS. DHS spending is not done autonomously. When combatting threats at the border, DHS must incorporate the costs of not only their own agencies, but the costs of cooperating with others. The next chapter will examine the budgetary spending dedicated to border security as well as enforcement numbers. Figuring out what DHS has achieved with its funding is an important step in measuring impact and return-on-investment of its border security expenditures. Border security is a complicated multi-scalar endeavor that requires DHS to be creative and flexible in its budgeting process.

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[153] U.S. Customs and Border Protection, *CPB Border Security Report FY 2014,* 4.

[154] Ibid.

[155] U.S. Customs and Border Protection, Department of Homeland Defense, *CBP Border Security Report Fiscal Year 2015*, December 22, 2015, 3, https://www.dhs.gov/sites/default/files/publications/CBP%20FY15%20Border%20Security%20Report_12-21_0.pdf.

III. U.S.–MEXICO BORDER BUDGETING AND ENFORCEMENT DATA

A. INTRODUCTION

Following the creation of DHS, the federal government has steadily increased the amount of resources dedicated to protecting the U.S.–Mexico Border. The increase in awareness of vulnerabilities to the homeland and the perceived threat of illegal goods and personnel transiting the border is what has driven the increased investment. Interest in protecting the U.S.–Mexico border is directly reflected in the increase in border security expenditures following 9/11. This chapter is an examination of DHS' budget, in particular an examination of CBP's significant border security investments along the U.S.–Mexico border. The previous chapter included a broad discussion of border security infrastructure, but this chapter will closely examine resources dedicated to protecting the U.S.–Mexico border.

All security organizations are attempting to keep the asset they are protecting safe. DHS' spending on the Southwest Border focuses on preventing illegal goods and personnel from entering the United States. Its success is currently published through enforcement data. An examination of the published enforcement data concurrently with a critical view of the budget will help establish whether the massive investment of resources along the Southwest border has been worth it. The chapter will set the stage for a model concerning return-on-investment for border security expenditures.

B. DHS BUDGETING AND INVESTMENTS

The initial investment in DHS was considerable even for the federal government's standards. In 2001, President Bush released a budget justification titled *Securing the Homeland Strengthening the Nation*, which established the justification for massive investments on homeland defense spending. He described the border as a "massive flow of people and goods across our borders help drive our economy but can also serve as a conduit for terrorists, weapons of mass destruction, illegal migrants, contraband, and other unlawful

commodities."[156] The president defined the first border management priority as the prevention of international terrorists from entering. The other illegal threats posed at the border, such as drugs or illegal immigration, were listed by President Bush as secondary considerations to terrorism.[157] The president requested a 2.2 billion dollar raise for border security expenditures for 2003 and the spending continued to increase ever since.

Presented in Figure 1 is the budget for DHS from its inception in 2002 to 2016. The budget each year for DHS has grown considerably. Each year spending has increased over the year prior except in two instances, enacted budget from FY 2010 to 2011 and from FY 2012 to 2013. The initial DHS budget was $23.3 billion and reached its peak in FY 2016 at $53.2 billion. Where is all this money going? What portion is specifically dedicated to border security?
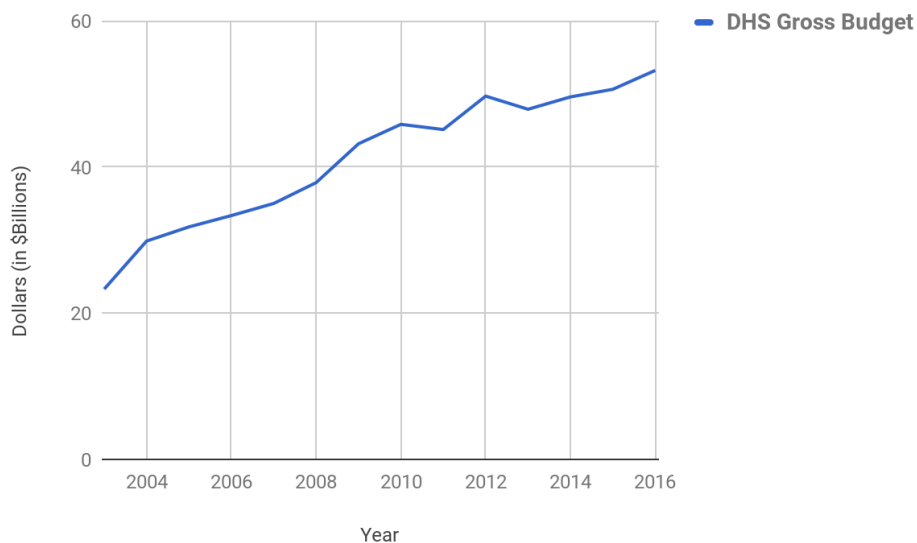
Note: 2015 and 2016 numbers represent proposed budget, not enacted budget.

Figure 1. DHS Enacted Gross Budget (in $Billions).[158]

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[156] George W. Bush, *Securing the Homeland Strengthening the Nation*, Washington, DC: The White House, 2001, 17, https://www.dhs.gov/sites/default/files/publications/homeland_security_book.pdf.

[157] Ibid.

[158] Data from U.S. Department of Homeland Security, *Budget in Brief Fiscal Year 2004–2016*, (Washington, DC: U.S. Department of Homeland Security, 2003–2016), https://www.dhs.gov/dhs-budget#.

Examining the DHS budget alone is too large of a scale when considering specifically border security investment impact and return-on-investment. It is also not necessary because they invest in so many assets not related to border security. It is appropriate to mention; however, because it is demonstrated in the previous chapter, border security is a collaborative effort within DHS. CBP is the main federal agency charged with protecting the homeland, and under it is the U.S. Border Patrol and CBP's Office of Air and Marine Operations. ICE and DHS Intelligence and Analysis are worth mentioning because of their contributions to border security.

1.   CBP

The CBP experienced the same trend in budgeting as the overall DHS budget. Its budget increased each year except for the dips in FY 2010 to 2011 and FY 2012 to 2013. Figure 2 demonstrates this data. At its creation, CBP had an initial budget of $5.8 billion. This number has more than doubled to the 2016 enacted budget to $13.2 billion.

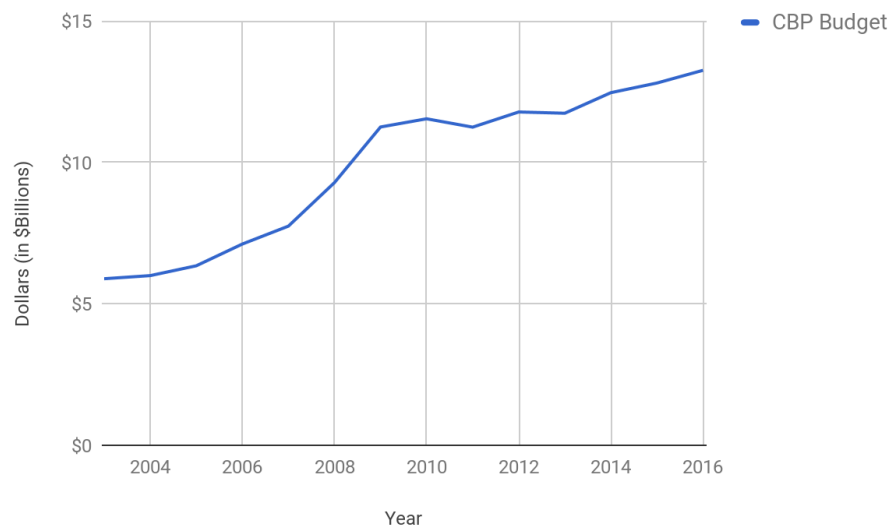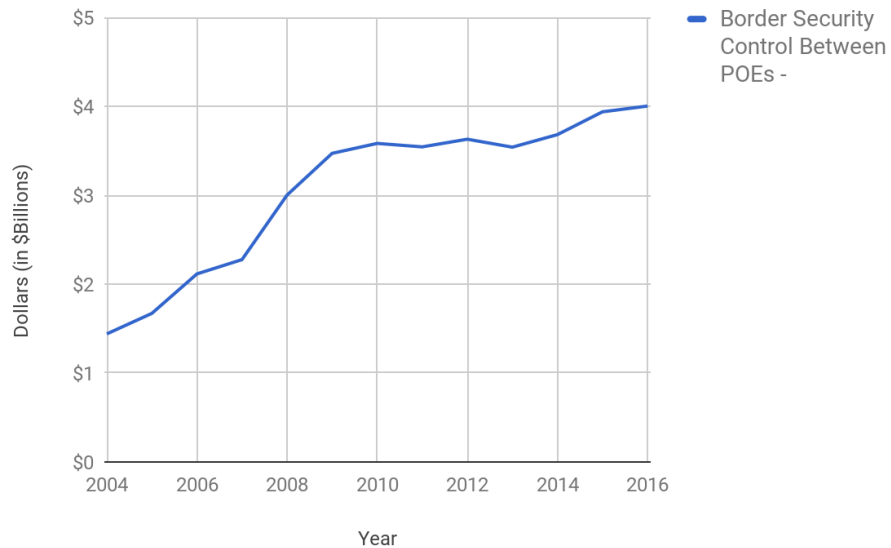Figure 2. CBP Enacted Budget (in $Billions).[159]

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[159] Data from U.S. Department of Homeland Security, *Budget in Brief Fiscal Year 2004–2016*, (Washington, DC: U.S. Department of Homeland Security, 2003–2016), https://www.dhs.gov/dhs-budget#.

CBP's mission does not solely lie at the physical U.S. borders, the maritime borders and customs from shipping also lay under its purview. Therefore, it is inappropriate to use its total budget when developing an understanding of border security expenditures. To get an idea of money allocated to border security, we must take a closer look at the CBP's budget.

Significant investments have been made at and between points of entry by the CBP to enhance border security. As shown in Figures 3, 4, 5, and 6, CBP's investment along U.S. borders has increased in every category delineated on its annual budgets except for its investment in Border Security Fencing, Infrastructure, and Technology.

Note: 2015 and 2016 numbers represent proposed budget, not enacted budget.

Figure 3. CBP Border Security Control Between POEs (in $Billions) Enacted Budget.[160]

[160] Data from U.S. Department of Homeland Security, *Budget in Brief Fiscal Year 2004–2016*, (Washington, DC: U.S. Department of Homeland Security, 2003–2016), https://www.dhs.gov/dhs-budget#.
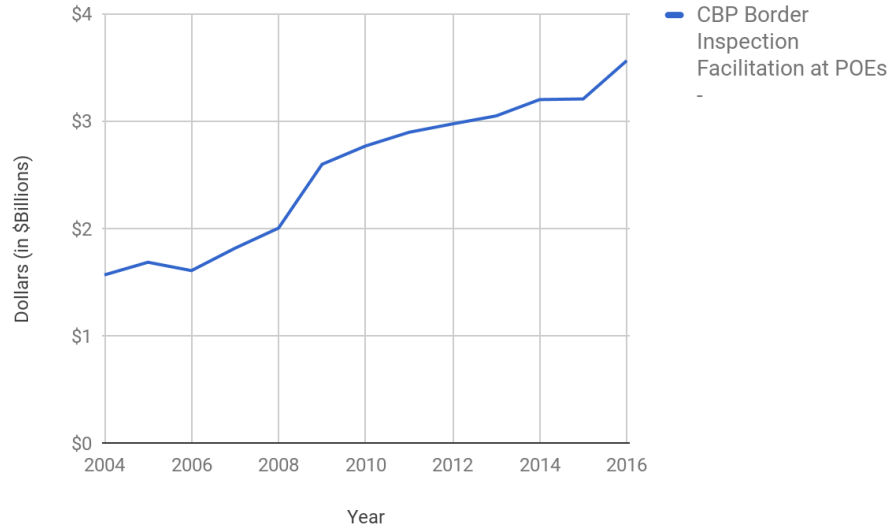
Note: 2015 and 2016 numbers represent proposed budget, not enacted budget.

Figure 4. CBP Border Inspection Facilities at POEs (in $Billions) Enacted Budget.[161]
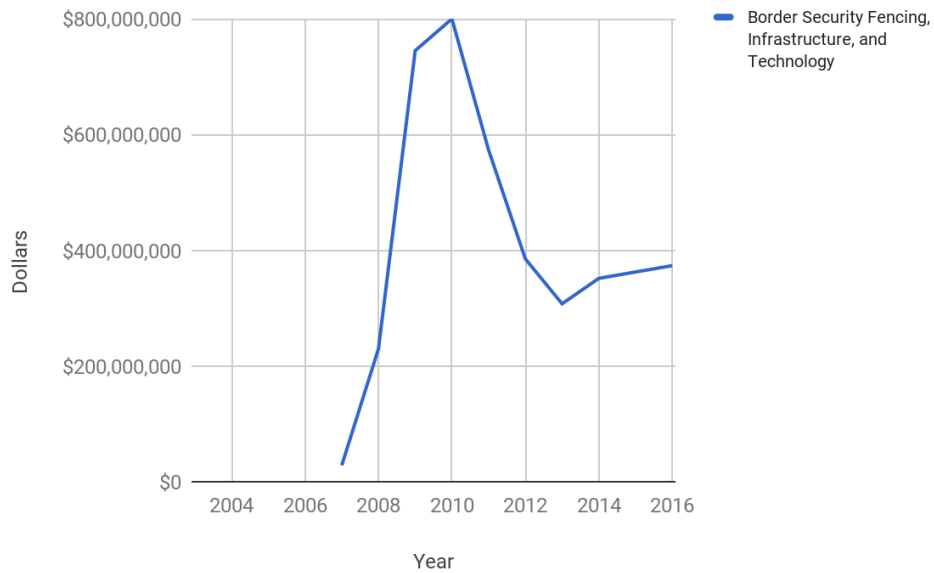
Note: 2015 and 2016 numbers represent proposed budget, not enacted budget. Data not presented in budget until FY 2007.

Figure 5. CBP Border Security Fencing, Infrastructure, and Technology Enacted Budget.[162]

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[161] Data from U.S. Department of Homeland Security, *Budget in Brief Fiscal Year 2004–2016*, (Washington, DC: U.S. Department of Homeland Security, 2003–2016), https://www.dhs.gov/dhs-budget#.

[162] Ibid.

Figure 6. CBP Air and Marine Interdiction Enacted Budget.[163]

The U.S. Border Patrol is worth mentioning as a separate category from CBP concerning border security. Following the creation of DHS, the U.S. Border Patrol has received an incredible increase in the amount of resources allocated in money and personnel, represented in Figures 7 and 8.

[163] Data from U.S. Department of Homeland Security, *Budget in Brief Fiscal Year 2004–2016*, (Washington, DC: U.S. Department of Homeland Security, 2003–2016), https://www.dhs.gov/dhs-budget#.
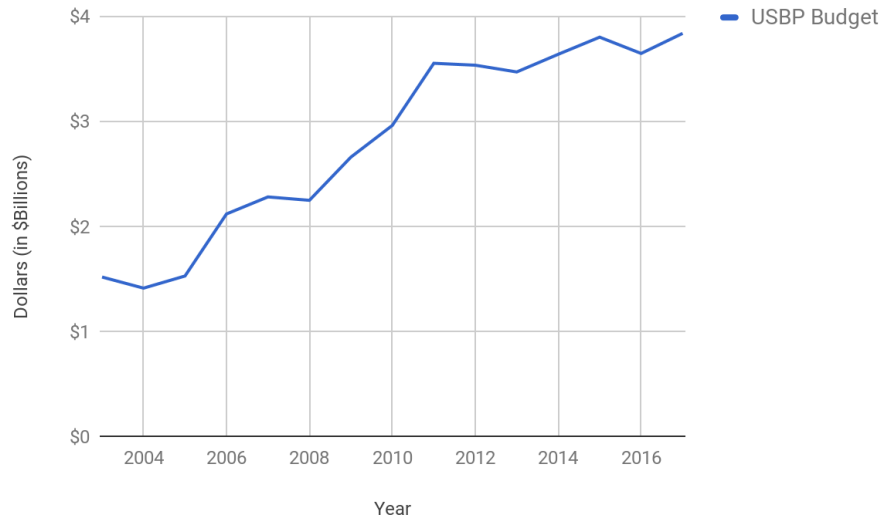
Figure 7. USBP Budget (in $Billions).[164]
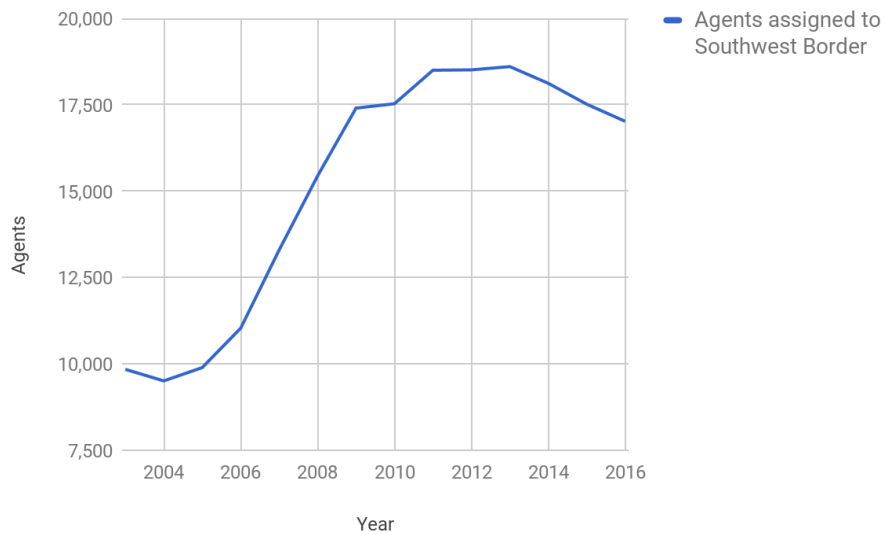
Figure 8. USBP Southwest Border Staffing.[165]

[164] Data from U.S. Border Patrol, "Enacted Border Patrol Program Budget by Fiscal Year," date accessed February 10, 2017. https://www.cbp.gov/sites/default/files/assets/documents/2016-Oct/BP%20Budget%20History%201990-2016.pdf.

[165] Adapted from U.S. Border Patrol, "Border Patrol Agent Nationwide Staffing by Fiscal Year," October 1, 2016, https://www.cbp.gov/sites/default/files/assets/documents/2016-Oct/BP%20Staffing%20FY1992-FY2016.pdf.

The data presented has demonstrated an overall upward trend in investment in border security. The majority of resources are dedicated to the Southwest border because of the perceived threat of criminal activity transiting the border.

2. ICE and DHS I&A

The previous chapter demonstrated the joint-effort between multiple DHS agencies that contribute to border security. While ICE and DHS I&A primary duties are not border enforcement, both play an important role in limiting the illegal activity transiting the border. Their budgets are presented in Figures 9 and 10. ICE, like CBP, has experienced an overall upward trend in investment dollars. Its initial enacted budget for FY 2003 was $3.2 billion and they have over doubled its budget through the years to over $6.1 billion in 2016. The DHS Intelligence and Analysis budget is allocated under the Analysis and Operations office of DHS. Its budget peaked in 2012 at $338.07 million but has had a decline in recent years.
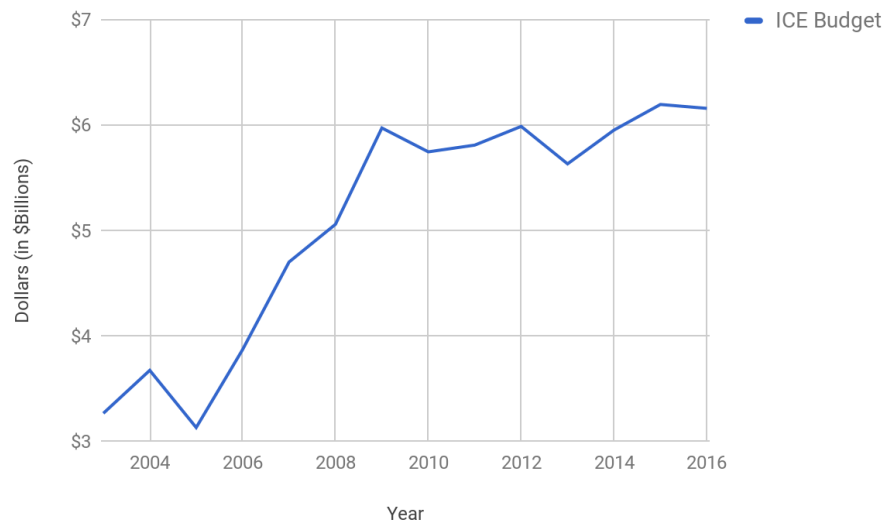
Note: 2015 and 2016 numbers represent proposed budget, not enacted budget.

Figure 9. ICE Enacted Budget (in $Billions).[166]

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[166] Data from U.S. Department of Homeland Security, *Budget in Brief Fiscal Year 2004–2016*, (Washington, DC: U.S. Department of Homeland Security, 2003–2016), https://www.dhs.gov/dhs-budget#.
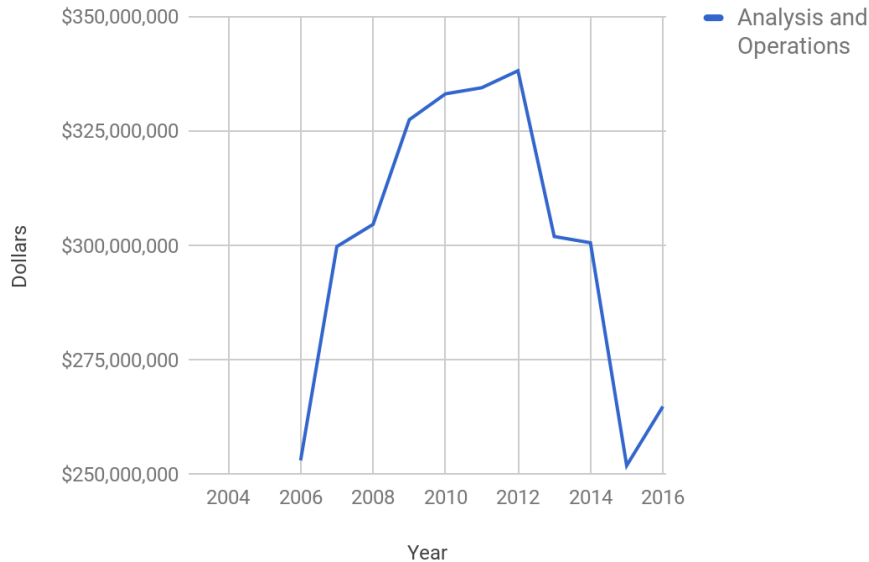
Note: 2015 and 2016 numbers represent proposed budget, not enacted budget.

Figure 10. DHS Analysis and Operations Enacted Budget.[167]

C.   SIGNIFICANT CBP BORDER SECURITY INVESTMENTS

The budgets of DHS demonstrate that there are significant investments made in securing America's borders. DHS justifies each year to Congress the need for significant funding and does so through its *Budget in Brief* series. In order to understand the federal government's justification for massive budgets, it is appropriate to review CBP's significant border security investments. Securing the U.S.–Mexico border is a constantly evolving endeavor that requires CBP to adapt to new ways criminals transit the border. The reason for focusing specifically on CBP investments is because they are the agency that is primarily investing in protecting the U.S.–Mexico Border.

In 2004, the DHS budget allocated over $18 billion dollars to border security and transportation security, including $273 million to improve infrastructure and technology.[168] Funding was also provided to improve tracking of people entering and

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[167] Data from U.S. Department of Homeland Security, *Budget in Brief Fiscal Year 2004–2016*, (Washington, DC: U.S. Department of Homeland Security, 2003–2016), https://www.dhs.gov/dhs-budget#.

[168] U.S. Department of Homeland Security, *Budget in Brief Fiscal Year 2004* (Washington, DC: U.S. Department of Homeland Security, 2003): 1, https://www.dhs.gov/sites/default/files/publications/FY_2004_BUDGET_IN_BRIEF.pdf.

leaving the country with over $100 million additional funding for America's entry-exit initiative.[169] The 2005 CBP budget specified continued investment of $64 million in its Remote Video System (RVS) to allow increased surveillance along the border.[170] Additional enhancements in targeting system programs warranted $20 million and would result in an increase in identification of "high-risk travelers and goods."[171] The requested $10 million dollars to procure and use UAVs would prove to become a useful tool in CBP's arsenal for preventing illegal traffic.[172]

The 2006 budget provided key funding to technologies on the air and ground. CBP allocated $44.2 million to take control of the Long-Range Radar technology used at the nation's border by the Federal Aviation Administration (FAA).[173] CBP allocated $125 million to acquire radiation portal monitors to detect and prevent WMD from entering the United States.[174] The America's Shield Initiative (ASI) received $51.1 million, which "enhances electronic surveillance capability along the Northern and Southern land borders."[175] The US-VISIT program received $390 million for implementation at land POEs.[176] This program is a "biometric storage and matching service," that provides identifying information on people leaving a coming to the country.[177] The Arizona Border Control Initiative (ABCI) received $1 million to continue providing an enhanced cooperative approach to border security between federal, state, and local law enforcement. An automated biometrics system that will help increase

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[169] U.S. Department of Homeland Security, *Budget in Brief Fiscal Year*, 1.

[170] U.S. Department of Homeland Security, *Budget in Brief Fiscal Year 2005* (Washington, DC: U.S. Department of Homeland Security, 2004): 21, https://www.dhs.gov/sites/default/files/publications/FY_2005_BIB_4.pdf.

[171] Ibid., 22.

[172] Ibid.

[173] U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2006* (Washington, DC: U.S. Department of Homeland Security, 2005): 9, https://www.dhs.gov/sites/default/files/publications/Budget_BIB-FY2006.pdf.

[174] Ibid., 27.

[175] Ibid., 8.

[176] Ibid., 27.

[177] U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2013* (Washington, DC: U.S. Department of Homeland Security, 2012): 86, https://www.dhs.gov/sites/default/files/publications/dhs-budget-in-brief-fy2013.pdf.

detection rates of illegal travelers, named the Automated Biometric Identification System (IDENT)/Integrated Automated Fingerprint System (IAFIS), received $3 million in funding.[178]

In 2007, the CBP budget allocated over $1.4 billion to a new project called the Secure Border Initiative (SBI). This included massive amounts of funding in infrastructure along the San Diego border ($30 million), Western Arizona border ($51 million), the U.S. VISIT Program ($399.5 million), Border Patrol Staffing Initiation ($647.8 million), and SBI*net* ($1 billion).[179] The tactical infrastructure included lighting, vehicle barriers, fencing, and patrol roads to be put into place.[180] The costliest investment is in a now cancelled program called SBI*net*. It will show in future budgets, but the program was ultimately found to be too costly and due to terrain problems failed to achieve the "one size fits all integrated fixed tower-based solution across the entire border."[181] DHS cancelled the program in 2011.

The budget for 2008 expanded border control staffing an additional $647.8 million.[182] SBI*net* received funding of $1 billion. CBP allocated $100 million to improve and provide additional border security facilities due to the current ones being operating at its capacity.[183] CBP assigned $25 million in funding for modernization to the Treasury Enforcement Communication System (TECS). This system allows for cross-agency watchlist checks at the border so no person entering through America's borders would go unnoticed if restricted by an outside agency.[184] During this FY, the CBP exceeded its

[178] U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2013*, 86.

[179] U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2007* (Washington, DC: U.S. Department of Homeland Security, 2006): 8–9, 27–28, https://www.dhs.gov/sites/default/files/publications/Budget_BIB-FY2007.pdf.

[180] Ibid., 27.

[181] U.S. Department of Homeland Security, *Report of the Assessment of the Secure Border Initiative-Network (SBInet) Program* (Washington, DC: U.S. Department of Homeland Security, 2011): 1, http://www.globalsecurity.org/security/library/report/2011/sbi-net-assessment.pdf.

[182] U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2008* (Washington, DC: U.S. Department of Homeland Security, 2007): 29, https://www.dhs.gov/sites/default/files/publications/budget_bib-fy2008.pdf.

[183] U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2008*, 29.

[184] Ibid.

goal of 145 miles of fencing at the border, a number that would be increased to over 670 by the end of the year.[185]

The 2009 budget allocated money to increase border staffing by over 2,200 ($362.5 million), improve Border Patrol Facilities ($149.5 million), increase Air and Marine Staffing ($4 million), and provide maintenance to the U.S.-Visit Program ($62.8 million) among the items.[186] The CBP Intelligence Program received its initial funding of $24 million to further develop the ability of the CBP to deter and detect illegal border security crossings.[187] FY 2010 continued increases in staffing investment along with $26.1 million to combat Southbound Firearms and Currency Smuggling.[188] This initiative was meant to increase staffing in between POEs along the Southwest border and increase the capabilities of its License Plate Reader (LPR) program, which helps identify suspicious vehicles quickly by querying the TECS database.[189]

In 2011, CBP allocated $10 million to hire 103 intelligence analysts who will provide "information required to make tactically and strategically sound decisions while also ensuring cost-effectiveness."[190] DHS allocated $10 million to expand the BEST program in additional locations to "disrupt and dismantle criminal organizations posing significant threats to border security."[191] The SBI*net* program received decreases in funding this year prior to its cancellation at the beginning of the next fiscal year.

With SBI*net* cancelled, in 2012 CBP redirected its attention to expand current technology that was successful along the U.S. border with $242 million. These funds

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[185] U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2009* (Washington, DC: U.S. Department of Homeland Security, 2008): 1,
https://www.dhs.gov/sites/default/files/publications/budget_bib-fy2009.pdf.

[186] Ibid., 28–30.

[187] Ibid., 30.

[188] U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2010* (Washington, DC: U.S. Department of Homeland Security, 2009): 60,
https://www.dhs.gov/sites/default/files/publications/budget_bib_fy2010.pdf.

[189] Ibid.

[190] U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2011* (Washington, DC: U.S. Department of Homeland Security, 2010): 56,
https://www.dhs.gov/sites/default/files/publications/budget_bib_fy2011.pdf.

[191] U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2011*, 8.

included the completion of 3 out of 5 Integrated Fixed Tower (IFT) systems in conjunction with other mobile equipment in Arizona.[192] In 2013, CBP allocated an additional $91 million to add another IFT along with other technologies focused on the Arizona area.[193] In FY 2012, $40 million was allocated to replace the current Tactical Communication (TACCOM) program with a more robust system along the Southwest border.[194] CBP allocated $261.5 million to the US-VISIT program in FY 2013 in order to take control of the program from the National Protection and Programs Directorate (NPPD) in DHS.[195]

In FY 2014, CBP took over control of the TARS program from the DOD and needed $37.4 million fund this venture. The IFS program received an allocation of $77.4 million to continue its proven track record along the Arizona border.[196] CBP allocated $40 million to update the TACCOM program with new digital technology with encryption capability to replace old analog radios.[197] CBP reserved over $362 million for infrastructure and technology updates. This included $46 million for its Remote Video Surveillance Systems (RVSS) and $44 million for its Mobile Video Surveillance Systems (MVSS) upgrades and expansions.[198] In 2015, an initial $13 million was allocated to develop the Arrival and Departure Information System (ADIS), which would eliminate the 30 days to share information between federal agencies on who has violated immigration laws.[199] Another new system that was assigned budgeting for 2015 was to

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[192] U.S. Department of Homeland Security, *Budget in Brief Fiscal Year 2012* (Washington, DC: U.S. Department of Homeland Security, 2011): 71, https://www.dhs.gov/sites/default/files/publications/budget-bib-fy2012.pdf.

[193] U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2013*, 86.

[194] U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2012,* 72.

[195] U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2013*, 86.

[196] U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2014* (Washington, DC: U.S. Department of Homeland Security, 2013): 115–116, https://www.dhs.gov/sites/default/files/publications/FY%202014%20BIB%20-%20FINAL%20-508%20Formatted%20%284%29.pdf.

[197] Ibid.

[198] U.S. Department of Homeland Security. *Budget-in-Brief Fiscal Year 2015* (Washington, DC: U.S. Department of Homeland Security, 2014): 8, 51–52, https://www.dhs.gov/sites/default/files/publications/FY15BIB.pdf.

[199] Ibid., 53.

develop a National Border Geo-Spatial Intelligence Strategy and establish a Southwest Border Tracking system. The $11 million-dollar allocation would "allow CBP to establish a geospatial tracking system for use across the Southwest border that will record the location of all apprehensions, getaways, and turnbacks."[200]

In FY 2016, CBP allocated $373.5 million to maintain border infrastructure and technology.[201] This included $44.7 million allocated to complete primary fencing along the Arizona border where criminals have been able to exploit weaknesses in border security.[202] More than $70 million was allocated to aircraft replacement and increased flight hours along the border. $16 million was allocated to increase Mobile Surveillance Capability (MSC) and $25.020 million was allocated to the MVSS system.[203] The intelligence operations received $12.9 million in funding along with the expansion of the National Geospatial Border Strategy that received $8.4 million in funding.[204]

The investments in border security by DHS are substantial. Set aside DHS' investment in SBI*net*, the most expensive item on its budget is its investment in human capital. The CBP Officers and Border Patrol Agents are what make up the majority of its year to year costs. The review of significant border security investments in technology and infrastructure demonstrates the complexity of perceived required investments. There are constantly new approaches taken and new investments being made. The unanswered question is this: Are border security investments working? How is this measured and is DHS investing its money wisely? The next section will review perceived accomplishments by DHS in border security.

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[200] U.S. Department of Homeland Security. *Budget-in-Brief Fiscal Year 2015*, 54.

[201] U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2016* (Washington, DC: U.S. Department of Homeland Security, 2015): 4, https://www.dhs.gov/sites/default/files/publications/FY_2016_DHS_Budget_in_Brief.pdf.

[202] U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2016*, 39.

[203] Ibid., 40–44.

[204] Ibid., 41–43.

D.   BORDER SECURITY ACCOMPLISHMENTS

This massive amount of federal budgeting allocated to border security should yield impressive results. An examination of these accomplishments by DHS in regard to border security is necessary to help determine whether they are going along the correct path in investments in technology and infrastructure improvements. The part of DHS that is responsible for the majority of enforcement along the U.S.–Mexico border is CBP's U.S. Border Patrol. This section will evaluate border security accomplishments by the USBP followed by border security accomplishments by the CBP since its inception.

The U.S. Border Patrol's apprehensions by year along the U.S.–Mexico border have steadily declined since the creation of the CBP, these numbers are shown in Figure 11. The graphical representation of apprehensions along the border is directly inverse to the amount of staffing placed at the border shown in Figure 8. Apprehensions peaked in 2005 at over one million and over the past year years have consistently stayed at approximately 400,000. There is a loose correlation between more border patrol agents resulting in fewer apprehensions at the border. This could suggest that the amount of border patrol agents assigned to the Southwest border are an appropriate deterrent to illegal crossings. The bit of evidence to refute the preceding statement is shown in Figure 12, which demonstrates there is no correlation between border agents patrolling the border and the amount of deaths at the border. The amount of deaths does not seem to be decreasing and is variable by year, suggesting that people are still taking the same amount of risk to transit the border illegally, even though there is increased presence along the border.
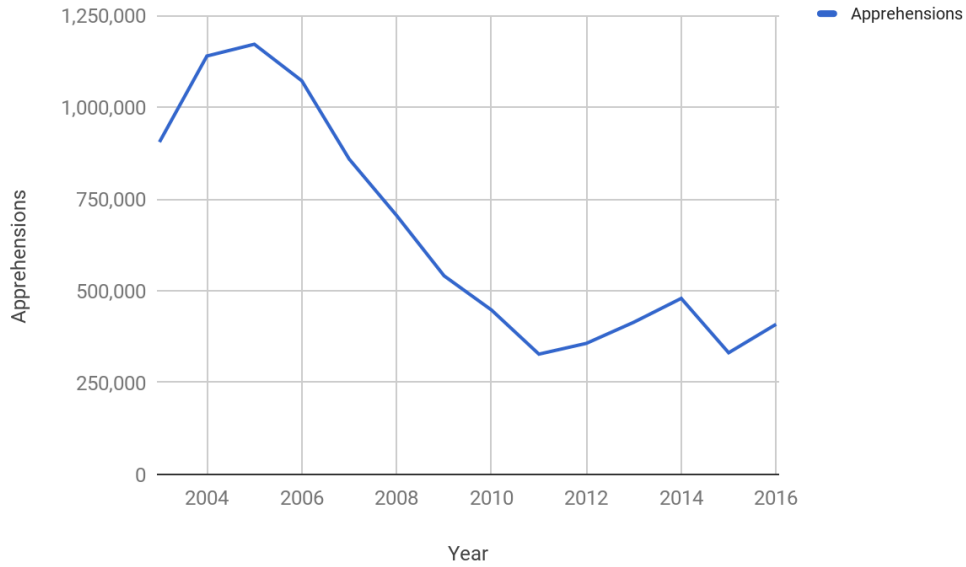
Figure 11. USBP Southwest Border Apprehensions.[205]
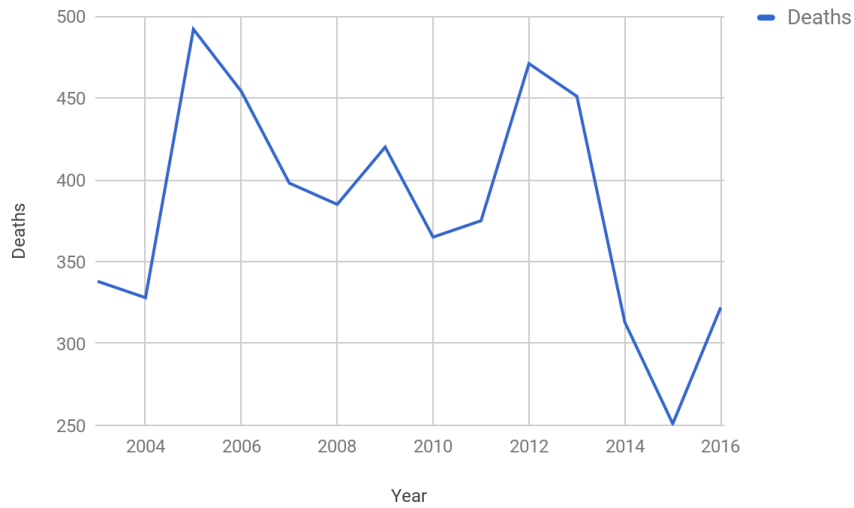
Figure 12. Southwest Border Deaths.[206]

205 Data from U.S. Border Patrol, "Southwest Border Sectors - Total Illegal Alien Apprehensions by Fiscal Year," date accessed February 10, 2017, https://www.cbp.gov/sites/default/files/assets/documents/2016-Oct/BP%20Southwest%20Border%20Sector%20Apps%20FY1960%20-%20FY2016.pdf.

206 Data from U.S. Border Patrol, "Southwest Border Deaths by Fiscal Year," date accessed February 10, 2017. https://www.cbp.gov/sites/default/files/assets/documents/2016-Oct/BP%20Southwest%20Border%20Sector%20Deaths%20FY1998%20-%20FY2016.pdf.

Beginning in 2011, the USBP began publishing threat sector data that specified enforcement numbers along the Southwest border for drugs, weapons, ammunition, and currency seizures. This enforcement data is available in Figures 13 through 16. The data is more limited in scope due to the recentness of publication; however, there appear to be downward trends in all enforcement categories except for currency seizures. The enforcement results cannot be attributed to border patrol agents' presence at the border alone. It is appropriate to review CBP accomplishments as a whole to help decipher if there is any sort of trend between border security investments and accomplishments.

Figure 13. USBP Southwest Border Firearm Seizures.[207]

[207] Data from U.S. Border Patrol, "Sector Profile - FY 2012–2016," date accessed February 10, 2017. https://www.cbp.gov/newsroom/media-resources/stats?title=Border+Patrol.
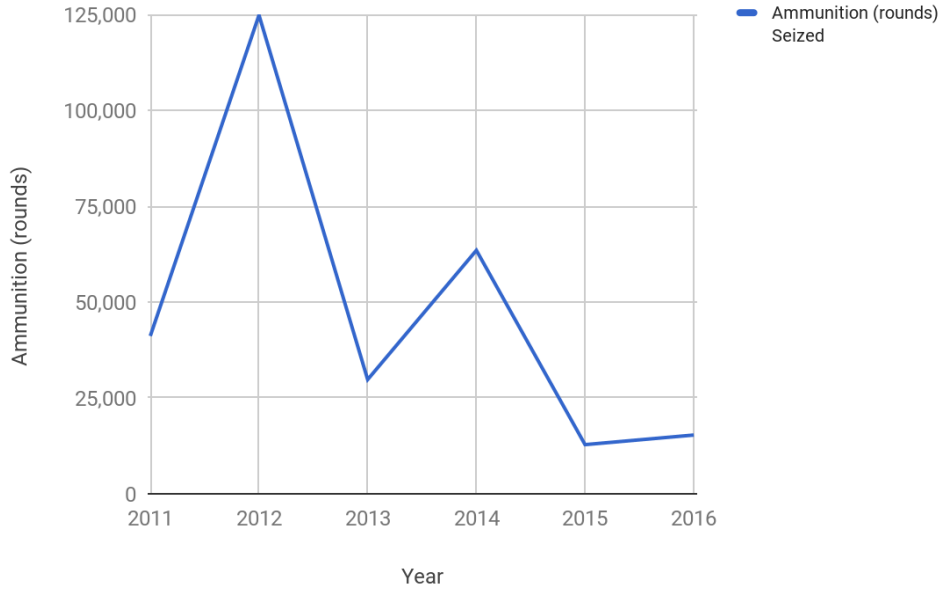
Figure 14. USBP Southwest Border Ammunition (rounds) Seizures.[208]
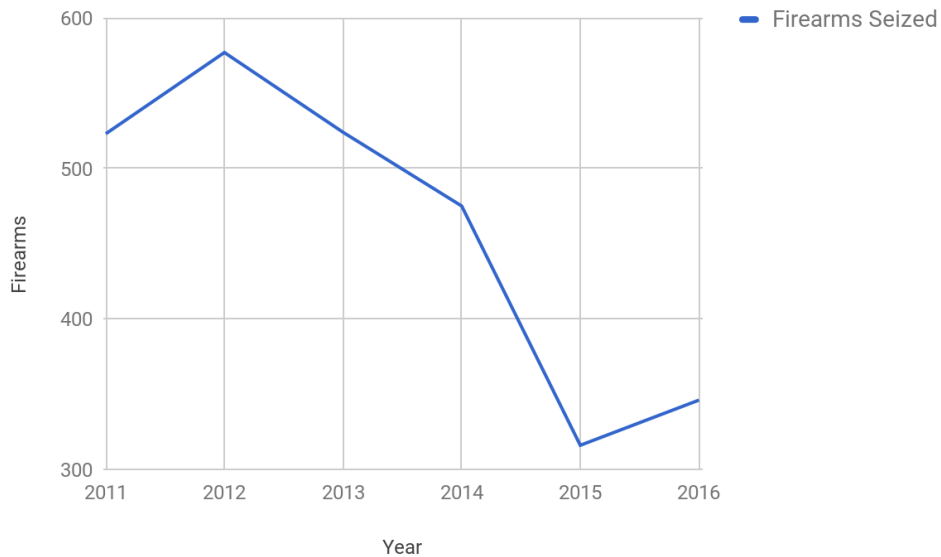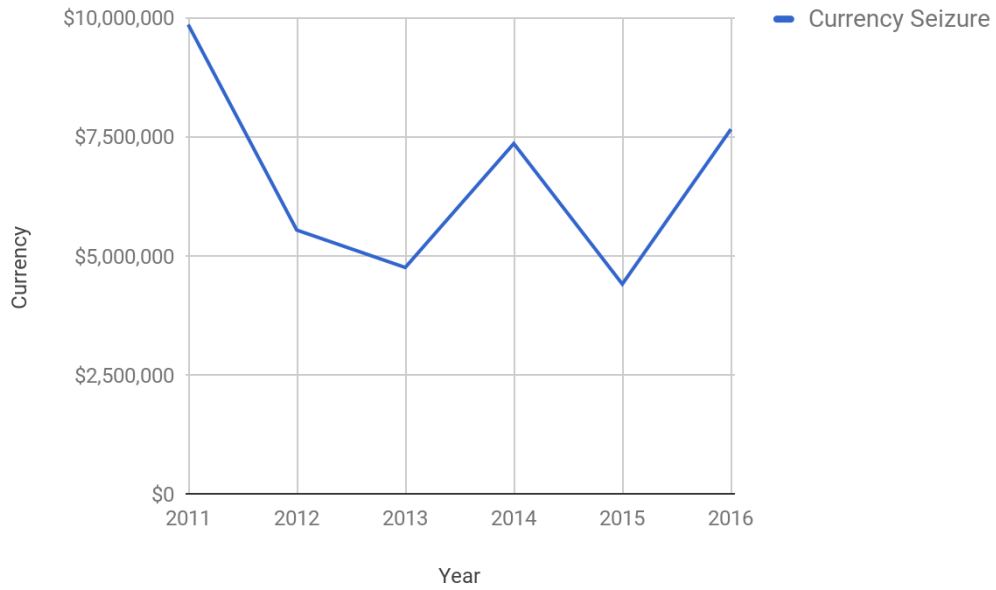

Figure 15. USBP Southwest Border Currency Seizures.[209]

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[208] Data from U.S. Border Patrol, "Sector Profile - FY 2012–2016," date accessed February 10, 2017. https://www.cbp.gov/newsroom/media-resources/stats?title=Border+Patrol.

[209] Ibid.
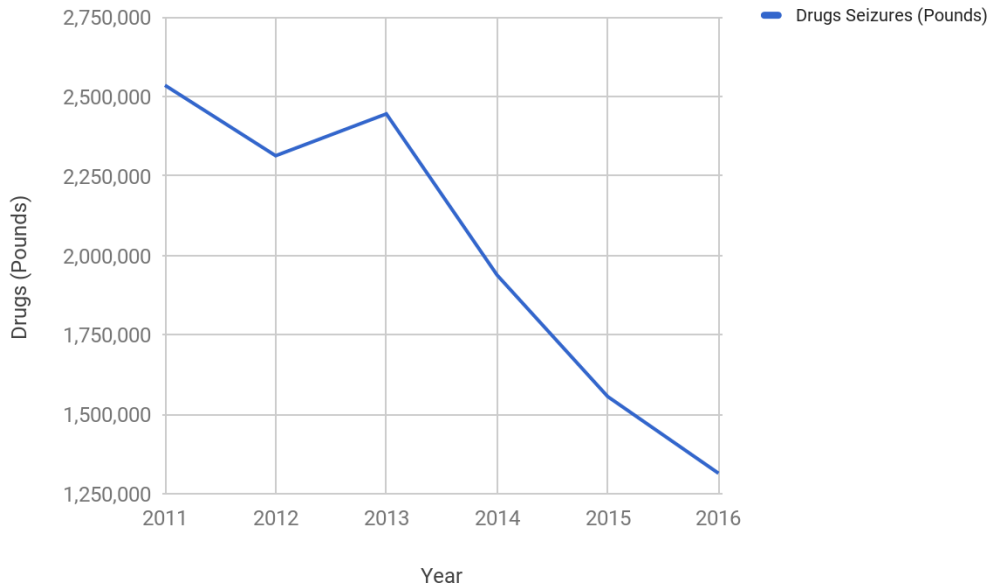
Figure 16. USBP Southwest Border Drugs Seizures (Pounds) Seizures.[210]

The CBP annually publishes its accomplishments for the year prior in DHS' *Budget in Brief* series. The accomplishments in 2003 and 2004 were primarily focused on trade enforcement with little mention of border security. In 2005, the CBP and ICE implemented an "interior repatriation" program that repatriated 20,580 individuals into Mexico "away from border smuggling organizations."[211] They also credited the seizure of over "1.2 million pounds of narcotics between ports of entry" and seized over 416,500 pounds by air.[212] The Free and Secure Trade (FAST) program received an additional 23,000 enrollees, expediting travel across the southern border.[213]

In 2006, the CBP's Air and Marine contributed to the apprehension of approximately 205 thousand illegal aliens leading to over 925 arrests.[214] The CBP's Air and Marine seized over 1.4 million pounds of drugs between ports of entry.[215] FY 2007

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[210] Data from U.S. Border Patrol, "Sector Profile - FY 2012–2016," date accessed February 10, 2017, https://www.cbp.gov/newsroom/media-resources/stats?title=Border+Patrol.

[211] U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2006*, 25.

[212] Ibid.

[213] Ibid.

[214] U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2007*, 26–27.

[215] U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2007*, 27.

accomplishments included significant physical infrastructure at the border. In 2007, they added 76 miles of primary fencing to the border, bringing it to a total of 154.7 miles of primary fencing at the border.[216] A 20 percent reduction in apprehensions occurred, including a 68 percent decrease in Arizona, that correlates with the ABCI initiative mentioned in the significant investment sections.[217] The border patrol traffic checkpoints contributed to over 21 thousand apprehensions and 3,459 narcotic seizures.[218]

In 2008, the CBP increased its "miles under effective control" from 599 to 757 miles.[219] This number rose to 939 miles in 2009.[220] The CBP credited these accomplishments to a mix of intelligence and physical infrastructure at the border.[221] In 2008, fencing along the border was increased to 357.4 miles.[222] There were in total over 723,000 people apprehended between ports of entry.[223] In 2009, there were 45,283 "other than Mexicans" apprehended at the Southwest border and a total of 556,000 people apprehended between ports of entry.[224]

In 2010, the CBP "completed nine 45-day Alliance to Combat Transnational Threats operations along 80 miles of the Arizona/Sonora border . . . contributing to 212,202 criminal arrests and seizure of 1,033,227 pounds of marijuana."[225] The CBP also for the first time screened 100% of rail bound shipments transiting the Southwest border and seized $104 million in illegal currency, which was $28 million more than the two years prior.[226] CBP and Mexican authorities completed 22 joint operations and resulted

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216 U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2008*, 24.

217 Ibid.

218 Ibid.

219 U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2009*, 56.

220 U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2010*, 52.

221 U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2009*, 56.

222 Ibid., 57.

223 Ibid., 56.

224 U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2010*, 52–53.

225 U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2011*, 66–67.

226 Ibid., 67.

in $113,000 in currency and 23.75 kilograms of narcotics seized.[227] In 2010, CBP seized a total of $56 million of illegal currency at the Southwest Border.[228]

In 2011, UAVs began to conduct full border sweeps along the U.S.–Mexico border. This program assisted in the seizure of over 7,600 pounds of narcotics and the apprehension of 467 individuals.[229] The UAVs contributed to over 59,000 pounds of narcotics seizures in 2013, a significant rise from two years earlier.[230] The CBP mentioned no other significant accomplishments specific to the U.S.-Mexico border for FY 2014 and 2015 that have not been previously discussed. DHS did not provide CBP's enforcement accomplishments for 2016 in the FY 2017 Budget-in-Brief.

E.   CONCLUSION

This chapter provided an empirical look at the budgeting and enforcement data for DHS in regards to border security. There appears to be no direct correlation between investment in border security resulting operational control of the border. There is no explanation in the budgets or enforcement data produced by DHS that can directly state a particular technology or investment in human capital resulted in a certain level of enforcement. It is evident that progress has been made in border enforcement based on the data presented; however, it is clear an answer to achieve operational control has not been found.

The constant investment in new technology and fluctuation in personnel demonstrates that more focus by DHS needs to be on efficiently using taxpayer money to achieve success at the border. Loosely correlating enforcement data to justify budgetary requests does not provide answers as to whether operational control is efficiently being strived for. The next chapter will outline what DHS should consider in developing a model for border control and provide a way forward for justification of U.S.-Mexico Border security expenditures.

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[227] U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2011*, 67.

[228] Ibid., 66–67.

[229] U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2012*, 83.

[230] U.S. Department of Homeland Security, *Budget-in-Brief Fiscal Year 2014*, 45.

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IV.   U.S.–MEXICO BORDER SECURITY DECISION MODEL

A review of the command and control structure of border security, DHS' assets, and its enforcement data pertaining to border security demonstrates complicated challenges in developing a model that captures an accurate quantitative assessment of return-on-investment. The standard risk reduction method discussed in the literary review, that has widely been adopted by DHS, is largely dependent upon subjective data to measure the effectiveness of an investment. Scholars have attempted to increase the accuracy of this model by creating more complicated and in-depth variations. Regardless of their methods, it still relies upon subjective input to assess investments based on shoddy empirical evidence to create inputted values to the formula. A more qualitative approach to modelling investment on border security is more appropriate.

A model to account for return on border security investment will need to focus on a set of decisions that help determine whether an investment is warranted. This chapter will provide an outline on the proper series of decisions to account for border security investments. The decision process in this chapter will serve as a tool for the development of future models, whether they are qualitative or quantitative.

A.   STEP ONE: DETERMINE THE OBJECTIVE OF A BORDER SECURITY MEASURE

The first consideration when choosing a border security expenditure is to determine the objective of the expenditure. According to the Secure Fence Act of 2006, DHS is to maintain operation control of the border.[231] Operational control of the border is defined as "the prevention of all unlawful entries into the United States, including entries by terrorists, other unlawful aliens, instruments of terrorism, narcotics, and other contraband."[232] The law orders the installation of fencing and surveillance at certain points of the U.S.–Mexico border, but does not directly state how DHS will obtain operational control of the border.

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[231] Secure Fence Act of 2006, Pub. L. No. 109–367, 120 Stat 2638 (2006).

[232] Ibid.

When considering an investment in a border security measure, DHS must consider whether or not the investment is able to achieve operational control of the border? Research into this topic for a security measure will need to be empirically studied and "red team" analysis will need to be implemented and tested. If a measure has been used before on the U.S.–Mexico border or another country's border, policy makers can use empirical data to determine whether or not it can help achieve operational control. If an investment is a new security measure that has not been used before, independent analysis must take place that measures how difficult it is for an adversary to defeat the measure given the normal expected capability of that adversary. Initial analysis must answer whether the investment can help achieve operational control or not? If the answer is yes or possibly yes, DHS should include the security measure in the next step of the process. If the answer is no, DHS should discard the security measure.

B.   STEP TWO: LIST ALL POSSIBLE BORDER SECURITY MEASURES
THAT WILL HELP ACHIEVE OPERATIONAL CONTROL

The next step is to list all possible investments that could achieve operational control. It is understood for this model that DHS will need a combinations of security measures to achieve operational control. DHS has not been able to achieve operational control of the border; further, it is clear from reviewing the existing combination of border security measures that DHS will not achieve operational control by any single security measure. Currently, there are fencing, manned and unmanned aerial vehicles, mobile surveillance, border patrol surveillance and enforcement, bilateral collaboration and intelligence operations among other assets securing the border. These combination of security measures are trying to prevent drugs, weapons, ammunition, illegal currency, and personnel from illegally transiting the border. To assume any one investment will be able to effectively prevent all illegal transition of the border would be ambitious.

Listing possible security measures enables DHS to understand all options available for enhancing border security. My model will organize security measures into four separate lists. The first list includes security measures that can achieve operational control of the entire 1,954 mile U.S.–Mexico Border. By examining security measures that will help achieve operational control of the entire border, policy makers will

understand what options they have that can cover large areas. This list is important to have because these measures will need to be combined with security measures that have a more minute focus.

The second list is security measures that would achieve operational control sorted by the separate border control sectors that lie along the U.S.–Mexico border. These sectors include the San Diego, El Centro, Yuma, Tucson, El Paso, Big Bend, Del Rio, Laredo, and Rio Grande Valley Sectors. Each sector faces specific challenges that would warrant more or less of a securitized environment. Areas of the border that are seldom traversed illegally would not warrant as stringent of security measures as areas that are empirically known to foster large amounts of illegal traffic. Listing security measures that could cover the entire border and cross-referencing them with potential combinations that are sector focused will help policy makers choose the correct combination of resources to use.

The third security measure list organizes investments by terrain type. Specific security measures will be more or less effective depending on the type of terrain they are meant to secure. For example, mobile surveillance towers are much less effective in mountainous terrain than they would be in a flat surface environment. The list would sort security measures based on mountainous terrain, flat terrain, valleys, and waterways. Policy makers can use this list in combination with the border sector divided list to help policy makers choose the correct combination of security measures that will suit the specific terrain needs based on the threat environment.

The fourth security measure list will include security measures that involve bilateral agreements between the United States and Mexico. Mexico is the second largest export market and third largest overall trading partner for the United States.[233] Border security cannot be a unilateral process that results in a diminished relationship between the two nations because the two nations are linked so closely economically as well as culturally. Factoring in bilateral enforcement measures that contribute to operational

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[233] M. Angeles Villareal, *U.S.-Mexico Economic Relations: Trends, Issues, and Implications* (CRS Report No. RL32934) (Washington, DC: Congressional Research Service, 2017), 1, https://fas.org/sgp/crs/row/RL32934.pdf.

control of the border will allow the U.S. policy makers to strengthen the border while simultaneously prevent confrontation along the border.

Providing all available options that will assist in operational control of the border is important in choosing which combination would be most effective. This list should not only consider currently available technology. Policy makers should assign grants to defense companies to research new technologies and assets that will assist in operational control. Policy makers need to consider future technologies and hard security measures because up until this point DHS has not achieved operational control and no concrete solution has been found. To choose a combination of security measures that precludes potential future security measures may result in ignoring the most cost-effective approach to securing operational control of the U.S.–Mexico border.

Technological and physical assets placed at the U.S.–Mexico border will not be the only measures that can contribute to operational control of the border. Internal immigration enforcement, drug awareness and rehabilitation programs, internal enforcement on fake currency, and illegal weapons trade enforcement can all contribute to eliminating the demand markets for these illegal activities that transit the border. There are a multitude of incentives that dominate the rational for people to illegally enter the United States. Heightened illegal immigration enforcement would make the incentive to transit the border more expensive and could reduce the attractiveness of this risky venture. Reducing the American market for illegal drugs will reduce the demand for the illegal transiting of the border. The list of programs requires consideration because they address the source of the issues that monetarily make illegal activity at the border appetizing.

C.   STEP THREE: EVALUATE COSTS OF SECURITY MEASURES

Once the lists have been categorically organized, policymakers must assign costs to each technological asset, physical asset, and program that will assist in developing operational control of the border. The valuation of these assets must include setup costs, operational costs, and maintenance costs. To have a comparable baseline for each asset, its value needs to be demonstrated as its net present value.

The lists must include all assets, even if they are too expensive. The Congressional approved DHS budget has its limitations. As seen in the previous chapter, the budget for DHS in 2016 was approximately $52 billion, with only $373 million allocated toward border security fencing, infrastructure, and technology. President Trump's proposed 2018 budget is calling for $1.6 billion attributed to building a border wall with brick and mortar.[234] The purpose of including security measures that may be out of reach is to demonstrate the total investment DHS assesses it needs to achieve operational control of the border. Listing costs will lead to demonstrating what assessed level of enforcement will be able to be achieved at the current budget level compared to an unlimited budget.

D.   STEP FOUR: EVALUATE EFFECTIVENESS OF SECURITY MEASURES

The most important step for determining the correct combination of assets that will provide operational control of the border is one that accurately measures effectiveness. The definition of effectiveness for this model is the "assurance the security-enforcing mechanism of the system meet the stated security objectives."[235] The objective is operational control of the border, which is defined by the Secure Fence Act of 2006. DHS will need to create a new metric that applies quantitative value to qualitative measurement parameters.

The risked-based model that DHS employs is insufficient for this step of the model. The current risk-based model employed by DHS does not account for a combination of assets in reducing risk of an attack. It also assumes there is an accepted level of vulnerability. A risk-based model demonstrates subjectively which security measure will reduce the likelihood of attack more and ignores the stated objective of DHS for border security, which is complete operational control. DHS must create a new model.

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[234] Tal Kopan, "Trump Seeks $1.6 Billion for Border Wall 'Bricks and Mortar,'" *CNN*, May 23, 2017, http://www.cnn.com/2017/05/23/politics/trump-budget-border-security/.

[235] Wayne Janson, *Directions in Security Measures Research* (Gaithersburg, MD: National Institute of Standard and Technology, 2009): 5, http://nvlpubs.nist.gov/nistpubs/Legacy/IR/nistir7564.pdf.

A new type of model for measuring effectiveness will also require subjective input. It is impossible to objectively quantify the overall effects of a security measure. The risk-based model is subjectively determined but that is not its main shortfall. DHS uses the model to achieve the incorrect goal of border security. They use the risk-based model to compare cost-effectiveness of assets, not for determining operational control. I am proposing DHS must research and employ a different model that correctly measures its ability to achieve effective operational control of the border.

In order for DHS' new model to fit into my decision process, quantitative measures for effectiveness need to be on a scale from 0 to 1. The lowest end of effectiveness, 0, would mean the security measure provides no operational control of the border. The high end of effectiveness, 1, would mean the security measure provides complete operational control. The model must reflect partial operational control by an asset in fractions between 0 and 1. The effectiveness model must account for the combination of assets resulting in a higher amount of operational control for each individual asset.

The effectiveness model must consider opportunity costs in its calculations. Opportunity costs will reduce a security measure's overall effectiveness. Border security measures that ruin the bilateral economic relationship between the United States and Mexico should carry a lower effectiveness compared to a security measure that do not. In addition, a security measure that is damaging to the environment should be considered less effective to one that results in minimal environmental impact. Security measures that negatively disrupt the well-being of Americans, which includes cultural and economic ties with Mexico, will not be tolerated in a democracy. The inclusion of opportunity costs on effectiveness is important in determining a politically feasible combination of assets to protect the border.

The scale of effectiveness for each asset will vary by list. The effectiveness measurement must be calculated on how effective a specific measure is for that assigned list. For example, the effectiveness of a wall that would encompass the whole border needs to be evaluated based on its ability to provide operational control of the entire border. The scale for an effectiveness measurement for Integrated Fixed Towers (IFTs)

along the Tucson sector must be limited to that sector. The sector, terrain, and program security measures must have a conversion factor that allows their effectiveness to be integrated with border wide investments. After each asset has a quantifiable rating, it will be possible to propose the correct combination of assets to achieve operational control of the border.

E.   CHOOSING A COMBINATION OF SECURITY MEASURES

Successful completion of each step of this model will allow the policymakers at DHS to pick the correct combination of security measures that will result in operational control of the border. At this point, the five lists provide possible security measures to achieve operational control of the U.S.–Mexico border. The user has calculated present value in dollars for each potential investment. Finally, the user has an effectiveness to consider for each security measures. Operational control of the border can be achieved by combining assets to equal a value at or near 1. Figure 17 is an example of the model.

U.S.-Mexico Border Operational Control							
Entire Border				**Laredo Sector**			
Security Measure	Asset	Cost	Effectiveness	Security Measure	Asset	Cost	Effectiveness
1		S	0-1	22		S	0-1
2		S	0-1	23		S	0-1
3		S	0-1	24		S	0-1
San Diego Sector				**Rio Grande Sector**			
Security Measure	Asset	Cost	Effectiveness	Security Measure	Asset	Cost	Effectiveness
4		S	0-1	25		S	0-1
5		S	0-1	26		S	0-1
6		S	0-1	27		S	0-1
El Centro Sector				**Mountainous/Valley Terrain**			
Security Measure	Asset	Cost	Effectiveness	Security Measure	Asset	Cost	Effectiveness
7		S	0-1	28		S	0-1
8		S	0-1	29		S	0-1
9		S	0-1	30		S	0-1
Yuma Sector				**Flat Terrain**			
Security Measure	Asset	Cost	Effectiveness	Security Measure	Asset	Cost	Effectiveness
10		S	0-1	31		S	0-1
11		S	0-1	32		S	0-1
12		S	0-1	33		S	0-1
Tucson Sector				**Waterways**			
Security Measure	Asset	Cost	Effectiveness	Security Measure	Asset	Cost	Effectiveness
13		S	0-1	34		S	0-1
14		S	0-1	35		S	0-1
15		S	0-1	36		S	0-1
El Paso Sector				**Programs**			
Security Measure	Asset	Cost	Effectiveness	Security Measure	Asset	Cost	Effectiveness
16		S	0-1	37		S	0-1
17		S	0-1	38		S	0-1
18		S	0-1	39		S	0-1
Big Bend Sector				**U.S.-Mexico Bilateral Enforcement Programs**			
Security Measure	Asset	Cost	Effectiveness	Security Measure	Asset	Cost	Effectiveness
19		S	0-1	40		S	0-1
20		S	0-1	41		S	0-1
21		S	0-1	42		S	0-1
Del Rio Sector				43		S	0-1
Security Measure	Asset	Cost	Effectiveness	44		S	0-1
40		S	0-1	45		S	0-1
41		S	0-1	46		S	0-1
42		S	0-1	47		S	0-1
Most Effective Combination of Assets (Eff=1):		# of Sec. Meas.		**DHS Technology & Infrastructure Budget:**	SBudget		
Best Combination of Assets within Budget:		# of Sec. Meas.		**Most Effective Combination of Assets Cost:**	"-"SCost		
Combination of Assets within Budget Effectiveness:		0-1		**Difference:**	"=" SNeeded		

Figure 17. Decision Model for Operational Control of the U.S.–Mexico Border.

F. LIMITATIONS TO THE DECISION MODEL

This proposed decision model specifically focuses on operational control of the border, which limits valuing impact of security measures specifically on their ability to prevent illegal transition of the border. Border security measures have impacts on society outside the realm the realm of operational control. The effectiveness model discussed should include opportunity costs of a security measure; however, opportunity costs of a specific measure will not include a multitude of peripheral effects on society.

The prevention of illegal migration can have economic effects on both sides of the border. Illegal migration is a result of push factors for Mexico and pull factors from the United States.[236] The higher wages offered in the United States have facilitated a market for smugglers from Mexico.[237] When security measures increase, there is evidence that Mexican worker wages in border towns are reduced.[238] Conversely, the reduction of the illegal labor market in the United States would result in higher costs for business. This model does not consider these effects because the supply of an illegal workforce is not a part of legitimate legal trade.

This model does not account for what to do about operational control of the border resulting in increased stay-time of illegal migrants. A security measure resulting in longer stay times, thus a larger illegal population, should not be considered in the effectiveness measurement. Deportation enforcement is a separate policy issue from operational control of the border. While higher deportation enforcement may have an effect on migration flows across the border, what to do about the populations after effective control of the border is achieved is a separate issue. U.S. policy makers will have to create deportation policy that is multilaterally supported to deal with the increased illegal population.

This model does not address the potential "balloon effect" of the drug market if operational control of the border is achieved. This effect implies that if you cut a supply route in one area, another one will be created.[239] This model focuses on prevention of illegal drug migration across the border, it ignores supply routes being created in areas other than the U.S.–Mexico border. Citizens may choose to migrate south for their supply of drugs. These issues should not be considered in this model.

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[236] Pia M. Orrenius, "Illegal Immigration and Enforcement along the U.S.-Mexico Border: An Overview," *Economic and Financial Review* (First Quarter, 2001): 3, http://search.proquest.com/docview/196531804/fulltextPDF/559E76E5713F4C5EPQ/1?accountid=12702.

[237] Ibid.

[238] Ibid., 2.

[239] Bernd Debusmann, "Drug Wars and the Balloon Effect," *Reuters* (blog). March 26, 2009, http://blogs.reuters.com/great-debate/2009/03/26/drug-wars-and-the-balloon-effect/.

The decision model in isolation focuses solely on ways to prevent illegal transition of the border. Policy makers need to consider the peripheral effects but it will require additional analysis outside of this model to deal with the multitude of situations that will arise as a result of implemented border security measures. Bilateral relations with Mexico and multilateral relations with other Central and South American countries will be important for dealing with the multitude of effects that result from achieving operational control of the border.

G. CONCLUSION

The purpose of using this decision process for security measures will demonstrate three things to Congress. First, the decision process demonstrates the required dollar needed achieve operational control of the border. It is safe to say that this amount will be outside of the current allocated budget for DHS, because they have yet to achieve operational control at the current budgeting level. Secondly, it will show members of Congress *how* effective DHS can be at the current budgeting level. Using this process, a combination of assets can be chosen that most effectively achieve operational control of the border, yet it will demonstrate what shortfalls exist and where. Thirdly, efficient spending will be a result of this method of decision making because costs will be directly considered when limiting assets to fit within a given budget. Policy makers can compare costs and can disregard options that are relatively too expensive and do not fall within allocated budgets.

V.   DHS, U.S.–MEXICO BORDER, AND THE ROAD AHEAD

DHS is a relatively new federal organization and coordinating the function of 22 federal agencies is a complicated task. Establishing effective relationships with state and local authorities is also complicated considering each law enforcement agency may operate slightly differently. DHS' inability to achieve operational control of the border to date is not surprising. This thesis has demonstrated that there are multiple threats faced at the border and each threat has its own independent variables to consider when choosing the proper security measures. This thesis has also demonstrated that the current border security measures have not gotten DHS any closer to achieving cost-effective operational control of the border.

There are multiple questions in the road ahead for DHS. Will it ever achieve operational control of the border? Will it produce a standard of effectiveness for security measures that can justify its costs? Will policies in the government continue to support its mission in achieving operational control? With an uncertain future ahead for the Federal agency, this chapter will outline the proposed border wall by President Trump, discuss the effects of interior enforcement on border issues under President Trump, and conclude with the importance of achieving a cost-effective operational control of the border.

A.   U.S.–MEXICO BORDER WALL

President Trump promised throughout his 2016 Presidential campaign that he would build a wall that spans the entire U.S.–Mexico border. He signed an Executive Order titled, "Border Security and Immigration Enforcement Improvements," that directed DHS to immediately begin construction of a wall along the southern border.[240] CBP has requested designs and bids from companies for the construction of the wall. The requested characteristics include:

> "Imposing in height," which the agency defined as at least 18 feet but ideally about 30 feet tall, and extending 6 feet underground to discourage tunneling. With features on top to make it impossible to jump over using

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[240] Exec. Order No. 13766, 82 F.R. 8793 (2017).

ladders, hooks or other climbing aids. And, heeding Trump's desire for a "beautiful" wall, that the north, U.S.-facing side be "aesthetically pleasing" and consistent with the surrounding area.[241]

At the time of this writing, it is unclear where funding for the border wall will come from. An internal DHS report estimated the cost of the wall to be $21.6 billion and will take three and a half years to complete.[242]

The construction of a wall along the southern border will be a deterrent to illegal immigration and make it more difficult to traverse the border with illegal drugs, weapons, and currency. Whether or not this will lead DHS toward the path of achieving operational control of the border is debatable. The demand markets will still exist for drugs, currency, weaponry, and an illegal workforce. A wall will not singularly eliminate the market for illegal goods and services. If built, the wall will need to be combined with other security measures to help DHS achieve operational control.

B.   INTERIOR ENFORCEMENT

President Trump's tough approach to immigration enforcement has had effects on illegal immigration. In Executive Order 13766, the President ordered DHS to detain and expedite deportation of illegal aliens who have violated local or federal law.[243] Secretary of Homeland Security John Kelly credited President Trump's harsh stance on illegal immigration for the severe decline in border arrests. In March 2017, apprehensions at the border was the lowest it has been in 17 years.[244] In the same month, seizures of cash heading south of the border are up 48 percent compared to March 2016, $18.6 million

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[241] Rafael Carranza, "What We Now Know About Donald Trump's Border Wall," *Arizona Republic*, March 30, 2017, http://www.azcentral.com/story/news/politics/border-issues/2017/03/30/what-we-now-know-donald-trump-border-wall/99844884/.

[242] Julia Edwards Ansley, "Exclusive—Trump Border 'Wall' to Cost $21.6 Billion, Take 3.5 Years to Build: Internal Report," *Reuters*, February 9, 2017, http://www.reuters.com/article/us-usa-trump-immigration-wall-exclusive-idUSKBN15O2ZN.

[243] Exec. Order No. 13766, 82 F.R. 8793 (2017).

[244] Alicia A. Caldwell, "Immigration Arrests at Mexican Border Continue to Plummet," Associated Press*, April 04, 2017, https://apnews.com/b0f539efd27d4f62b7745c16e7630dd8.

compared to $12.6 million.[245] The President has vowed to hire an additional 15,000 federal agents for border and interior enforcement.[246]

It is too early to determine the impact of President Trump's border security focus. The President has not had a fiscal year cycle in which his proposed budget has been enacted to physically alter enforcement at the border or within the country. The President is merely allowing DHS to act upon laws and funding that were already in place prior to his presidency. Going forward, it is unclear how his emphasis on border security enforcement will potentially impact the drug trade, weapons trade, and the movement of illegal currency.

C.   LOOKING AHEAD AT OPERATIONAL CONTROL OF U.S.–MEXICO BORDER

The ability for DHS to achieve cost-effective operational control of the border depends on cross-departmental cooperation among federal agencies. Multilateral cooperation in the levels of government is also required. The proposal of the wall for the U.S.–Mexico border has been done with minimal focus on efficiency. The wall cannot be depended on to achieve operational control of the border without including other assets.

DHS must employ a model that accounts for cooperation among security assets and policies in determining cost-effectiveness in achieving operational control of the border. The model proposed in the preceding chapter outlines a decision process that will help DHS consider how to achieve operational control of the border. As of this writing the national debt is over $19 trillion dollars.[247] DHS needs to terminate the trial and error process of determining border security investments. The security of American citizens is important, but using taxpayer money efficiently is more pertinent.

The trial and error method to budgeting for border security has led to billions of dollars in wasted investments. An example of this is the SBI*net* program. DHS Budget

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245 Ron Nixon and Fernando Santos, "U.S. Appetite for Mexico's Drugs Fuels Illegal Immigration," *New York Times*, April 4, 2017, https://www.nytimes.com/2017/04/04/us/politics/us-appetite-for-mexicos-drugs-fuels-illegal-immigration.html?_r=0.

246 Ibid.

247 "U.S. Debt Clock.org," U.S. Debt Clock.org, accessed May 27, 2017, http://www.usdebtclock.org/.

requests from 2008–2011 included requests for over $3 billion for the deserted SBI*net* program.[248] DHS failed to incorporate logical long-term analysis of SBI*net* prior to its inception. The program was supposed to create a technological integration that would help strengthen border security between ports of entry.[249] DHS' claim that the SBI*net* program would help achieve effective control of the border was never evaluated on how well it would work. The primary CBP performance measure for SBI*net* was "percent of border miles covered by SBI*net* technology – southwest border."[250] After years of cost-overruns, delays in implementation, inability of the program to adjust to different terrain types, and the availability of cheaper alternatives, DHS discontinued the project in 2011.[251]

DHS used Analysis of Alternatives (AOA) to "assess the cost effectiveness of SBI*net*."[252] AoA is the "evaluation of different choices available for achieving an objective, usually requiring cost-benefit analysis, life cycle costing, and sensitivity analysis."[253] DHS compared SBI*net* with four alternative technology categories: Agent-Centric, Fixed, Mobile, and Aviation-Centric.[254] DHS used four metrics to evaluate Measures of Effectiveness (MOEs) of alternative investments. The categories included: monitoring and persistent surveillance, enable timely and effective response, and two other categories that focused on "other considerations (for example, agent safety) and the ability to adapt to shifts in traffic and threats at the border."[255] DHS concluded that

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[248] U.S. Department of Homeland Security, *Budget in Brief Fiscal Year 2008–2011*. Washington, DC: U.S. Department of Homeland Security, 2003–2016. https://www.dhs.gov/dhs-budget#.

[249] U.S. Customs and Border Protection, Department of Homeland Defense, *SBInet Program: Program Specific Recovery Act Plan*, May 15, 2009, 2, https://www.dhs.gov/xlibrary/assets/recovery/CBP_SBInet_Program_Final_2009-05-15.pdf.

[250] Ibid., 9.

[251] U.S. Department of Homeland Security, *Report of the Assessment of the Secure Border Initiative*, 5–6.

[252] Ibid., 7.

[253] *Business Dictionary*, s.v. "Analysis of alternatives (AOA)," accessed July 24, 2017, http://www.businessdictionary.com/definition/analysis-of-alternatives-AOA.html.

[254] U.S. Department of Homeland Security, *Report of the Assessment of the Secure Border Initiative*, 7.

[255] U.S. Department of Homeland Security, *Report of the Assessment of the Secure Border Initiative*, 7–8.

different variants of security measures are required for different parts of the border and the "one size fits all" method to enforcement that SBI*net* employs does not work.[256] It took DHS multiple years and billions of dollars in investment to come to this conclusion. DHS never established a proper goal for the program nor did it conduct enough research on its potential usefulness. If DHS used a decision model that incorporated proper assessment of SBI*net*'s effectiveness on different types of terrain and its ability to be incorporated with existing technologies prior to its implementation, federal money and time could have been saved.

D.   CONCLUSION

This thesis outlined the current literature available on valuing public expenditures, provided an organizational overview of DHS' border security structure, reviewed DHS' U.S.–Mexico Border Security expenditures and enforcement data, and provided a decision model for achieving operational control of the border. The expenditures for border security have proven to be significant and difficult to correlate to enforcement data. The United States has a long road ahead before being able to confidently declare operational control of the border. This declaration may never come. Operational control of the border begins with DHS constructing and implementing a proper model that will achieve this.

The proper securitization of the border will involve agencies outside of DHS. The fact that DHS is the primary agency tasked with securing the border means it has the responsibility to determine a proper model. A proper model may result in funding being re-routed to programs that lay outside of its purview. DHS may be hesitant to admit funding should be routed somewhere else, but it will take a mature agency to be able to make this determination. DHS appears to be far from achieving operational control and this will continue until it can implement a proper model that justifies border security expenditures.

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[256] U.S. Department of Homeland Security, *Report of the Assessment of the Secure Border Initiative*, 8.

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