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A Multi-dimensional Macrolevel Study of Drug Enforcement Strategies, Heroin Prices, and Heroin Consumption Rates

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A Multi-dimensional Macrolevel Study of Drug Enforcement Strategies, Heroin Prices, and
Heroin Consumption Rates

by

Alexander G. Toth

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
Department of Criminology
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Keywords: heroin possession/sale arrests, opium production/eradication, deterrence theory,
rational choice theory, economic price elasticity of demand perspective

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DEDICATION

This dissertation is first and foremost dedicated to my wife, Andrea, who never questioned my “crazy” plan of continuing my education. Thank you for standing by me during the numerous solitary days of the Ph.D. educational experience. I would never have finished this program without your love and support for which I am eternally grateful.

I also dedicate this dissertation to my parents Sylvia J. Toth and Alexander L. Toth who passed away before ever seeing the values of fairness, compassion, and equity towards all people that they instilled in me as a child come to fruition in my adult life. I carried those values with me through a 30 plus year career in law enforcement and they are forever rooted in my core personality. Additionally, I thank and dedicate this work to my sister Sharon Joiner and my brother-in-law John Joiner who have supported me throughout my life. I miss you, Sherry.

It is also dedicated to the women and men who serve throughout the world in law enforcement agencies and treatment facilities who address the myriad of issues associated with illicit substance abuse every day. It is my sincere hope that this dissertation provides some insights into ways that illegal drug trafficking and substance abuse can be managed more effectively. Having “been there”, I know there has to be a better way to help the millions who are impacted by the illegal drug trade.

Lastly, this dissertation is dedicated to Scott Allen, my friend, who left us too soon. The countless hours we spent “talking through issues” and your friendship were essential to me completing my academic program at the University of South Florida. I will carry the memory of your friendship with me for the rest of my life.

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ABSTRACT

American policy makers primarily embrace a deterrent-based policing agenda to curb illicit drug trafficking and use that relies on the principles of the economic price elasticity of demand (Boynum & Reuter, 2005). This counter-drug platform includes three fundamental programs: arresting offenders, seizing illicit drugs, and eradicating horticultural sources of illicit drugs (U.S. DEA, 2015). One of the main goals of these programs is to deter illegal trafficking and use by increasing the price of illicit substances so they are no longer attractive to consumers. The United States has weathered various drug use epidemics during its history, and currently it is facing a heroin and opioid epidemic (Dean, 2017).

The present multi-dimensional study is guided by three broad goals: to assess the dynamics of illicit drug pricing and the economic price elasticity of demand perspective; to evaluate whether drug trafficking organizations respond to theoretically deterrence based counter-drug law enforcement efforts; and to assess why law enforcement activities are (or are not) effective in controlling illegal drug markets. To accomplish these three broad goals, four separate yet linked focal points comprised of quantitative, qualitative, and mixed-methods evaluations of official data are examined.

The findings in the study call into question the current American counter-drug law enforcement agenda being used to address the ongoing heroin epidemic. Furthermore, the results shine light on various shortcomings in overall U.S. counter-drug policy. Finally, the study calls for a new approach to address illicit drug trafficking and use in the U.S.

CHAPTER ONE:

INTRODUCTION

The American Heroin Dilemma

The United States of America (U.S.) is in the midst of a heroin epidemic, which is evident from the steady increase in the use of the drug by Americans since 2007 (Dean, 2017; National Institute on Drug Abuse, 2018; U.S. DEA, 2016a). Heroin consumption has drastically increased in the country among all demographic groups including women, most age groups, and individuals with higher incomes (Jones, Logan, Gladden, & Bohm, 2013). A more salient indicator of the heroin epidemic is the rise in heroin overdose deaths, which tripled in the U.S. from 2007 to 2014 (U.S. DEA, 2016a). Notably, the current heroin epidemic is just the latest in a series of American drug crises. This current crisis was preceded by the methamphetamine epidemic in the 1990s, the crack cocaine epidemic in the 1980s, and an earlier heroin epidemic that began in the 1960s (Musto, 1999).

The U.S. government's response to this crisis, as with other illicit drug problems, is based on a combination of the economic price elasticity of demand model and the deterrence perspective (see e.g. Boynum & Reuter, 2005; Felbab-Brown, 2013; Layne et al., 2001, Masucci, 2013; Paul-Emile, 2010). Federal law enforcement efforts designed to stem the current American heroin epidemic are largely focused on programs that are supposed to raise the prices of the drug (Dean, 2017). In essence, the idea behind this robust enforcement agenda is that potential drug violators will be deterred from consuming or trafficking in illicit substances after calculating the

possibility of arrest against the pleasure associated with illegal drug consumption and the overall monetary rewards of drug trafficking. This strategy is also founded upon the economic price elasticity of demand perspective, which asserts that law enforcement activities will raise the price of illicit drugs, which in turn will cause drug consumption and drug overdoses to decline (Boynum & Reuter, 2005).

One clear indicator of this deterrence-based enforcement platform is the increase in federal drug-related incarcerations, compared to the number of federal property crime incarcerations, from 1980 to 2011 (see Figure 1). In 1980, there were 4,630 individuals incarcerated in the federal correctional system, whereas the total number of people incarcerated federally for drug offenses that same year was 3,675. As the drug war escalated into 1986, there was a noted shift in the federal prison population with inmates who were incarcerated for drug crimes numbering 9,275 compared to 6,291 individuals who were incarcerated for property crimes (U.S. Department of Justice, Bureau of Justice Statistics, 1992). The full effect of America's federal law enforcement emphasis on drug enforcement is evident by the dramatic shift in the federal prison population in 2011, where 23,741 individuals were incarcerated in federal prisons for drug offenses. compared to 7,174 people who were being held on property crime offenses (Motivans, 2015). America's federal drug enforcement efforts helped to spur what has become known as the era of mass incarceration (Mears & Cochran, 2015).

Given that American drug policy has long been rooted in the economic price elasticity of demand and deterrence perspectives, surprisingly few studies have examined whether international wholesale drug markets behave in a manner consistent with this perspective. The extant empirical research quantitatively examines, to varying degrees, the correlations between various types of illicit drug prices, consumption rates, and various counter-drug enforcemen

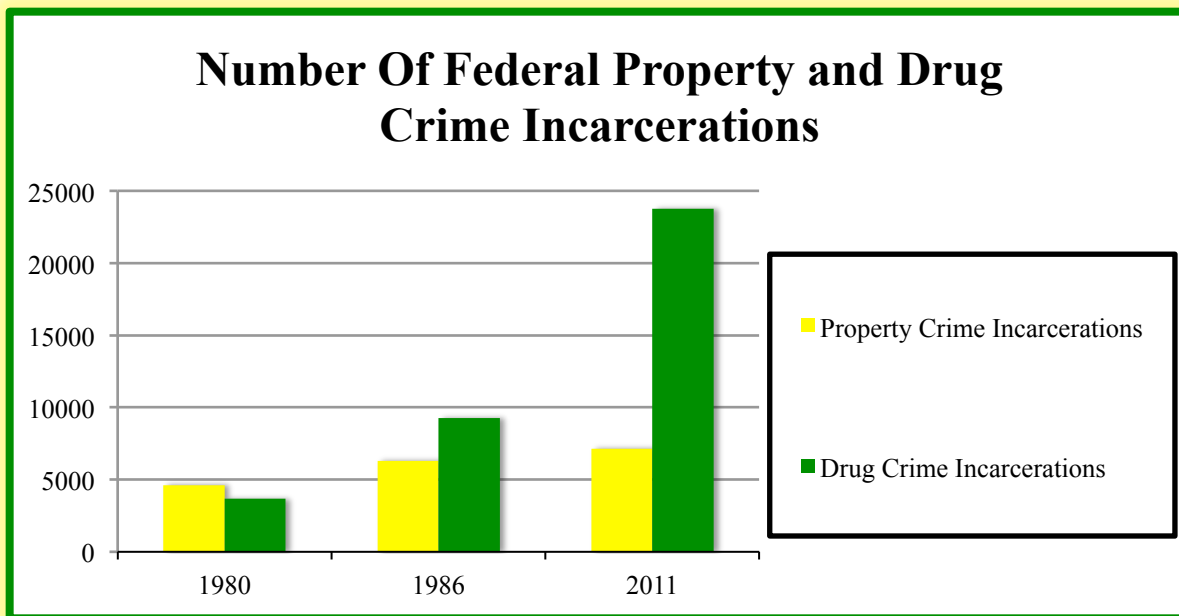


Figure 1. Number of federal property and drug crime incarcerations from 1980 to 2011 (data for 1980 and 1986 from U.S. Department of Justice, Bureau of Justice 1980 Statistical Tables, U.S. Department of Justice, Bureau of Justice Statistics, 1992; data for 2011 from Federal Justice Statistics, 2011 Statistical Tables, Motivans, 2015).

initiatives (see e.g. Caulkins, 1994; Crane, Rivolo, & Comfort, 1997; DiNardo, 1993;

Freeborn, 2009; Gallego & Rico, 2013; Gallet, 2013; Kuziemko & Levitt, 2004; Meija &

Restrepo, 2012; Pollack & Reuter, 2014; Weatherburn & Lind, 1997; Yuan & Caulkins, 1998).

Most of these studies are microlevel examinations that focus on street market drug dynamics.

Furthermore, the majority of the noted research endeavors do not encompass significant longitudinal time periods.

This focus on micro-level effects is deeply problematic, because it is quite possible that deterrence-based drug enforcement has different effects at the macro level. For example, it is possible that drug law enforcement may deter sanctioned individuals from future involvement in drug offending (i.e. specific deterrence) at a micro level, but at a macro level, these individuals might quickly be replaced by new offenders; as a result, the overall landscape of the drug market

is not responsive to deterrence-based drug law enforcement.

Empirical studies that exclude examinations into the wholesale pricing dynamics of illicit drugs also limit the knowledge base for understanding how these illegal economic markets function. A great deal of U.S. federal law enforcement efforts target production and transportation stages of illicit drugs with the goal of reducing supply in order to increase prices. However, the majority of the existing literature into the pricing of illicit drugs has concentrated on the effects of law enforcement efforts on illegal retail drug prices, which leaves an important segment of the American counter-drug enforcement strategy empirically untested.

The dynamics of illicit drug markets also need to be examined over time, as there is evidence that emerging drug markets respond differently to law enforcement activities than established illegal drug markets (Caulkins & Reuter, 2010). Furthermore, while the noted quantitative studies on illicit retail drug markets are useful in determining the strength and direction of relationships between market characteristics (e.g. price to number of users), this research is limited because it fails to provide an explanation for why these relationships exist. Combining quantitative and qualitative research in a mixed methods design has the ability to explain these relationships.

The Current Study

This study provides a multi-dimensional macro-level longitudinal (25 years) mixed methods assessment of the correlations between U.S. one-gram prices of heroin, international heroin wholesale prices, American heroin consumption rates, and various U.S. counter-drug law enforcement initiatives. This research uses quantitative data to examine whether U.S. street drug markets operate in a manner consistent with economic price elasticity of demand and deterrence theoretical models. Furthermore, qualitative data from interviews with high-level drug

trafficking confidential informants, is used to understand the dynamics of wholesale illicit drug markets and how these markets react to law enforcement activities.

This longitudinal macro-level mixed methods study has three broad goals. First, it seeks to assess the relationship between heroin pricing, the economic price elasticity of demand perspective, and deterrence theory. Second, it seeks to evaluate whether and how drug trafficking organizations respond to theoretically based deterrence counter-drug law enforcement efforts. Third, it seeks to examine why law enforcement activities are (or are not) effective in controlling illegal drug markets. These three goals are intended to provide an overall assessment of counter-drug efforts relative to the current heroin epidemic in America.

To accomplish these three broad goals, four separate yet linked focal points comprised of quantitative, qualitative, and mixed methods evaluations are examined. The first focal point centers on determining whether there is a statistically significant relationship between U.S. street-level prices of heroin and consumer rates of the illicit substance. The second focal point assesses whether U.S. standard counter-drug law enforcement operational tactics have an impact on heroin trafficking and use. The third focal point examines whether drug trafficking organizations respond to standard U.S. counter-drug law enforcement methods within the parameters of deterrence-based theoretical perspectives. The last focal point assesses whether drug trafficking organizations operate within deterrence-based and economic price elasticity of demand perspectives in determining heroin prices.

Policy Implications

Giordano (2014) notes that criminological theory should drive research and research should dictate criminal justice policy. The 2018 U.S. President's fiscal budget provides an overview of requested funding for addressing America's illicit drug use (see Figure 2). The

budget includes 9.3 billion U.S. Dollars (USD) to support domestic counter-drug law enforcement efforts, which includes support for state and local agencies, federal enforcement agencies, and federal correctional facilities. Furthermore, it has 4.7 billion USD for counter-drug interdiction efforts, and 1.5 billion USD for international counter-drug operational support. Additionally, the budget includes 1.5 billion USD for drug prevention programs and 9.8 billion USD for drug treatment initiatives (Office of National Drug Control Policy, 2017).

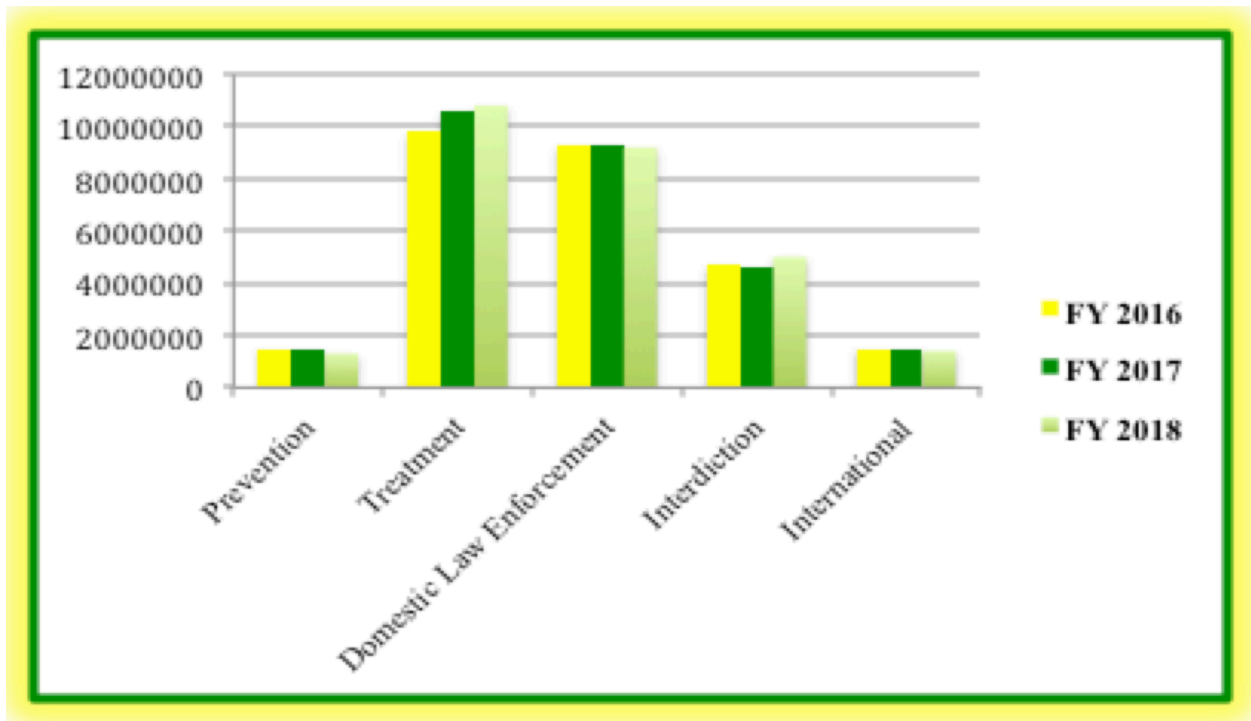


Figure 2. Federal drug resources by function (Office of National Drug Control Policy, 2017)

This study will provide empirical evidence on the effectiveness of federal law enforcement activities, which make up the majority of federal counter-drug funding. In essence, if illicit drug markets respond to standard U.S. law enforcement efforts by increasing price and decreasing consumption rates of illicit drugs, then one can conclude that the federal drug enforcement policy is effective. Conversely, if drug markets do not respond in this manner to counter-drug law enforcement operations than it can be deduced that U.S. drug policy is not effective.

Overview Of the Chapters

This study is comprised of seven chapters. The second chapter provides a historical overview of U.S. illicit substance use trends and counter-drug policies. This review provides a contextual framework for the evolution of the law enforcement counter-drug operational components that serve as independent variables in this study. Furthermore, it serves to illuminate the responses from the confidential informants in the qualitative section of the study.

Chapter three describes the intricacies of heroin trafficking, deterrence theory, rational choice theory, and the economic price elasticity of demand perspective. The purpose in presenting the heroin trafficking model is to provide a contextual understanding of how American drug enforcement responds to each step of this process within the main theoretical perspectives of this study. Additionally, the research questions and hypotheses for the study are set forth within the context of the presented theoretical frameworks.

The fourth chapter provides a literature review of empirical studies, which are not limited to the theoretical frameworks of this current study. The empirical studies presented assess the main undertakings of this research project. Specifically, they examine the influence of counter-drug law enforcement practices on the prices of illicit drugs and consumer rates.

Chapter five provides an overview of the study's methodology. It includes a description of the data, a review of the data sources, and the contextual use of the data in study. The quantitative, qualitative, and mixed methods analytical models are discussed in detail within the contexts of each focal point of the study.

Chapter six encompasses the analytical findings of the study. These findings are provided within the framework of the four focal points of the study. Chapter seven provides a summary of the analytical findings, theoretical implications, policy and practice implications, and limitations

of the study.

Chapter Summary

In sum, heroin abuse has plagued the world for centuries (Frisendorf, 2007). Recently, heroin addiction and its adverse consequences have become the focal point of the U.S.'s anti-drug efforts (Dean, 2017; U.S. DEA, 2016a). The U.S. government's main approach to addressing the current heroin epidemic is centered around deterrence-centric and economic price elasticity of demand perspectives. This deterrence-centered approach significantly increased after former U.S. President Richard M. Nixon declared a war on illicit drugs in the early 1970s (Boyum & Reuter, 2005; Goode, 2007; MacCoun, Reuter, & Schelling, 1996; Musto, 1999). This chapter has provided an overview of America's current heroin epidemic, the goals of the study, the justification for the study, and an overview of the chapters that make up the study.

CHAPTER TWO:

HISTORICAL OVERVIEW OF U.S. ILLICIT DRUG TRENDS AND COUNTER-DRUG POLICIES FROM THE EARLY 1900S TO 2018

Drug abuse has been a problematic issue in the U.S. for hundreds of years. During the Civil War, morphine was widely abused by combatants from the North and the South. Around the same time, many individuals used recreational cocaine, which was legal during that period. Furthermore, many medical professionals considered cocaine to be a remedy for narcotic addiction at that time. Heroin use began to take shape in the U.S. during the second half of the nineteenth century (U.S. DEA, 2015).

The U.S. policy toward oppugning illicit drug trafficking has evolved over time and has developed into a complex endeavor requiring a budget of billions of dollars. Initially, the responsibility for countering American illicit drug consumption rested with state/local law enforcement officials and federal law enforcement agencies played a relatively small role in addressing the matter. Today, U.S. counter-drug efforts not only include state and local policing agencies, but also numerous federal entities including such as the Department of Defense, the Department of the Treasury, the Department of Homeland Security, the State Department, the Department of Justice, and the Central Intelligence Agency (Rosen, 2015).

This chapter provides a broad historical overview of U.S. illicit drug use trends and counter-drug policies from the early 1900s to present day. Additionally, the chapter presents a brief discussion of the major themes found in the historical review. This chapter has two specific goals. First, it provides a contextual framework of the law enforcement-related independent

variables that are analyzed in the quantitative portion of this study.¹ Furthermore, it will help provide contextual insight for the qualitative data that are examined in the study.

U.S. Illicit Drug Use Trends and Counter-drug Law Enforcement Policy in the Early 1900s to the 1950s

The U.S. has a long history of prohibition dating back to the banning of alcohol and tobacco in the 19th century (Boyum & Reuter, 2005). Conversely, in the early 1900s heroin and cocaine were legal and were sold in drug stores without a prescription. The U.S. federal government first recognized opium use as a problem when it took over the Philippine Islands after the Spanish-American War. Eleven years later U.S. President Theodore Roosevelt initiated an international conference in Shanghai, China to address opium trafficking from the Far East. This was followed by a subsequent opium multi-national conference in The Hague in 1912, which also addressed cocaine abuse (United Nations, 2018; U.S. DEA, 2015). The result of these conferences was the establishment of an international agreement that recognized the dangers of opium smoking and the non-medical use of cocaine. It was in essence, the first international drug control policy (United Nations, 2018).

While the U.S. was involved in addressing international opium trafficking in the early 1900s, the unregulated use of opium and cocaine was becoming widespread inside the country (U.S. DEA, 2015). As heroin and cocaine addiction rates increased, the U.S. federal government took its first major step in establishing American anti-drug laws with the Harrison Act of 1914, which established federal rules for the distribution of heroin and cocaine. Additionally, it set forth punishments that ranged from fines to five-year imprisonment sentences for violating its provisions (Boyum & Reuter, 2005; Musto, 1999). The deterrence-based approach to substance

¹ The law enforcement independent variables in this study are: the number of heroin/cocaine possession arrests in the U.S., the number of heroin cocaine sale arrests in the U.S., the number of kilograms of heroin seized in the U.S., and the number of opium poppy hectares eradicated in Mexico.

abuse in the Harrison Act of 1914 remains the foundation of American counter-drug policy (Boyum & Reuter, 2005). Since the Harrison Act of 1914 was a tax law, the enforcement of its provisions rested with the U.S. Treasury Department, which mainly targeted doctors who dispensed heroin and cocaine without prescriptions (U.S. DEA, 2015).

On January 16, 1920, the 18th Amendment to the U.S. Constitution was passed, which prohibited the use and sale of alcohol. The U.S. Treasury Department was the main federal agency responsible for enforcing alcohol prohibition and as such its attention to counter-drug laws decreased. However, in 1922, the U.S. Congress passed the Narcotic Drugs Import and Export Act, which was designed to address international opium commerce. The law was amended in 1924 to include a provision that outlawed heroin in America. Furthermore, it established the Federal Narcotics Control Board, which had oversight of the U.S. government's drug policy.

U.S. Congressman Steven G. Porter led the American delegation that attended the Second International Opium Convention in Geneva, Switzerland in 1924. Porter asserted that before the Harrison Act of 1914 could be enforced the flow of heroin and cocaine had to be stopped (Kan, 2016; U.S. DEA, 2015). Porter's position has remained a mainstay in America's counter-drug policy to this day.

As enforcement of narcotic laws grew in the late 1920s, federal prisons began seeing large increases in their populations. The majority of inmates housed in federal correctional institutions during this time were serving sentences for drug violations. The Narcotic Farm Act of 1929 was passed by the U.S. Congress to address the rising number of drug addicts in federal prisons. The act resulted in the establishment of federal correctional drug rehabilitation prisons in Kentucky and Texas (U.S. DEA, 2015).

Marijuana use became widespread in the 1930s, which led to all 48 U.S. States instituting laws to control its cultivation and production. However, the federal government did not have regulations against the drug until 1937 when the Marijuana Act was passed. This law was modeled after the Harrison Act of 1914 (Boyum & Reuter, 2005; U.S. DEA, 2015).

The United States was engrossed in World War II from 1941 to 1945. During this time illegal substance use and drug trafficking became a secondary concern for the U.S. government. However, the end of the war saw an influx of morphine as well as synthetic dilaudid-based drugs on U.S. streets. Cocaine also became prevalent again with large amounts of the drug being seized at U.S. ports of entry. The international response to the synthetic drug problem was to bring them under the same restrictions as morphine, heroin, and cocaine. Furthermore, during this time the responsibility for dealing with the rising issue of illegal drug use in this country moved from the Department of Treasury to the Department of Justice (U.S. DEA, 2015).

The 1950s saw an increase in sanctions leveled against illicit drug users and traffickers. The Boggs Act of 1951 initiated a system in which a first-time federal conviction for drug trafficking carried a sentence of 2 to 5 years of incarceration, a second adjudication of guilt for drug sales mandated a prison sentence of 5 to 10 years, and a subsequent conviction carried a confinement sentence of 10 to 15 years. The 1956 Boggs-Daniel Narcotic Control Act further increased sanctions for drug offenses by instituting minimum mandatory prison sentences of 5 years for a first-time conviction for narcotics or marijuana trafficking and a mandatory prison sentence of 10 to 40 years for subsequent convictions (Boyum & Reuter, 2005; U.S. DEA, 2015).

U.S. Illicit Drug Use Trends and Counter-drug Law Enforcement Policy in the 1960s

By the mid-1960s the United States found itself in a cultural revolution, which was fueled by

protests against the Vietnam War and the Civil Rights Movement. Additionally, during this time illicit drug use began to increase significantly in the country. The pharmaceutical industry also began to grow, which led to an influx of stimulants, depressants, and hallucinogens into the illicit drug marketplace. During this period, the U.S. found itself awash in widespread illicit drug use (DEA, 2015).

Heroin, marijuana, and Lysergic acid diethylamide (LSD) use substantially increased in the 1960s in America. In 1966, the U.S. Congress passed the Narcotic Addict Rehabilitation Act, which provided youthful offenders with no prior arrest records the opportunity to receive drug abuse treatment in lieu of prison sentences for drug possession convictions. Drug rehabilitation efforts during this time were largely centered on the dispensing of methadone to counter heroin addiction. In 1969, President Nixon implored the U.S. Congress to take action regarding the growing illicit drug problem in America. On October 27, 1970 the U.S. Congress responded to Nixon's request by passing the Comprehensive Drug Abuse and Control Act (CSA). This law put in place treatment, education, and increased regulations that were designed to thwart the growing problem of substance abuse in America (Boyum & Reuter, 2005; Kan, 2016; U.S. DEA, 2015).

U.S. Illicit Drug Use Trends and Counter-drug Law Enforcement Policy in the 1970s

Heroin use was a grave concern for the mainstream American population at the start of the 1970s (Gerstein & Green, 1993). Following the passage of the CSA in 1970, Nixon declared “a war on drugs” in 1971 (Boyum & Reuter, 2005; Goode, 2007; Musto, 1999). Nixon's “war on drugs” led him to create the DEA in 1973 to lead his anti-drug enforcement battle (Goode, 2007; Musto, 1999; U.S. DEA, 2015). Interestingly, although Nixon created the DEA to combat illicit drug use at a federal level, the U.S. budgeted more funding for drug addiction treatment than

drug enforcement from 1971 to 1975 (Boyum & Reuter, 2005; Massing, 1998).

The DEA was charged with enforcing the CSA. The DEA was initially comprised of 2000 employees. One of the main purposes in establishing the agency was to end the interagency infighting between the Bureau of Narcotics and Dangerous Drugs and the U.S. Customs Service. The creation of the DEA was unique in that it was a single-mission federal law enforcement agency; to this day, it remains the only federal law enforcement agency with a single mission: the enforcement of federal drug laws (U.S. DEA, 2015).

Leaders of the DEA quickly determined that combating the lingering heroin problem of the 1960s and the growing cocaine problem would require both a domestic and an international focus. The domestic law enforcement tools that the DEA established for countering the illicit drug trade were arrests of drug traffickers, the seizure of illicit drugs, and the seizure of illicit drug proceeds. To attack illicit drug trafficking internationally, the DEA stationed Special Agents in foreign countries. These Special Agents were tasked with coordinating international counter-drug law enforcement efforts with their foreign counterparts. The DEA's international enforcement platform included helping foreign governments locate and destroy illicit drug horticultural crops, seizing illicit drugs, and arresting individuals for drug trafficking. These key domestic and foreign law enforcement missions remain in place today at the DEA (U.S. DEA, 2015).

In early 1975, then U.S. President Gerald Ford established the Domestic Council Drug Abuse Task Force. This council was charged with assessing the illicit drug problem in America, and it determined that the DEA and the U.S. Customs Service needed to focus their efforts on heroin trafficking from Mexico rather than cocaine and marijuana trafficking. This decision opened the door for cocaine traffickers in Colombia to develop robust U.S. markets in the late 1970s and

1980s (Boyum & Reuter, 2005; U.S. DEA, 2015).

Colombian drug traffickers began to flood the U.S. market with cocaine in the mid-1970s. The geography and cooperative international banking systems of Miami, Florida served to make it the epicenter of international cocaine trafficking during this time. One of the driving forces behind America's cocaine problem was the establishment of the Medellin Colombian Drug Cartel (U.S. DEA, 2015).

The increased amounts of cocaine in the American marketplace led to drastic drops in the price of the illicit substance. In 1978, a kilogram of cocaine in the U.S. cost approximately \$800,000 USD, whereas by the early 1980s a kilogram of cocaine could be purchased for \$16,000 USD in Miami. Americans demanded that their political leaders do something to address the issue of cocaine trafficking and the violence that was associated with it. These demands would lead to significant expansions in American counter-drug law enforcement efforts in the 1980s (U.S. DEA, 2015).

U.S. Illicit Drug Use Trends and Counter-drug Law Enforcement Policy in the 1980s

The rise in American illicit drug consumption escalated significantly in the 1980s, which compelled U.S. federal policy makers to address the growing illicit drug trade. U.S. President Ronald Reagan led the way in re-focusing and expanding America's anti-drug law enforcement efforts in response to the growing cocaine trade in the U.S. and the emergence of crack cocaine use. The increased amounts of cocaine in the U.S. market and the lower prices for this illicit drug helped to fuel the emergence of the crack cocaine market (Boyum & Reuter, 2005).

Crack cocaine was less expensive than powdered cocaine, highly addictive to users, and extremely profitable for drug dealers. The increase in the amount of cocaine available to consumers and the introduction of crack cocaine would change the landscape of America's

counter-drug enforcement efforts forever. Reagan directed nearly every federal law enforcement agency to place drug crimes at the top of their respective agendas in the 1980s (Boyum & Reuter, 2005; The White House, 1989; U.S. DEA, 2015).

Reagan's counter-drug enforcement plan required large amounts of funding. In 1981, the U.S. federal drug control budget was approximately \$1.5 billion dollars. By 1989, the federal drug control budget had grown to approximately \$6.6 billion dollars. The bulk of these funds were used to support deterrence-based counter-drug efforts, which included increasing interdiction operations. By 1989, over 70 percent of the federal anti-drug budget was spent on counter-drug law enforcement as opposed to the less than 30 percent that was allocated for treatment and prevention programs (Boyum & Reuter, 2005). This shift in focus was the exact opposite of Nixon's approach to the drug problem in America, which allocated more funding for drug treatment than drug enforcement (Boyum & Reuter, 2005; Massing, 1998).

There were several U.S. anti-drug policy changes that occurred at federal and local/state levels during the 1980s. These policy changes were designed to thwart the growing cocaine and crack cocaine problems. Three of the most significant federal counter-drug policy changes included the establishment of: Organized Crime Drug Enforcement Task Forces (OCDETF), the High Intensity Drug Trafficking Initiative (HIDTA), and the Office of National Drug Control Policy (ONDCP). At the state and local levels, drug courts began to emerge in major cities as a way to deal with the country's growing cocaine and crack cocaine addict population (Boyum & Reuter, 2005; King & Pasquarella, 2009; The White House, 1989; U.S. DEA, 2015).

Then U.S. Vice President George W. Bush was tasked by Reagan to lead the OCDETF initiative, which was established in 1982. Initially, the OCDETF program focused on cocaine-related issues in Miami, Florida; however, it later became a nationwide program. The idea

behind this initiative was that international drug trafficking organizations could be deterred from engaging in illicit drug trafficking if the U.S. government could mount coordinated multi-agency law enforcement efforts against them (U.S. DEA, 2015).

The OCDETF program brought together personnel from the DEA, the FBI, the ATF, the Immigration and Naturalization Service, the U.S. Marshal Services, the U.S. Customs Services, the U.S. Coast Guard, and the Department of Defense. Personnel from these different agencies worked together to bring criminal indictments against major drug traffickers. The OCDETF initiative was later expanded to include investigative efforts against all types of organized criminal activities. In building these criminal indictments, the OCDETF teams utilized deterrence-based law enforcement tools of arrest, drug seizures, and the seizure of drug assets (U.S. DEA, 2015).

In 1986, the U.S. Congress passed the Anti-drug Abuse Act, which enhanced prison sentences for violating federal drug laws. The harsh minimum sentences mandated by the 1986 Anti-drug Abuse Act were intended to act as a deterrent for those who were trafficking in illicit drugs. These enhanced sanctions in combination with greater counter-drug enforcement efforts led to large increases in the number of incarcerated drug offenders in federal prisons. The average length of a federal drug offense prison sentence rose from approximately two years in 1980 to slightly more than six years in 1992 (Boyum & Reuter, 2005; Mears & Cochran, 2015).

Perhaps the most controversial and consequential revisions to federal drug laws in the 1986 Anti-Drug Abuse Act were those associated with crack cocaine. The new crack cocaine laws established by the U.S. Congress were based upon a concept known as the 100:1 ratio. This provision of the law mandated that one gram of crack cocaine would now effectively equal 100 grams of powder cocaine for federal sentencing purposes. This sentencing threshold change was

enacted despite the fact that powder cocaine and crack cocaine are comprised of the same chemical compounds. The new crack cocaine guidelines mandated a minimum five-year prison sentence for a first-time federal conviction of possession or distribution of 5 grams of crack cocaine. Conversely, the maximum federal prison sentence for an equal amount of powder cocaine was one year (Divita, 2015; The Sentencing Project, n.d.).

The implementation of the revised sentencing rules for crack cocaine resulted in large increases in the federal correctional population. The vast majority of the offenders affected by this federal sentencing change were African American males (Mears & Cochran, 2015; The Sentencing Project, n.d.) These increased sanctions demonstrate that the U.S. government's anti-drug policy was focused on ratcheting up punitive sanctions to serve as a deterrent.

The establishment of the ONDCP in 1989 was significant because it reflected the significant growing illicit drug problem in America. The passage of the 1986 U.S. Anti-Drug Abuse Act mandated that Ronald Reagan's administration establish the ONDCP in the final year of his second term as President. The U.S. Congress felt that federal anti-drug efforts were immersed in bureaucracy, which rendered them ineffective. Interestingly, Reagan resisted this congressional mandate. His resistance most likely was because prior to this congressional mandate, the Office of the President was responsible for managing federal anti-drug efforts. Nonetheless, the ONDCP was established and it was charged with presenting annual, short-term and long-term anti-drug strategies (Boyum & Reuter, 2005). One of the first tasks assigned to the ONDCP was meeting the goal of making the United States "drug free". Initially, the ONDCP focused U.S. anti-drug efforts on criminal penalties as a way of addressing illegal drug use. The ONDCP measured success in the battle against illegal drugs by assessing the number of illicit substance users. With this unit of measure the U.S. continued forward with its deterrence-

based law enforcement approach to American illicit drug use (Boyum & Reuter, 2005; U.S. DEA, 2015).

In 1989, the ONDCP established the HIDTA program. HIDTA programs were designed to provide federal assistance in the forms of funding and federal law enforcement agents to areas of the U.S. that were struggling with high rates of drug trafficking and abuse. The criteria for an area to be eligible for HIDTA funding were as follows:

1) the extent to which the area is a center of illegal drug production, manufacturing, importation, or distribution; 2) the extent to which State and local law enforcement agencies have committed resources to respond to the drug trafficking problem in the area, thereby indicating a determination to respond aggressively to the problem; 3) the extent to which drug-related activities in the area are having a harmful impact on other areas of the country; and 4) the extent to which a significant increase in allocation of Federal resources is necessary to respond adequately to drug-related activities in the area (The White House, 1989, p. 129).

HIDTA programs still remain an integral part of U.S. counter-drug policy today. Currently, there are 28 individual DEA-led HIDTA programs located throughout the U.S. and its territories including Puerto Rico and the U.S. Virgin Islands (U.S. DEA, 2018).

Increases in cocaine trafficking and abuse during the 1980s led to overall higher crime rates in metropolitan areas, which resulted in severely overcrowded jails. In response to jail overcrowding local officials in Miami, Florida established the first drug court for substance abuse offenders in 1989. Drug courts differ from traditional American criminal courts in that prosecutors and defense attorneys do not interact in an adversarial manner in relation to establishing the guilt or innocence of an offender. Instead, they work in concert with each other, judges, and mental health professionals in helping drug addicts recover by promoting a treatment

agendas. Today there are drug courts in all 50 American states. Empirical studies have generally demonstrated that drug courts lower recidivism rates and are cost effective (Alarid & Reichel, 2018; King & Pasquarella, 2009). The establishment of drug courts signaled that policymakers were growing tired with punitive deterrence-centered law enforcement approaches to America's growing drug problem. However, the overall U.S. counter-drug policy agenda remained largely centered on punitive deterrence, and as has been mentioned before, this policy continues to guide the American response to illicit drugs.

U.S. Illicit Drug Use Trends and Counter-drug Law Enforcement Policy in the 1990s

Cocaine trafficking remained the main illicit drug problem throughout most of the 1990s; however, heroin would once again become a significant issue during this decade (U.S. DEA, 2015). The overall U.S. federal counter-drug deterrence-based policy changed little under President William J. Clinton's leadership from 1993 to 2001. Federal drug arrests continued to rise and Clinton more than doubled the number of DEA Special Agents from 2500 to 5000. Additionally, he approved the first DEA budget in excess of 1 billion dollars (\$1.054 billion dollars) in 1997 (Boyum & Reuter, 2005; U.S. DEA, 2015).

While the overall U.S. anti-drug policy did not change during 1990s, the focus of the DEA changed significantly. Under the leadership of DEA Administrator Thomas A. Constantine the agency focused its enforcement efforts on domestic crack cocaine, methamphetamine, and heroin drug trafficking initiatives while reducing its foreign enforcement programs. The result of this shift in operational focus resulted in the DEA arresting lower-level crack cocaine, methamphetamine, and heroin drug traffickers as opposed to higher-level offenders (U.S. DEA, 2015). This change in focus by the DEA demonstrates an ever-increasing pursuit of punitive sanctions by the U.S. government as a way of dealing with the country's drug problem.

Heroin use, as discussed earlier, increased dramatically in the U.S. in the mid-1990s. The rise in heroin consumption was particularly acute in the Eastern U.S. states. This was due in large part to Colombian drug trafficking organizations growing opium poppies and manufacturing heroin. The heroin that they produced was extremely potent; purity levels of U.S. heroin seizures in 1985 averaged 7 percent, conversely seizures of Colombian-manufactured heroin in 1995 averaged 40 percent in purity. Some seizures of Colombian heroin registered purity levels as high as 90 percent. This increase in purity levels and the rise in consumption rates of heroin led to significant increases in heroin-related deaths in the mid to late 1990s (U.S. DEA, 2015).

U.S. Illicit Drug Use Trends and Counter-drug Law Enforcement Policy in the 2000s

The 2000s saw cocaine trafficking and consumption rates remain stable in the U.S. Conversely, three significant shifts with respect to American illicit drug trafficking and the consumption of illicit substances also occurred during this decade. First, the heroin epidemic that had plagued the Eastern U.S. subsided. Second, the crack cocaine epidemic also became less pronounced. Third, club and designer drugs such as 3,4-methylenedioxymethamphetamine (MDMA) and gamma-hydroxybutyric acid (GHB) became popular in the U.S. (U.S. DEA, 2015). Interestingly, there were substantive and rhetorical changes in U.S. anti-drug policy in the 2000s (Boyum & Reuter, 2005).

The DEA attributed increased law enforcement efforts directed toward the heroin problem in the Eastern states of the country to thwarting the problem in the 1990s. HITDA groups led by DEA Special Agents in various cities including Baltimore, Orlando, and New York had aggressively targeted all levels of heroin dealers and prosecuted them in federal courts (U.S. DEA, 2015). Notably, there are no known empirical studies that support the DEA's claim that

their enforcement efforts led to the reduction in heroin consumption in the 2000s.

The 2000s saw an increase in the use of designer and club drugs, which was attributed in large part to the growing prevalence of all-night dance events known as “raves”. These dance events would typically last from 10:00 p.m. until 7:00 a.m. and were characterized by loud, rapid-paced, “techno” music. Young people in particular were drawn to these events and drug traffickers utilized them to introduce designer and club drugs such as MDMA and GHB into the population (U.S. DEA, 2015). MDMA is a stimulant and psychotropic substance that was banned in the U.S. in 1989. However, drug traffickers in the 2000s developed various designer drugs that contained small amounts of MDMA with other non-banned substances to circumvent criminal prosecution (Patterson, 2018). GHB is a mixed stimulant-sedative that initially produces euphoria, which then transitions into unconsciousness (Abanades et al., 2006). The sale and use of GHB was legal when it first flooded the U.S. population in the 2000s (U.S. DEA, 2015).

U.S. policy makers responded to the increased use of MDMA derivative type substances and GHB by banning all substances that contained any amount of the drugs in 2003. This prohibition led to increased federal law enforcement prosecution of those who sold and used the substances (U.S. DEA, 2015). The response by lawmakers and policing agencies to the increased use of MDMA and GHB substances was consistent with the overall deterrence-based theoretical U.S. policy response to other types of illicit drug use in the United States.

While the U.S. policy response to MDMA and GHB remained consistent with the deterrence theoretical perspective there were some interesting changes in the American political leadership’s substantive and rhetorical approaches to illicit drug use in the 2000s. U.S. President George W. Bush made it a point to stop blaming the American illicit drug consumption problem

on Latin American countries (e.g. Mexico, Colombia, Peru, and Bolivia) that produced cocaine, heroin, methamphetamine, and marijuana. Conversely, he made a concerted effort to note that the American appetite for illicit drugs was also central to addressing the problems of illicit drug abuse. This change in rhetoric led the ONDCP to focus its attention on anti-drug propaganda rather than law enforcement initiatives. Despite this change in focus, 75% of the overall fiscal budget of the ONDCP remained allocated for law enforcement initiatives designed to thwart illicit drug use. Furthermore, the ONDCP made a concerted effort to ensure that marijuana remained an illegal drug in America despite social movements to de-criminalize its possession (Boyum & Reuter, 2005).

Perhaps the event that most effected America's counter-drug efforts during the 2000s was the terrorist attacks on September 11, 2001. The U.S. now had a new enemy: Islamic terrorist groups. These led to stricter border controls and the re-allocation of government expenditures. The result was a reduction in domestic anti-drug efforts. This opened the door for drug traffickers to establish cocaine and heroin transportation routes in South America, Central America, and Mexico. The battle with illicit drugs that had been a main issue for American citizens, policy makers, and law enforcement officials since Nixon declared his "war on drugs" in 1971 became a secondary concern after the terrorist attacks on September 11 (Hadden, 2011).

While the terrorist attacks of September 11 led U.S. policymakers to reduce their focus on domestic illicit drug trafficking, it also served to expand America's drug war into the realm of what is now known as narco-terrorism (Waxman, 2008). According to the DEA, "Narco-terrorism is a subset of terrorism, in which terrorist groups participated directly or indirectly in the cultivation, manufacture, transportation, or distribution of controlled substances and the monies derived from these activities" (U.S. DEA, 2015, p. 104). The U.S. DEA (2015) estimates

that approximately one-third of all foreign U.S.-designated terrorist groups can be described as narco-terrorist organizations.² Nonetheless, as noted above, counter-drug efforts that had been the focal point of U.S. law enforcement since the early 1970s became a secondary issue in American federal policing during this time period.

U.S. Illicit Drug Use Trends and Counter-drug Law Enforcement Policy in the 2010s

Concerns about illicit drug consumption and trafficking rose among Americans in the 2010s. Thus far, the focus on illegal drug activities during this decade has centered on the issues of marijuana legalization and the opioid epidemic. Additionally, the early 2010s, under the direction of President Barack Obama, were characterized by drastic changes related to the sanctioning of non-violent drug offenders. The later portion of the decade has seen the current U.S. presidential administration reemphasize punitive sanctions for both violent and non-violent drug traffickers (Kilmer, Midgette, & Saloga, 2016).

Shifting population views on the dangers of marijuana drove the 2012 legalization of recreational marijuana use in the states of Colorado and Washington. These legislative reforms removed the prohibition on marijuana and made way for the establishment of for-profit companies to produce and distribute marijuana for recreational purposes. While marijuana remained federally illegal, President Obama directed federal law enforcement agencies to tolerate the noted changes in marijuana prohibition (Kilmer, Midgette, & Saloga, 2016). In 2017, the Trump Administration initially presented a plan for federal law enforcement to reverse the trend set by the Obama Administration relative to marijuana laws. However, the Trump Administration reversed this plan in April of 2018 (Halper, 2018). These decisions by the Obama and the Trump Administrations are reflective of the changing U.S. social views toward

² The Secretary of State has the responsibility and authority for designating groups as foreign terrorist organizations under Section 219 of the Immigration and Nationality Act (U.S. Department of State, 2018).

recreational and medicinal marijuana use.

The early 2010s were a period of significant U.S. counter-drug policy changes under the direction of President Obama. In August 2010, the Fair Sentencing Act was passed, which reduced the disparity in the amounts of powder cocaine and crack cocaine required for the imposition of mandatory minimum sentences and eliminated the mandatory minimum sentence for simple possession of crack cocaine. Additionally, Obama used his authority to commute the sentences of thousands of federal inmates who were incarcerated for illegal drug possession and trafficking offenses. Furthermore, he attempted to change the focus of the U.S. government's approach to illicit drug activities. He emphasized treatment and prevention programs over deterrence-based sanction policies in addressing illicit drug trafficking and consumption (Obama, 2017).

Heroin use in America began to significantly rise in 2010. This trend has continued and, as noted earlier, has placed the U.S. in the midst of an opioid epidemic. During the 1990s, the vast majority of the heroin consumed in the U.S. was derived from opium cultivated in Colombia and Mexico. By the 2000s, Mexican-based drug organizations began establishing themselves as the primary suppliers for the majority of the heroin consumed in America. This Mexico/U.S. heroin trafficking connection is now firmly established (U.S. DEA, 2014a).

The rise in heroin consumption has resulted in a significant upswing in the number of heroin-related overdose deaths. Heroin and opioid overdose deaths increased more than fivefold from 1999 to 2016 (Centers for Disease Control and Prevention, 2018). The U.S. Department of Health and Human Services (2018) asserts that the current American heroin epidemic is related to the increase of prescription opioids for pain management. Beginning in the late 1990s, pharmaceutical companies developed new versions of opioid medications that were promoted as

being non-addictive. This claim turned out to be false and many patients turned to heroin as a cheaper alternative when they could no longer get opioid prescriptions from doctors. This upswing in heroin and opioid consumption led the U.S. government to declare the situation as a public health emergency.

The U.S. has responded to the current heroin epidemic with a renewed focus on deterrence-based counter-drug enforcement programs. On March 1, 2017, former FBI Director James Comey and former acting DEA Administrator Chuck Rosenberg addressed an audience at an opioid summit in Virginia. Comey noted that the nation was facing a nationwide heroin crisis that requires a complex strategy of traditional law enforcement and economic market analysis. He further asserted that the U.S. government was addressing the current heroin epidemic with a variety of enforcement tactics, which were to drive up the cost of heroin, thus making it less attractive to consumers (Dean, 2017).

Jefferson Sessions, the former U.S. Attorney General, directed federal prosecutors to seek the most severe penalties possible for drug traffickers in countering the current American heroin epidemic (Sessions, 2017). Furthermore, on March 10, 2018, President Trump stated that he supported legislation that would make certain drug trafficking offenses a capital offense under federal law (Herreria, 2018). Federal U.S. law already provides for the implementation of the death penalty for the trafficking of high levels of certain illicit drugs including heroin and cocaine (Offices of the U.S. Attorneys, 2018). Additionally, Trump noted that he was directing his administration to seek sentencing enhancements for all drug trafficking penalties (Herreria, 2018). The referenced statements by Comey, Sessions, and Trump are reflective of the noted deterrence-based rational choice theoretical perspective and the economic price elasticity of demand premise. It is in essence a continuation of the punitive/deterrent American counter-drug

policy that has been utilized to combat substance abuse since the passing of the Harrison Act of 1914.

Discussion of Major Themes in the Historical Review

There are three main themes found in this historical review of U.S. illicit drug trends and counter-drug policies from the 1900s to 2018. First, Americans have a long history with abusing illicit substances that has ebbed and flowed in terms of drugs of choice and consumption rates. Second, while U.S. policymakers have acknowledged the need for and provided varying amounts of funding for substance abuse prevention and treatment programs they have consistently supported and provided increasingly significant more funding for counter-drug law enforcement deterrence-based programs. Third, this law enforcement deterrence-focused approach toward illicit substance abuse has expanded over time. This expansion has led to overall increases in deterrence-based sanctions toward illicit drug offenders in the forms of imprisonment, seizures, and drug crop eradications. Regarding the noted historical themes, whether these policies and practices are effective in controlling wholesale and retail drug markets by increasing the costs of illegal substances remains unclear. This study provides a multi-dimensional macro-level longitudinal mixed methods empirical assessment of this issue.

Chapter Summary

In sum, a historical overview of U.S. illicit drug trends and counter-drug policies from the early 1900s to 2018 has been set forth in this chapter. This review has demonstrated that the United States has struggled with various types of illicit drug consumption problems for hundreds of years. The general U.S. policy response to these illicit drug problems has been deterrence-based counter-drug enforcement programs. This approach has resulted in increases in the American prison populations (Mears and Cochran, 2015). The Obama Administration attempted

to shift America's response to illicit drug trafficking and consumption toward a focus on prevention and treatment; however, the current heroin epidemic is serving as a catalyst for the Trump Administration to re-focus U.S. counter-drug policy on deterrence-based law enforcement initiatives.

CHAPTER THREE:

CONTEXTUAL BACKGROUND AND THEORETICAL FRAMEWORK

This chapter provides a discussion of the contextual background of this study: the heroin trafficking process (from production to retail market distribution) in conjunction with the law enforcement responses to the various stages of this process. Additionally, the chapter provides a summary of deterrence theory, rational choice theory, and the economic price elasticity of demand perspective, which implicitly guide U.S. federal drug policies.

Heroin Trafficking Process

The trafficking of heroin involves three distinct progressive stages: production, transportation, and distribution (U.S. DEA, 2017). Law enforcement responds to each of these phases with different counter-drug initiatives (see e.g., Kan, 2016; Kleiman Caulkins, & Hawken, 2011; Toth, 2006; U.S. DEA, 2015). These drug trafficking stages and counter-drug initiatives are depicted in Figure 3. Each of these points in the heroin trafficking process will be explained in conjunction with the traditional U.S. law enforcement responses to each. The DEA (U.S. DEA, 2014a; 2017) asserts that the vast majority of heroin consumed in the United States is grown in Mexico and is trafficked by Mexican drug organizations. Therefore, the presentation of the three distinct phases of heroin trafficking and law enforcement responses to them will, at times, include specific references to Mexico.

Production Stage

The production of heroin begins with the growing of opium poppies (specifically the *papaver somniferum* species of poppy), which require an environment that is relatively dry with specific

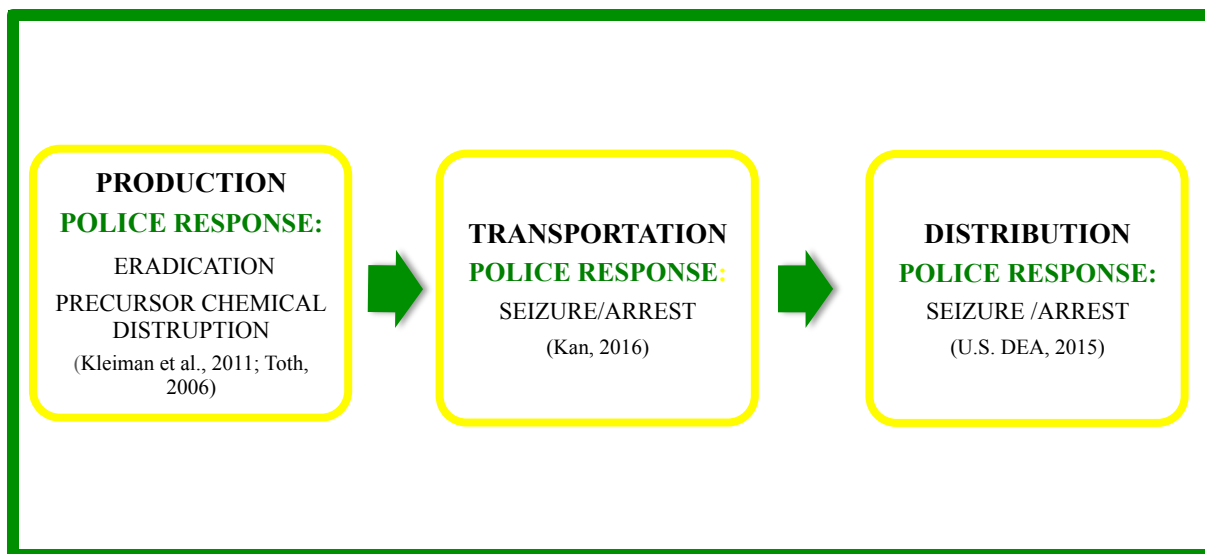


Figure 3. Drug trafficking stages and counter-drug initiatives

soil compositions (Booth, 1996). There are only a few regions in the world that are capable of producing large opium poppy crops. The majority of illegal opium poppy crops are grown in Southwestern Asia (Afghanistan), Southeastern Asia (Myanmar and Laos), and Latin America (Colombia, Mexico, and Guatemala) (Ospina, Tinajero, & Jelsma, 2018). The United Nations (2017) notes that based on 2014-2015 estimates, Mexico is the third largest opium producing nation behind Afghanistan and Myanmar. The growing season (from planting to harvesting) for opium poppies is approximately 90 days (Booth, 1996).

Law enforcement officials incorporate various eradication strategies to destroy opium poppy plants during the growing season. Police and military officials in Mexico, often supported by U.S. law enforcement agencies, use two eradication methods to kill the plants. The first method involves manually eradicating the plants either by pulling them up from the ground or burning them. The second approach entails utilizing chemical agents, usually deployed from aircraft, to poison the plants (Kleiman et al., 2011).

The next step in heroin production is the extraction of the morphine molecule from the opium

poppy, which is then chemically processed into heroin. This requires the use of various precursor chemicals to facilitate the process. This transformation process occurs in clandestine laboratories that may or may not be located near cultivation sites (Finklea, 2019; U.S. DEA, 2017).

To disrupt this phase of the production cycle, law enforcement officials employ two techniques. As mentioned above, precursor chemicals are needed to transform the opium poppies into morphine and then into heroin. Regulations are placed on these precursor chemicals, which limit their legal distribution and police officials attempt to interdict illicit shipments of them before they arrive at clandestine laboratory sites. Second, if clandestine laboratories are identified, law enforcement, and in some countries (including Mexico) military officials, raid and destroy the sites (Kleiman et al., 2011; Toth, 2006).

Transportation Stage

The second stage of heroin trafficking encompasses a complex transportation network for delivering the drug to retail markets. First, the heroin is moved from the clandestine laboratories to storage facilities in the source country. Once safely stored, it is eventually smuggled into the U.S. via land, sea, and air routes. In the case of Mexican heroin destined for the U.S., there are two main avenues of entry into America.: official points of entry (i.e. ports of entry, seaports, and airports) and illegal points of entry (i.e. land crossings, unregulated marinas, and clandestine airstrips). The traffickers utilize a variety of smuggling techniques that are limited only by their imaginations. These techniques include clandestine tunnels, concealed compartments (in luggage, vehicles, boats, and planes), and drug couriers who transport heroin inside their bodies (Decker & Chapman, 2008; Toth, 2006; U.S. DEA, 2015; 2016a; 2016b; 2017).

Various interdiction methods are used by law enforcement officials to disrupt the

transportation flow of heroin into the U.S. from Mexico. Generally, they all center on seizing heroin and arresting smugglers. Various U.S. federal law enforcement, intelligence, and military agencies play roles in these efforts, including: The Department of Homeland Security, the FBI, the DEA, the Central Intelligence Agency, the National Security Agency, the Department of Defense, and the Defense Intelligence Agency (Kan, 2016).

Distribution Stage

The distribution phase of heroin trafficking includes three distinct levels: international wholesale, domestic wholesale, and retail. International wholesale distribution refers to the sale of large quantities of heroin, usually in the hundred-kilogram range, from one drug trafficking organization to another. This usually occurs in the country where the heroin was produced. Domestic wholesale distribution occurs in the consumption nation, and can include quantities that range from one hundred-kilograms to mere ounces. The international and domestic wholesale distribution of heroin is closely monitored and controlled by key figures within trafficking organizations. Retail distribution involves the selling of a gram or less of heroin to users of the drug. Retail distributors encompass a variety of individuals from official members of drug trafficking organizations, various types of gangs, “independent” street drug dealers, and drug addicts who sell heroin just to maintain their own habits (U.S. DEA, 2015).

Responses to the distribution of heroin occur at three different law enforcement levels: federal, state, and local. The DEA is the lead federal agency responsible for addressing international and domestic wholesale heroin distribution, whereas, state and local law enforcement agencies are generally concerned with addressing retail distribution of heroin. It is noteworthy that other federal agencies such as the FBI, the Department of Homeland Security, the Central Intelligence Agency, and the Department of Defense also engage in operations

designed to disrupt international and domestic wholesale distribution of heroin. Furthermore, as was noted in Chapter Two, federal, state, and local law enforcement agencies often team up in a variety of taskforce models (i.e. HIDTA and OCDETF units) to address the spectrum of heroin distribution activities. All of these law enforcement responses focus on four main goals: Arresting violators (sellers and users of heroin), seizing heroin, eradicating opium plants, and seizing assets derived from heroin trafficking (U.S. DEA, 2015).

Summary Of Heroin Trafficking

The heroin trafficking process begins in various foreign-situated opium poppy farms and ends in American retail heroin distribution marketplaces (Booth, 1996; Finklea, 2019; Toth, 2006; U.S. DEA, 2015; 2017). Law enforcement officials attempt to disrupt each step of this process by implementing a variety of techniques including arrests, seizures, and eradication (Kan, 2016; Kleiman et al., 2011; U.S. DEA, 2015). The overall goal of these policing actions is to deter heroin traffickers and users and to increase the price of heroin. The premise behind increasing the price of heroin is so that it will become less attractive to consumers (Dean, 2017).

Deterrence Theory

One of two rationales underlying law enforcement's eradication of opium poppies, the seizing of heroin, and arresting heroin traffickers is found in the premises of the deterrence perspective. Deterrence theory is based on the belief that individuals calculate the perceived benefits of engaging in criminal activity against the perceived risks of being punished (Cullen & Agnew, 2011; Kubrin, Stucky, & Krohn, 2009; Paternoster, 2010; Vold, Bernard, & Snipes, 1998). This portion of the chapter encompasses a review of deterrence theory that includes its history and main premises.

Historical And Main Premises Of Deterrence Theory

The deterrence perspective traces its roots back to the works of the Italian scholar Cesare Beccaria and the British theorist Jeremy Bentham in the 1700s. Both men were greatly influenced by various Enlightenment philosophers who promoted the concept of utilitarianism³ (Cullen & Agnew, 2011; Kubrin, Stucky, & Krohn, 2009; Paternoster, 2010; Vold, Bernard, & Snipes, 1998). The work by Beccaria and Bentham served to establish the classical school of criminology⁴ (Cullen & Agnew, 2011; Kubrin, Stucky, & Krohn, 2009; Tibbetts, 2015; Vold, Bernard & Snipes, 1998). Beccaria and Bentham based their classical school deterrence perspective on the philosophical insights of Thomas Hobbes' work *Leviathan* (1651) (Cullen & Agnew, 2011; Tibbetts, 2015). Hobbes argued that people naturally pursue their own selfish interests and that this pursuit often leads them to harm other people. As a result of this pursuit individuals must enter into a social contract with one another, which leads them to accept certain limits on the pursuit of self-interests to prevent a war of "all against all". The state enforces this social contract with laws that put a limit on self-interest and punishes those who break the laws (Bejan, 2010; Kubrin, Stucky, & Krohn, 2009; Tibbetts, 2015).

Beccaria

Newman (1997) and numerous other scholars (see e.g. Newman & Margongiu, 1997; Tibbetts, 2015; Vold, Bernard, & Snipes, 1998) note that Beccaria's most significant work associated with deterrence was his 1764 work *On Crimes and Punishments*. In this work he established his foundational concepts of crime and the elements of effective criminal deterrence.

³ Utilitarianism is generally defined as the philosophical ideal that society should strive to achieve the greatest amount of happiness for the greatest number of people (Tibbetts, 2015).

⁴ The classical school of criminology holds that, with few exceptions, individuals possess levels of intelligence and feelings to consciously decide whether they should commit criminal offenses (Kubrin, Stucky, & Krohn, 2009; Tibbetts, 2015; Vold, Bernard & Snipes, 1998).

Beccaria (1764/1963) asserts, “the true measure of crimes is namely the harm done to society” (p. 14). Furthermore, he maintained that individuals are naturally inclined to place their own interests above those of others and seek out what pleases them, while they naturally avoid unpleasant situations (Beccaria, 1764/1963). From these basic positions, Beccaria set forth the main developmental components of his deterrence perspective.

Beccaria (1764/1963) believed that all individuals have “agency”⁵. He posited that humans evaluate situations they encounter and consider the benefits and costs of their behavioral options prior to engaging in them within the parameters of “agency”. He further noted that the majority of individuals chose to commit acts that benefit them the most. This led him to deduce that because individuals have “agency”, they are therefore responsible for their actions and if they choose to commit a criminal offense the government has the right to punish them.

It is significant to note that Beccaria (1764/1963) favored limiting governmental punishment as much as possible. He further asserted that when punishment was enacted by the state against an individual the goal of the sanction should be to inhibit the person from committing future crimes. Furthermore, he asserted that the punishment bestowed upon the individual should also serve to deter other members of society from committing similar acts. This societal criminal deterrence is achieved by demonstrating to the general public the consequences of committing similar criminal offenses. These concepts are known respectively today as specific and general deterrence.

Current U.S. counter-drug law enforcement policy is based upon the noted foundational concepts of deterrence as set forth by Beccaria (1764/1963). Illicit drugs are seen as criminal because of their adverse effect on society. These detrimental effects include, but are not limited

⁵ The concept of “agency” is that people have the ability to control their behavior and to make rational choices regarding their behavior (Cullen & Agnew, 2011; Kubrin, Stucky, & Krohn, 2009; Tibbetts, 2015; Vold, Bernard & Snipes, 1998).

to, negative health effects for users, increased levels of violence associated with illicit drug trafficking, and the destabilization of democratic governments (Kan, 2016; U.S. DEA, 2014a). Furthermore, the goal of America's counter-drug enforcement platform is general and specific deterrence. Specific deterrence is supposed to occur when individuals are arrested and punished for using or selling illicit drugs, which should serve to deter them from committing similar criminal acts in the future. General deterrence should occur when those who are tempted to use or sell illicit substances see the punishment administered to apprehended drug traffickers and users and are persuaded not to engage in these sorts of behaviors.

Beccaria (1764/1963) examined various stages of the criminal justice system such as the structure of the criminal trial (including the process of determining the offender's innocence or guilt). Additionally, he explored the various elements of the criminal justice system's sanctioning program. Beccaria wanted to ensure that punishment was administered only to those people who were found to be guilty in a criminal trial. He argued the criminal justice system should use sanctions to reduce future crime. These views were consistent with his utilitarian belief that the criminal justice system should maximize the public benefit by achieving the greatest amount of good for the most amount of people (Newman, 1997; Newman & Margongiu, 1997).

Because Beccaria (1764/1963) held that individuals rationally sought to avoid pain and maximize pleasure, he believed that the criminal justice system should reward societal legal conformity, and impose sanctions for violating societal laws. He asserted that the best mechanism to achieve legal conformity was fear. He further maintained that individuals would likely be inclined to conform to societal laws if they calculated that the potential punishments associated with criminal behavior were greater than any possible benefits they may gain by

violating societal laws. This concept is utilized in America's counter-drug enforcement agenda. In essence, the U.S. law enforcement approach for addressing illicit drug consumption and trafficking is based upon the premise that the punishment an individual receives for using an illicit substance must be greater than the pleasure the person receives from ingesting the illegal substance. Furthermore, it holds that the criminal sanction for selling a banned substance must be greater than the monetary gain one receives from selling the illicit substance.

Beccaria (1764/1963) determined that deterrence with respect to criminal activity could be achieved if the punishment for breaking a societal law was comprised of three essential elements: certainty, severity, and swiftness. Furthermore, he maintained that when an individual was punished for violating a societal law, the general public needed to be aware of the certainty, severity, and swiftness of the sanction that was administered to the offender. These two positions of Beccaria (1764/1963) helped to further solidify the concepts of general and specific deterrence.

The concept of the certainty of punishment is critical in Beccaria's concept of deterrence (Tibbetts, 2015). Beccaria (1764/1963) noted that: "Even the least of evils, when they are certain, always terrify men's minds" (p. 58). Furthermore, he asserted that: "The certainty of punishment, even if moderate, will always make a stronger impression than the fear of another which is more terrible but combined with the hope of impunity" (Beccaria, 1764/1963, p. 58). Fundamentally, he argued that if an individual is not certain they will be caught, and if the punishment for the offense is not clearly prescribed, the deterrent effect of the criminal sanction.

Regarding the severity of punishment Beccaria (1764/1963) held that in order for a criminal sanction to deter criminal behavior it must be proportionate to the offense committed. He stated that: "For a punishment to attain its end, the evil which it inflicts has only to exceed the

advantage derived from the crime; in this excess of evil one should include the...loss of the good which the crime might have produced” (Beccaria, 1764/1963, p. 43). Essentially, he was noting that if the punishment for committing an offense was not severe enough, then it would not serve to deter the crime. Likewise, he noted that if a punishment was too severe it might lead an individual to commit a more serious crime. For, example if the punishment for robbing a store is the death penalty, then a person may be inclined to kill any witnesses to the crime, because apprehension for the robbery would result in execution.

The final essential element of deterrent-based punishment for Beccaria (1764/1963) is swiftness or celerity. When Beccaria (1764/1963) wrote *On Crimes and Punishment*, prisoners often were incarcerated for long periods of time prior to having their cases heard in court (Tibbetts, 2015). Regarding the swiftness of punishment Beccaria (1764/1963) posited that:

“Promptness of punishments is more useful because when the length of time that passes between the punishment and the misdeed is less, so much the stronger and more lasting in the human mind is the association of these two ideas, crime and punishment; they then come insensibly to be considered, one as the cause, the other as the necessary inevitable effect” (p. 56).

Thus, for Beccaria, deterrence could only be achieved if individuals were apprehended quickly and punished as soon as possible. A significant gap in either of these weakened a criminal sanction’s ability to deter.

Bentham

Bentham’s (1789/1988) concepts on the values of pleasure and pain in what has become known as the “felicific calculus” are related to the theoretical deterrence framework of America’s counter-drug enforcement agenda in several ways. Furthermore, they are essential to further understanding the deterrence premises set forth by Beccaria. Interestingly, Bentham never used the term “felicific calculus” in describing his observations of pleasure and pain

(Crimmins, 2017).

According to Bentham (1789/1988), the value that a person places on pleasure or pain is related to several elements. The primary components related to an individual's interpretation of pleasure and pain are intensity, duration, certainty or uncertainty, and its propinquity or remoteness (Crimmins, 2017; Tibbetts, 2015). In discussing the value of pleasure or pain in relation to the probability of an act occurring, Bentham (1789/1988) notes that two other elements also need to be considered. The first is that the act will produce subsequent similar sensations of pleasure or pain. And, conversely, the second component is the probability that similar acts will not produce the same congruent effects of pleasure or pain. He further notes that when considering the effects of pleasure or pain on a group of individuals one must also calculate the percentage of people who will experience the pleasure or pain (Crimmins, 2017). Individuals utilize these noted elements in calculating whether they should or should not engage in specific activities (Bentham, 1789/1988).

The insights of the human experiences of pleasure and pain that Bentham sets forth are related to the deterrence-based U.S. counter-drug program in that it is based on the assumption that individuals calculate the ratio of the pleasure of illicit drug use and/or trafficking against the pain of the punishment administered for using or selling illicit substances. There are numerous pleasures associated with illicit drug use (e.g., alleviating stress, lowering social inhibitions) and trafficking (e.g., significant monetary gains, increasing social status); conversely there are several painful experiences associated with the sanctions applied for engaging in illegal drug use and trafficking (e.g., loss of freedom, monetary losses, social stigmatization).

Numerous empirical examinations (especially regarding adolescents) have established peer pressure as a causal mechanism for engaging in illicit drug use (Cauffman & Steinberg, 2000;

Loke, & Mak, 2013). However, it is the pleasure derived from ingesting illicit substances that is generally accepted as the driving force behind drug addiction (Foddy & Savulescu, 2010; Heath, 1964; Kennett, Matthews, & Snoek, 2013; Olds, 1977). The human desire to maximize pleasurable experiences is thus critical for maintaining markets for illicit drugs.

The experience of pleasure that users of illicit substances feel is not the only factor fueling illegal drug markets. The benefits derived from trafficking in illegal substances have also been empirically linked to promoting illegal drug markets. Specifically, some individuals engage in the trafficking of illicit substances to support their own drug habits (Li, Stanton, Feigelman, Black, & Romer, 1994; McCurley & Snyder, 2008). Furthermore, the sale of illicit drugs can lead to significant monetary gains for some individuals, which is undoubtedly a source of pleasure for them. Kilmer et al. (2015) estimate that American illicit drug consumers spent an average of 100 billion USD annually from 2000 to 2010 to purchase various illegal substances. High-level drug traffickers such Mexico's Joaquin "El Chapo" Guzman have built significant financial empires from the sale of illicit substances. Kan (2016) notes that Guzman was cited by *Forbes* magazine as being one of the wealthiest people in the world. His personal wealth was estimated to be in the billions of dollars prior to his arrest and conviction in the U.S. Notably, not everyone who sells illegal drugs derives monetary pleasure from it or engages in the illicit activity to support their own drug habits.

Levitt and Veakatesh (2000) conducted a seminal study on the financial operations of a large Chicago based street gang whose primary source of income was drug trafficking. The authors reported in their empirical study that only a small number of the highest-level gang members made large financial gains from trafficking illegal substances. They suggested that the pleasure gained by the individuals who did not make significant monetary profits from drug selling was

the security and sense of belonging that they gained from being members of a drug trafficking gang. Their assertion regarding the pleasure associated with the sense of belonging in a gang is consistent with numerous classic studies on the dynamics of gang membership (see e.g. Cloward & Ohlin 1960; Cohen 1955; Shaw and McKay, 1931; Thrasher, 1927).

Overall, the American deterrence-based counter-drug deterrent platform is in essence utilizing Bentham's (1789/1988) "felicific calculus" as its foundation. Specifically, it is asserting that the pain associated with drug possession/sales arrests, drug seizures, and coca leaf and opium poppy eradication are more significant than the noted pleasures associated with illicit drug use and trafficking. Therefore, individuals who are tempted to use or sell banned substances will decide via the "felicific calculus" that is better to not use or sell banned substances. In recent years, an innovative form of law enforcement deterrence program has been developed, which is known as focused deterrence. These programs, which will be discussed further in the subsequent chapter, attempt to tilt the "felicific calculus" scale toward perceived costs of offending by targeting repeat offenders. Several law enforcement agencies have used this deterrence-based method to address overt drug market places (Braga, 2008; Corsaro & Brunson, 2013).

Rational Choice Theory

The classical school deterrence perspective remained prominent within criminological studies and U.S. criminal justice policy from the late 1700s and well into the 1800s (Cullen & Agnew, 2011; Tibbetts, 2015). However, the late 19th century saw the rise of the positivist school among criminologists. The positivist approach is scientifically centered and places an emphasis on matters such as the genetics and psychological deficits of criminal offenders. Despite this change in scholarly approaches to understanding crime, the American justice system

remained largely deterrence oriented. However, it is significant to note that the positivist approach was instrumental in bringing a newfound interest to criminal rehabilitation within the U.S. justice system (Kubrin, Stucky, & Krohn, 2009; Tibbetts, 2015; Vold, Bernard, & Snipes, 1998).

The interest in criminal rehabilitation was somewhat short-lived as rising crime rates and illicit drug use in the late 1960s and 1970s in conjunction with frustration due to poorly administered rehabilitation efforts (see e.g. Martinson, 1974) led criminal justice practitioners to once again fully embrace a deterrence-based approach (Cullen & Agnew, 2011; Tibbetts, 2015). The shift within criminology toward the classical school approach of deterrence is evident in many of the significant scholarly articles produced during the time preceding Martinson's (1974) work (see e.g. Chirico & Waldo, 1970; Gibbs, 1968; Tittle, 1969). This research resulted in a wide array of new deterrence-related theoretical perspectives. Perhaps the most significant of these is Clarke and Cornish's (1985) rational choice perspective, which can trace its conceptual roots back to economic perspectives that were designed to analyze and predict consumer decision making (Kubrin, Stucky, & Krohn, 2009; Pratt, Cullen, Blevins, Daigle, & Madensen, 2006; Tibbetts, 2015). The section below provides an historical background of the rational choice perspective and its main premises.

Historical And Main Premises Of Rational Choice Theory

Clarke and Cornish (1985) developed their theoretical perspective asserting that many criminological theories are deterministic in nature and ignore the decision-making process involved in criminality. The basis of their study was an assessment of the decision-making process employed by residential burglars; however, they noted that their perspective could be applied to any form of crime. They divided their decision making process into two distinct

categories: criminal involvement and criminal events.

Criminal involvement is comprised of three decision stages: initial, continuance, and desistance. The issue of criminal involvement for illicit drug use and trafficking is extremely complex. The reasons for initially using and selling controlled substances, continuing to use and traffic in them, and terminating use and the sale of them have been linked to numerous factors including peer pressure, stress, pleasure, coping, financial gain, acceptance, drug addiction, social stigmatization, and the negative effects of criminal sanctioning in general (Kan, 2016; Levitt & Veakatesh, 2000; Li, Stanton, Feigelman, Black, & Romer, 1994; McCurley & Snyder, 2008; Novacek, Raskin, & Hogan, 1991).

In their rational choice perspective, Clarke and Cornish (1985) note that because criminal event decisions are unique for each crime, criminals utilize specific cognitive processes for different crime types; therefore, any study of a criminal decision-making process must be crime-specific (Braga, 2012; Clarke & Cornish, 1985; Cullen & Agnew, 2011; Tibbetts, 2015). For example, the criminal event decision-making process for someone who commits a commercial robbery is different than the decision-making process used by somebody who engages in drug use or trafficking activities. Furthermore, it is logical to assume that the criminal event decision-making process for someone who uses illegal drugs is more often than not different than the criminal event decision-making process of an individual who sells them.

In relation to deterrence cognition, Clarke and Cornish (1985) utilize a much broader contextual framework than Beccaria (1764/1963). Specifically, they assert that all crime involves decisions that are based on a desire to fulfill basic needs such as cash, excitement, sex, or subcultural deviant status. Once again, they note that criminal motivation varies by type of crime. Furthermore, they assert that cognitive decisions to engage in crime are predicated upon

elements such as time, ability, and the availability of relevant information (Braga, 2012; Clarke & Cornish, 1985). A key element in their perspective is that deterrence-based policing actions may lead an offender to alter the modus operandi of their criminal activities. For example, an offender might change the spatial or temporal elements of their criminal activity in response to law enforcement actions (Guerette & Bowers, 2009). This element of their perspective would also hold true within the context of using and/or trafficking in illicit drugs.

An additional key point in their theoretical perspective is that the decision to engage in criminality may not necessarily be logical or intelligent in a conventional manner; however, to a criminal offender, the choice to engage in a deviant act appears to be sound because it is based upon optimizing his or her outcome (Clarke & Cornish, 1985; Kubrin, Stucky, & Krohn, 2009; Tibbetts, 2015; Vold, Bernard, & Snipes, 1998). This element of the rational choice perspective is lost on many who support the U.S. counter-drug rational choice deterrent-based perspective because they erroneously assume that everyone will make a conventional rational choice with respect to engaging in drug consumption and/or trafficking. However, the cognitive decision-making process of a drug addict or a drug trafficker may often times be far removed from conventional logic. Clarke and Cornish (1985) further assert that there are various intellectual, psychological, sociological, and biological elements that can influence criminal choice, but in every case the decision to engage in a criminal act is cognitive in nature, and is guided by the belief that it is in the individual's best interest to commit the criminal act. Current and past U.S. anti-drug policy is rooted in this conceptual element of their theory; namely, that police enforcement actions will minimize the perceived positive outcomes of both using illicit substances and trafficking in them.

In sum, the above overview of Clarke and Cornish's rational choice theory demonstrates that

the American counter-drug enforcement platform is firmly related to many of the theory's premises. Likewise, the review of the rational choice perspective demonstrates that there are significant elements of their theory that are not completely congruent with U.S. counter-drug enforcement policy. Perhaps the most significant of these incongruences is the difference between the conceptual understandings of the cognitive decision-making process of criminal offending. U.S. counter-drug law enforcement policy is based upon the premise that illicit drug offenders make decisions regarding whether to engage in the illegal drug trade within a conventionally logical decision-making framework. Conversely, the rational choice perspective notes that decisions to engage in criminal activity are made within a subjective and often skewed conceptual framework.

Economic Price Elasticity of Demand Perspective

Caulkins and Reuter (2010) note that various empirical studies (see e.g. Gallet, 2013) have established that drug crimes and illicit drug markets are largely economically motivated. Caulkins (1994) and Caulkins and Reuter (2010) assert that numerous studies have theoretically linked retail drug market prices to the economic price elasticity of demand perspective. The section below will provide a history of the economic price elasticity of demand perspective and its main premises.

Historical and Main Premises of Economic Price Elasticity of Demand Perspective

McGregor (1942) declares that the concept of demand elasticity (e.g., the percentage change in quantity demanded due to a percentage change in any factor affecting demand) traces its roots to Mun in 1627. Furthermore, he notes that Whewell's work in 1829 and 1831 provided the first formula for elasticity of demand. Additionally, he asserts that Moffatt was the first to coin the phrase elasticity of demand in 1878 (Timmerman & Stewart, 2006). Eventually, Marshall

(1890/1920), in his *Principles of Economics* treatise, applied the variables of supply and demand to the concept of elasticity of demand, which he termed the economic price elasticity of demand.

Gallo (2015) explains that the economic price elasticity of demand theory maintains that consumers are sensitive to the price of a product or service, and the assumption is that more people will buy a product or service if it is less expensive and fewer will buy it if it is more costly. She demonstrates this concept with the following formula:

$$\text{Price Elasticity of Demand} = \frac{\text{quantity of demand \%}}{\% \text{ change in price}}$$

Utilizing this equation, a one-gram heroin price elasticity of demand determination would be calculated in the following manner. If a drug trafficker raised the price of a gram of heroin from \$100 to \$120 the price increase would be $\frac{\$120 - \$100}{\$100} = 20\%$. If this increase caused the quantity of grams sold by the drug dealer to decrease from 1,000 grams to 900 grams per month then the percentage decrease in demand would be -10% . This is best illustrated by inserting these numbers (.20 and -10) into the price elasticity of demand formula: $\frac{-10}{.20} = -0.5$. The absolute value of the quotient is used to interpret the price elasticity of demand metric. The value is the magnitude of the distance from zero that matters and not whether the value is positive or negative (Gallo, 2015). Therefore, the price elasticity of demand in the noted example would be interpreted simply as 0.5.

Avery and Steenburgh (2010) note that there are five different zone type of economic price elasticity of demand. These five zone types are shown in Figure 4. Perfect elasticity occurs when a very minor change in price results in a very large change in consumer demand. If a slight change in product price causes a large change in the demand for the commodity it is known as relative elasticity. When any change in a product's price is equal to the change in demand, it is

known as unit elasticity. If large changes in product price result in minor changes in demand for an item, the phenomenon falls within the relatively inelastic zone. And, lastly, perfect inelasticity occurs when the amount demanded does not change when the price changes.

ZONE TYPE	CHANGE
Perfect elasticity	very minor change in \$= large change in demand
Relative elasticity	slight change in \$= large change in demand
Unit elasticity	change in \$= to proportional change in demand
Relative inelasticity	large change in \$= minor change in demand
Perfect inelasticity	change in \$≠ change in demand

Figure 4. Five zone typologies of economic price elasticity of demand (Avery & Steenburgh, 2010)

Former FBI Director Comey’s referenced assertion that the American counter-drug enforcement plan of arresting individuals for heroin possession and sale, seizing heroin, and eradicating Mexican opium poppies will result in increases in the price of heroin and thus render the drug unaffordable for consumers, is based on the price elasticity of demand premise. His declaration requires that heroin is either a perfect elastic, relative elastic, or unit elastic product. If it is not one of these zone types, then his assertions would, according to the premise of price elasticity of demand, be inaccurate.

In sum, a brief historical overview of the development of the economic price elasticity of demand theory has been presented. Additionally, a brief explanation of the premise has been provided, which included an application of it to the price of heroin. Lastly, this perspective has been explained in relation to its significance in America’s counter-drug enforcement plan for combating the current heroin epidemic in the U.S.

Chapter Summary

The material covered in this chapter began with a contextual review of the three main components of heroin trafficking and the standard law enforcement techniques that are utilized to counter them. Furthermore, an overview of the theoretical framework that serves as the foundation for this study was discussed. The theoretical review included the historical backgrounds and main components of each of the three perspectives examined in this study.

CHAPTER FOUR:

EMPIRICAL LITERATURE REVIEW

This chapter provides an empirical literature review of research endeavors that have investigated the theoretical framework and relationship between the key variables of interest in this study. Additionally, the unique ways in which the current study builds upon the extant literature are highlighted throughout the chapter. Furthermore, testable research questions and hypotheses are set forth at the end of the chapter. These research questions and hypotheses are generated from the theoretical perspectives presented in chapter three, and serve as the foundation for expanding the literature.

The chapter is divided into four main sections. The first section of the chapter consists of studies that have examined the theoretical premises of deterrence, rational choice, and focused deterrence programs relative to drug trafficking and counter-drug law enforcement efforts. The second portion of the chapter provides a review of studies that have examined economic models and illicit drug pricing. The third part of the chapter focuses on research that has focused on the relationship between counter-drug law enforcement operations, illicit drug prices, and consumption rates of illegal drugs. Lastly, the research questions and hypotheses are presented.

Empirical Studies of Deterrence, Rational Choice, and Focused Deterrence

Deterrence and rational choice perspectives, as noted earlier, are established criminological theories. Numerous researchers have tested the main premises of these theories (Kubrin, Stucky, & Krohn, 2009; Piquero & Rengert, 1999; Tibbett, 2015). However, assessments of the central assertions set forth in deterrence-oriented perspectives suffer from several limitations.

Specifically, general and specific deterrence are difficult variables to measure. Furthermore, several scholars have noted causal ordering issues with measuring deterrence effects (Kubrin, Stucky, & Krohn, 2009). The following literature review encompasses a review of drug offense-centric studies that have assessed deterrence, rational choice, and focused deterrence perspectives.

Zimmer (1990) evaluated the effects of a proactive counter-drug initiative conducted by the New York City Police Department known as *Operation Pressure Point*. The operation utilized increased order maintenance oriented uniformed police patrols in conjunction with undercover street drug buys designed to disrupt open air drug trafficking activities in the Lower East Side of New York City. The data for her research was primarily derived from official police crime statistics. Additionally, she conducted a few interviews of residents, drug traffickers, and police officers to supplement her data analysis. While she indeed relied on qualitative data in her study, it is still considered to be a largely quantitative study since it fails to meet the complete definition of a mixed methods study.⁶

The conclusions drawn by Zimmer's (1990) analysis of *Operation Pressure Point* support some of the key elements of the rational choice perspective. She concluded that drug traffickers responded within the context of the cognitive components of the rational choice perspective. Specifically, in response to the police operation, drug traffickers changed their street distribution methods by moving to other locations and by selling their illicit drugs in a less conspicuous manner. Additionally, she concluded that drug traffickers and drug users conduct a calculation of the rewards and risks in relation to their respective illicit activities. It is significant to point out that Zimmer (1990) also concluded that *Operation Pressure Point* did not result in

⁶ A mixed methods research design encompasses the examination of both quantitative and qualitative data by triangulating the findings of each set of data examined in reaching a scientific conclusion (DeCuir-Gunby & Schutz, 2017).

the complete desistance of drug trafficking.

Zimmer's (1990) study assessed the rational choice theory within the confines of one specific law enforcement program. The current study provides a more comprehensive assessment of how drug trafficking organizations respond to the overall U.S. government's theoretical deterrence-based law enforcement approach. The findings in the current study should provide greater generalizability than Zimmer's (1990) study.

Decker and Chapman's (2008) *Drug Smugglers on Drug Smuggling* is a book based upon a qualitative study of 34 incarcerated federal inmates who were designated as significant drug trafficking participants. The subjects of their study were initially incarcerated between 1992 and 1998. They utilized a set of standardized open-ended questions, which covered a variety of topics related to the rational choice perspective, including whether the participants weighed the costs and benefits of their illegal activities.

The qualitative study by Decker and Chapman (2008) determined that their participants conducted varying degrees of cost/benefit analyses before engaging in drug trafficking activities. However, they also found that the majority of them did not have a complete knowledge of the various tools used by law enforcement to oppugn drug trafficking (i.e. conspiracy laws), which led them to assert that many of the individuals they interviewed continued to engage in their illegal activities because the perceived rewards appeared to be greater than the actual risks of apprehension. Their findings are generally supportive of the rational choice perspective's proposition that individuals engage in a cost/benefit calculation prior to deciding whether they should engage in criminal activities. Furthermore, it is supportive of the rational choice perspective's claim that the decision-making process of criminals is often not conducted within a framework of conventional rationality.

The current study will provide a more complete assessment than Decker and Chapman's (2008) study. First, the present study utilizes qualitative interviews from 23 high-level drug confidential informants who have more current and extensive information than Decker and Chapman's study participants. Second, their study was limited to qualitative data and analyses, whereas this study will utilize quantitative, qualitative, and mixed methods data analyses, which provides a more thorough assessment of a wider range of variables of interest.

Toth and Mitchell's (2018) qualitative analysis investigated whether drug trafficking organizations operate within the confines of the rational choice perspective in terms of international sporadic drug interdiction initiatives. The data for their study consisted of interviews of 23 high-level DEA confidential informants who had intimate knowledge of how drug trafficking organizations operate. The data were obtained from an unclassified DEA technical report known as *Operation Drill Bit* (Toth, 2006). *Operation Drill Bit* utilized a standardized set of 85 questions that addressed a wide range of topics including, but not limited to, how drug trafficking organizations launder money, how they respond to sporadic international police anti-drug interdiction operations, and police corruption in foreign countries. The catalyst behind *Operation Drill Bit* was a directive from former DEA Chief of Operations Michael Braun who stated, "I want to understand how drug trafficking works from the farm to the arm" (M. Braun, personal communication, March 15, 2006).

The analytical methodology employed by Toth and Mitchell (2018) consisted of coding the participants' responses into five non-exclusive categories related to how drug trafficking organizations react to international sporadic anti-drug interdiction operations. The coding categories included: 1) permanent deterrent effects, 2) temporary deterrent effects/temporal displacement, 3) spatial displacement, 4) method displacement, and 5) no deterrent effect and no

alteration of trafficking activity. Their findings generally supported the rational choice perspective's premise that individuals conduct cognitive calculations, which in turn are used to make rational determinations before they engage in criminal behavior. Specifically, they found that drug trafficking organizations respond to international sporadic drug interdiction operations within a rational framework based on the information they have available.

The study by Toth and Mitchell (2018) was limited to qualitative data analysis and had a tangential focus on sporadic drug interdictions. This study, as noted, will use quantitative, qualitative, and mixed methods data analyses that will provide a wider range of assessments across a broader spectrum of drug trafficking issues. The multi-dimensional analyses in this study should provide stronger internal validity than Toth and Mitchell's (2018) study.

Over the last several years, focused deterrence approaches have been incorporated by U.S. law enforcement agencies to target violent offenders, gang activity, and drug markets. Numerous researchers have empirically assessed these focused deterrence strategies and have reported statistically significant reductions in violence, gang crime, and drug trafficking (see e.g. Braga, 2008; Braga et al., 2001; Corsaro, Brunson, & McGarrell, 2009; Corsaro & Brunson, 2013; Kennedy, Braga, & Piehl, 1997; Kennedy, Piehl & Braga, 1996). Focused deterrence programs are based upon the general premise of deterrence theory in that they assume offenders weigh the cost and benefit of engaging in criminal behavior (Braga, Weisburd, & Turchan, 2018).

Focused deterrence programs attempt to tilt the calculation of the perceived costs and benefits of offending. They specifically place their attention on repeat or problematic offending populations/areas (i.e. criminal gangs, overt illicit drug markets) and attempt to influence perceptions of apprehension toward the cost side of the cost/benefit equation. The strategy used

to accomplish this goal is generally referred to as “pulling levers”. In general, a task force consisting of law enforcement professionals, researchers, social workers, prosecutors, and community stakeholders is formed to develop programs that target specific repeat offenders or problematic offending populations/areas to increase perceptions of apprehension (Braga et al., 2001, Kennedy et al., 1996).

Braga and Weisburd (2012) conducted a review and meta-analysis of 11 quasi-experimental studies on focused deterrence. They divided the 11 studies that they examined into three main focused deterrence type programs: gangs, overt drug marketplaces, and high-risk offenders. They found that 10 out of the 11 studies that they analyzed reported statistically significant crime reductions. The most significant criminal activity reductions were in the street gang initiatives with a within group effect size of .770 ($p < .05$). Overt drug market crime reduction programs had the second highest within group effect size findings (.661, $p < .05$). In contrast, initiatives that targeted high-risk offenders had the smallest within group effect sizes (.186, $p < .05$).

Braga et al. (2018) conducted a subsequent systematic review and meta-analysis of 24 quasi-experimental design studies that empirically tested focused deterrence programs. Like Braga and Weisburd (2012), they divided the focused deterrence initiatives into three groups: gangs, overt drug marketplaces, and high-risk offenders. Overall, they determined that five of the programs did not show any crime reductions in post-tests. Related to specific program types, they found that focused deterrence programs targeting gang activities were associated with the largest within group effect size, at .657 ($p < .05$). The second most effective initiative were those that addressed high-risk offenders, which demonstrated a within group effect size of .204 ($p < .05$). Overt drug market focused deterrence programs had the lowest within group effect size (.091, $p < .05$).

It is significant to note that none of the overt drug market focused deterrence studies in the two meta-analyses measured illicit drug consumption or drug price affects. While the data in the present study do not allow for assessments of focused deterrence counter-drug programs, the findings in the meta-analyses are relevant in that they demonstrate significant reductions in drug crime activities. If this study finds that standard American counter-drug operations are not effective at reducing heroin prices and consumption rates of the drug than one possible alternative may be to implement more of focused deterrence-based approaches to address the current heroin epidemic.

Economic Models and Illicit Drug Prices

The first set of studies examined in this section addresses the economic pricing modeling of cocaine and heroin. While the present study is focused on heroin, it is necessary to include cocaine economic price modeling in this portion of the literature review because the two illicit drugs share nearly identical cultivation, production, transportation, and distribution processes and cannot be disentangled in the data (U.S. DEA, 2015). Therefore, it is logical that they would have similar economic price modeling characteristics. These studies are important because the economic price modeling of these illicit drugs is crucial to understanding if their costs are impacted by standard counter-drug law enforcement practices.

Caulkins (1994) conducted a study to determine if cocaine prices are additive or multiplicative in nature across major distribution points. His analyses were based on DEA System to Retrieve Information on Drug Evidence (STRIDE) data from several American cities. STRIDE analyzes the price and chemical composition of cocaine and other drugs that are obtained from undercover street-level drug purchases and seizures. Specific details of the STRIDE program are discussed in chapter five.

In understanding Caulkins' (1994) study and findings, it is essential for the concepts of additive and multiplicative effects be understood within the context of his inquiry. He asserted that if the pricing of cocaine is additive in nature then a one-dollar increase in the wholesale price of a kilogram of cocaine would result in a one-dollar increase in the distribution level price of an ounce of cocaine and a one-dollar increase in the cost of a gram of cocaine at the street level. For example, if the wholesale cost of a kilogram of cocaine is \$10,000, the distribution level price for an ounce of cocaine is \$1,000, and the street level price for a gram of cocaine is \$100, then a one-dollar increase in the wholesale price of a kilogram would raise the distribution ounce price of cocaine to \$1,001, and the street level gram cocaine price to \$101. However, if the pricing of cocaine is multiplicative, then the cost is associated with percentage increases starting at the wholesale kilogram level. Utilizing the figures above, a 1 percent increase in the wholesale level of a kilogram of cocaine would result in the following price adjustments: a kilogram of cocaine at the wholesale point would be \$10,100, an ounce would cost \$1,010, and a gram would cost \$101 at street distribution levels.

Caulkins (1994) used four different analytical models to construct cocaine pricing series from historical longitudinal STRIDE data from 1988 to 1991. The data encompassed gram, ounce, and kilogram prices of cocaine from 8 large U.S. cities and one mid-size American city. His analyses consisted of regressing log prices on log quantities. He determined that the pricing of cocaine is multiplicative in nature. At first glance, his finding appears to lend support to the position of those who posit that decreasing the production levels and quantities of drugs available in the U.S. will result in significant price increases. He cautioned, however, that further analysis needed to be done to fully understand how the pricing of cocaine occurs.

The present study will address some of the weaknesses in Caulkins' (1994) work. First, it

will provide qualitative insights into how prices are established for international wholesale, domestic wholesale, and domestic retail heroin and cocaine, whereas Caulkins' (1994) study was limited to a quantitative analysis of cocaine pricing at the wholesale, distribution, and street levels. This qualitative component of the current study will provide a "why" element never addressed in any empirical study on illicit drug pricing. Additionally, the current study will provide a mixed methods analysis of how counter-drug efforts influence retail and wholesale pricing of heroin, which Caulkins (1994) did not address in his cocaine study. Finally, it will also provide an analytical understanding of how heroin prices influence consumption.

Perhaps the most significant and interesting point made by Caulkins (1994) is that the purity level is not associated with the price of cocaine. He presents a concept that he labels as "expected purity hypothesis" (EPH). This hypothesis states that the actual purity of cocaine is inconsequential to pricing because what is significant in the purchase price of cocaine is the buyers' perceived notion of the purity of the cocaine he/she is buying rather than the drugs' actual purity level. This point is relevant to this research endeavor because some may assert that the analyses should take purity levels into account. Accepting the EPH of Caulkins (1994) negates the need for such a consideration.

Miron (2003) attempted to determine if the prohibition of cocaine and heroin significantly increases the prices of these illicit drugs. His study compared the ratio of cultivation to retail street level pricing of prohibited cocaine and heroin to five different types of legal commodities. The legitimate agricultural products that he examined in his analyses were coffee, chocolate, tea, beer, and tobacco. The products in his study are derived from some of the same countries that produce cocaine and heroin. The production countries that he utilized in his research endeavor were Afghanistan, India, Thailand, Colombia, Brazil, and the U.S.

The first analytical model conducted in the study by Miron (2003) accounted for costs associated with the retail sale of the legitimate products he examined. These included taxes, regulatory expenses (environmental, safety, and health), labor, and advertising. He determined that the prices for the legitimate commodities rose during each stage of the distribution process. Furthermore, he noted that the type of establishment that sold the legitimate product influenced the final pricing ratio of cultivation to retail distribution. For example, he noted that the cultivation to retail price ratio was greater for a cup of coffee sold in a Starbucks Coffee Shop as opposed to unprepared coffee that is sold in a grocery store. Overall, he determined that the ratio of cultivation to retail costs of the legitimate products in his study were only slightly greater than those of prohibited cocaine and heroin. He noted that the prohibition effects on the prices cocaine and heroin are similar to the cost amplification variables (taxes, regulatory expenses, labor, and advertising) associated with the legitimate products in his study. He further asserted that if cocaine and heroin were legalized, for recreational purposes, it is likely that the cultivation to retail distribution costs would equate to similar street level pricing dynamics for the these drugs.

The second analytical comparison model in Miron's (2003) study entailed examining the prices of medicinal cocaine and illegal cocaine in conjunction with medicinal morphine and heroin. He noted that at the time of his study only one company was authorized to distribute medicinal cocaine in the U.S. and only two companies were authorized to import morphine into the country. The limited number of distributors of these controlled substances allows them to charge significantly high prices for their products relative to the actual costs associated with manufacturing them. Furthermore, the products are subjected to taxes, regulatory, and testing high employee costs and expected losses (i.e. law enforcement seizures and theft by competing

costs. Conversely, the costs associated with manufacturing illicit cocaine and heroin includes organizations). The high employee costs are related to the exposure that individuals in the black market trade of heroin and cocaine face, in the form of violence and potential apprehension.

In his comparison study of illicit cocaine and medicinal cocaine, Miron (2003) found that the cost of illicit cocaine was slightly higher than medicinal cocaine. His inquiry into the comparison of heroin and morphine produced similar results. He noted that the slightly higher increases in the two illicit substances were attributable to law enforcement efforts leading to the increase in heroin and illicit cocaine prices by a factor of 3. He asserts that more studies are needed to determine if increasing anti-drug law enforcement efforts will significantly increase the prices of heroin and illicit cocaine. The present study will expand on Miron's (2003) work by providing quantitative, qualitative, and mixed methods analyses regarding whether counter-drug law enforcement efforts increase the retail and wholesale prices of heroin.

There are numerous empirical non-crime related studies that have validated the central components of the economic price elasticity of demand perspective. These studies have included examinations of various legitimate economic commodities (see e.g. Brons, Nijkamp, Pels, & Rietveld, 2008; Goodwin, 1992; Oum, Waters, & Yong, 1992). Gallet (2013) identified 42 studies from various countries, including the U.S., Norway, Indonesia, Australia, and Taiwan, that collectively provided 462 estimates of the economic price elasticity demand of marijuana, cocaine, and heroin in relation to counter-drug law enforcement programs. He presented an overview of the various studies in his meta-analysis in conjunction with each project's median price elasticity findings. Table 1 contains the results of his meta-analysis in relation to heroin price elasticity of demand.

Table 1. Meta-analysis Results on Economic Price Elasticity of Demand Relative to Heroin (Gallet, 2013)

Study: Year Published	Drug(s) Studied	Country	M Price Elasticity
1. Bretteville-Jensen (1999)	Heroin	Norway	(-0.96)
2. Bretteville-Jensen (2006)	Heroin	Norway	(-0.55)
3. Bretteville-Jensen & Sutton (1996)	Heroin	Norway	(-0.72)
4. Bretteville-Jensen & Biøen (2003)	Heroin	Norway	(-0.90)
5. Bretteville-Jensen & Biøen (2004)	Heroin	Norway	(-0.90)
6. Caulkins (1995)	Cocaine/Heroin	U.S.	(-0.34)
7. Caulkins (2001)	Cocaine/Heroin	U.S.	(-1.07)
8. Chalmers et al. (2009)	Heroin	Australia	(-2.11)
9. Chalmers et al. (2010)	Heroin	Australia	(-1.82)
10. Chandra & Swoboda (2008)	Marijuana/Heroin	India	(-0.52)
11. Dave (2006)	Cocaine/Heroin	U.S.	(-0.42)
12. Dave (2008)	Cocaine/Heroin	U.S.	(-0.52)
13. Grossman (2005)	Marijuana/Cocaine/Heroin	U.S.	(-0.27)
14. Jofre-Bonet & Petry (2008)	Cocaine/Heroin	U.S.	(-0.90)
15. Liu et al. (1999)	Heroin	Taiwan	(-0.27)
16. Petry & Bickel (1998)	Heroin	U.S.	(-1.06)
17. Rhodes et al. (2000)	Marijuana/Cocaine/Heroin	U.S.	(-0.26)
18. Saffer & Chaloupka (1999a)	Cocaine/Heroin	U.S.	(-0.59)
19. Saffer & Chaloupka (1999a)	Cocaine/Heroin	U.S.	(-0.61)
20. Van Luijk & Van Ours (2001)	Heroin	Indonesia	(-0.22)
21. Van Ours (1995)	Heroin	Indonesia	(-0.61)

Gallet (2013) utilized a meta-regression model to evaluate the price elasticity estimates in the various studies that he incorporated into his study. He reported that in comparison to cocaine and heroin, the demand for marijuana is less responsive to price. Additionally, he further concluded that the decision to use illicit drugs is more responsive to price than the decision of

how much of the substance is purchased. Interestingly, he also asserted that that the price elasticity in the U.S. is smaller in absolute value for marijuana, cocaine, and heroin, compared to other countries. He posited that the findings suggested there is no single law enforcement operational enforcement program that impacts the prices of cocaine, heroin, and marijuana. He therefore suggested that this should be taken into consideration when formulating drug control policies.

The current study will expand upon all of the studies in the meta-analysis by Gallet (2013) by assessing whether arrests, seizures, and/or eradication influence the prices of retail and wholesale heroin. None of the studies in Gallet's meta-analysis examined all three of these standard counter-drug law enforcement techniques in a combined manner. Furthermore, the qualitative component of the present study, as mentioned earlier, will provide an explanation regarding the pricing of heroin. None of the studies in his meta-analysis have this component, which is critical to assessing the dynamics of illicit drug pricing.

In sum, the review of the first study by Caulkins (1994) determined that cocaine prices are multiplicative in nature, as opposed to additive. This is an important finding because it suggests that anti-drug law enforcement efforts would need to substantially impact cocaine traffickers at cultivation and production levels to exert significant influence on the prices of street level quantities of cocaine. The present study will examine his assertion quantitatively and qualitatively. Furthermore, he presented his expected purity hypothesis, which negates the need to consider actual purity levels of illicit substances when studying their prices.

The second research endeavor examined in this section of the literature review by Miron (2003) presented two comparison studies related to the effect that prohibition has on heroin and illicit cocaine prices. His first study determined that the prices of heroin and prohibited cocaine

are slightly higher than legitimate agriculturally based products. The second study in his research project concluded that the prices of illicit cocaine and heroin were slightly higher than the prices for medicinal cocaine and morphine. An important conclusion in his research project is that the prohibition of heroin and illicit cocaine indeed affect their respective prices. The current study will quantitatively and qualitatively test his assertion at both the wholesale and retail levels.

Lastly, the meta-analysis reviewed by Gallet (2013) determined that heroin and cocaine retail prices do respond to the economic price elasticity demand. Additionally, he determined that his meta-analysis showed that no single law enforcement operational program significantly impacts the prices of cocaine, heroin, and marijuana. The present study will provide greater insight into his findings and will provide a unique qualitative assessment on the impact of counter-drug law enforcement efforts on wholesale heroin pricing.

Illicit Drug Prices, Counter-drug Law Enforcement Operations, and Consumption Rates of Illegal Drugs

This section of the empirical literature review encompasses prior studies that have examined anti-drug law enforcement platforms, illicit drug prices, and consumption rates of illicit drugs. Empirical studies on these topics present challenges with respect to the data available to accurately assess them. Reuter and Greenfield (2001) note the following regarding these challenges:

“The underlying data that give rise to estimates of global drug markets are riddled with discrepancies and inconsistencies. Nonetheless, they can provide useful information on the overall size or ‘scale’ of the global drug trade, the distribution of supply chain activities and value added across countries, and the distribution of final consumption across countries” (p. 159).

The current study will help fill the void of these discrepancies and inconsistencies by combing official quantitative data and unique qualitative data.

No studies were found during the literature review that addressed the exact combined independent and dependent variables that are assessed in the present study. Therefore, this study is completely unique and will significantly enhance the literature. However, several of the studies reviewed did in fact address various combinations of the current study's independent and dependent variables.

There are numerous studies that have examined the relationship between various anti-drug law enforcement initiatives, the prices of various illegal drugs, and consumption rates of illicit drugs. A study that reviews the findings of several empirical examinations of the effects of anti-drug law enforcement on illicit drug prices is presented below. Additionally, several studies that have examined the relationship between the prices of cocaine/heroin and consumption rates of these substances will subsequently be discussed.

Pollack and Reuter (2014) conducted a review of nine empirical studies that examined the effectiveness of several standard anti-drug law enforcement operational platforms in relation to their abilities to influence the prices of cocaine and heroin. The counter-drug operational methods that they examined included: crop eradication, precursor chemical control, clandestine laboratory destruction, high-level trafficker enforcement, and street-level enforcement. They identified six studies that focused on enforcement operations targeting cocaine. These studies were conducted by: Crane, Rivolo and Comfort (1997), DiNardo (1993), Freeborn (2009), Gallego and Rico (2013), Kuziemko and Levitt (2004), and Meija and Restrepo (2012). They found one study by Yuan and Caulkins (1998) that addressed cocaine and heroin enforcement operations. Additionally, they located one study by Weatherburn and Lind (1997) that examined heroin enforcement, and one study by Clemens (2008) that investigated opium enforcement. The above-mentioned research projects were conducted in various countries, which included the

U.S., Colombia, Australia, and Afghanistan. An overview of the referenced studies and their respective findings with respect to heroin and opium are presented in Figure 5.

The review of the noted studies conducted by Pollack and Reuter (2014) led them to make several noteworthy conclusions. First, they concluded that there is insufficient evidence to assert that any type of police enforcement tactic results in an increase in cocaine and heroin prices. Additionally, they noted that prices at the wholesale level for cocaine and heroin have little effect on prices at the retail or street level. Their findings seem to support the conclusion of Caulkins

Year Published	Drug	Location	Study Design	Findings
Clemens (2008)	Opium	Afghanistan	Calibrated Theoretical Model	Substantial increases in crop eradication needed to achieve 3-19% reduction in production. Cessation of crop eradication could result in a 1.6-9.6% increase in opium production.
Weatherburn & Lind (1997)	Heroin	Australia	Correlational Time-Series	Heroin seizures have no effect on price, purity, or perceived street availability. No relationship between arrests and street heroin prices.
Yuan & Caulkins (1998)	Cocaine & Heroin	U.S.	Regression Modeling with Granger Tests For Causality	Overall mixed results, however no relationship found between enforcement and price.

Figure 5. Review of empirical studies on drug enforcement and illegal drug pricing in relation to opium and heroin (Pollack and Reuter, 2014)

(1994) that wholesale price increases of cocaine would have to be significant, since they are multiplicative in nature, to impact retail prices of the drug.

As noted earlier, the review by Pollack and Reuter (2014) contained only one study that was specific to heroin, and one study that was specific to opium. Their review demonstrates that there is a significant gap in the literature on the impact that law enforcement operations have on heroin pricing. Furthermore, none of the studies in their review were qualitative in nature. The present study is comprehensive in that it provides quantitative and qualitative assessments of the impact law enforcement programs have on wholesale and retail prices of heroin.

The subsequent paragraphs cover empirical examinations of the relationship between prices of cocaine/heroin and consumption rates of the drugs. In general, these findings show that consumption rates decrease when the prices of cocaine and heroin increase. However, some studies indicate that these findings do not hold true across all socio-economic classes.

Grossman and Chaloupka (1998) conducted a study using data from the Monitoring the Future Survey and the DEA's STRIDE system to assess whether the price of cocaine was related to consumption rates. The data in their study covered a time period from 1977 to 1985. The authors employed two-stage least squares analysis and an ordinary least squares analysis to examine the relationship between cocaine prices and user consumption rates.

The findings by Grossman and Chaloupka (1998) suggest that decreases in cocaine prices increase consumption rates of the illicit drug. Specifically, they reported that a permanent 10% reduction in price would cause the number of cocaine users to grow by approximately 10% in the long run and would increase the frequency of use 14% in a fixed population in the long run and by slightly less than 10% in the short run (p. 458).

The authors also noted that a 10% short-term increase (one-year) in the price of cocaine would only reduce total cocaine consumption by 5%. However, they asserted that their finding suggested that a permanent 10% price increase in cocaine would reduce total cocaine consumption by 14%.

The finding by Grossman and Chaloupka (1998) that both temporary and permanent price increases of cocaine are associated with varying degrees of cocaine consumption appears to support the premise that increasing the price of heroin would lead to lower consumption rates of the drug. However, it is significant to note that, as was mentioned earlier, cocaine is not physically addictive, whereas heroin does induce a physical dependency. It is possible that the physical addictive quality of heroin would render it less responsive to price changes than cocaine.

Saffer and Chaloupka (1999a) conducted a study using yearly (1988, 1990, and 1991) data from the National Household Surveys on Drug Abuse (NHSDA) and the DEA STRIDE system to assess the relationship between the prices of cocaine and heroin, in conjunction with the decriminalization of marijuana, on occasional and chronic consumption rates of the respective drugs. Chronic consumption rates were defined as using any of the noted substances on a monthly basis, while occasional use was defined as any use during an annual period of time. They established demographic sub-sets in their study, which included: White male non-Hispanics, African Americans, Native Americans, Asians, Hispanics, females, and adolescents. They utilized an ordinary least squares regression to test their research questions.

The findings by Saffer and Chaloupka (1999a) determined that cocaine, heroin, and marijuana price increases decreased occasional and chronic consumption rates of each respective drug. A price increase for occasional cocaine was associated with a .55 decrease in use while a

price increase for chronic cocaine was related to a .36 decrease in consumption levels. Heroin price increases were associated with .90 decreases in user rates at the occasional level and .80 decreases at the chronic level. Additionally, they noted that the decriminalization of marijuana was found to be associated with a 6 to 7 percent increase in the occasional use of the drug and a 4 to 5 percent increase in the chronic use of the substance.

Saffer and Chaloupka (1999b) conducted another study using yearly (1988, 1990, and 1991) data from the NHSDA, the DEA's STRIDE system, and the American Chamber of Commerce Research Association's quarterly Inter-City Cost of Living Index to investigate the relationship between the prices of alcohol, marijuana, cocaine, heroin and consumption rates of the substances. They demographically divided their overall sample into the following sub-sets: White male non-Hispanics, African Americans, Native Americans, Asians, Hispanics, females, and adolescents. They utilized ordinary least squares regression models. All regressions included price (or decriminalization for marijuana), income, marital status, and time dummies.

The findings reported Saffer and Chaloupka (1999b) indicate that increases in the prices of alcohol, marijuana, cocaine, and heroin decrease the consumption rates for each of the substances in all of the demographic populations in their study. Furthermore, they determined that alcohol and the illicit drugs in their study are related in a complementary manner. More specifically, increases in alcohol prices result in lower drug consumption rates for the other substances in their study. Additionally, increases in the prices of marijuana, cocaine, and heroin result in lower consumption rates of alcohol.

Saffer and Chaloupka's (1999a; 1999b) findings appear to support the assertion that increases in the price of heroin will result in lower consumption rates. Additionally, they suggest that an easier and more cost-effective mechanism than counter-drug law enforcement programs is

available for reducing marijuana, cocaine, and heroin use. Specifically, they assert that simply adding a sales tax to increase the price of alcohol should reduce the number of cocaine, heroin, and marijuana users. They further assert that this solution would actually increase state and federal revenues as opposed to increasing state and federal expenditures for enhanced anti-drug law enforcement programs.

The current study will enhance the findings in the studies by Grossman and Chaloupka (1998) and Saffer and Chaloupka (1999a; 1999b). Their respective studies examined smaller time periods than the present study, which covers a period of 25 years. The extended time frame of the current study will greatly enhance the literature by providing extensive analysis of market changes in heroin consumption, in relation to retail prices and law enforcement practices.

In sum, several studies that examined illicit drug prices, counter-drug law enforcement operations, and consumption rates of illegal drugs were reviewed above. While all of the studies have provided important insights, the present study expands upon all of them. And, as previously noted, its qualitative, quantitative, and mixed methods analyses provide unique insights with respect to the study's unique variable construction. Furthermore, the present study provides an analysis of more recent data on heroin pricing, consumer rates, and law enforcement actions that coincide with the recent heroin epidemic.

Research Questions and Hypotheses

The theoretical perspectives discussed in Chapter three are represented, to varying degrees, in the following research questions and hypotheses. These research questions and hypotheses will serve to guide the research in this study.

First Focal Point

U.S. drug policy is premised on the idea that consumption (demand) is closely tied to retail drug market prices (Kleiman et al., 2011). The first set of research questions empirically tests

this premise and sets the foundation for the remainder of the study. This set of research questions empirically examines the relationships between the production of Mexican opium poppies, retail prices of heroin, and consumption rates of heroin. The research questions for this focal point are:

1. Do the number of opium poppy tons produced in Mexico and the number of U.S. heroin users influence the American one-gram price of heroin?
2. Do the number of opium poppy tons produced in Mexico and the U.S. one-gram price of heroin influence the number of U.S. consumers of the drug?

The hypotheses for this focal point are:

1. A decrease in the number of opium poppy tons produced in Mexico and an increase in the number of U.S. heroin users increases the one-gram price of the drug in America.
2. A decrease in the number of opium poppy tons produced in Mexico and an increase in the U.S. one-gram price of heroin reduces the number of American consumers of the drug.

The two research questions and two hypotheses for the first focal point are presented in Figure 6. The first hypothesis is based on the economic price elasticity of demand perspective. A decrease in the number of opium poppy tons produced in Mexico and an increase in the number of heroin users should lower the supply of the drug on the open market, which should increase the price of the drug. This in turn should make the drug less desirable for consumers. The second hypothesis is also based upon the economic price elasticity of demand perspective and prior empirical research. Specifically, increases in prices reduce consumption rates and decreases in prices increase consumption rates (see e.g. Grossman & Chaloupka, 1998; Saffer & Chaloupka, 1999a, 1999b). Decreasing the number of opium poppy tons produced in Mexico should lead to an increase in the price of heroin, which should make it less attractive to

consumers thereby reducing the number of heroin users.

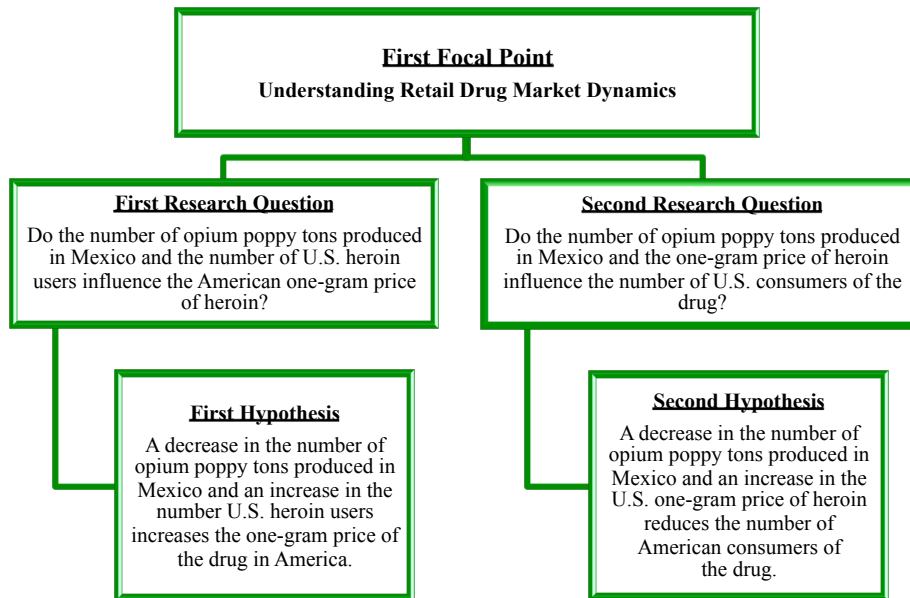


Figure 6: Overview of research questions and hypotheses in the first focal point

Second Focal Point

This focal point assesses the premise that the retail price of illicit drugs can be made more expensive by deterrence-based law enforcement operations, which in turn make the drugs less desirable to consumers. The research questions and hypotheses for this focal point are intended to examine whether U.S. standard deterrence-focused counter-drug law enforcement operations impact heroin use and heroin trafficking in a manner that is consistent with economic price elasticity of demand and deterrence perspectives. The research questions for this focal point are:

3. Do increases in the number of individuals arrested for the possession of heroin and the trafficking of heroin, opium poppies eradicated in Mexico, and heroin seizure amounts in the U.S., while controlling for production rates of opium poppies in Mexico, increase the U.S. one-gram price of heroin?
4. Do increases in the number of individuals arrested for the possession of heroin and the

trafficking of heroin, opium poppies eradicated in Mexico, and heroin seizure amounts in the U.S., while controlling for production rates of Mexican opium poppies in Mexico, decrease the number of lifetime heroin users in America?

The hypotheses for this focal point are:

3. Increasing the number of heroin possession arrests, heroin trafficking arrests, opium poppies eradicated in Mexico, and heroin seized in the U.S. while controlling for the production rates of opium poppies in Mexico, increases the American one-gram price of heroin.

4. Increasing the number of heroin possession arrests, heroin trafficking arrests, opium poppies eradicated in Mexico, and heroin seized in the U.S. while controlling for the production rates of opium poppies in Mexico, decreases the number of lifetime heroin users in America.

The two research questions and two hypotheses for the second focal point are presented in Figure 7. The first hypothesis is based upon deterrence theory and the economic price elasticity of demand perspective. If individuals perceive that there is a great risk of being arrested because they have witnessed others being arrested (general deterrence), then the price of heroin should increase to balance out the risk with the reward for those who are selling the drug. Additionally, increases in eradication and seizures should lower the supply of heroin, which should raise the price of the drug. The second hypothesis is likewise based upon deterrence, rational choice, and the economic price elasticity of demand perspectives. If individuals weigh the cost of incarceration against the reward of using heroin, the number of heroin users should decrease. Additionally, the eradication of opium poppies and the seizure of heroin should reduce the amount of heroin available, which should make it more expensive and less desirable for

consumers.

This focal point statistically controls for Mexican opium production because of the insights provided by Caulkins and Reuter (2010). Specifically, they note that there is a limited understanding of how production levels of illicit drugs are impacted by law enforcement efforts. Given their finding, production levels of opium poppies will be controlled for because they may act in a confounding manner in relation to the other variables in the study.

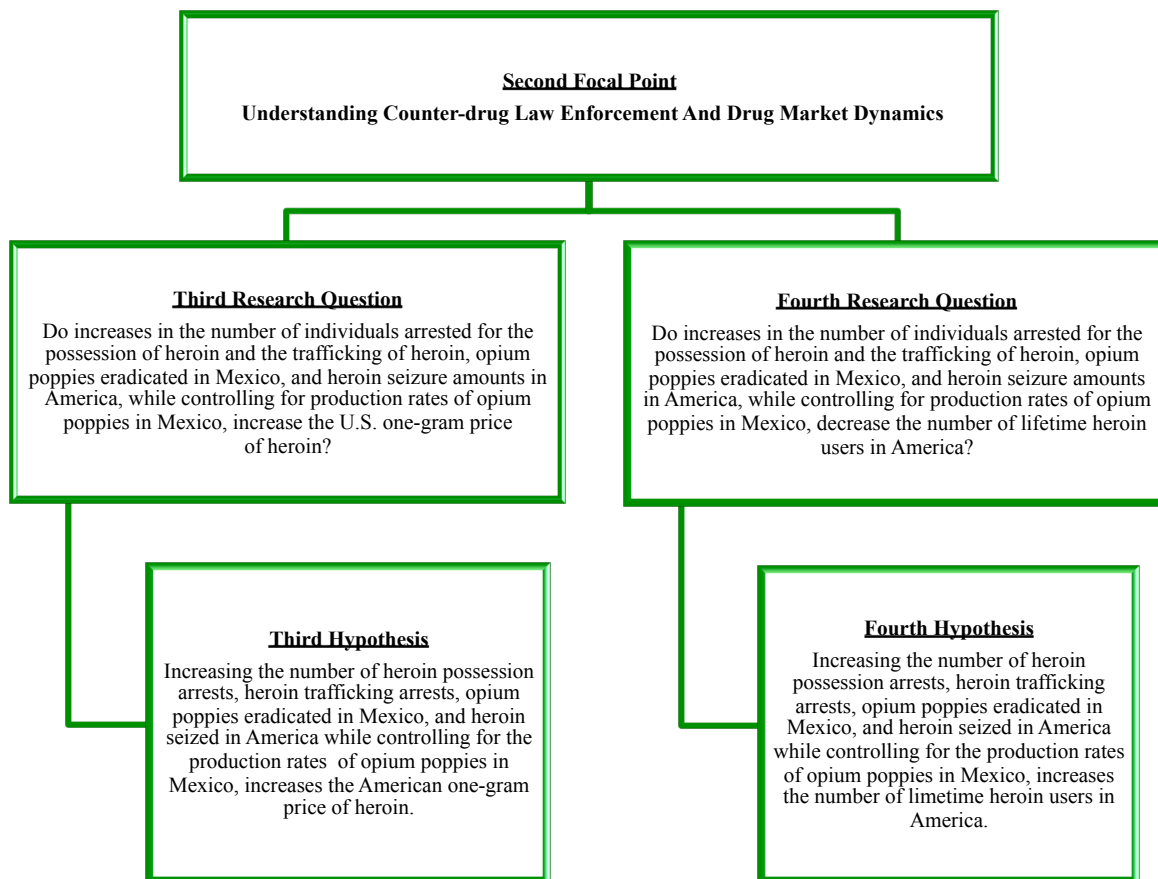


Figure 7: Overview of research questions and hypotheses in the second focal point

Third Focal Point

U.S. counter-drug efforts are fundamentally linked to the overall concept of deterrence. They rely on the premise that individuals will be deterred from offending if the perceived risks of punishment outweigh the perceived rewards of offending (Kleiman et al., 2011). The research

question and hypothesis for this focal point are based upon assessing if drug trafficking organizations operate within the parameters of deterrence and rational choice theories as they respond to standard counter-drug policing initiatives. The research question and hypothesis will be explored using qualitative analysis. The research question for this focal point is:

5. Do drug trafficking organizations operate within the parameters of deterrence and rational choice theories when they respond to standard U.S. counter-drug operations?

The hypothesis for this focal point is:

5. Drug trafficking organizations operate within the parameters set forth in the deterrence and rational choice perspectives as they react to U.S. standard counter-drug law enforcement practices.

The research question and hypothesis for the third focal point are presented in Figure 8. The rationale for the hypothesis is based upon prior empirical evidence showing that drug trafficking organizations function, to a large degree, within the parameters of the deterrence and rational choice perspectives (see e.g. Decker & Chapman, 2008; Toth & Mitchell, 2018; Zimmer, 1990).

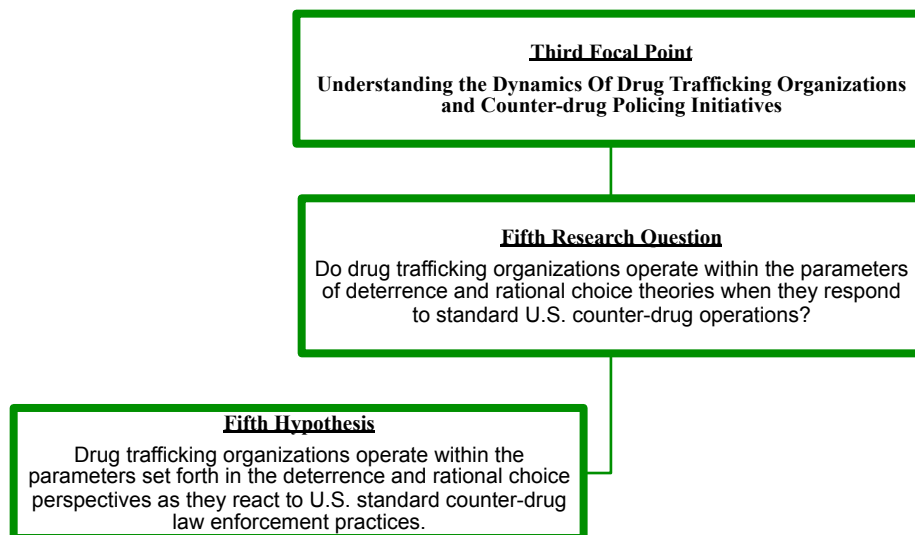


Figure 8: Overview Of research question and hypothesis in the third focal point

Fourth Focal Point

There are numerous studies that have determined illicit drug trafficking to be financially motivated and that retail drug markets are responsive, to varying degrees, to price elasticity of demand and the risks associated with selling illicit substances (Caulkins & Reuter, 2010). The research question and hypotheses in this focal point are based on qualitative data used to assess how drug trafficking organizations establish wholesale prices for heroin and if the method of establishing wholesale prices falls within the confines of the economic price elasticity of demand and deterrence perspectives. The research question for this focal point is:

6. Do drug trafficking organizations operate within the parameters of the rational choice and economic price elasticity of demand perspectives when they establish wholesale prices for heroin?

The hypothesis for this focal point is:

6. Drug trafficking organizations operate within the parameters set forth in the economic price elasticity of demand and rational choice perspectives in establishing heroin prices.

The research question and hypothesis for the third focal point are presented in Figure 9. The rationale for the hypothesis is based upon prior research. As discussed above, several researchers have determined that retail drug market prices are influenced, to varying degrees, by the concepts posited by the economic price elasticity of demand, deterrence, and rational choice perspectives. Therefore, it is logical for these theoretical perspectives to be applicable to how wholesale price determinations are established for heroin (see e.g. Decker & Chapman, 2008; Toth & Mitchell, 2018; Zimmer, 1990).

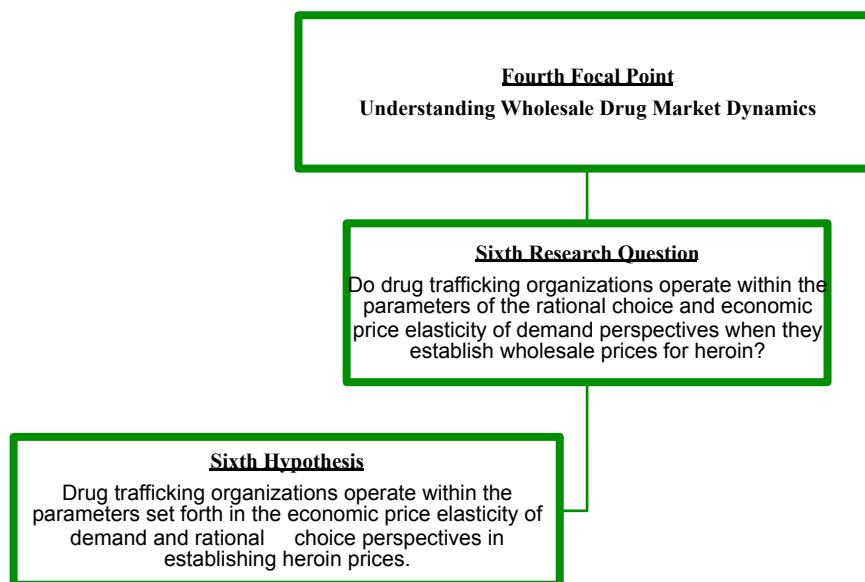


Figure 9: Overview of research question and hypothesis in the fourth focal point

Chapter Summary

This chapter presented empirical reviews of several studies that examined the theoretical constructs of this study. Furthermore, several significant inquiries were set forth that empirically assessed various limited combinations of the variables that are included in the current study. While all of these reviewed studies produced significant findings, the current study expands on each of them. The above empirical review demonstrates that the present study provides unique qualitative and quantitative insights, compared to the extant literature. Additionally, the present study's empirical examination of both retail drug and wholesale drug distribution dynamics has never before simultaneously been examined in the literature. Therefore, the present study will greatly enhance the literature on deterrence, rational choice, and economic price elasticity of demand perspectives in relation to heroin trafficking, heroin pricing, heroin consumption rates, and counter-drug law enforcement operations. Subsequently, the research questions and hypotheses for the four focal points of the study were discussed. The presented hypotheses are based upon the reviewed theoretical perspectives, prior empirical studies, and logic.

CHAPTER FIVE

METHODOLOGY

This chapter provides an overview of the study's methodology. It is divided into three main sections. The first section provides an overview of the quantitative dimensions of the study, which contains a description of the data, a presentation of the overall quantitative analytical plan, and separate reviews of the analytical plans/goals for each applicable focal point. The second section provides an overview of the qualitative dimensions of the study, and it is structured identically to the first section, in that it contains a description of the qualitative data, a description of the overall qualitative analytical plan, followed by the specific analytical plan for each applicable focal point. The third portion of the chapter provides an overview of the mixed methods analytical plan.

Quantitative Overview

Quantitative Data Description

The quantitative data for this study consists of yearly data from 1989 to 2013, and is derived from several different sources. The majority of the data are derived from the *2015 National Drug Control Strategy Data Supplement* (ONDCP, 2016).⁷ In some instances, data for the study were unavailable in the *2015 National Drug Control Strategy Data Supplement*, which required a search for additional sources. Table 2 provides an overview of the concepts that the data measures, descriptions of the data, and the original data sources.

⁷ The National Drug Control Strategy Supplement is an annual report prepared by the ONDCP for the President of the United States. The report utilizes various sources of data to present an overview of the current illegal drug situation in the U.S.

Table 2. Overview of the Quantitative Data

Concept Measured	Data Description	Original Data Source
Average Annual Retail Price of Heroin in the U.S.	Annual U.S. Prices for One-Gram of Heroin from 1989 to 2012 Expressed in 2018 U.S. Dollar Values	DEA's STRIDE System
Annual Estimates of Heroin Use in America	Annual Number of Lifetime Heroin Users in the U.S. from 1989 to 2013	National Survey on Drug Use & Health
Approximate Yearly Production Rates of Opium in Mexico	Annual Number of Opium Poppy Tons Produced in Mexico from 1989 to 2013	U.S. Department of State, Bureau of International Narcotics & Law Enforcement Affairs' <i>International Narcotics Control Strategy Reports</i>
Approximate Number of Individuals Arrested Annually in the U.S. for Possession of Heroin	Annual Number of Cocaine/Heroin Possession Arrests in The U.S. from 1989 to 2013	FBI's Uniform Crime Report
Approximate Number of Individuals Arrested Annually in the U.S. for the Sale of Heroin	Annual Number of Cocaine/Heroin Sale Arrests in the U.S. from 1989 to 2013	FBI's Uniform Crime Report
Approximate Amount of Heroin Seized in America Yearly by Law Enforcement Officials	Annual Number of Heroin Kilograms Seized in the U.S. from 1989 to 2013	National Seizure System
Approximate Amount of Opium Poppy Hectares Destroyed Annually in Mexico by Law Enforcement Officials	Annual Number of Opium Poppy Hectares Eradicated in Mexico from 1990 to 2007; 2010; 2012	U.S. Department of State, Bureau of International Narcotics & Law Enforcement Affairs' <i>International Narcotics Control Strategy Reports</i>
Approximate Amount of Opium Poppy Hectares Destroyed Annually in Mexico by Law Enforcement Officials	Annual Number of Opium Poppy Hectares Eradicated in Mexico from 2008-2009; 2011; 2013	United Nations' (2016) <i>Opium Poppy Eradication Report</i>
Approximate Amount of Opium Poppy Hectares Destroyed Annually in Mexico by Law Enforcement Officials	Number of Opium Poppy Hectares Eradicated in Mexico during 1989	United Nations' <i>2002 Global Illicit Drug Trends Report</i>

The subsequent paragraphs describe the variables measured in the study.

Heroin gram prices

The annual one-gram prices of heroin are derived from DEA's STRIDE System.

The STRIDE System provides laboratory and financial analyses of street-level informant and/or undercover police drug purchases as well as seizures where the DEA participated either directly or indirectly. Consumer prices for heroin and cocaine are generally established in STRIDE by having either an undercover DEA Special Agent(s) or a confidential informant(s) purchase one-gram quantities of the drugs. This occurs once every three months annually across U.S. mid-size to large metropolitan areas. The prices and purities of the drugs are documented quarterly for internal agency review and then a yearly average price and annual average purity level for each drug is made available to the general public. The purpose of these undercover transactions is to monitor consumer prices and purity levels of the illicit substances, and therefore no criminal investigations are initiated against the sellers (U.S. DEA, 2015).

The annual prices for one-gram quantities of heroin are expressed in 2018 dollars and the sample includes the annual one-gram prices of heroin from 1989 to 2013. The one-gram heroin prices from 1989 to 2012 are derived from the *2015 National Drug Control Strategy Data Supplement* (ONDCP, 2016). In contrast, the 2013 one-gram price of heroin is from the *2013 National Level STRIDE Price and Purity Data Report* (U.S. DEA, 2014b).

Number of lifetime heroin users in America

The annual data for the number of U.S. lifetime users of heroin between 1989 and 2013 is from the National Survey on Drug Use and Health. This survey uses reports from substance abuse centers located throughout America to measure the location, scope, and characteristics of drug abuse and alcoholism. The survey is from the *2015 National Drug Control Strategy Data*

Supplement (ONDCP, 2016). A lifetime heroin user is defined as anyone who has knowingly ingested heroin during their life-course. The number of lifetime heroin users in the U.S. is reported in thousands.

Mexican opium production

The yearly data for the number of tons of Mexican opium produced from 1989 to 2013 are from the U.S. Department of State, Bureau of International Narcotics and Law Enforcement Affairs' *International Narcotics Control Strategy Reports*. This report is prepared annually for the U.S. Congress and the information in it is obtained from various American Embassies. The report is from the *2015 National Drug Control Strategy Data Supplement* (ONDCP, 2016). Production rates of Mexican opium are measured in the study because, as was noted earlier, Mexico produces the majority of the heroin consumed in the U.S. (DEA, 2014a; 2017).

Cocaine/heroin possession and sale arrests

The FBI's UCR is the source for the yearly 1989 to 2013 data on the number of local, state, tribal, military, and federal cocaine/heroin possession and sale arrests as reported in the *2015 National Drug Control Strategy Data Supplement* (ONDCP, 2016). The sale of heroin and cocaine includes the offenses of trafficking, selling, and/or manufacturing. The UCR compiles data on cocaine and heroin violations as one therefore it is impossible to differentiate between the two types of drug arrests. Because the purpose of the current study is to assess pricing, consumption rates, and counter-drug law enforcement efforts relative to the ongoing heroin crisis cocaine trafficking is not addressed in the study.

Heroin seizures

The annual heroin seizure data from 1989 to 2013 is recorded in kilograms and is derived from the National Seizure System, (NSS) as reported in the *2015 National Drug Control*

Strategy Data Supplement (ONDCP, 2016). The NSS tabulates yearly information on illicit drugs that are seized in America by participating U.S. state, local, tribal, military, and federal law enforcement agencies.

Mexican opium poppy eradication

As previously noted, heroin is cultivated from opium poppies grown in several regions of the world, and the majority of heroin consumed in the U.S. comes from Mexico (U.S. DEA, 2014a; 2017). For this reason the number of hectares of opium poppy eradicated in Mexico are used in this study. The yearly data for the number of opium poppy hectares eradicated in Mexico from 1990 to 2007, 2010, and 2012 are from the U.S. Department of State, Bureau of International Narcotics and Law Enforcement Affairs' *International Narcotics Control Strategy Reports* as reported in the *2015 National Drug Control Strategy Data Supplement* (ONDCP, 2016). Data for 1989 were not available in this report and were therefore obtained from the United Nations' (2003) *2002 Global Illicit Drug Trends Report*. The data for 2008, 2009, 2011, and 2013 were not available in either of the referenced reports and were therefore extracted from the United Nations' (2016) *Opium Poppy Eradication Report*.

Quantitative Analytical Plan

The first two focal points of the study involve quantitative analyses, specifically the estimation of ordinary least squares (OLS) regressions. OLS regression is appropriate to use in the quantitative portion of the study because each dependent and independent variable in the study is continuous (Allison, 1999; McClendon, 1994). The dependent variables are regressed on the relevant independent variables to test each hypothesis individually. Descriptive statistics for the variables of interest are presented prior to conducting the regression analyses for each focal point in the study. The distributions of the variables of interest are skewed; therefore,

natural logarithmic transformations are performed on the variables, which reduces the skewness and makes the data more interpretable (Allison, 1999).

Quantitative Analytical Plans/Goals for the Focal Points

First focal point

The quantitative analytical plan for the first focal point includes two separate OLS regressions, which separately test the first two hypotheses in the study:

1. A decrease in the number of opium poppy tons produced in Mexico and an increase in the number of U.S. heroin users increases the one-gram price of the drug in the U.S.
2. A decrease in the number of opium poppy tons produced in Mexico and an increase in the U.S. one-gram price of heroin reduces the number of American consumers of the drug.

An overview of the goals for the analytical plan of the first focal point in the study is depicted in Figure 10.

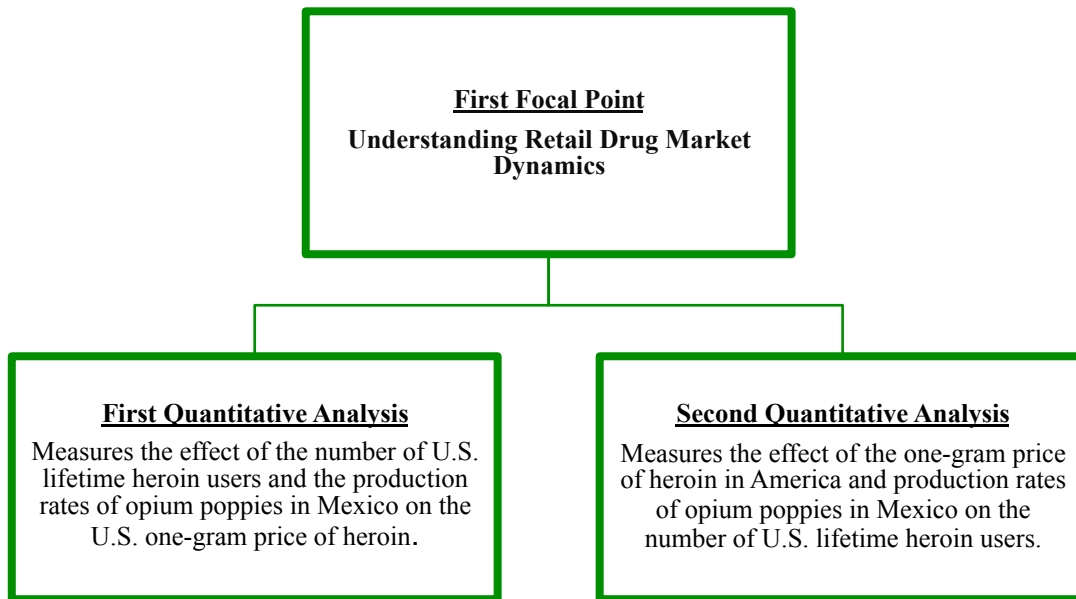


Figure 10. Overview of analytical goals for the first focal point

The first OLS regression analysis in this focal point tests the first hypothesis. The

independent variables in this OLS regression analysis are the annual number of opium poppy tons produced in Mexico from 1989 to 2013 (n=25), and the annual number of U.S. lifetime heroin users from 1989 to 2013 (n=25). The dependent variable is the annual average U.S. price of one-gram of heroin from 1989 to 2013 (n=25).

The second OLS regression analysis in this focal point tests the second hypothesis. The independent variables in this OLS regression analysis are the annual number of opium poppy tons produced in Mexico from 1989 to 2013 (n=25), and the annual average U.S. price of one-gram of heroin from 1989 to 2013 (n=25). The dependent variable is the annual number of U.S. lifetime heroin users from 1989 to 2013 (n=25).

Second focal point

The quantitative analytical plan for the second focal point involves two separate OLS regressions, which separately test the third and fourth hypotheses in the study:

3. Increasing the number of heroin possession arrests, heroin sale arrests, opium poppies eradicated in Mexico, and heroin seized in the U.S. while controlling for the production rates Mexican opium poppies in Mexico, increases the American one-gram price of heroin.
4. Increasing the number of heroin possession arrests, heroin trafficking arrests, opium poppies eradicated in Mexico, and heroin seized in the U.S. while controlling for the production rates of opium poppies in Mexico, decreases the number of lifetime heroin users in the U.S.

The analytical plan for assessing the third hypothesis also involves qualitative data analysis and mixed methods analysis, which will be discussed later in this chapter. An overview of the goals for the analytical plan of the second focal point in the study is depicted in Figure 11.

The first OLS regression analysis in this focal point tests the third hypothesis. The

independent variables are the annual number of U.S. arrests for possession of heroin/cocaine from 1989 to 2013 (n=25), the annual number of U.S. arrests for the sale of heroin/cocaine from

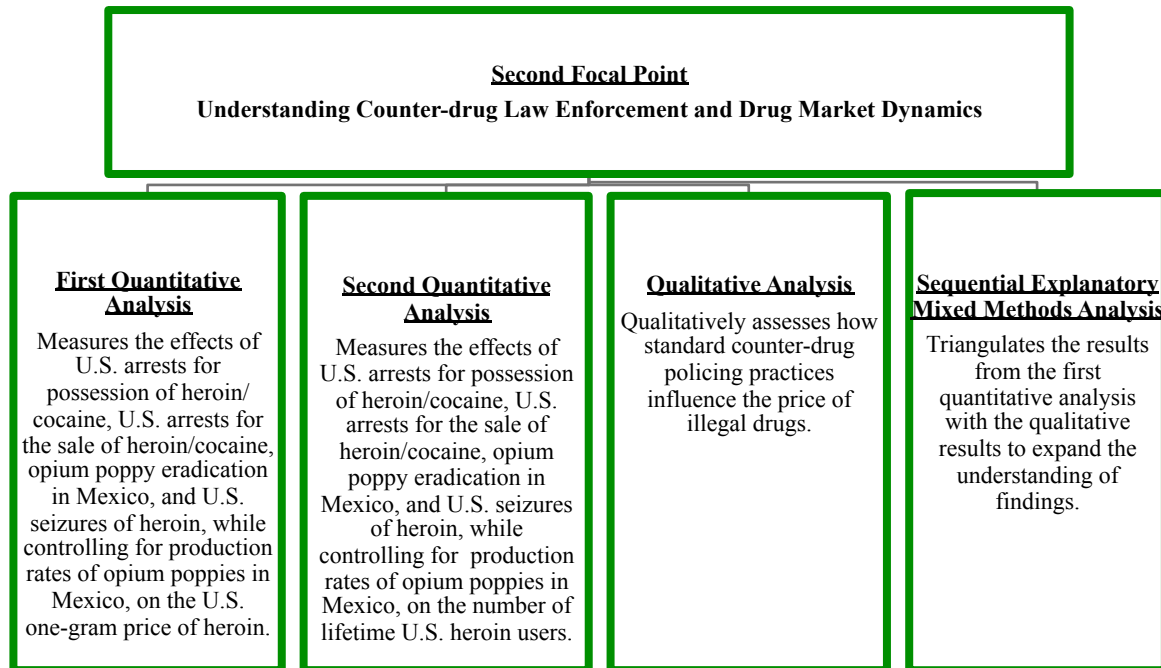


Figure 11. Overview of analytical goals for the second focal point

1989 to 2013 (n=25), the annual number opium poppy hectares eradicated in Mexico from 1989 to 2013 (n=25), and the annual number of kilograms of heroin seized in America from 1989 to 2013 (n=25). The dependent variable is the annual price of one-gram of heroin in the U.S. from 1989 to 2013 (n=25). The control variable is the annual number of opium poppy tons produced in Mexico from 1989 to 2013 (n=25).

The second OLS regression in this focal point tests the fourth hypothesis. The independent variables are the annual number of U.S. arrests for possession of heroin/cocaine from 1989 to 2013 (n=25), the annual number of U.S. arrests for the sale of heroin/cocaine from 1989 to 2013 (n=25), the annual number opium poppy hectares eradicated in Mexico from 1989 to 2013 (n=25), and the annual number of kilograms of heroin seized in America from 1989 to 2013

(n=25). The dependent variable is the annual number of lifetime heroin users in in the U.S. from 1989 to 2013 (n=25). The control variable is the annual number of opium poppy tons produced in Mexico from 1989 to 2013 (n=25).

Qualitative Overview

The qualitative overview first provides a description of the data. Next, it sets forth the analytical method for assessing the qualitative data. Lastly, it reviews the analytical goals for the focal points that require qualitative data analyses.

Qualitative Data

The qualitative data in the study are from a DEA non-classified technical report known as *Operation Drill Bit* (Toth, 2006). The data for this study consists of interviews of 23 high-level DEA confidential informants and sources of information that had intimate knowledge of how drug trafficking organizations operate. At the time of this report, all of the confidential informants and sources of information were covertly embedded in various drug trafficking organizations. Two of the individuals were interviewed together and their responses were documented as one, and therefore 22 responses are noted in the data. A confidential informant is a documented DEA informant who undergoes a background investigation and signs a letter of agreement to provide information to the U.S. government. A source of information is an individual who is not subjected to a thorough background check by the DEA and provides information to the U.S. government sporadically (Toth, 2006). The confidential informants were physically located throughout South America, Central America, Mexico, and the U.S. Appendix “A” contains a description of the respondents, and Table 3 contains a summary of their key characteristics.

Table 3. Key Characteristics of The Confidential Informants (n= 22)¹

Characteristics	Frequency (f)	Percentage (%)
Interview location		
Colombia	9	39%
Mexico	5	22%
United States	9	39%
Primary countries/regions of operations ²		
Colombia	16	70%
Mexico	6	26%
United States	4	17%
Central America	2	9%
South America ³	1	4%
Caribbean	1	4%

¹The total number of confidential informants is 23 because two of them were interviewed together.

² Responses may fit more than one category.

³Peru, Bolivia, and Brazil

As previously discussed, interviews in *Operation Drill Bit* relied on a standardized set of 85 open-ended questions that addressed a variety of topics, including how money laundering by drug trafficking organizations, responses to police anti-drug operations, how trafficking organizations established drug prices, and police corruption in Latin American countries. The set of 85 open-ended standardized questions used in *Operation Drill Bit* can be found in Appendix “B”. Two DEA Special Agents administered the set of standardized questions in the native languages of the respondents. Using two Special Agents helped establish “confirmability” or objectivity in the data gathering process, which Lincoln and Guba (1985) note is critical in any qualitative study.

The Special Agents also engaged in member checking with the confidential informants to ensure that they accurately recorded their responses. Lincoln and Guba (1985) note that member checking entails informally and formally verifying that the recorded information documented by the researchers (in this instance, the DEA Special Agents) is considered to be accurate by the respondents (in this study the confidential informants). They further assert that member checking is the most important tool a researcher can use in a qualitative study to establish

“credibility” or internal validity. Nine questions were identified as being relevant from the questions reviewed in *Operation Drill Bit* for the various inquiries in the present study. These questions are as follows:

1. “What is the impact of law enforcement on arrests and seizures of drugs, money, and precursors?”
2. “What has the most significant impact on production and production costs?”
3. “How does eradication impact production?”
4. “How are price and purity determined?”
5. “When an organization is aware of a planned law enforcement operation, what is typically done (stockpile, new route, etc.)?”
6. “What are some issues related to stockpiling and how do they affect the business?”
7. “What methods and routes of transportation are utilized?”
8. “What is the effect of law enforcement efforts on selected transportation routes/methods (alternate routes preplanned, temporary stop of transportation, etc.)?”
9. “How is intelligence used to counter law enforcement efforts?”

Qualitative Analytical Plan

The overall qualitative analytical plan entails assessing the responses from relevant questions posed to the respondents in *Operation Drill Bit* in order to test the hypotheses in the study. The qualitative analysis involves two steps. The first step entails assessing the responses from the confidential informants and placing them into non-mutually exclusive response categories. The second step in the analytical model involves calculating the frequency and percentage of each response.

The analysis of the qualitative in this study is structured in a manner that promotes

“dependability”. Lincoln and Guba (1985) use the term “dependability” as a synonym for the quantitative analytical term of “reliability”. One method of achieving “dependability” is for two researchers to separately verify the responses, code the responses, and analyze the responses. However, when it is not possible to follow this protocol, another option is to have one researcher analyze the data over time on separate occasions to determine if the findings are similar. This method of determining “dependability” is known as the “code-recode” method (Anney, 2014). Since this dissertation is a “solo” project, this methodology is used to analyze the qualitative data. Specifically, the responses of the confidential informants are reviewed and coded over three separate occasions to promote “reliability” in the study.

Once coding responses are established and the responses recorded, the findings are broken down into percentages that are based upon the sample of 22 interviews. Responses that occur in less than 33% of the questions are considered “uncommon”; responses that occur in 33% to 66.9% of the questions are labeled as “common”; and, responses to the questions that occur 67% or more are considered to be “very common”. This analytical plan is modeled after the one utilized by Toth and Mitchell (2018), which examined different questions and responses from the data in *Operation Drill Bit*.

Qualitative Analytical Plans/Goals for The Focal Points

The second, third, and fourth focal points of the study involve qualitative data analyses. Each focal point’s qualitative analytical plan is set forth in the following paragraphs. Furthermore, the qualitative data analytical results in the second focal point are used in the mixed methods analysis that is presented later in the chapter.

Second focal point.

Qualitative data is used to expand on the quantitative data analysis in the first OLS regression

model in the second focal point. Specifically, after pertinent questions and responses are identified in the qualitative data, the above qualitative analysis plan is used to expand upon the quantitative findings of the first OLS regression analysis in the second focal point. This is accomplished by providing qualitative data analyses of the overall and separate geographical regions where the confidential informants were operating. The qualitative data are not structured in a manner that will allow for separate analyses with respect to specific drug types.⁸ An overview of the second focal point's qualitative analytical goals is depicted in Figure 11.

Third focal point

The noted qualitative analysis plan is used to test the following hypothesis:

5. Drug trafficking organizations operate within the parameters set forth in the deterrence and rational choice perspectives as they react to U.S. standard counter-drug law enforcement practices.

An overview of the goal of the analytical plan for the third focal point in the study is depicted in Figure 12.

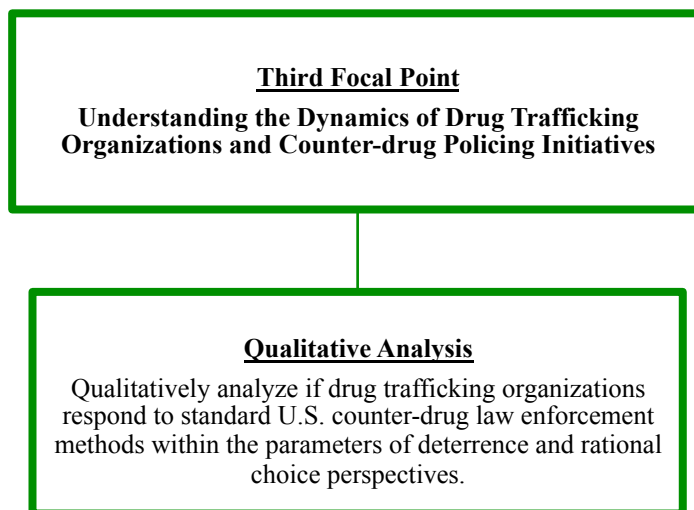


Figure 12. Overview of analytical goal for the third focal point

⁸ The confidential informants all worked for poly-drug trafficking organizations. Therefore, they generally did not differentiate between heroin, cocaine, or marijuana trafficking practices.

Fourth focal point

The noted qualitative analysis plan is used to test the following hypothesis:

6. Drug trafficking organizations operate within the parameters set forth in the economic price elasticity of demand and rational choice perspectives in establishing heroin prices.

An overview of the goal of the analytical plan for the fourth focal point in the study is depicted in Figure 13.

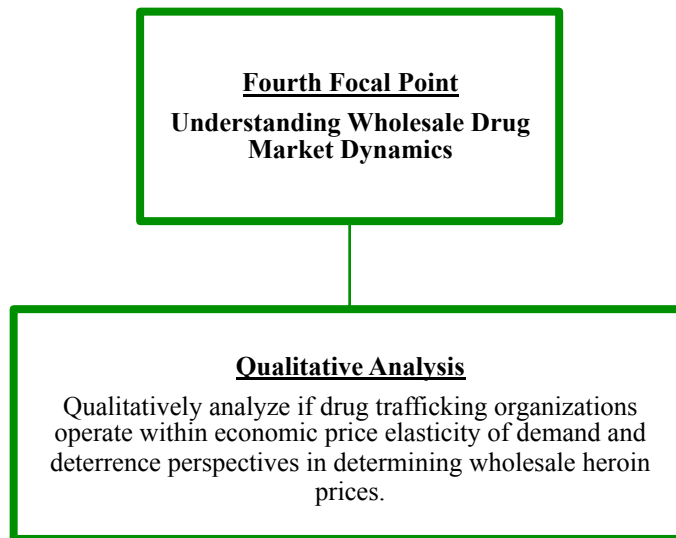


Figure 13. Overview of analytical goal for the fourth focal point

Overview of Mixed Methods Analytical Plan

An explanatory sequential mixed method design is utilized to further assess the second focal point in the study. Creswell and Plano Clark (2007) note that this type of mixed methods approach entails analyzing qualitative and quantitative data separately and then merging the results of the two analyses together to create a comprehensive analysis or discussion. A mixed methods “positive/supportive (+), “negative/non-supportive” (-), or “neutral/inconclusive” (±) coding determination as to whether the qualitative findings are supportive of the quantitative findings is created. The mixed methods findings provide a comprehensive assessment of the third hypothesis in the study:

3. Increasing the number of heroin possession arrests, heroin trafficking arrests, opium poppies eradicated in Mexico, and heroin seized in the U.S. while controlling for the production rates of opium poppies in Mexico, increases the American one-gram price of heroin.

Figure 14 depicts the explanatory sequential mixed methods analytical plan in the study.

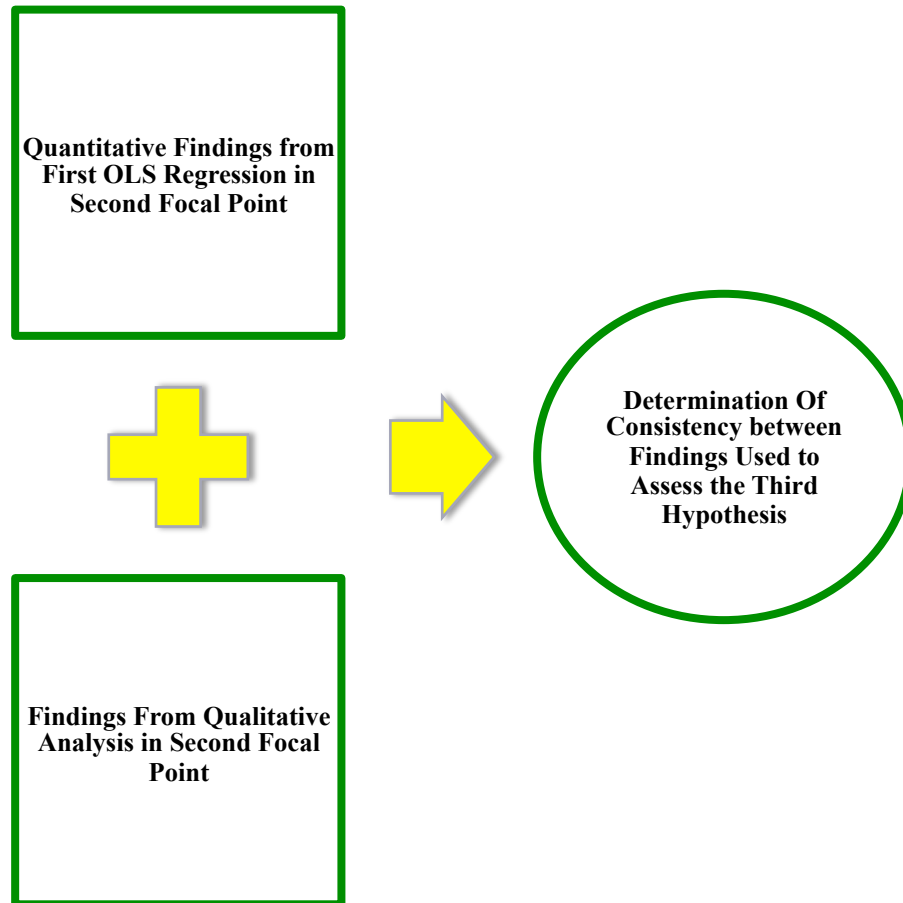


Figure 14. Explanatory sequential mixed methods analytical plan

Chapter Summary

A review of the study's overall methodology has been presented in this chapter. Descriptions of study's quantitative and qualitative data have been set forth. Additionally, the analytical models and goals of the study have been presented within the context of each of the four focal points of the study.

CHAPTER SIX

RESULTS

This chapter presents the findings of the quantitative, qualitative, and mixed methods analyses. Results are presented within the context of each of the four focal points of the study. The statistical results are used to provide assessments of the six hypotheses that frame each of the focal points of this multi-dimensional study.

First Focal Point Analytical Results

The overall purpose of the analyses in the first focal point is to test the first two hypotheses of the study, which provide an understanding of retail heroin market dynamics in the U.S. The results in this focal point first provide descriptive findings of the quantitative variables, which are applicable to all of the quantitative analyses in the study. Furthermore, the two OLS regressions in this focal point assess the first two hypotheses of the study.

Descriptive Results of Quantitative Variables

Table 4 contains the descriptive data on the quantitative variables in the study. The descriptive statistics present some interesting findings about heroin prices, heroin consumption rates, and counter-drug law enforcement practices. For example, the mean price of a gram of heroin, expressed in 2018 U.S. dollar amounts, in the United States is \$827.16 (SD= 366.84). Figure 15 provides an overview of the annual U.S. one-gram price of heroin from 1989 to 2013. This figure demonstrates that the highest price for a gram of heroin was in 1990 (\$1745.00), and that it maintained an overall downward price trajectory up until 2012 (\$509.00). In 2013, the price of a gram of heroin in America had risen substantially to \$774.00.

Table 4. Quantitative Descriptive Statistics

<i>Variables</i>	<i>M</i>	<i>SD</i>	<i>Minimum</i>	<i>Maximum</i>
One-gram heroin price*	827.16	366.8409	509	1745
Lifetime heroin users**	3039.16	990.3438	1112	4812
Heroin seizures***	2180.52	1107.607	687	4976
Opium eradicated****	14336.64	4044.177	4650	20034
Heroin/cocaine poss. arrests	358692.6	58186.03	246171	472510
Heroin/cocaine sale arrests	164123.4	48830.95	90063	260085
Opium produced*****	118.6	107.505	21	425

*2018 U.S. dollar value; **Thousands; ***Kilograms; ****Hectares; *****Tons

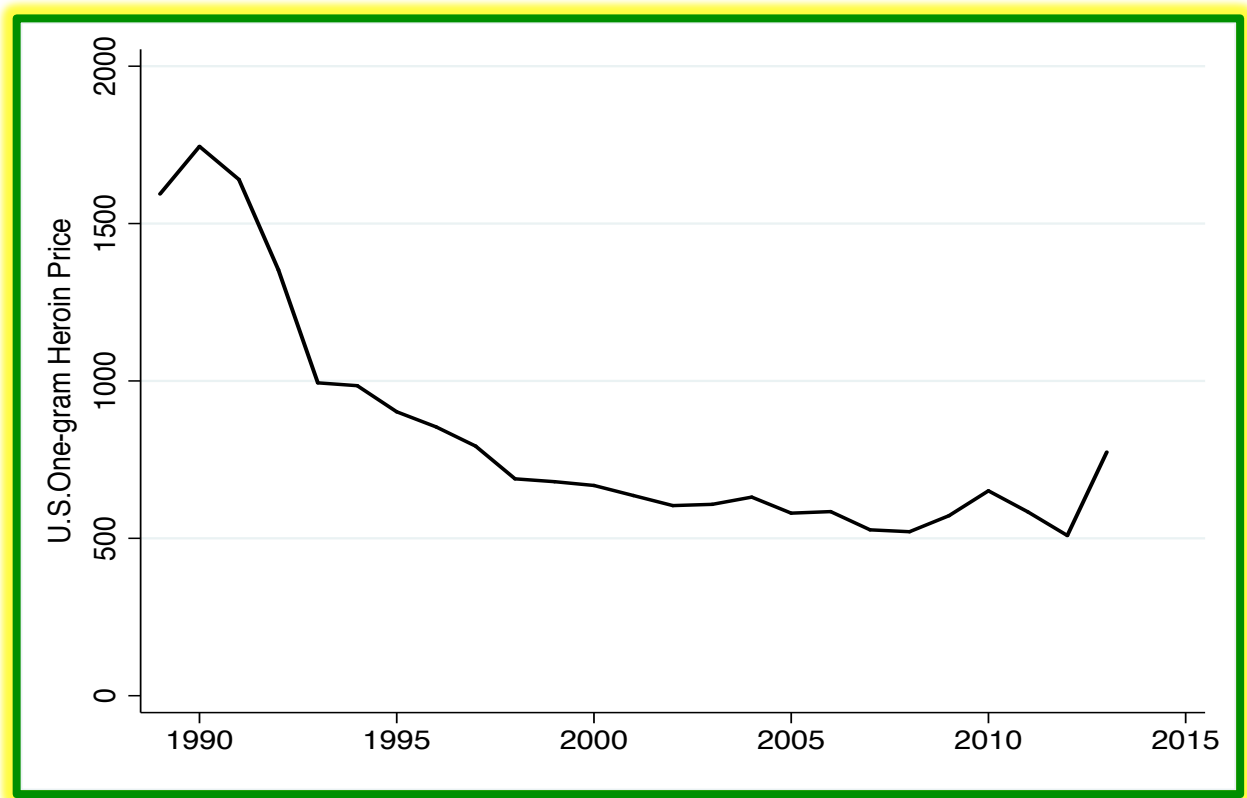


Figure 15. Annual one-gram heroin price in America expressed in U.S. 2018 dollar values from 1989 to 2013

The mean value of lifetime heroin users in America is 3039.16 (SD= 990.34). The range of lifetime heroin users has varied from a low of 1112 to a high of 4812. Figure 16 provides a

comparison between the annual number of lifetime heroin users in the U.S. and the average one-gram price of heroin in America from 1989 to 2013. This figure demonstrates that lifetime heroin use generally increased in the U.S. from 1989 to 2013 with the exception of a few minor annual downward trends. The descriptive results suggest an inverse correlation between the two variables, in that a decrease in the price of one gram of heroin leads to an increase in the number of lifetime heroin users.

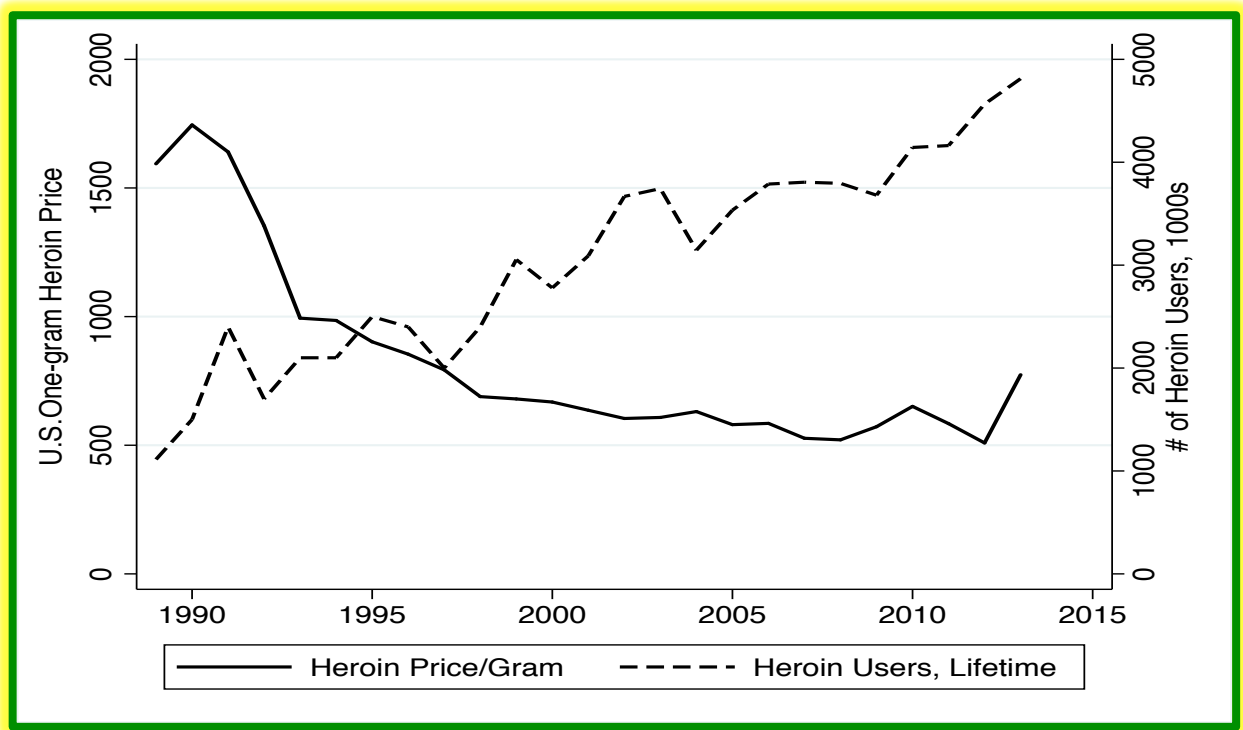


Figure 16. Comparison between the U.S. average one-gram price of heroin and the number of lifetime heroin users in America from 1989 to 2013

The mean value of heroin seizures in the U.S. is 2180.52 (SD= 1107.60). Figure 17 provides a comparison between the annual number of kilograms of heroin seized in America and the average one-gram price of heroin in the U.S. from 1989 to 2013. This figure demonstrates that the number of kilograms of heroin seized in the U.S. from 1989 to 2013 generally increased yearly, with the exception of a few minor annual downward trends. The upward trend of heroin

seizures seems to indicate a negative correlation with the one-gram price of heroin, and a positive correlation with the number of lifetime heroin users in the U.S. Specifically, as heroin seizures increased, the one-gram price of heroin decreased, and as heroin seizures increased the number of lifetime heroin users increased (see Figure 18).

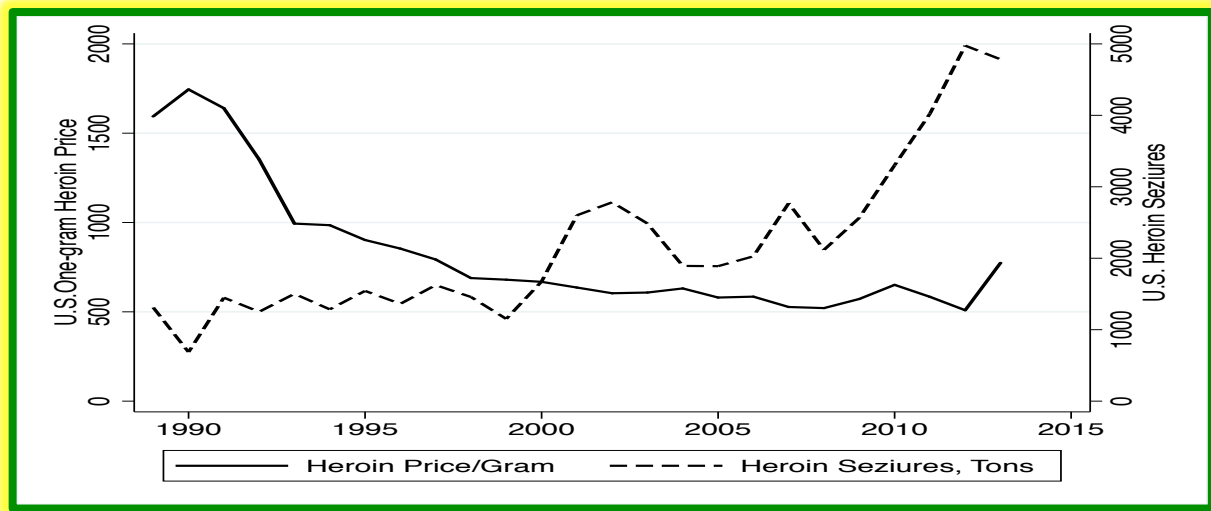


Figure 17. Comparison between the U.S. average one-gram price of heroin and the number of heroin seizures in America from 1989 to 2013

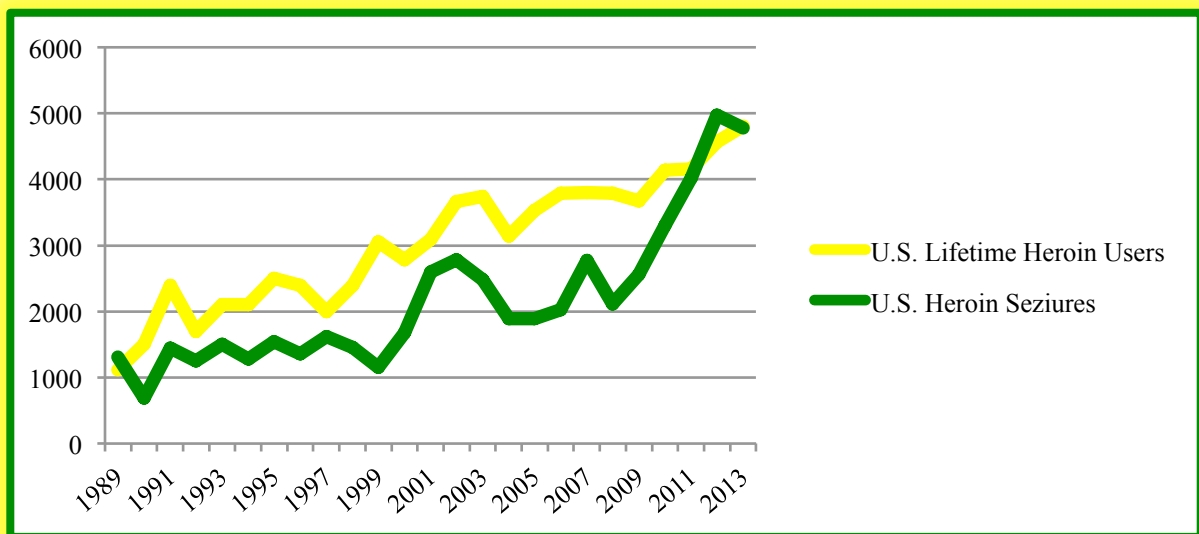


Figure 18. Comparison between the number of heroin users and the number of kilograms of heroin seized in America from 1989 to 2013

The mean value of opium poppy hectares eradicated in Mexico is 14336.64 (SD=4044.17).

Figure 19 provides an illustration of the annual number of opium poppy hectares eradicated in Mexico and the average one-gram price of heroin in America from 1989 to 2013. This figure demonstrates that the number of opium poppy hectares eradicated in Mexico fluctuated annually from 1989 to 2013. The variation in the annual number of opium poppy hectares eradicated in Mexico seems to have no correlation with the downward trajectory of the one-gram price of heroin in the U.S.

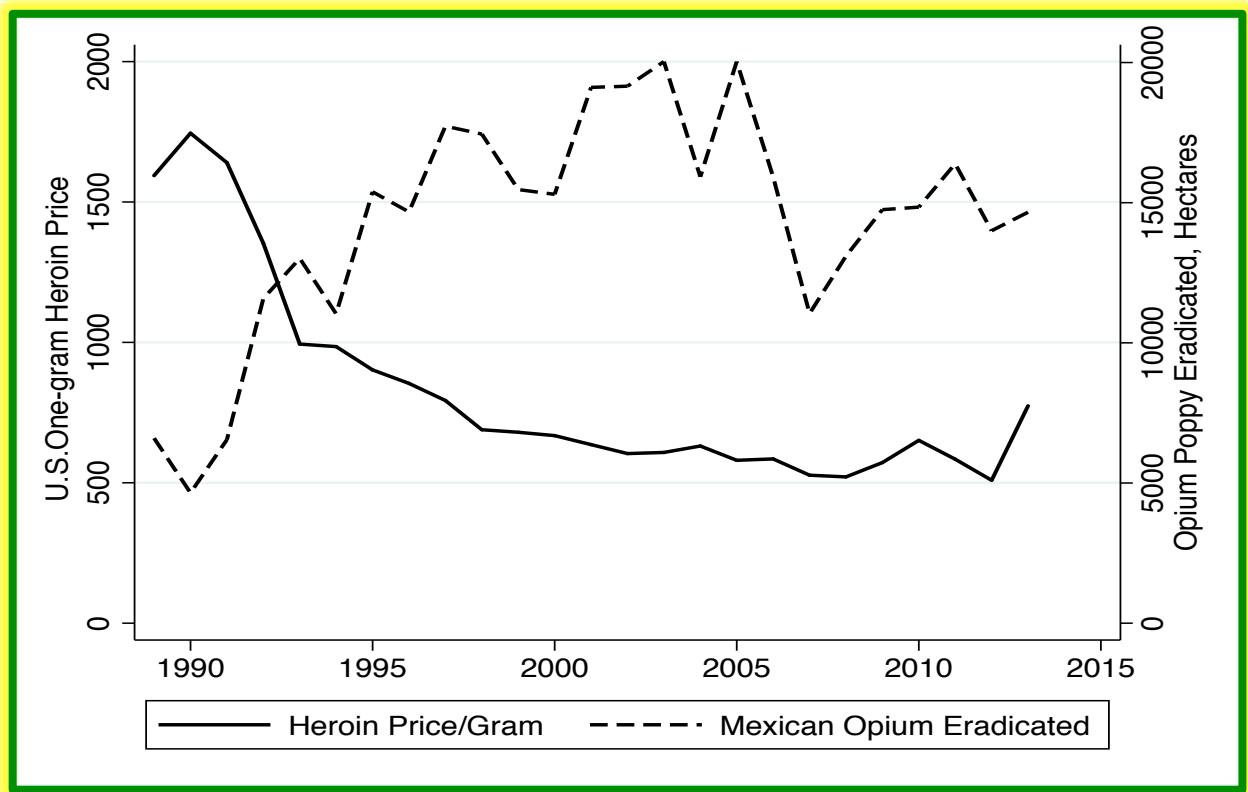


Figure 19. Comparison between the U.S. average one-gram price of heroin and the number of opium poppy hectares eradicated in Mexico from 1989 to 2013

The mean value of heroin/cocaine possession arrests in the U.S. is 358692.6 (SD= 58186.03).

Figure 20 provides a comparison between the annual number of individuals arrested in the U.S. for possessing heroin/cocaine and the average one-gram price of heroin in the U.S. from 1989 to

2013. The highest number of possession arrests occurred in 1989 (472510), and the number of apprehensions varied slightly every year up until 2006. From 2006 to 2013 the number of annual arrests for possession of heroin/cocaine decreased yearly. Furthermore, the number of heroin/cocaine possession arrests in 2013 (246171) is nearly half the number of heroin/cocaine possession arrests in 1989 (472510). It is difficult to determine a definitive statistical conclusion between the number of arrests for the possession of heroin/cocaine and the one-gram price of heroin. However, the variation in the number of possession arrests does not seem to have an obvious correlation with the downward trend in the one-gram price of heroin.

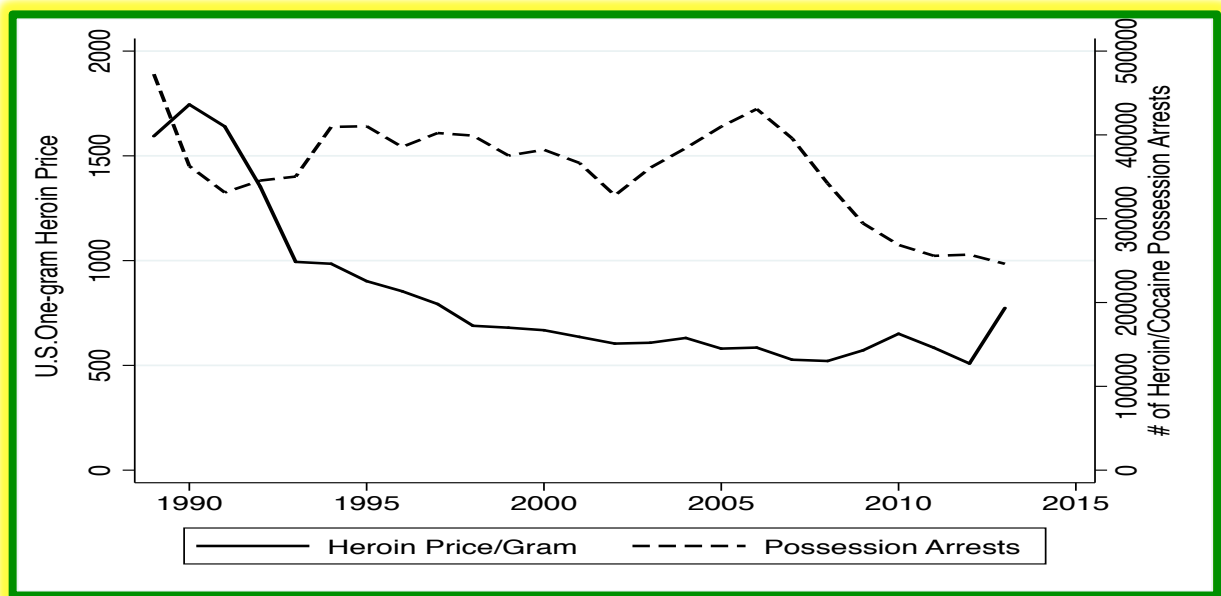


Figure 20. Comparison between the U.S. average one-gram price of heroin and the number of individuals arrested in America for possession of heroin/cocaine from 1989 to 2013

The mean value of heroin/cocaine sale arrests in the U.S. is 164123.4 (SD= 48830.95).

Figure 21 provides a comparison between the annual number of individuals arrested in America for selling heroin/cocaine and the one-gram price of heroin in the U.S. from 1989 to 2013. This figure demonstrates that the number of arrests for selling heroin/cocaine in the U.S. declined substantially from 1989 (260085) to 2013 (90063). Additionally, heroin/cocaine sale arrests

steadily decreased from 2006 (151184) to 2013 (90063). It is difficult to determine whether a significant correlation exists between the number of arrests for the sale of heroin/cocaine and the one-gram price of heroin. However, the variation in the number of sale arrests does not seem to have an obvious effect on the downward trend in the one-gram price of heroin.

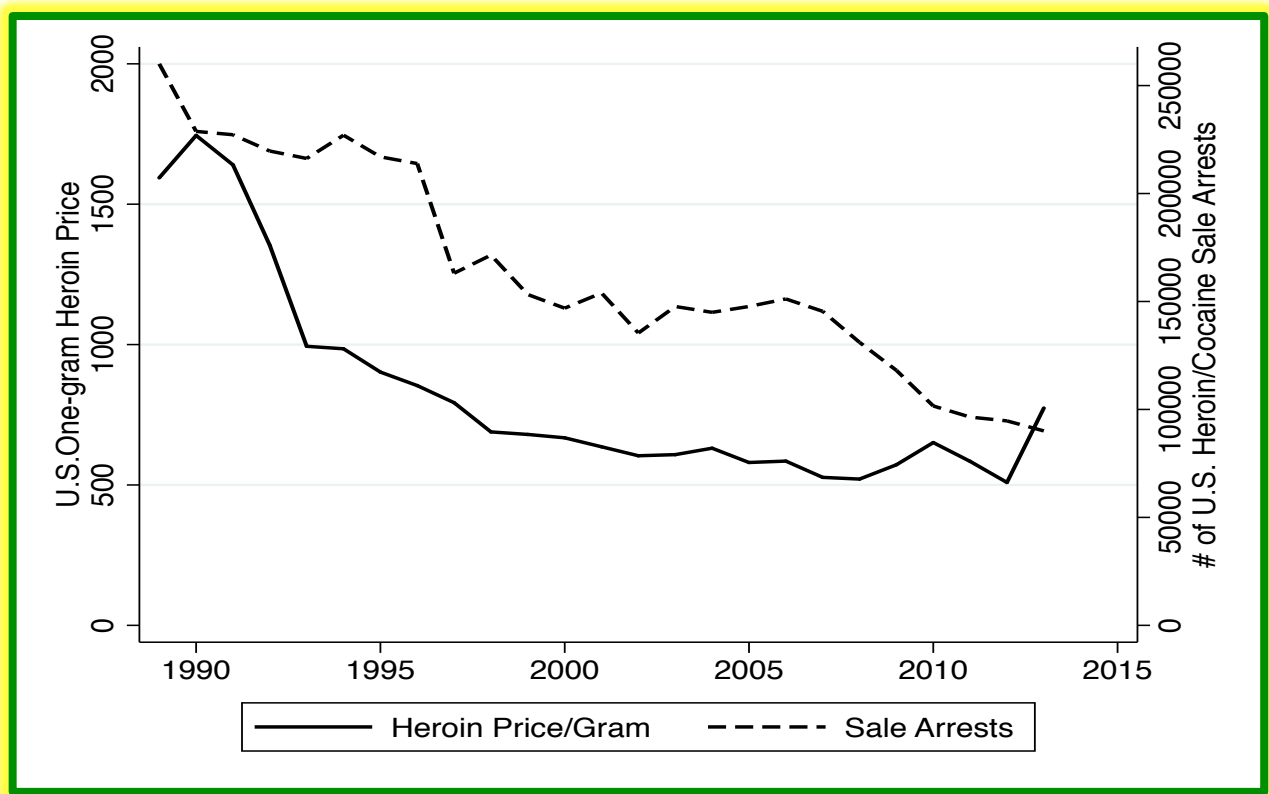


Figure 21. Comparison between the U.S. average one-gram price of heroin and the number of individuals arrested in America for the sale of heroin/cocaine from 1989 to 2013

Figure 22 provides a comparison between the number of heroin/cocaine possession arrests and the number of heroin/cocaine sale arrests. Overall law enforcement arrested more individuals annually for the possession of heroin/cocaine than for the sale of heroin/cocaine. In 2013, the number of possession arrests for heroin/cocaine in the U.S. (246171) more than doubles the number of individuals arrested in America for the sale of heroin/cocaine (90063).

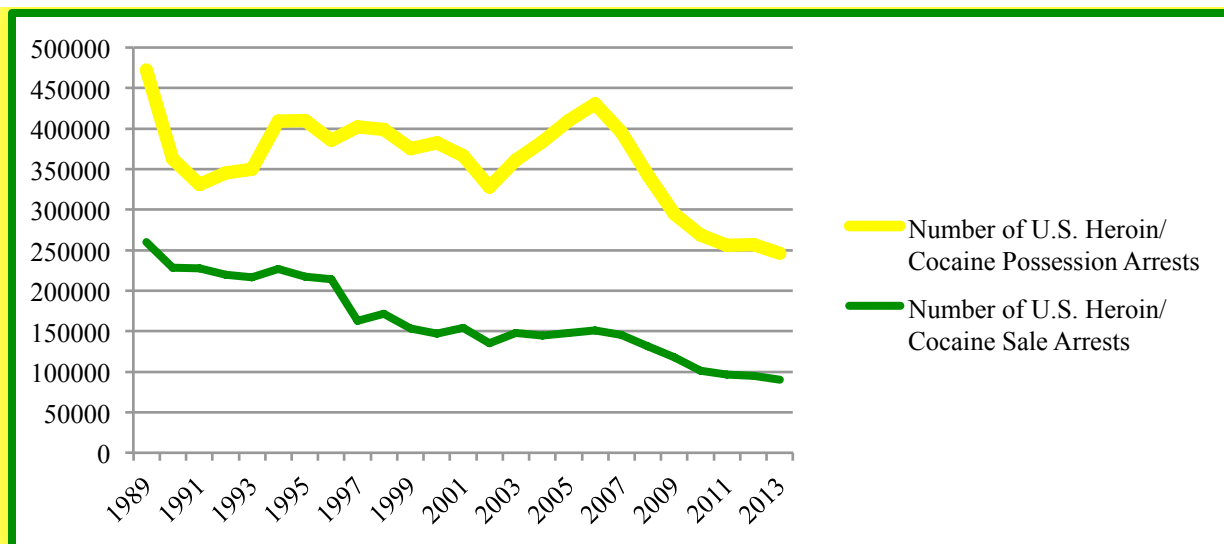


Figure 22. Comparison between the number of heroin/cocaine possession and sale arrests in the U.S. from 1989 to 2013

The mean value of opium tons produced in Mexico is 118.6 (SD= 107.50). Figure 23 provides a comparison between the annual number of opium tons produced in Mexico and the average one-gram price of heroin in America from 1989 to 2013. The number of tons of opium produced in Mexico remained at or below 100 from 1989 to 2005 when it began an upward trend. The highest number of opium tons produced in Mexico was in 2009, when 425 tons were produced. The number of tons of opium produced in Mexico experienced a downward trend from 2009 (425) to 2013 (219). There is no clear correlation between the annual number of opium tons produced in Mexico and the one-gram price of heroin in America. However, it is interesting to note that the difference between the production rates of opium in Mexico and the one-gram price of heroin in the U.S. has appeared to diminish overtime with an increase in the difference between the two occurring in 2013.

The descriptive analyses of the quantitative variables demonstrate that none of the variables in the study are evenly distributed. To reduce the various degrees of skewness in the distribution of the variables, natural logarithmic transformations were performed on them prior to running the

various OLS regressions in the study. The natural logarithmic transformations reduce the skewness and make the data more interpretable in the various OLS regression analyses (Allison, 1999).

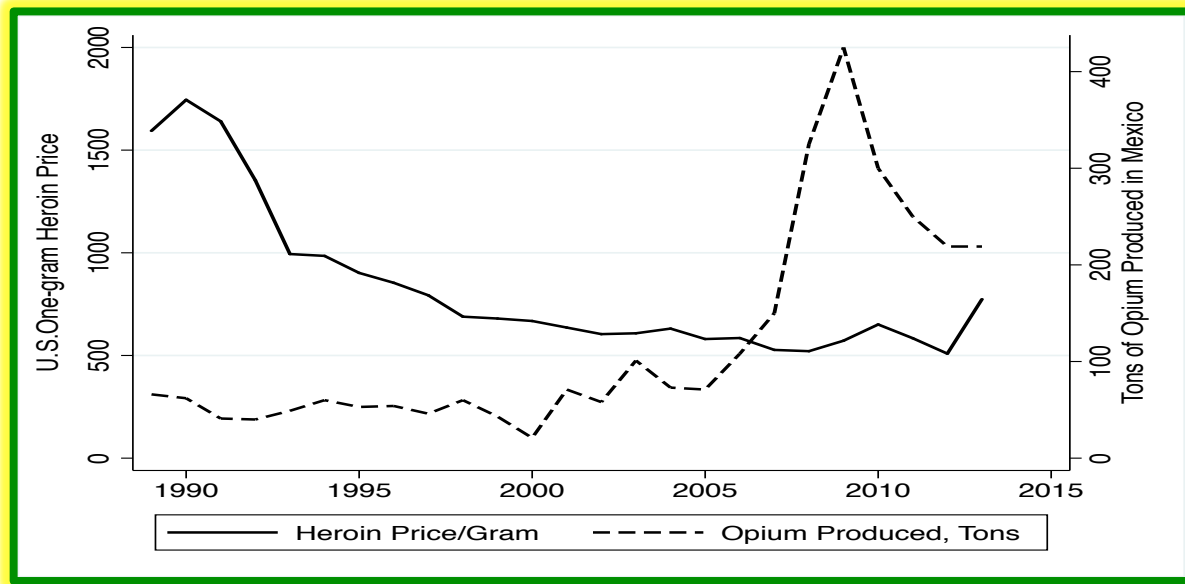


Figure 23. Comparison between the average one-gram price of heroin in America and the annual number of opium tons produced in Mexico from 1989 to 2013

Regression Results

VIF Results

Multicollinearity was assessed for each of the OLS regressions in the various focal points via an examination of the variance inflation factors (VIF). These analyses revealed that no single variable exceeded a VIF of 6.91 in any of the focal points’ OLS regression models.

Furthermore, none of the OLS regression models exceeded a mean VIF of 3.96. Therefore, multicollinearity was not a concern for the OLS regression analyses (O’Brien, 2007).

First regression model results

The results of the OLS regression analysis of annual U.S. one-gram prices of heroin, using measures of yearly U.S. lifetime users and production rates of Mexican opium poppies as predictors, are reported in Table 5.

Table 5. Predicting Heroin Prices: Model 1 OLS Regression Results

<i>Variables</i>	<i>Coef.</i>	<i>SE</i>	<i>t</i>	<i>Beta</i>
Life-time heroin users	-.880****	.148	-5.95	-.877
Opium produced	.025	.070	0.36	.053
Constant	13.461****	1.010	13.32	.

*Adj. R*²= .712
 Prob. > *F*= .0000
F (2, 22)= 27.28
 p*< .05; ** *p*< .01; **p*< .001; **** *p*< .0001

As seen in Table 5, there is a statistically significant and negative relationship between the annual number of lifetime heroin users in the U.S. ($b = -.880$, $SE = .148$, $Beta = -.877$, $p < .0001$) and the yearly one-gram price of heroin in America. The number of opium poppy tons produced annually in Mexico was not related to the price of heroin. This finding suggests that increases in the number of heroin users in America significantly predict decreases in the street-level price of the drug.

Second regression model results

The results of the OLS regression analysis of annual U.S. lifetime heroin, using measures of yearly one-gram prices of heroin in America and annual production rates of opium poppies in Mexico as predictors, are reported in Table 6.

It is evident from the results in Table 6 that there is a statistically significant and negative relationship between the annual one-gram price of heroin in America ($b = -.701$, $SE = .118$, $Beta = -.704$, $p < .0001$) and the annual number of lifetime heroin users in the U.S. Furthermore, there is a statistically significant and positive relationship between the annual number of opium tons produced in Mexico ($b = .132$, $SE = .056$, $Beta = .279$, $p < .05$) and the yearly number of lifetime heroin users in the U.S. These findings indicate that price increases of heroin in the U.S.

are associated lead to decreases in the number of U.S. heroin users, and that opium production increases in Mexico are lead to increases in the number of American heroin users.

Table 6. Predicting Heroin Users: Model 1 OLS Regression Results

<i>Variables</i>	<i>Coef.</i>	<i>SE</i>	<i>t</i>	<i>Beta</i>
One-gram heroin price	-.701****	.118	-5.95	-.704
Opium produced	.132*	.056	2.36	.279
Constant	11.975****	.925	12.95	.

*Adj. R*²= .769

Prob. > *F*= .0000

F (2, 22)= 36.69

p*< .05; *p*< .01; ****p*< .001; *****p*< .0001

Second Focal Point Analytical Results

The overall purpose of the analyses in the second focal point is to test the third and fourth hypotheses of the study in order to provide an understanding of the relationship between counter-drug law enforcement and drug markets. The results in this focal point include the statistical findings of the third and fourth OLS regressions in the study. Furthermore, sensitivity analyses results are noted for the regression analyses in the first and second focal points. Additionally, qualitative analytical results provide expanded assessments of the third hypothesis. The qualitative results include overall and geographically specific results. The qualitative data, as was noted earlier, do not allow for specific drug type results because the organizations in which the informants worked were poly-drug distribution enterprises. Therefore, the responses from the confidential informants often alluded to both heroin and cocaine. Lastly, the sequential explanatory mixed methods results are presented to provide a complete assessment of the third hypothesis.

Regression Results

First set of regression results

The results of the OLS regression model of annual one-gram prices of heroin on measures of yearly U.S. heroin/cocaine possession arrests, annual U.S. heroin/cocaine sale arrests, yearly opium poppy eradication in Mexico, and annual U.S. seizures of heroin, while controlling for yearly production rates of opium poppies in Mexico are reported in Table 7.

The results in Table 7 reveal that there is a statistically significant and negative relationship between the yearly number of heroin/cocaine possession arrests in the U.S. ($b = -1.005$, $SE = .272$, $Beta = -.468$, $p < .01$) and the annual one-gram price of heroin in America. Additionally, there is a statistically significant and positive relationship between the number of annual heroin/cocaine sale arrests in America ($b = .884$, $SE = .233$, $Beta = .729$, $p < .0001$) and the yearly one-gram price of heroin in the U.S. Furthermore, there is a significant negative relationship between the annual numbers of opium poppies eradicated in Mexico ($b = -.447$, $SE = .113$, $Beta = -.436$, $p < .01$) and the annual one-gram price of heroin in the U.S. The annual number of kilograms of heroin seized in the U.S. is not significantly related to heroin prices in the U.S. These findings indicate that an increase in the number of heroin/cocaine possession arrests in the U.S. leads to a decline in the one-gram price of heroin in America, and so does an increase in the amount of opium poppies eradicated in Mexico. Conversely, an increase in the number of heroin/cocaine sale arrests in the U.S. leads to an increase in the one-gram price of heroin in the country.

Table 7. Predicting Heroin Prices: Model 2 OLS Regression Results

<i>Variables</i>	<i>Coef.</i>	<i>SE</i>	<i>t</i>	<i>Beta</i>
Heroin/cocaine poss. arrests	-1.005**	.272	-3.69	-.468
Heroin/cocaine sale arrests	.884****	.233	3.79	.729
Opium eradicated	-.447**	.113	-3.95	-.436
Heroin seizures	.001	.128	0.01	.002
Opium produced	-.105	.057	-1.85	-.220
Constant**	13.543	4.016	3.37	.

*Adj. R*²= .898
 Prob. > *F*= 0.0000
F (5,19)= 33.62

p*< .05; *p*< .01; ****p*< .001; *****p*< .0001

Second regression results

The results of the OLS regression model of the annual number of lifetime heroin users in America on measures of yearly U.S. heroin/cocaine possession arrests, annual U.S. heroin/cocaine sale arrests, yearly opium poppy eradication in Mexico, and annual U.S. seizures of heroin, while controlling for yearly production rates of opium poppies in Mexico are reported in Table 8.

The results in Table 8 reveal that there is a significant negative relationship between the annual number of heroin/cocaine sale arrests in the U.S. ($b = -.705$, $SE = .358$, $Beta = -.584$, $p < .05$) and the yearly number of lifetime heroin users in America. As the number of heroin/cocaine sale arrests increases, the number of lifetime U.S. heroin users decreases. The other variables in the model were not significantly related to lifetime U.S. heroin users.

Table 8. Predicting Heroin Users: Model 2 OLS Regression Results

<i>Variables</i>	<i>Coef.</i>	<i>SE</i>	<i>t</i>	<i>Beta</i>
Heroin/cocaine poss. arrests	.092	.359	0.26	.043
Heroin/cocaine sale arrests	-.705*	.307	-2.30	-.584
Opium eradicated	-.209	.149	1.40	.204
Heroin seizures	.142	.169	0.84	.182
Mexican opium produced	.043	.075	0.58	.091
Constant*	11.966	5.284	2.26	.

*Adj. R*² = .822
 Prob. > *F* = 0.0000
F (5,19) = 17.65

p* < .05; *p* < .01; ****p* < .001; *****p* < .0001

Sensitivity Analyses

Law and Kelton (1991) note that sensitivity analysis is a statistical methodology of altering input values into a statistical model to provide further validation of previous findings.

Sensitivity analyses were initially performed on the OLS regressions in the first two focal points by lagging the independent variables in the models. Multicollinearity was assessed for each of the lagged OLS regressions via VIF analyses. These analyses demonstrate that no single variable exceeds a VIF of 5.98 in the lagged OLS regression models. Furthermore, none of the lagged OLS regressions exceed a mean VIF of 3.54. Therefore, multicollinearity is not a concern (O'Brien, 2007).

In these lagged sensitivity regressions analyses, each dependent variable of interest was regressed on the values of the independent variables from the previous year. This promoted temporal order and provided verification of the results in the various OLS regressions performed in the first and second focal points. These lagged sensitivity analyses mirror the findings of the OLS regression models in the first two focal points.

Subsequent sensitivity analyses were conducted on the two OLS regression models in the

second focal point by substituting the annual number of heroin/cocaine possession and sale arrests from 1989 to 2013 with corresponding independent variables of annual per 100,000 heroin/cocaine possession and sale arrest rates in the U.S. population. The data for the U.S. population were derived from historical U.S. Census Bureau (2019) archives. To obtain the yearly heroin/cocaine possession and arrest rates the annual number of U.S. heroin/cocaine possession and sale arrests for each year from 1989 to 2013 was divided by the total U.S. population for each corresponding year. Next, the quotient was multiplied by 100,000 for the annual per 100,000 heroin/cocaine possession and sale arrest rates in the U.S. population. This process is noted in the following formula:

$$\frac{\text{Annual number of U.S. heroin/cocaine possession or sale arrests}}{\text{Yearly U.S. Population}} \times 100,000 = \text{per 100,000 annual arrest rate}$$

Multicollinearity was assessed for each of these sensitivity OLS regressions via VIF analyses. These analyses demonstrated that no single variable exceeded a VIF of 9.13. Furthermore, neither of the OLS regressions exceeded a mean VIF of 4.88. Therefore, multicollinearity was not a concern (O'Brien, 2007). These sensitivity analyses were consistent with the significant findings in the two OLS regression models of the second focal point. Appendix "C" is comprised of Tables A1 to A6, which contain the findings of the sensitivity analyses conducted on focal points one and two.

Qualitative Results

Descriptive analysis of the confidential informants

The key characteristics of the confidential informants who were interviewed in *Operation Drill Bit* were described earlier in Table 3. As mentioned previously, the geographical areas where they operated were as follows (in numbers and percentages): Colombia (16/73%), Mexico (6/27%), the U.S. (4/18%), Central America (2/9%), South America (Peru, Bolivia, and Brazil)

(1/5%), and the Caribbean (1/5%). Table 9 contains the areas of knowledge, relevant to the current study, that the confidential informants provided in *Operation Drill Bit*. Nearly all of the confidential informants (95%) had knowledge of trafficking/transportation methods and all of them had organizational dynamics knowledge (100%). Additionally, 45% of the confidential

Table 9. Confidential Informants' Areas of Knowledge ($N = 22$)¹

Area of knowledge ²	Frequency (f)	Percentage (%)
Trafficking/transportation methods	21	95%
Organizational dynamics	22	100%
Production methods	10	45%
Wholesale drug pricing protocols	11	50%

¹The total number of confidential informants is 22, because two informants were interviewed together.

² Responses may fit more than one category.

informants had information on production methods of heroin and cocaine, and 50% had knowledge of illicit wholesale drug pricing protocols. Taken together, the confidential informants had a broad range of knowledge in relation to the variables of interest in the study.

Qualitative analytical assessment results

A review of the standardized open-ended questions contained in the semi-structured interviews conducted as part of *Operation Drill Bit* identified two questions that pertained to how standard counter-drug policing practices influence the price of illegal drugs. The two relevant questions are:

1. "What is the impact of law enforcement on arrests and seizures of drugs, money, and precursors?"
2. "How does eradication impact production?"

The categorical responses, frequencies, and percentages for how arrests influence the prices of illegal drugs across all of the geographical areas where the confidential informants were operating in conjunction with geographical specific frequencies and percentages for Mexico and

Colombia are depicted in Table 10.⁹ The overall results in the table demonstrate that the only category cited commonly (59%) was “no effect”, in relation to the impact of arrests on illicit drug prices. As can be seen, the geographical regional result for Mexico is “very common”

Table 10. Results of Arrest Effect on Illegal Drug Prices

Response Category	Overall Frequency (f) ¹	Mexico ²	Colombia ³
Retail drug price increase	0 (0%)*	0 (0%)*	0 (0%)*
Wholesale drug price increase	0 (0%)*	0 (0%)*	0 (0%)*
Retail drug price decrease	0 (0%)*	0 (0%)*	0 (0%)*
Wholesale drug price decrease	0 (0%)*	0 (0%)*	0 (0%)*
No price effect	13 (59%)**	6 (100%***)	10 (67%***)
No knowledge on this issue	9 (41%)**	0 (0%)*	5 (33%)**

¹The total number of interviews is 22 because two informants were interviewed together.

²The total number of interviews is 6.

³The total number of interviews is 15 because two informants were interviewed together.

*uncommon response < 33%; **common response 33% to 66.9%; ***very common response > 66.9%

for arrests having “no effect” (100%), and for Colombia the result is “very common” for arrests having “no effect” (67%) on the prices of illicit drugs.

The responses in this category are illustrated by these quotes:

CS #1: “Arresting individuals really has no significant impact on Central American drug trafficking organizations. When one cell of an organization is arrested or dismantled, another cell simply moves in and fills the void, which happens on a routine basis.”

CS #16: “If someone is arrested the only thing that happens is people dump phones, emails, and change meeting locations. There is nothing else that happens when someone is picked up.”

CS #19: “The arrest of drug traffickers in Mexico does not hurt organizational operations or impact prices.”

CS #22: “The only possible impact on the price would be if the head of an organization was

⁹ Individual geographic responses are not noted in any of the qualitative analytical tables for the U.S., Central America, South America (Peru, Bolivia, and Brazil), and the Caribbean because of the small number of operational confidential informants in these locations.

arrested and a new person set a different price, which never happens.”

The categorical responses, frequencies, and percentages for the influence of drug seizures on the prices of illegal drugs across all of the geographical areas where the confidential informants were operational in conjunction with geographical specific frequencies and percentages for Mexico and Colombia are depicted in Table 11. The table indicates that the only category mentioned “very commonly” (77%) in the overall results was “no effect”. As shown, the geographical regional findings for Mexico and Colombia are similar to the overall findings.

Table 11. Results of Drug Seizure Effect on Illegal Drug Prices

Response Category	Overall Frequency (f) ¹	Mexico ²	Colombia ³
Retail drug price increase	0 (0%)*	0 (0%)*	0 (0%)*
Wholesale drug price increase	0 (0%)*	0 (0%)*	0 (0%)*
Retail drug price decrease	0 (0%)*	0 (0%)*	0 (0%)*
Wholesale drug price decrease	0 (0%)*	0 (0%)*	0 (0%)*
No price effect	17 (77%)***	5 (83%)***	10 (67%)***
No knowledge on this issue	5 (23%)*	1 (17%)*	5 (33%)*

¹The total number of interviews is 22 because two informants were interviewed together.

²The total number of interviews is 6.

³The total number of interviews is 15 because two informants were interviewed together.

*uncommon response < 33%; **common response 33% to 66.9%; ***very common response > 66.9%

The responses in this category are illustrated by these quotes:

CS #4: “When drugs are seized the person who is in possession or responsible for the shipment must make up for the loss. This is done by supplying the person with more product so they can pay back the bosses.”

CS #8: “If a load is seized whoever lost the load has to pay for it. This could mean that the organization takes the person’s house, cars, money, and anything of value to make up for the loss. There is no change in the overall pricing of cocaine or heroin.”

CS #17: “Nothing happens to the price of coke or heroin when a load or money is seized, the

organization just works harder by shipping more to make it up.”

CS #18: “Some Mexican organizations stop operations for a while when a seizure happens while others just keep shipping more heroin. The loss of product does nothing to prices because the overall organization always has more.”

The categorical responses, frequencies, and percentages for the influence of eradication on the prices of illegal drugs across all of the geographical areas where the confidential informants were operational in conjunction with geographical specific frequencies and percentages for Mexico and Colombia are depicted in Table 12. The results in the table indicate that the only “common” (55%) response in the overall results was “no effect”. No categories in the overall were found to contain “very common” responses. Interestingly, two confidential sources (9%) in the overall results noted that eradication increases the prices of illicit drugs, which the quantitative results in the first regression do not support. Evidently, the regional findings for eradication effects in Colombia and Mexico are similar to the overall findings.

Table 12. Results of Eradication Effect on Illegal Drug Prices

Response Category ¹	Overall Frequency (f) ²	Mexico ³	Colombia ⁴
Retail drug price increase	0 (0%)*	0 (0%)*	0 (0%)*
Wholesale drug price increase	2 (9%)*	1 (17%)*	1 (6%)*
Retail drug price decrease	0 (0%)*	0 (0%)*	0 (0%)*
Wholesale drug price decrease	0 (0%)*	0 (0%)*	0 (0%)*
No price effect	12 (55%)**	5 (83%***)	11 (73%***)
No knowledge on this issue	8 (36%)**	0 (0%)*	3 (20%)*

¹ Responses may fit more than one category.

² The total number of interviews is 22 because two informants were interviewed together.

³ The total number of interviews is 6.

⁴ The total number of interviews is 15 because two informants were interviewed together.

*uncommon response < 33%; **common response 33% to 66.9%; ***very common response > 66.9%

The responses in this category are illustrated by these quotes:

CS #2: “Eradication in Sierra Madre, Mexico has impacted the prices of wholesale product.”

CS #7: “Eradication has no effect on the price of coke, heroin, or marijuana at the wholesale or retail levels.”

CS #8: “Eradication has no impact on the production levels of Colombian drug trafficking organizations.”

CS #12: “Eradication is not effective. There are various harvest seasons and grows are separated from each other. If a grow is eradicated traffickers simply harvest the grows from another location.”

Mixed Methods Results

The results from the sequential explanatory mixed methods analysis are presented in Table 13.

Table 13. Sequential Explanatory Mixed Methods Results

	Quantitative Results	Qualitative Results	Mixed Methods Determination
Heroin/cocaine poss. arrests**	+	-	±
Heroin/cocaine sale arrests****	+	-	±
Opium eradicated**	+	-	±
Heroin seizures	-	-	+

* $p < .05$; ** $p < .01$; *** $p < .001$; **** $p < .0001$

(+)= positive/supportive; (-)= negative/non-supportive; (±)= neutral/inconclusive

A statistically significant and negative relationship between the number of annual heroin/cocaine possession arrests in America ($b = -1.005$, $SE = .272$, $Beta = -.468$, $p < .01$) and the yearly U.S. one-gram heroin price was found (see Table 6), which indicates that a quantitative relationship is present (+) between heroin/cocaine possession arrests and the price of one-gram of heroin. The qualitative findings, however, are negative/non-supportive (-) of this result, and

thus a mixed methods determination regarding whether heroin/cocaine possession arrests lower the one-gram price of heroin in the U.S. is neutral/inconclusive (\pm). Additionally, a significant positive relationship between the number of annual heroin/cocaine sale arrests in the U.S. ($b = .884$, $SE = .233$, $Beta = .729$, $p < .0001$) and the yearly one-gram heroin price in America was found in the OLS regression results (see Table 7), which indicates that a quantitative relationship is present (+) between heroin/cocaine sale arrests and the price of one-gram of heroin. Conversely, the qualitative results were negative/non-supportive ($-$) of this finding; therefore, a mixed methods determination regarding whether heroin/cocaine sale arrests increases the cost of one-gram of heroin in the U.S. is neutral/inconclusive (\pm).

The OLS regression analytical results in Table 7 showed significant negative relationship between yearly amounts of opium eradicated in Mexico ($b = -.447$, $SE = .113$, $Beta = -.436$, $p < .01$) and the annual one-gram price of heroin in the U.S. This finding indicates that a quantitative relationship is present (+) between opium poppy eradication in Mexico and the price of one gram of heroin. However, the qualitative findings are negative/non-supportive ($-$) of this statistically significant result; therefore, a mixed methods determination regarding whether opium poppy eradication in Mexico lowers the one-gram price of heroin in the U.S. is neutral/inconclusive (\pm). The disparities between the quantitative and qualitative findings regarding the effects of heroin possession arrests, apprehensions for the sale of heroin, and opium eradication on the one-gram price of heroin may be attributed to the viewpoint of the confidential informants. In particular, the confidential informants' observations regarding the impact of arrests and eradication are most likely related to wholesale prices of illicit drugs, whereas the quantitative results are assessing the relationship between arrests, eradication, and retail prices of heroin.

Lastly, the OLS regression results in Table 7 showed no significant relationship between the annual amount of heroin seized in America and the yearly one-gram price of heroin in the U.S. This finding indicates that a quantitative relationship is not present (–) between heroin seizures in the U.S. and the one-gram price of heroin in the U.S. The qualitative results also indicate that heroin seizures do not (–) have an impact on heroin prices, and therefore the mixed methods determination is positive (+). Specifically, both the quantitative and qualitative results indicate that heroin seizures do not influence the price of heroin.

Third Focal Point Analytical Results

The overall purpose of the analysis in the third focal point is to provide an understanding of the dynamics of drug trafficking organizations and counter-drug policing initiatives and to test the fifth hypothesis of the study. The findings include overall and geographic regional specific results for Mexico and Colombia.

Qualitative Results

A review of the standardized open-ended questions contained in the semi-structured interviews conducted as part of *Operation Drill Bit* identified six questions that pertain to whether drug trafficking organizations operate within the parameters of deterrence and rational choice theories as they respond to standard U.S. policing operations. The six relevant questions are:

1. “What is the impact of law enforcement on arrests and seizures of drugs, money, and precursors?”
2. “What are some issues related to stockpiling and how do they affect the business?”
3. “What methods and routes of transportation are utilized?”
4. “What is the effect of law enforcement efforts on selected transportation

routes/methods (alternate routes preplanned, temporary stop of transportation, etc.)?”

5. “How is intelligence used to counter law enforcement efforts?”

6. “When an organization is aware of a planned law enforcement operation, what is typically done (stockpile, new routes, etc.)?”

Table 14 presents the categorical responses, frequencies, and percentages of whether drug trafficking organizations respond to standard counter-drug policing programs within the parameters of deterrence and rational choice perspectives across all of the geographical areas where the confidential informants were operational, in conjunction with geographical specific frequencies and percentages for Mexico and Colombia. The results in the table reveal two “very common” responses (“calculate risks and rewards”= 100%; “adjustments to perceived risks”= 77%) and one “common” response (temporary/partial deterrence= 50%). These findings suggest that drug trafficking organizations respond within the confines of deterrence and rational choice perspectives as they react to standard American counter-drug operational tactics. Not surprisingly, none of the confidential informants indicated that law enforcement operations have a permanent deterrent effect on drug trafficking organizations. As seen in the table, the geographical regional analytical results for Mexico and Colombia are similar to the overall findings.

The responses relative to calculating perceived risks and rewards are illustrated by these quotes:

CS #3: “A seizure of 100 kilograms does nothing. What it does is teach organizations the techniques that law enforcement are using so they can go around them.”

CS #4: “In New York people are used as lookouts for police cars or other suspicious cars. Tags are written down and if a car keeps showing up operations are stopped.”

CS #6: “If an organization feels that there is a threat of a law enforcement operation about to happen, the first thing that they do is to move their families to safe places. Next, they make sure that the workers are moved to safe locations away from the operational area. They also move any product that is about to ship to storage areas until the threat of the operation is over.”

CS #14: “When there is a law enforcement presence or operation Colombian and Mexican organizations sometimes distrust any member who they think may have compromised the load. They then split the load up into smaller loads and do not tell the person who they don’t trust.”

Table 14. Responses To Law Enforcement Operations

Response Category ¹	Overall Frequency (f) ²	Mexico ³	Colombia ⁴
Calculate perceived risks and rewards	22 (100%)*	6 (100%)*	15 (100%)*
Adjustments to perceived risks	17 (77%)*	5 (83%)*	13 (67%)*
Temporary/partial deterrence	11 (50%)*	3 (50%)*	11 (73%)*
Permanent deterrence	0 (0%)*	0 (0%)*	0 (0%)*

¹ Responses may fit more than one category.

² The total number of interviews is 22 because two informants were interviewed together.

³ The total number of interviews is 6.

⁴ The total number of interviews is 15 because two informants were interviewed together.

*uncommon response < 33%; **common response 33% to 66.9%; ***very common response > 66.9%

The responses that depict drug trafficking organizations make adjustments to perceived risks are illustrated by these quotes:

CS #2: “U.S. law enforcement operations make organizations on the American side of the border think about new ways to safely move product.”

CS #15: “Colombian organizations use fishing vessels as look-outs for law enforcement. If it is suspected that there is a U.S. patrol near-by an alternate route is used. If a chase happens then the load is dumped and the look-out boats go back later to try and recover it.”

CS #18: “Mexican organizations use alternate routes at sea, which are determined by the location of the U.S. Coast Guard.”

CS #22: “Mexican organizations always have pre-planned alternate smuggling routes in case there is a law enforcement operation going on. Also, they typically know about operations in advance because of corrupt Mexican police, and they change as needed.”

The responses regarding the fact that police counter-drug operations led to temporary or partial deterrence are illustrated by these quotes:

CS #7: “Colombian organizations temporarily stop smuggling efforts until law enforcement activity stops targeting their operation.”

CS # 13: “Product is buried underground at ranches or farms until a law enforcement operation ends.”

CS #16: “Local Colombian and Mexican law enforcement officers are paid for information about upcoming operations. Organizations change dates and times of loads to avoid them.”

CS #21: “ Mexican organizations bury the drugs until the law enforcement operation ends. They usually know about operations before they occur because of corrupt Mexican law enforcement.”

Fourth Focal Point Analytical Results

The overall purpose of the analysis in the fourth focal point is to provide an understanding of wholesale drug market dynamics and to test the sixth hypothesis. The findings include overall results and geographically specific results for Mexico and Colombia.

Qualitative Results

A review of the standardized open-ended questions contained in the semi-structured interviews conducted as part of *Operation Drill Bit* identified four questions that addressed the dynamics of international wholesale drug markets. Specifically, they provide insights into whether drug trafficking organizations operate within the parameters of the economic price

elasticity of demand and rational choice theories as they establish international wholesale drug prices. The four relevant questions are:

1. “What has the most significant impact on production and production costs?”
2. “How are price and purity determined?”
3. “What is the effect of law enforcement efforts on selected transportation routes/methods?”
4. “What are some issues related to stockpiling and how do they affect business?”

The categorical responses, frequencies, and percentages of whether drug trafficking organizations operate within the parameters of the economic price elasticity of demand and rational choice theories as they establish international wholesale drug prices across all of the geographical areas where the confidential informants operated, in conjunction with geographical specific frequencies and percentages for Mexico and Colombia, are depicted in Table 15. The results in the table reveal that only one “common” response (“supply on hand”= 32%) in the Colombia results section suggests that drug trafficking organizations respond within the parameters of the economic price elasticity of demand as they set wholesale prices for illicit drugs. However, 50% (11) of the confidential informants overall, 50% (3) of the confidential informants in the Mexico geographical region, and 53% (8) of the confidential informants in the Colombia region did not have any knowledge of wholesale pricing dynamics. These percentages of confidential informants who did not have any knowledge of international wholesale drug pricing protocols was greater than any other topic analyzed in the study.

Because the percentage of confidential informants with no information on international wholesale drug protocols was so high, a revised analysis was conducted in which confidential informants with no knowledge of international wholesale drug pricing protocols were removed

from the sample. The revised overall and geographical regional results, as depicted in Table 16, reveal that all of the overall categorical responses support the premise that drug trafficking organizations operate within the parameters of the economic price elasticity of demand perspective (“supply on hand”= 63%; “demand for product”= 36%; “processing costs”= 36%). Likewise, the “common” response results in the revised overall model (“perceived risk of apprehension”= 36%; “perceived risk of seizure”= 36%) suggest that the parameters of the rational choice perspective are also pertinent to international wholesale drug pricing.

Table 15. Wholesale Drug Market Pricing

Response Category ¹	Overall Frequency (f) ²	Mexico ³	Colombia ⁴
Supply on hand ⁵	7 (32%)*	1 (17%)*	6 (40%)**
Demand for product ⁵	4 (18%)*	1 (17%)*	4 (26%)*
Processing costs ⁵	4 (18%)*	1 (17%)*	4 (26%)*
Perceived risk of apprehension ⁶	4 (18%)*	0 (0%)*	1 (6%)*
Perceived risk of seizure ⁶	5 (23%)*	0 (0%)*	5 (23%)*
No knowledge on this issue	11 (50%)**	3 (50%)**	8 (53%)**

¹Responses may fit more than one category.

²The total number of interviews is 22 because two informants were interviewed together.

³The total number of interviews is 6.

⁴The total number of interviews is 15 because two informants were interviewed together.

⁵Conceptually linked to economic price elasticity of demand

⁶Conceptually linked to rational choice theory

*uncommon response < 33%; **common response 33% to 66.9%; ***very common response > 66.9%

The revised results from Mexico demonstrated support for the economic price elasticity of demand perspective with every relative categorical response result being within the “common” level (“supply on hand”= 33%; “demand for product”= 33%; “processing costs”= 33%). However, the revised Mexico model results do not demonstrate support for drug trafficking organizations operating within the parameters of rational choice theory as they establish international wholesale drug prices. The results in relation to the rational choice theoretical

perspective in the revised Mexico results are: “perceived risk of apprehension”= 0% and “perceived risk of seizure”= 0%.

Table 16. Revised Wholesale Drug Market Pricing

Response Category ¹	Overall Frequency (f) ²	Mexico ³	Colombia ⁴
Supply on hand ⁵	7 (63%)**	1 (33%)**	6 (86%)***
Demand for product ⁵	4 (36%)**	1 (33%)**	4 (57%)**
Processing costs ⁵	4 (36%)**	1 (33%)**	4 (57%)**
Perceived risk of apprehension ⁶	4 (36%)**	0 (0%)*	1 (14%)*
Perceived risk of seizure ⁶	5 (36%)**	0 (0%)*	5 (71%)***

¹Responses may fit more than one category.

²The total number of interviews is 11 because two informants were interviewed together.

³The total number of interviews is 3.

⁴The total number of interviews is 7 because two informants were interviewed together.

⁵Conceptually linked to economic price elasticity of demand

⁶Conceptually linked to rational choice theory

*uncommon response < 33%; **common response 33% to 66.9%; ***very common response > 66.9%

The revised results for Colombia support the overall revised results relative to the economic elasticity of demand with every pertinent categorical response being at the “common” level (“demand for product”= 57%; “processing costs”= 57%), with the exception of the category for “supply on hand”, which is deemed to be “very common” at 86%. Additionally, the revised Colombia analyses show support for the overall revised model’s findings on the rational choice perspective in one category (“perceived risk of seizure”= 71%). Interestingly, the categorical response for “perceived risk of apprehension” (14%) in the revised Colombia model does not support the finding in the overall revised model.

The responses on whether the price elasticity of demand perspective is a determining factor in international wholesale drug pricing are illustrated by these quotes:

CS #1: “If supply is high the cost is low and if supply is low the cost is high.”

CS #4: “The price and purity are determined by market. For example, the demand in the destination city and the supply of the product on hand.”

CS #11: “The demand in the U.S. market is used to set the prices for drugs. Also, the distance that you have to travel effects the price”

CS #14: “The cost of precursor chemicals has a major impact on the price of cocaine and heroin. The regulation of the chemicals makes it difficult and costly to get what is needed.”

CS #17: “The larger the amount that is purchased the lower the price. The average price per kilogram of heroin in New York is \$55,000 to \$60,000, and if someone can buy in bulk in Mexico where the price is much lower than they make a large profit.”

The responses in relation to rational choice theory and its role in establishing international wholesale drug market prices are illustrated in the following quotes:

CS #2: “If operations prevent an organization from moving drugs into the U.S. and they have to stockpile them say in Ensenada, Mexico then it drives the price up in Los Angeles because there is no product on the street.”

CS #3: “Once the drugs get to the U.S. it is like a minefield getting past the cops. The hotter the area the higher the price.”

CS #8: “If the risk is high for transporting product than the transporters get more money, which is sometimes made up by raising drug prices.”

CS #10: “The more bribes you have to pay to get information and safe passage the higher the price.”

Chapter Summary

This chapter contained the analytical results for each of the focal points in the study. Significant findings obtained during the empirical analyses were presented and tied to the overall focal points. A discussion regarding whether or not the results support the six hypotheses of the study is presented in the next chapter.

CHAPTER SEVEN

DISCUSSION AND CONCLUSION

This chapter first provides a summary of the findings, which includes assessments of the six hypotheses in the study. Next, the theoretical and research implications of the study's findings are discussed. Subsequently, the policy and practice implications of the results from the study are presented. Lastly, the limitations of the study are described.

Summary of The Findings

This review of the findings in the study begins by discussing some of the more noteworthy results in the descriptive analyses. Subsequently, the pertinent findings in each focal point are discussed, which includes assessments of the study's hypotheses. Finally, overall assessments of the results in relation to the three goals of the study are noted.

Summary of Descriptive Analytical Results

The results in the descriptive analysis reveal several significant findings. First, a comparison in the total number of heroin/cocaine possession arrests in America between 1989 and 2013 (9,312,596) and the total number of heroin/cocaine sale arrests in the U.S. between 1989 and 2013 (4,103,084) reveals that over twice as many people were arrested for the possession of heroin/cocaine than for the sale of heroin/cocaine. There are several possible explanations for this difference. Perhaps law enforcement was concentrating more on arresting users than sellers of heroin/cocaine. Equally plausible is the explanation that it may be easier to arrest users of these drugs as opposed to individuals who sell them.

Descriptive analyses also revealed a downward trend in heroin/cocaine sale arrests in the U.S. since 1989, which seems to indicate a positive correlation with the one-gram price of heroin in the country. Specifically, as arrests for the sale of heroin/cocaine declined, the price of heroin also declined. Furthermore, heroin/cocaine sale arrests appear to have a negative correlation with the number of lifetime heroin users in America. Specifically, as heroin/cocaine sale arrests decreased, the number of lifetime users of heroin increased. The one-gram price of heroin in America appears to have a negative correlation with the number of lifetime heroin users in the country. More specifically, as the price of heroin decreased, the number of lifetime heroin users increased. These findings are interesting in that they partially support the premise that lower prices of heroin increase consumption rates of the drug, which is similar to the findings by Saffer and Chaloupka (1999a; 1999b). However, they seem to fail to support the premise that arresting individuals for selling heroin raises its price.

The descriptive results also appear to indicate that since 2008 heroin seizures in the U.S. have had a negative correlation with the number of lifetime heroin users in the country. In essence, it appears that as more heroin was seized from 2008 to 2013 the number of lifetime users increased. This time frame is extremely important since it encompasses the time period of the current heroin epidemic in America. One possible explanation for this observation could be that there is simply more heroin available to seize because there are more users of the drug, and therefore more of it is being produced. The production rates of opium poppies in Mexico during this time frame shows an overall increase between 2007 and 2013, but the production rates varied year by year. It is also significant to note that since 2008 the one-gram heroin price has fluctuated, which seems to indicate that it has no direct correlation with the number of U.S. lifetime heroin users and seizures of the drug in America.

A review of the descriptive results on the number of hectares of opium eradicated in Mexico demonstrates that it varied annually between 1989 and 2013, and it was not possible whether it was correlated with other variables of interest in the study, such as the price of a gram of heroin in the U.S. and the number of lifetime users of the drug in the U.S. The overall descriptive results are extremely salient in relation to the assertion made by former FBI Director Comey that law enforcement efforts can in effect raise prices of heroin, which in turn will dissuade individuals from using the drug (Dean, 2017). The descriptive findings cast significant doubt on his assertion.

Summary of First Focal Point Analytical Results

The analytical results in the first focal point provide an understanding of retail drug market dynamics and are derived from two OLS regressions. The results from the first OLS regression assessed the first hypothesis of the study: a decrease in the number of Mexican opium poppy tons produced and an increase in the number of U.S. heroin users increases the one-gram price of the drug in America. On the other hand, the results from the second OLS regression tested the second hypothesis of the study: a decrease in the number of Mexican opium poppy tons produced and an increase in the U.S. one-gram price of heroin reduces the number of American consumers of the drug. The assessments of the two hypotheses are presented in Figure 24.

The results in the first OLS regression do not support the first hypothesis that decreases in Mexican opium poppy production and increases in the number of U.S. heroin users increase the price of the drug in America. Specifically, the results were not statistically significant for the relationship between the amount of yearly opium produced in Mexico and the annual one-gram heroin price in America. Furthermore, it is interesting to note that the inverse of the hypothesis appears to be represented in the results. Specifically, the results revealed a negative effect of the

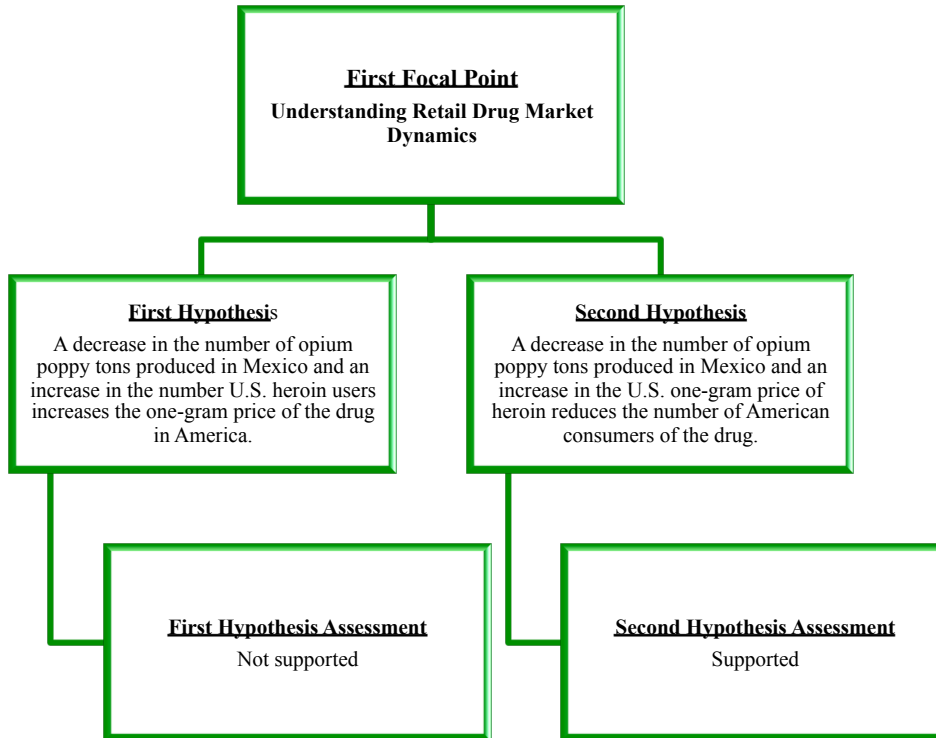


Figure 24. First focal point hypotheses assessments

annual number of heroin users on the yearly price of the drug in America.

The results of second OLS regression analysis provide support for the second hypothesis that decreases in opium poppy production in Mexico and increases in U.S. heroin street-level prices decrease the number of heroin users in America. The results revealed that increases in the yearly one-gram heroin price in the U.S. led to reductions in the annual number of lifetime users of heroin, and the annual number of opium tons produced in Mexico led to increases in yearly number of U.S. lifetime heroin users.

Summary of Second Focal Point Analytical Results

The analytical results in the second focal point provide an understanding of the relationship between counter-drug law enforcement and drug market dynamics. Results from an OLS regression analysis, qualitative analyses, and a sequential explanatory mixed methods analysis assessed the third hypothesis of the study: increasing the number of heroin possession arrests,

heroin trafficking arrests, opium poppies eradicated in Mexico, and heroin seized in America while controlling for the production rates of opium poppies in Mexico, increases one-gram price of heroin in the U.S. Meanwhile, results from an OLS regression assessed the fourth hypothesis in the study: increasing the number of heroin possession arrests, heroin trafficking arrests, opium poppies eradicated in Mexico, and heroin seized in America while controlling for the production rates of opium poppies in Mexico, will decrease the number of lifetime heroin users in America. The assessments of the two hypotheses tested in the second focal point are presented in Figure 25.

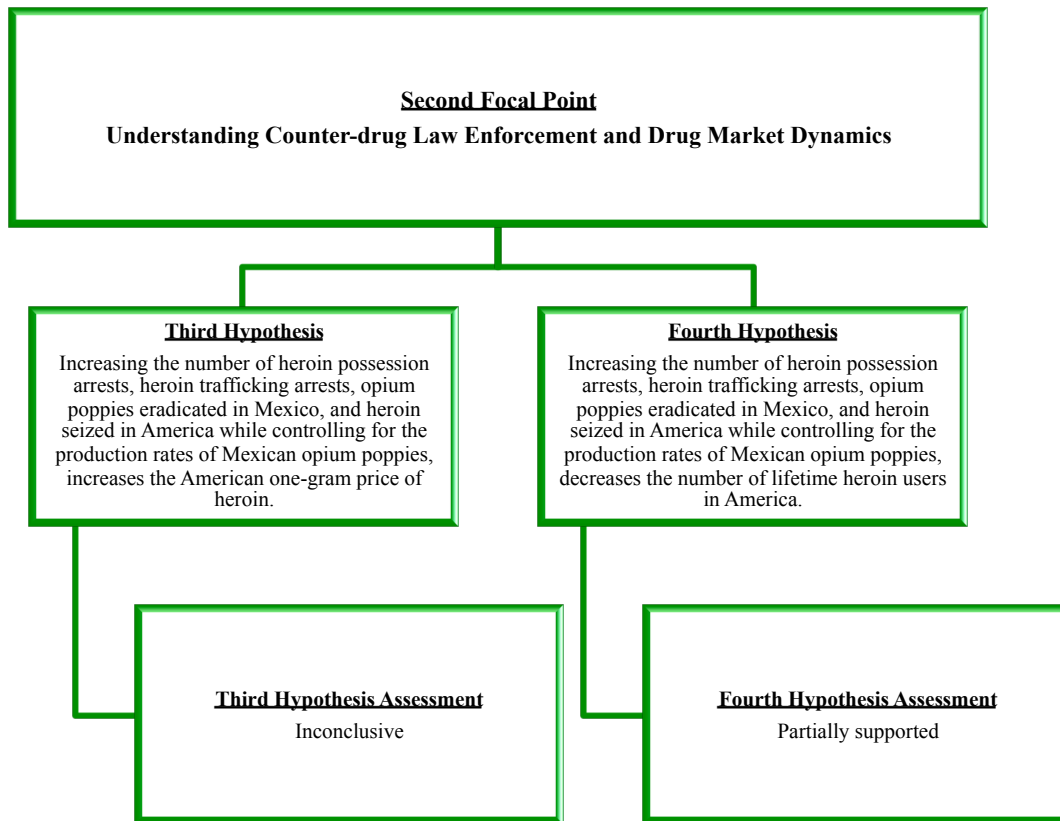


Figure 25. Second focal point hypotheses assessments

The findings in the first OLS regression in this focal point provide partial quantitative support for the third hypothesis in the study. Specifically, the arrest of individuals for the sale of heroin/cocaine in the U.S. is a significant predictor of the price of heroin and appears to lead to increases in this variable. This finding stands in contrast to the findings of Weatherburn and

Lind (1997) and Yuan and Caulkins (1998) who found that arrests have no impact on heroin prices.

Other portions of the hypothesis are not supported by the findings in the OLS regression and appear to offer inverse explanations relative to the third hypothesis. Specifically, the results revealed a significant negative relationship between arrests for the possession of heroin/cocaine in the U.S. and the one-gram price of heroin in America. One possible explanation for this finding is that perhaps increases in incarcerated heroin addicts increases the availability of the drug in the marketplace, which lowers the prices. This finding is also contrary to the findings by Weatherburn and Lind (1997) and Yuan and Caulkins (1998).

The results in the OLS regression analysis also demonstrated a significant negative relationship between the amount of opium poppy eradicated in Mexico and the one-gram price of heroin in the United States. This finding is inconsistent with Clemens (2008), who found that eradication of opium in Afghanistan had no impact on the price of opium. A possible explanation for this finding is that increases in opium poppy eradication are indicative of greater opium poppy production. The second set of OLS regression results in the first focal point demonstrates that increases in opium poppy production leads to significant increases in the number of heroin users. Conversely, increases in the number of U.S. heroin users leads to lower one-gram prices of the drug in America. Heroin seizures were not found to be significantly related one-gram heroin prices; therefore, this finding does not support the third hypothesis.

The overall qualitative results were negative/non-supportive (–) with respect to the statistically significant OLS regression findings. Furthermore, the qualitative findings support the non-statistically significant OLS regression finding regarding the relationship between the

annual number of heroin seizures in America and the yearly one-gram price of heroin in the U.S. The overall qualitative findings are not supportive of the third hypothesis in the study.

The mixed methods analytical findings demonstrate inconclusive (\pm) support for the following portions of the quantitative and qualitative findings in the study: increasing the number of U.S. heroin possession arrests, increasing heroin trafficking arrests in America, and eradicating opium poppies in Mexico, while controlling for the production rates of opium poppies in Mexico, increases the American one-gram price of heroin. As noted earlier these inconclusive mixed methods determinations may be due to the qualitative findings being related to international wholesale prices of illicit drugs, whereas the quantitative results are reflective of the relationship between arrests, eradication, and U.S. retail prices of heroin.

The mixed methods findings show no relationship between heroin seizures in America and increases in the U.S. heroin one-gram price. Taken as a whole, the mixed methods analytical results provide more inconclusive (\pm) results than non-supportive ($-$) or supportive ($+$) results. Therefore, the conclusion for the third hypothesis is that there is inconclusive (\pm) support for the hypothesis.

The second set of OLS regression results provides partial support for the fourth hypothesis of the study. Specifically, the arrest of individuals for the sale of heroin/cocaine in America led to significant decreases in the number of lifetime heroin users in the U.S. A possible explanation for this finding is that the removal of individuals who are selling heroin from a community reduces the distribution capacity, which in turn reduces availability of the drug. The reduced availability of heroin would naturally reduce the number of people who can buy it. However, other portions of the hypothesis are not supported by the OLS regression findings in that no statistically significant relationships were found in the other variables in the model.

Summary of Third Focal Point Analytical Results

The analytical results in the third focal point provide an understanding of the dynamics of drug trafficking organizations and counter-drug policing initiatives. The overall and geographical regional qualitative analyses assessed the fifth hypothesis of the study: drug trafficking organizations operate within the parameters set forth in the deterrence and rational choice perspectives as they react to U.S. standard counter-drug law enforcement practices. The assessment of the hypothesis tested in the third focal point is presented in Figure 26.

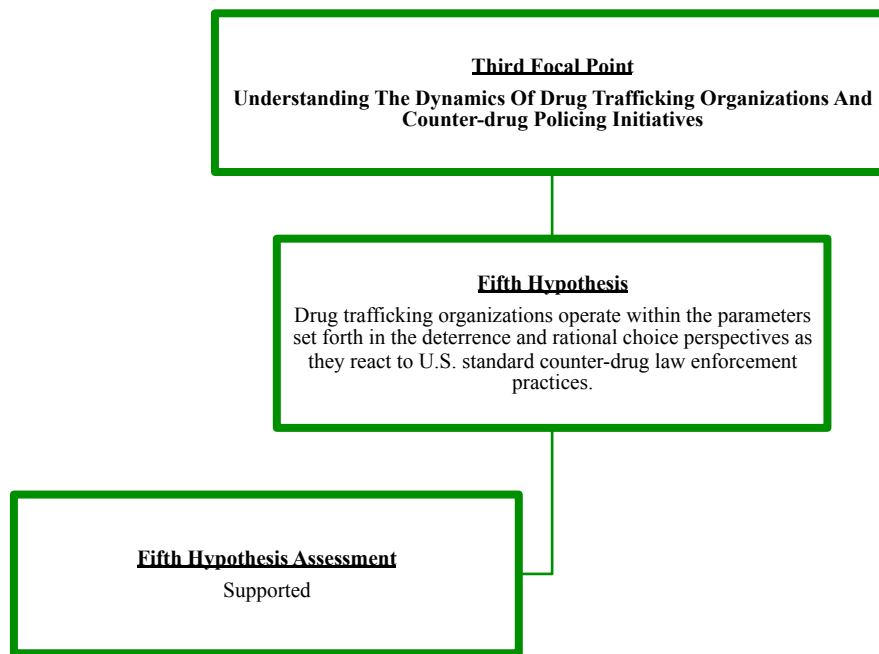


Figure 26. Third focal point hypothesis assessment

The overall qualitative findings demonstrate support for the fifth hypothesis in the study in that the responses were found to be “very common” in relation to drug trafficking organizations calculating perceived risks and rewards (100%) and making operational adjustments (77%) to law enforcement operations. Furthermore, the overall finding that counter-drug operations produce temporary and/or partial deterrence (“common”= 50%) in drug trafficking organizations is also supportive of the fifth hypothesis. Not surprising is the finding that none of the

confidential informants noted that counter-drug operations produce permanent deterrence effects (0%). The geographical regional findings for Mexico and Colombia were also supportive of the fifth hypothesis.

Summary of Fourth Focal Point Analytical Results

The analytical results in the fourth focal point provide an understanding of wholesale drug market dynamics. The overall and geographical regional qualitative analytical results and revised overall and geographical regional results assessed the fifth hypothesis of the study: drug trafficking organizations operate within the parameters set forth in economic price elasticity of demand and rational choice perspectives in establishing heroin prices. The assessment of the hypothesis tested in the fourth focal point is presented in Figure 27.

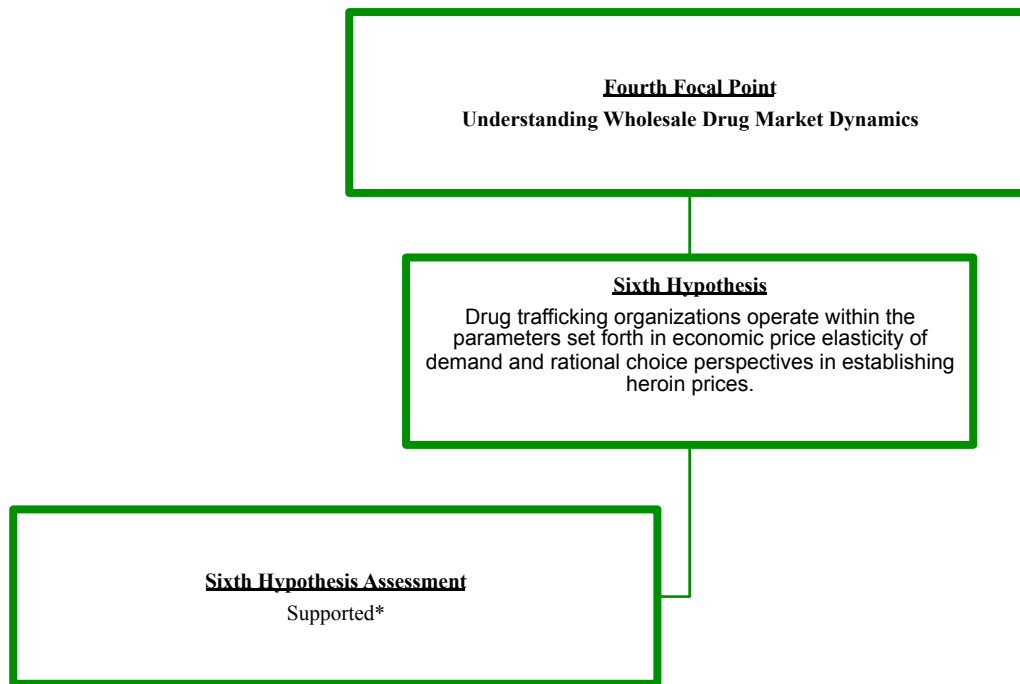


Figure 27. Fourth focal point hypothesis assessment

*Revised analytical results used to assess the hypothesis

The initial overall analytical results in conjunction with the Colombia and Mexico geographical regional analytical results did not support the sixth hypothesis. However, in

examining the results it was apparent that 50% of the confidential informants did not have any knowledge about the protocols of international wholesale illicit drug pricing. This lack of knowledge was not an issue in any of the other qualitative analyses in the study. Therefore, a revised model was constructed where the confidential informants, who did not have knowledge of the protocols of international wholesale drug pricing, were removed from the analyses.

All of the results in the revised overall model were deemed to be “common” for each of the categorical responses, which demonstrate support for the sixth hypothesis. Furthermore, the revised results regarding Mexico support the economic price elasticity of demand perspective with every relative categorical response result within the “common” level: “supply on hand” (33%), “demand for product” (33%), and “processing costs” (33%). However, the revised Mexico model results did not provide support for the premise that drug trafficking organizations operate within the parameters of rational choice theory as they establish international illicit drug prices: “perceived risk of apprehension” (0%) and “perceived risk of seizure” (0%).

The revised geographical regional model results for Colombia revealed that the “very common” categorical response of “supply on hand” (86%) strongly supports the premise that drug trafficking organizations operate within the parameters of the economic price elasticity of demand perspective. Additionally, the revised Colombia results reveal that the “common” responses for “demand for product” (57%) and “processing costs” (57%) also support the premise that drug trafficking organizations operate within the parameters of the economic price elasticity of demand theory. Likewise, the “very common” categorical response result in the revised Colombia model for “perceived risk of seizure” (71%), suggests that the rational choice perspective is pertinent to wholesale drug pricing. However, the “perceived risk of Colombia apprehension” (14%) was found to be an “uncommon” categorical response in the revised

model.

In sum, the revised analytical results in the overall model completely support the sixth hypothesis. Furthermore, the revised Colombia and Mexico models both support the portion of the hypothesis related to drug trafficking organizations operating within the economic price elasticity of demand perspective as they establish international wholesale drug prices. However, the revised Colombia model's analytical results only partially support the portion of the sixth hypothesis related to drug trafficking organizations operating within the parameters of rational choice theory. Likewise, the revised Mexico model's analytical results do not support this portion of the hypothesis. Overall, in examining the totality of the results in the revised model it is apparent that there is support for the sixth hypothesis.

Theoretical and Research Implications

The implications of the three main theoretical perspectives in the study (deterrence, rational choice, and economic price elasticity of demand) are noted within each of the four focal points of the study. Subsequently, a brief discussion of the overall research implications of the study is presented. The research implications discussion includes suggestions for future research.

Theoretical Implications

First focal point

The first focal point of the study provided an understanding of retail drug market dynamics. From a theoretical perspective, the overall findings in this focal point are generally supportive of the economic price elasticity of demand perspective. Specifically, the OLS regression results in this focal point determined that as the annual one-gram price of heroin in America increased the yearly number of users of the drug in the U.S. decreased. This finding shows that the consumption of heroin is linked to the price of the drug, which is congruent with the economic

price elasticity of demand perspective. This determination is similar to the overall meta-analysis findings by Gallet (2013), in which he reported that marijuana, cocaine, and heroin prices react within the confines of the economic price elasticity of demand perspective.

Second focal point

The analytical results in the second focal point have theoretical implications for the deterrence perspective. Results in the second OLS regression model in this focal point seem to provide support for deterrence theory. Specifically, arrests for selling heroin/cocaine seem to deter individuals from consuming the illicit drug. However, arrests for possessing heroin/cocaine appear to not have any deterrent effect on the consumption of heroin. The latter insight seems to contradict the premises of the deterrence perspective. However, if one takes into account the highly addictive characteristic of heroin, it is very plausible that arresting individuals for possession of the drug does not deter them from using it simply because the threat of arrest is not significant enough to move the calculation of risk and reward in favor of the risk side of the equation.

Another interesting finding in the second focal point, in terms of deterrence theory, is that no single counter-drug law enforcement initiative or a combination of them (arrests, seizures, and/or eradication) produces permanent deterrence in heroin use and trafficking. This finding is congruent with the determinations of Zimmer (1990), and Toth and Mitchell (2018). As was referenced above in relation to heroin possession arrests, it is possible that this lack of permanent deterrence is related to the ability of these law enforcement operational tools to outweigh the addictive nature of heroin and the lucrative financial rewards of selling the product.

Third focal point

The analytical results in the third focal point have theoretical implications for deterrence and

rational choice perspectives in relation to understanding the dynamics of drug trafficking organizations and counter-drug initiatives. Similar to the theoretical implication discussion with respect to the second focal point, the qualitative results in this section do not support the idea that permanent deterrence can be achieved by utilizing standard counter-drug trafficking policing strategies. Rather, the qualitative findings in this focal point suggest that members of drug trafficking organizations utilize calculations of perceived risks and rewards to adjust operationally to deterrence-based policing operations. The qualitative results suggest that while these adjustments may produce temporary or partial deterrence, overall they fail to produce permanent deterrence in drug traffickers. Again, this theoretical finding could be related to the inability of these counter-drug operational tactics to sufficiently counter the lucrative rewards of heroin trafficking in an offender's risk and reward calculations. The findings in this section support the previous empirical studies of Decker and Chapman (2008), Zimmer (1990), and Toth and Mitchell (2018).

Fourth focal point

The analytical results in the fourth focal point have theoretical implications for the rational choice and economic price elasticity of demand perspectives in relation to understanding international wholesale drug market dynamics. The results in this focal point provide unique support for the premises of rational choice, in that they suggest that drug trafficking organizations apply the principles of perceived risks and rewards as they determine prices for illicit drugs. This finding is congruent with the overall empirical findings of Miron (2003).

The main premises of the economic price elasticity of demand perspective were also supported in the qualitative findings. This qualitative determination is unique in that it has not been previously noted in the literature. These qualitative results bolster the empirical

determinations of Gallet's (2013) meta-analytical results on drug markets and the economic price elasticity of demand theory.

Theoretical implications summary

Overall the present study has expanded the empirical knowledge regarding the deterrence, rational choice, and economic price elasticity of demand perspectives in several ways. First, as was noted, it has provided additional support for the findings reported in prior studies.

Additionally, this support has been rendered through empirically sound multi-dimensional quantitative, qualitative, and mixed methods analyses. Furthermore, the support for the perspectives has been demonstrated across multiple geographical regions over a 25-year timeframe. This later achievement has never been accomplished before in the literature.

Research Implications

There are numerous research implications that have been generated from this study. First, the finding that drug markets respond within the parameters of the economic price elasticity of demand perspective requires further exploration. In particular, while the present study is able to conclude that heroin markets fall within either perfect elastic, relative elastic, or unit elastic pricing typologies, it cannot make a determination as to which type is most applicable to the pricing and consumer dynamics of the drug.

The qualitative findings in the study provided significant insights into the "why" of the quantitative analytical results. Future research into drug trafficking would be well served to utilize more qualitative and mixed methods studies to understand this complex criminological issue. Rennison and Hart (2019) note that qualitative inquires can provide a comprehensive understanding of complex matters. While the use of sophisticated quantitative analyses is important, researchers who want to know the "why" of drug trafficking would be well advised to

incorporate qualitative components into their research project.

Additionally, this study aims to provide support for Giordano's (2014) conceptual idea that criminological theory should drive research and research should drive criminal justice policy. It is imperative that future research endeavors into drug trafficking be theoretically sound and empirically strong. Additionally, they must strive to make their findings applicable to criminal justice policy. This latter goal requires that criminological research not only be applicable to criminal justice policies, but it must also be understandable to policy makers and practitioners. Given the fact that the U.S. is in the middle of a heroin epidemic and the U.S. government spends billions of dollars each year in attempting to counter illicit drug use, scholars must produce practical research that is understandable to the common person and viable in the "real world".

Policy and Practice Implications

Earlier in this dissertation, former FBI Director Comey's plan for addressing the current heroin epidemic in America was set forth. His plan, as noted, called for the use of police tactics to drive up the price of heroin to make it less desirable for consumers (Dean, 2017). This plan by Comey seems to make logical sense, and it is partially supported by the finding of this study that increased prices of heroin seem to reduce consumer rates of the drug in America. However, the study has also clearly demonstrated that arresting people in the U.S. for the possession of heroin/cocaine, eradicating opium poppies in Mexico, and seizing heroin in the U.S. do not appear to raise the wholesale or retail prices of heroin. Furthermore, quantitative results in the study suggest that arresting people for the possession of heroin/cocaine actually appears to lower the price of heroin. Interestingly, the quantitative results also indicated that the only enforcement action that seems to increase the price of street-level quantities of heroin in America is arresting

individuals for selling heroin/cocaine; however, arrests for selling heroin/cocaine have declined annually in the U.S. since 2007. It appears that the one law enforcement counter-drug initiative that may increase one-gram prices of heroin is actually the one that has been decreasing in use during the current heroin epidemic in America.

The qualitative and mixed method analytical results likewise do not support the premise set forth by Comey. Overall, these results demonstrate that counter-drug law enforcement tactics have no apparent influence over the international wholesale pricing of illicit drugs. Furthermore, they show that while counter-drug enforcement plans may produce partial/temporary deterrence they have no permanent deterrent effect on drug trafficking organizations or illicit drug users.

This study demonstrates that new policies and practices need to be adopted for addressing America's current heroin crisis and overall illicit drug trafficking issues. The mission assigned to the ONDCP in 1989, as noted by Boyum & Reuter (2005), of making America "drug free" is a utopian concept. Policy makers and the public need to come to terms with the reality that historically people in this country have used and trafficked illicit substances for over 100 years. This activity has occurred despite increases in counter-drug policing programs and harsher sanctioning of drug offenders. Furthermore, it is logical to deduce that Americans will continue to use and sell illicit substances no matter the perceived risks presented by counter-drug initiatives or the potential sanctions associated with them. Therefore, the fight against illicit drug use and trafficking cannot be viewed as a win or lose proposition, rather it needs to be viewed and measured within the concept of control.

This control concept is best illustrated by examining the medical situation of sexually transmitted diseases such as gonorrhea and syphilis. While the best solution for avoiding these two diseases is to abstain from sexual activity, it is unrealistic to think that individuals will stop

having sexual relations. Therefore, medical professionals have developed medicines to effectively treat the diseases. Furthermore, preventative educational programs are used to warn people about the perils of unprotected sexual encounters. The fight against these diseases is not viewed as a win or lose proposition, but rather it is viewed through the lens of control. The findings in the present study support such an approach to the current heroin epidemic and drug trafficking in general.

Some may suggest that the present study provides evidence for a legalization platform for heroin and other illicit drugs. Such a viewpoint is naïve in that it misses the point that heroin and cocaine can only be grown in certain geographical regions of the world. To legalize heroin and/or cocaine would mean immediately turning the major heroin and cocaine producers in the world into super-economic powers. In the long term such an approach would cost the U.S. government more than what it currently spends in counter-drug operations. Such a move would in fact change global economic markets. Therefore, as was noted, the best approach to the heroin epidemic relative to enforcement is to understand that counter-drug efforts cannot stop it they can only provide a measure of control. Overall, the policy and practice implications derived from this study are that the best approach to dealing with the current heroin epidemic and illicit drug use in general is through evidence-based prevention, education, and enforcement control.

Overall, this study demonstrates that policymakers and law enforcement agencies should consider four specific changes to addressing the current heroin epidemic and illicit drug use as a whole. First, focused deterrence programs should be used to objectively identify and target mid-to high-level drug traffickers. Secondly, seizures of illicit drugs and horticultural eradication should be used to help objectively identify middle to high-level drug trafficking targets rather than as a tool to lower illicit drug prices. Additionally, as was mentioned earlier, illicit drug use

has ebbed and flowed somewhat naturally over time in the U.S. Caulkins and Reuter (2010) note that the issue of illicit substance abuse is best addressed by utilizing an enforcement approach that is measured with the purpose of controlling illicit drug markets rather than completely eradicating them. Rather than providing increasing funds and limited law enforcement assets toward an unreachable goal policymakers and law enforcement professionals should embrace realistic illicit drug control policies and enforcement strategies rather than chasing unattainable goals. Lastly, the FBI should disentangle cocaine and heroin when reporting possession and sale arrests. By implementing this suggestion, researchers, policymakers, and law enforcement officials can better assess the impact of possession and sale arrests for heroin and cocaine.

Limitations of the Study

The limitations of the study are set forth within the context of the three types of empirical analyses (quantitative, qualitative, and mixed methods) that are incorporated in it.

Limitations of the Quantitative Analyses

While some may argue that a limitation of the quantitative analyses is the small number of observations ($n=25$), in actuality the data encompass 25 years of observations. They would be correct in noting that the small number of observations reduces the statistical power in the various quantitative analytical models. Furthermore, they would be accurate in observing that a small number of independent variables are used in study. However, the quantitative analyses actually provided a robust number of observations spanning two and half-decades, and the independent variables used in the study are very pertinent. Overall, the combination of the longitudinal nature of the data and the quality of independent variables in the study provide a scope of assessment never before seen in a published empirical study in this area of research.

Another limitation of the quantitative analyses is the exclusive use of official government

data. All of the data analyzed in the quantitative portions of the study were derived from various official government sources. Bachman and Schutt (2012) note that in general, data derived from official government sources that is obtained from a central agency are typically reliable. However, they added that data collected by local governmental agencies that in turn are reported to a federal agency need to be used with caution. In the present study, the data on arrests for heroin/cocaine possession and sale are derived from the UCR, which relies on reporting by federal, state, tribal, military, and local police agencies.

Loftin and McDowall (2010) state that the major shortcomings of UCR data cited by many criminologists are:

1. The procedures and definitions are not consistent across agencies.
2. Many crimes are not included because citizens do not report them to the police and the likelihood of citizen reporting varies in systematic ways.
3. The police are selective in reporting crime and this filtering process is biased (not constant across social groups or areas).
4. Some agencies do not report or report incompletely, and missing data are poorly documented.
5. The major data collections do not provide information on the characteristics of offenders (such as age, race, and gender), and these must be inferred from arrest data.
6. The UCR is not a statistical program in the usual sense of the term. Rather, it is a “house organ” of the police (Lejins 1966, 1016) and reflects the organizational interests of agencies that may use the data to further those interests (p. 528).

A major shortcoming of the UCR not addressed by Loftin and McDowell (2010) is the hierarchy rule that it uses. Tabarrok, Heaton, and Helland (2010) note that this UCR mandate

requires a reporting agency only to log the most serious Part I offense if multiple offenses were committed in the same space and time. It is possible that arrests for the possession and sale of heroin/cocaine are underreported because of the hierarchy rule. Furthermore, the combination between the two types of arrests makes it impossible to separately identify the number of heroin possession and sale arrests from the number of cocaine possession and sale arrests. While this is somewhat problematic, it is significant to note that there is no other database that records the annual number of U.S. heroin possession and sale arrests.

Maxfield and Babbie (2015) state that another issue with official reporting of drug sales and possession is that most people who commit these offenses go undetected by the police. Therefore, it is likely that the number of arrests for possession and sale of cocaine/heroin are not representative of the actual number of individuals who engage in these types of criminal activities. While this is likely accurate it is important to note that the study measured both arrests for the possession and sale of heroin/cocaine and consumption rates of heroin.

The consumption rates in the study are, as discussed earlier, derived from the number of lifetime heroin users as reported by the National Survey on Drug Use and Health. This survey uses reports from substance abuse centers located throughout the country to measure the location, scope, and characteristics of drug abuse and alcoholism. It is possible that this study underestimates the number of actual heroin users in America. Furthermore, it is also possible that this study overestimates the number of heroin users in the U.S. For example, it is likely that heroin-free addicts in recovery may be counted as lifetime heroin users. Nonetheless, the data provide a good overall estimate of the number of heroin users in America. However, a more sensitive analysis would likely be possible if current heroin users were utilized instead of lifetime heroin users.

Other data in the study such as the annual number of kilograms of heroin seized, the number of hectares of opium eradicated in Mexico, and the amount of opium produced in Mexico are also susceptible to the noted limitations of official data. The data on the production and eradication of opium in Mexico is somewhat problematic because it relies on officials from the Mexican government who gather significant portions of the data without U.S. governmental oversight. However, these data sources provide the only quantitative comprehensive insights into these issues.

Lastly, the comingling of heroin and cocaine possession and sale arrests in the UCR is problematic in that it provides a less than complete picture of the number of heroin possession and sale arrests in America. Interestingly, local, state, tribal, military, and federal agencies differentiate between the two drugs at the time of arrest. Furthermore, the punitive sanctions for possessing and/or selling the two drugs are different in most jurisdictions. While this issue is problematic the UCR data on heroin possession and sale are the only longitudinal national data available on the number of heroin and cocaine arrests.

Limitations of Qualitative Studies

As previously discussed, Toth and Mitchell (2018) utilized the same qualitative data that was described in this study. A limitation of the data that they mentioned is applicable for this study as well. They noted that a relatively small number of individuals participated in *Operation Drill Bit* (n=23). Of course, it would be desirable to have a larger sample to study in the qualitative portions of the study; however, it is important to point out that the sample represents individuals who have unique insights into how drug trafficking organizations operate across several geographical regions. The exclusive insights into the operational characteristics of drug trafficking organizations presented by this group of respondents outweighs the small sample size.

Limitations of Mixed Methods Study

The major limitation of the mixed methods analysis in the study is that the characteristics of the qualitative data did not allow for mixed methods analyses on all of the quantitative variables. While this is disappointing there was sufficient qualitative data in *Operation Drill Bit* to conduct mixed methods analysis on the majority of the quantitative variables in the study.

Chapter Summary

In sum, this chapter has provided a review of the analytical findings in the study. Subsequently, the theoretical implications of this research endeavor were discussed in relation to each focal point of the study. Next, the policy and practice implications of the study were set forth. Lastly, the limitations of the study were noted and discussed.

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APPENDIX A:

DESCRIPTION OF *OPERATION DRILL BIT* RESPONDENTS

1. The informant is a Guatemalan national who had knowledge of money laundering activities and drug trafficking in Central and South America, and the U.S.
2. The informant had knowledge of drug trafficking activities in the countries of Mexico and the U.S.
3. The informant is of Colombian descent and had information regarding money laundering and drug trafficking in the country of Colombia.
4. (Combined responses of two informants) The informants are Colombian nationals who had knowledge of drug trafficking in the New York City area. They initiated numerous investigations involving Colombian cocaine/heroin organizations, as well as Colombian money laundering organizations, operating in the New York area.
5. The informant is a Colombian national who had extensive knowledge of Colombian drug trafficking organization's transportation methods, financial techniques, and communications.
6. The informant is a Colombian national who had extensive knowledge of Colombian drug trafficking organization's organizational structure, transportation methods, and communications.
7. The informant is a Colombian national who had knowledge of many aspects of Colombian drug trafficking organization's production methods, transportation/distribution systems, financial techniques, and communications. This informant had an extensive understanding of drug trafficking organizations operating in the Caribbean region.

8. The informant is a Colombian national who had knowledge of many aspects of Colombian drug trafficking organizations, such as their production methods, transportation and distribution systems, financial techniques, as well as their communications networks.
9. The informant primarily had information regarding maritime smuggling in the areas of the Golfo de Uraba and La Guajira, Colombia.
10. The informant had information regarding illicit drug operations in the country of Colombia.
11. The informant had knowledge of illicit drug operations in the country of Colombia.
12. The informant had knowledge of illicit drug operations in the country of Colombia, specifically the San Andres Islands.
13. The informant had knowledge of mid-level, drug trafficking activities within the country of Colombia.
14. The informant had knowledge of illicit drug operations in the country of Colombia, specifically the North Coast from La Guajira to Turbo.
15. The informant is a computer specialist and primarily had information regarding illicit drug trafficking operations in the country of Colombia.
16. The informant had knowledge of the many aspects of Colombian drug trafficking organizations, such as production methods, airport transportation systems, and financial techniques.
17. The informant had knowledge of the many aspects of Colombian drug trafficking organizations, specifically their production methods, transportation and distribution systems, financial techniques, and communications.
18. The informant is Mexican national who had knowledge of several aspects of a Mexican drug trafficking organization's structure, to include transportation and communication methods.

19. The informant is a Mexican national who had knowledge of several aspects of a Mexican drug trafficking organization's structure, to include transportation and communication methods.
20. The informant is a Mexican national who had knowledge of a Mexican drug trafficking organization's activities, which were limited to activities within the country of Mexico.
21. The informant is a Mexican national who had knowledge of a Mexican drug trafficking organization's activities within the country of Mexico.
22. The informant is a Mexican national who had knowledge of drug trafficking organization's activities in the countries of Mexico, Costa Rica, and Guatemala.

APPENDIX B:

RESPONDENT QUESTIONS IN *OPERATION DRILL BIT*

1. How is the organization structured in the source, transit, and destination countries, i.e., chain of command, cell, or linear structure?
2. What are the different levels of command/control and what are their specific roles?
3. How are organizational members recruited/replaced?
4. What does the CS coordinate with other organizations (production, transportation, etc., with Colombians, Mexicans, Dominicans, etc.)?
5. What is the impact of law enforcement on arrests and seizures of drugs, money, and precursors?
6. When an organization is aware of a planned law enforcement operation, what is typically done (stockpile, new route, etc.)?
7. How is intelligence used to counter law enforcement efforts?
8. What is the effect of turf battles and violence among gang members?
9. What are the main organizational costs?
10. What means of concealment are used?
11. What are some organizational strengths/weaknesses?
12. Is information isolated/segmented between entities?
13. How does corruption occur and what effect does it have on operations?
14. What has the most significant impact on production and production costs?
15. How does eradication impact production?

16. What methods are used for obtaining production materials (precursors, fertilizers, etc.)?
17. Who dictates packaging choices (customers/other)?
18. How is a production site selected?
19. What are some issues related to stockpiling and how do they affect the business?
20. What are the effects of loss of product on the organization?
21. How are price and purity determined?
22. How are drugs being transported from the source country to the U.S.?
23. What methods and routes of transportation are utilized?
24. What is the effect of law enforcement efforts on selected transportation routes/ methods (alternate routes preplanned, temporary stop of transportation, etc.)?
25. What other factors affect transportation routes/methods?
26. What determines the method of transportation and timing of transportation?
27. What are the different levels of coordination for transportation?
28. How are primary/secondary routes chosen?
29. How are events monitored?
30. Is intelligence used to counter law enforcement efforts, and if so, how?
31. Are the transporters paid in cash or in product and how much are they typically paid and/or what percentage of the load?
32. How does the organization distribute the drugs in the U.S.?
33. What are the various methods of distribution used by organizations?
34. What is the accountability of the different levels of distribution?
35. How are losses/seizures accounted for and who determines responsibility?

36. Within the organization, what is the level of awareness regarding various stages of an operation?
37. Is there awareness of a final destination?
38. How are final destinations chosen?
39. What is the distribution infrastructure?
40. What means of protection are used to secure the drugs once in the U.S.?
41. How are proceeds moved/launched (bulk money, money transfers)?
42. How are negotiations conducted: Price per kilo?
43. Form of payment, currency (USD, Euros, local) or wire transfers?
44. What types of collateral payments are accepted (real estate, currency, bank/stock accounts)?
45. At what point does ownership/accountability pass for the drug shipment?
46. Payment terms: Point of drug transfer, credit (what are the terms)?
47. How are losses/seizures accounted for and who determines responsibility?
48. Are written/computerized records maintained?
49. Are balance sheets of assets, expenditures, and cash flow maintained?
50. Who keeps the records?
51. How are the records stored?
52. How are the records communicated?
53. What steps are taken to hide assets?
54. Use of corrupt professionals, accountants, bankers, real estate agents?
55. Do drug trafficking organizations hold assets in third party names?
56. How are legitimate businesses used?

57. Use of corrupt professionals, accountants, bankers, real estate agents?
58. Do they hold legitimate businesses in third party names?
59. What part does bribery and corruption play in asset management?
60. Use of corrupt professionals, accountants, bankers, real estate agents in asset management?
61. Do drug trafficking organizations hold assets in third party names?
62. Who handles the money and at what stage?
63. Is money handling “contracted” to specialists that are not direct members of the organization?
64. Do organizations use stash houses at the U.S./Mexico border?
65. What happens to the money once it arrives in the country?
66. What methods do organizations use to launder money in source countries?
67. Are drugs and money ever handled together?
68. Use of same stash houses or concealment methods for drugs and money?
69. Is there a domestic investment of monies generated and in what venue?
70. If so, how common is this?
71. What means of communication are used, i.e., frequencies used, codes, e-mails, direct connect, cellular phones etc.?
72. How are communications handled regarding the movement of money?
73. How does a drug trafficking organization coordinate which radio frequencies to use?
74. What costs go into the purchase of communications equipment? Does the drug trafficking organization purchase top of the line equipment or cheaper, disposable communication devices?

75. When using specialized devices, such as a GPS, where are they purchased? Is there a common dealer in the area that all traffickers use for the purchase of said specialized equipment?
76. Was the drug trafficking organization conscious of having their communications intercepted (wiretap) and what steps did they take to evade this?
77. If a multi-National drug enforcement operation, lasting from 2 weeks to possibly 11/2 Months, took place targeting the “transit zone”, what would your drug trafficking organization’s response be to this enforcement action?
78. Do you know anything about the drug transportation networks in Central America or South America? If so, which countries?
79. What mode of concealment is used to transport drugs through the country you are located in?
80. What are the secondary routes being used by traffickers when the primary routes are being monitored by law enforcement (LE)?
81. Who decides and when is the decision made to use alternates routes; delay operations; or store the drugs in a safe location when LE is in the area?
82. Who decides and when is the decision made to use alternates routes; delay operations; or store the drugs in a safe location when LE is in the area?
83. What indicators should LE look for that will tip-off that a location/route will be used?
84. What procedures do drug transporters use to ensure their survival from LE or other criminal organizations?
85. What are the most critical things when transporting drugs by land, sea, or air?

APPENDIX C:

SENSITIVITY ANALYSES TABLES

Table A1. Predicting Heroin Prices: Model 1 Lagged Sensitivity Results

<i>Variables</i>	<i>Coef.</i>	<i>SE</i>	<i>t</i>	<i>Beta</i>
Life-time heroin users	-.904****	.137	-6.58	-.944
Opium produced	.077	.064	2.21	.174
Constant	13.373****	.949	14.10	.

*Adj. R*²= .724

Prob. > *F*= .0000

F (2, 21)= 27.57

p*< .05; *p*< .01; ****p*< .001; *****p*< .0001

Table A2. Predicting Heroin Users: Model 1 Lagged Sensitivity Results

<i>Variables</i>	<i>Coef.</i>	<i>SE</i>	<i>t</i>	<i>Beta</i>
One-gram heroin price	-.613****	.091	-6.75	-.728
Opium produced	.116**	.045	2.61	.282
Constant	11.513****	.720	15.99	.

*Adj. R*²= .821

Prob. > *F*= .0000

F (2, 21)= 48.15

p*< .05; *p*< .01; ****p*< .001; *****p*< .0001

Table A3. Predicting Heroin Prices: Model 2 Lagged Sensitivity Results

<i>Variables</i>	<i>Coef.</i>	<i>SE</i>	<i>t</i>	<i>Beta</i>
Heroin/cocaine poss. arrests	-.655*	.289	-2.27	-.301
Heroin/cocaine sale arrests	.807**	.246	3.28	.678
Opium eradicated	-.493**	.121	-4.09	-.527
Heroin seizures	.066	.137	0.48	.084
Opium produced	-.046	.061	-0.76	-.102
Constant	9.658*	4.313	2.24	.

*Adj. R*²= .837
 Prob. > *F*= 0.0000
F (5,18)= 24.63
 p*< .05; *p*< .01; ****p*< .001; *****p*< .0001

Table A4. Predicting Heroin Users: Model 2 Lagged Sensitivity Results

<i>Variables</i>	<i>Coef.</i>	<i>SE</i>	<i>t</i>	<i>Beta</i>
Heroin/cocaine poss. arrests	.395	.265	1.49	.196
Heroin/cocaine sale arrests	-1.069****	.226	-4.74	-.968
Opium eradicated	.058	.111	0.52	.067
Heroin seizures	-.038	.125	-0.30	-.053
Mexican opium produced	.056	.055	1.02	.136
Constant	15.246***	3.954	3.86	.

*Adj. R*²= .839
 Prob. > *F*= 0.0000
F (5,18)= 25.07
 p*< .05; *p*< .01; ****p*< .001; *****p*< .0001

Table A5. Predicting Heroin Prices: Model 2 Arrest Rates per 100,000 Sensitivity Results

<i>Variables</i>	<i>Coef.</i>	<i>SE</i>	<i>t</i>	<i>Beta</i>
Heroin/cocaine poss. arrests	-1.016**	.277	-3.67	-.596
Heroin/cocaine sale arrests	.935****	.208	4.50	.958
Opium eradicated	-.464****	.106	-4.38	-.543
Heroin seizures	.054	.124	0.44	.070
Opium produced	-.112	.056	-1.99	-.236
Constant****	12.230	2.020	6.06	.

*Adj. R*²= .881

Prob. > *F*= 0.0000

F (5,19)= 36.51

p*< .05; *p*< .01; ****p*< .001; *****p*< .0001

Table A6. Predicting Heroin Users: Model 2 Arrest Rates per 100,000 Sensitivity Results

<i>Variables</i>	<i>Coef.</i>	<i>SE</i>	<i>t</i>	<i>Beta</i>
Heroin/cocaine poss. arrests	-.103	.361	-0.29	-.061
Heroin/cocaine sale arrests	-.601*	.271	-2.22	-.618
Opium eradicated	.200	.138	1.45	.196
Heroin seizures	.084	.161	0.52	.108
Opium produced	.019	.073	0.26	.040
Constant***	8.243	2.634	3.13	.

*Adj. R*²= .881

Prob. > *F*= 0.0000

F (5,19)= 36.51

p*< .05; *p*< .01; ****p*< .001; *****p*< .0001

ABOUT THE AUTHOR

Alexander G. Toth is a retired law enforcement officer with over 30-years of military, local, and federal experience. He spent over 25 and half years as DEA Special Agent working in numerous U.S. states and 29 foreign countries. Some of his more significant assignments include: Resident Agent in Charge of the Tijuana, Mexico Office, Assistant Regional Director of the Bolivia Country Office, and Headquarters Chief of Enforcement for Latin America and the Caribbean. In his last assignment with the DEA he had executive oversight for enforcement operations in Brazil, Argentina, Uruguay, Paraguay, and Chile. Following his retirement from the DEA, he accepted a Presidential Fellowship in the Criminology Department at the University of South Florida. His research interests include: drug trafficking, transnational crime, terrorism, and sanctioning methods.