



Michigan Technological University
Create the Future Digital Commons @ Michigan Tech

Dissertations, Master's Theses and Master's
Reports - Open

Dissertations, Master's Theses and Master's
Reports

2011

Afghanistan connection : heroin production, distribution, and consumption

Brandon J. Swartz
Michigan Technological University

Follow this and additional works at: <https://digitalcommons.mtu.edu/etds>



Part of the [Agricultural and Resource Economics Commons](#)

Copyright 2011 Brandon J. Swartz

Recommended Citation

Swartz, Brandon J., "Afghanistan connection : heroin production, distribution, and consumption ", Master's Thesis, Michigan Technological University, 2011.
<https://doi.org/10.37099/mtu.dc.etds/443>

Follow this and additional works at: <https://digitalcommons.mtu.edu/etds>



Part of the [Agricultural and Resource Economics Commons](#)

THE AFGHANISTAN CONNECTION: HEROIN PRODUCTION,
DISTRIBUTION, AND CONSUMPTION

By

Brandon J. Swartz

A THESIS

Submitted in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

APPLIED NATURAL RESOURCE ECONOMICS

MICHIGAN TECHNOLOGICAL UNIVERSITY

2011

© 2011 Brandon J. Swartz

This thesis, "The Afghanistan Connection: Heroin Production, Distribution, and Consumption," is hereby approved in partial fulfillment of the requirements for the Degree of MASTER OF SCIENCE IN APPLIED NATURAL RESOURCE ECONOMICS.

School of Business and Economics

Signatures:

Thesis Advisor

Dr. Gary Campbell

Dean

Dr. Darrell Radson

Date

Table of Contents

| | |
|---|----|
| List of Figures | 4 |
| List of Tables..... | 5 |
| Abstract | 6 |
| 1. Introduction | 7 |
| 2. History and Current Affairs..... | 10 |
| 2.1. History of Mujahidin | 10 |
| 2.2. Afghan Insurgent and Warlord | 11 |
| 2.3. Taliban's Rise, Fall, and Comeback..... | 13 |
| 2.4. Heroin Market in Afghanistan..... | 19 |
| 2.5. Hawala Network | 21 |
| 2.6. Seizures..... | 22 |
| 2.7. Europe..... | 24 |
| 3. Literature Review | 27 |
| 3.1. Previous European Heroin Market Analysis | 27 |
| 3.2. Conflict | 28 |
| 3.3. Seizures..... | 29 |
| 3.4. Heroin Prescriptions | 29 |
| 4. Hypothesis, Data, and Model | 32 |
| 4.1. Hypothesis | 34 |
| 4.2. Model..... | 37 |
| 4.3. Data..... | 38 |
| 5. Empirical Results | 42 |
| 6. Discussion | 47 |
| 7. Bibliography..... | 50 |

List of Figures

| | |
|--|----|
| Figure 2.1 Afghan insurgent controlled area as of 2010..... | 14 |
| Figure 2.2 Afghanistan opium production in metric tons, 1990-2008..... | 17 |
| Figure 5.1 Western Europe price (\$/gram) and Afghanistan heroin supply (kg) | 45 |

List of Tables

| | | |
|-----------|----------------------------------|----|
| Table 4.1 | Summary of statistics | 40 |
| Table 4.2 | List of countries analyzed | 41 |
| Table 5.1 | 2SLS estimation results | 42 |

Abstract

Heroin prices are a reflection of supply and demand, and similar to any other market, profits motivate participation. The intent of this research is to examine the change in Afghan opium production due to political conflict affecting Europe's heroin market and government policies. If the Taliban remain in power, or a new Afghan government is formed, the changes will affect the heroin market in Europe to a certain degree. In the heroin market, the degree of change is dependent on many socioeconomic forces such as law enforcement, corruption, and proximity to Afghanistan. An econometric model that examines the degree of these socioeconomic effects has not been applied to the heroin trade in Afghanistan before. This research uses a two-stage least squares econometric model to reveal the supply and demand of heroin in 36 different countries from the Middle East to Western Europe in 2008. An application of the two-stage least squares model to the heroin market in Europe will attempt to predict the socioeconomic consequences of Afghanistan opium production.

1. Introduction

Poppy production in Afghanistan directly affects Europe's foreign and domestic policy. Recent conflict in Afghanistan has lowered European heroin prices, increased seizure rates, and provided funding for organized crime networks and insurgencies. This research hypothesizes that the change in Afghanistan opium production has socioeconomic consequences affecting European countries by changing foreign policy, drug enforcement laws, corruption, and crime rates. The intent of the research is to examine how the change in Afghan poppy production due to political conflict affects Europe's heroin market. A direct result of recent conflict has been an increase of 81% in Afghanistan heroin production during 2003 to 2008. At the same time, the heroin seizure rate in Europe has also increased by 37%.

This research develops a two-stage least squares model using data from 2008 for a simultaneous supply and demand of heroin in 36 different countries along the supply chain. The use of a two-stage least squares model for the heroin market will determine the impact of Afghanistan opium production on Europe and create a price estimate. Two-stage least squares is a common method of analysis for a supply and demand model. These variables have never been previously applied in this manner to create an econometric model to measure the effects of heroin on Europe.

Based on estimates from the U.S. Drug Enforcement Agency (DEA), Interpol, and United Nations, 90% of the heroin currently consumed in Europe comes from Afghanistan poppy production (U.S. Drug Enforcement Agency 2011). Europe is the ideal geographical area in which to analyze the heroin markets because of diverse demographics and heroin consumption rates per capita. The world heroin market has 11.3 million users who pay \$56 billion to street level dealers annually, of which Europe commands a 26% share (United Nations Office on Drugs and Crime 2009).

On the demand side, an interesting scenario occurs. Islamic countries have a low number of heroin users per capita compared to Europe. Sunni Muslims, in countries such as Saudi Arabia, are not allowed to use any intoxicating substances that alter their behavior and state of mind, thus reducing demand in a location where the percentage of Sunni Muslims is high. In Shia Muslim countries, such as Iran, the low number of heroin

users is related to their use of opium in religious practices and medical applications. Low heroin demand and increased corruption in Islamic countries allows the heroin to transit efficiently to Europe.

In Europe, demand per capita increases in countries where heroin prescriptions are legal. Liberal drug policy in this research is shown to increase by 188.27 users per 100,000. Heroin consumers in the European Union often migrate to Germany, Netherlands, Switzerland, or the UK where heroin prescriptions are legal (EMCDDA 2011). A country will license heroin manufacturing to private companies or use high-quality seizures to sell or donate to pharmaceutical manufacturers to prepare licit supplies and research (EMCDDA 2011). The licit supply will be administered in a designated clinic and the heroin must be consumed on site.

On the supply side, heroin flows greater than 70 metric tons are predominately transported through countries with an Islamic population greater than 50%. To put the 70 metric tons in perspective, worldwide annual production of heroin is 340 metric tons (United Nations Office on Drugs and Crime 2009). A large dump truck can hold 20 metric tons, which is the annual rate of U.S. consumption (U.S. Drug Enforcement Agency 2011). Low heroin use per capita, high opium use per capita, corrupt law enforcement, and an efficient supply network through Islamic countries allow a higher rate of heroin flow. Corruption and law enforcement are important factors in the shipping routes and seizure rate. A significant amount of corruption can lower seizure rates and negatively influence law enforcement or government officials, usually in the form of monetary compensation.

A recent history of conflict and opium farming in Afghanistan has played a significant role in the current affairs of heroin production. Both the Mujahidin and Taliban relied on heroin profits to fund a percentage of their political and violent conflicts. Afghanistan is set up for heroin production by having an ample supply of labor, land, corruption, weak border control, and minimal law enforcement. Warlords and insurgents have prospered from political and law enforcement corruption.

Recently, warlords have helped the U.S. oust the Taliban, but are generally perceived to commit crimes with impunity. Warlords are assigned to positions in

government, business, and law enforcement, creating allegations of land grabs, rape, murder, and kidnapping against them (Safi 2008). Although the Taliban are being ousted, they benefit from drug cultivation profits and convoy protection estimated to be \$400 million per year because of corruption in the government and law enforcement (Peters 2009). These Taliban profits allow the purchase of assets (ordinance, payment to government officials, and operational expenses) to protect their drug market and fund political objectives.

The history and current affairs of Afghanistan discussed in section 2 have shaped heroin distribution and consumption in Europe. European legislation has adapted to the socioeconomic consequences of an increased heroin supply. This adaption is shown by a higher seizure rate in Europe over the last decade. Next, section 3 discusses previous literature relevant to the heroin consumption and distribution network. Literature on heroin seizure rates reveals how law enforcement can influence the price of heroin and prescriptions of the drug can reduce the burden on law enforcement by decreasing drug related crimes and violence. After the literature review, section 4 includes the hypothesis of the variables, the econometric model, and sources of the data. The two-stage least squares econometric model is applied in section 5. Section 6 discusses the implications of the model's application and how an extensive econometric model for the heroin market may be developed.

2. History and Current Affairs

The development of the Mujahidin during the Afghan-Soviet War created a new era of warfare in the Middle East. Insurgents travelled to Afghanistan for ‘jihad,’ and different groups have controlled Afghanistan since 1979. In the 1980s the Mujahidin was the main opponent of the Soviets. The Mujahidin lost power after the Soviet’s left because of civil conflict and mistreatment of the Afghan population. The Taliban rose to power in 1994, with the intent of protecting the Afghan population from Mujahidin corruption. In 2001 the ‘protection’ diminished and the Taliban was violating human rights and hosting terrorist organizations. Al Qaeda’s destruction of the World Trade Center on September 11, 2001 provoked the U.S. to invade. Not long after the invasion a Taliban ‘comeback’ formed near the Afghanistan- Pakistan border. The geographical features and weak border controls made this feasible. The Taliban’s influence of power over Afghanistan affects the European heroin market and will be explained in this section.

2.1. History of Mujahidin

The Afghanistan War from 1979-89 was a conflict between anti-Communist Islamic Afghan insurgents (Mujahidin) and the Afghan government aligned with Soviet forces. The conflict had its origins in the 1978 coup that overthrew Afghan president Muhammad Daud Khan who had come to power by ousting the king in 1973 (Kopczyk 2004). In 1979 another coup, which brought Hafizullah Amin to power, provoked an invasion by Soviet forces and their installation of Babrak Karmal as Afghan president. The Soviet invasion provoked Afghan resistance and initially involved an estimated 30,000 troops, a force that ultimately grew to 100,000 (Kopczyk 2004). The Mujahidin benefited from their proclaimed leader, Dr. Abdullah Azzam’s establishment of service offices (Maktab al-Khidmit).¹

The insurgent network of the Mujahidin used the service office as base camps to heal the wounded, hand out supplies, and train new recruits. The services office in the

¹ Service offices are base camps outside of Afghanistan (i.e. outside the conflict zone). Military training, supply depot, and medical capabilities are at the service offices.

1980s was run by Usama Bin Laden and Dr. Azzam; training ‘holy warriors’ from more than 50 countries to fight the Soviet forces in Afghanistan (Lissitz 2003). Funding of the Service Offices came from private investment or foreign governments such as the Pakistani ISI and Saudi Arabia. The Mujahidin received aid and training from the Central Intelligence Agency throughout the Cold War years, along with Pakistan, Saudi Arabia, and Iran sending monetary and weapon support (Gress and Grau 2002).

The Soviets had superior weaponry throughout the conflict, but they became hesitant with their airpower in the rural areas after 1985 when the U.S. gave the Mujahidin antiaircraft missiles (Gress and Grau 2002). The conflict largely settled into a stalemate, with Soviet and government forces controlling the urban areas, and the Mujahidin operating freely in mountainous rural regions. As the war progressed, the Mujahidin improved their organization and tactics and began using imported and captured weapons, including U.S. antiaircraft missiles, to neutralize the technological advantages of the USSR.

The Mujahidin maintained service offices throughout the world in Afghanistan, Pakistan, and the United States, particularly the al Kifah Refugee Center in Brooklyn, Arizona, and multiple locations in Texas (Kopczyk 2004). Bin Laden wanted these fighters to continue the “holy war” beyond Afghanistan and Azzam wanted to keep the organization in the Middle East. The creation of al Qaeda in 1988 came after Usama Bin Laden parted ways with his long time mentor Azzam due to Bin Laden’s demand of a global presence for the Mujahidin. When the former Mujahidin members did not join al Qaeda, different sections of the Mujahidin formed into Afghan warlords, Taliban, and Northern Alliance. The Afghan warlords, Taliban, and Northern Alliance scope of conflict is in Afghanistan, unlike al Qaeda’s global agenda.

2.2. Afghan Insurgent and Warlord

In Afghanistan, a Taliban member can be classified as an insurgent. Insurgents are not like the ordinary criminal or lunatic assassin; the insurgent tends to not be purely egocentric, they are partially homocentric and violent intellectuals (Hoffman 2006). A new network of political resistance has developed from the Taliban, populated with

individuals who are ideologically motivated, inspired, and animated by a movement or a leader, but the majority of insurgents operate outside any established chain of command (Hoffman 2006). There is not a cohesive mission plan for the insurgents, just attack when the opportunity arises. One individual may have the lead role, but they operate in cells independent from other cells and focus on small attacks. When a large mission is necessary, they seek out a ranking official in the Taliban. A certain cell may never know the other exists, making the organization elusive from law enforcement and military. This makes it a nightmare to trace their insurgent network, because they blend in with the civilian population.

Afghan “warlord” is a term for a former militia leader during the Afghan-Soviet Conflict. Following the 1989 withdrawal of Soviet troops, rival Mujahedin groups that had united to drive the foreigners out turned on each other, further decreasing political stability in Afghanistan erupting into a brutal civil war marked by warlord rule (Safi 2008). The Afghan government collapsed and the warlord militia leaders seized territory, terrorized the population, and issued their own currency. The Taliban capitalized on the warlord’s individualist governance in each territory by eventually bringing the warlords together to form a powerful governing body in Afghanistan (Thomas 2005). The Taliban’s rise to power in 1996 came about, in part, because of their perceived justice-seeking agenda for society with collective governance.

The Afghan warlords largely responsible for assisting the U.S.’s ousting of the Taliban in 2001 are now deeply entrenched in Afghan society (Safi 2008). Warlords have maintained their core militia’s in the form of private security companies, political parties, or business networks (Safi 2008). They have positions in government, police, army, and business. An Afghan citizen’s perception of a warlord is that they are protected by their influence and their use of violence, which threatens to undermine the very government that the United States and its allies are trying to build. Warlords can generally commit crimes with impunity, creating allegations of land grabs, rape, murder, and kidnapping (Safi 2008).

2.3. Taliban's Rise, Fall, and Comeback

The economic power of the Taliban transforms into religious justification and political expression. The Taliban developed their expertise in warfare and conflict finance during the Soviet campaign to spread Communism in Afghanistan, hence their rise to prominence in 1994. From 1996-2001 the Taliban was officially in control of Afghanistan. The fall of the Taliban's power came in 2001 when the U.S. invaded. A comeback for the Taliban started after 2002. Their comeback is in a condensed area along the Durand Line (in the Southern and Western portions of Afghanistan), refer to Figure 2.1. The comeback brought a new political approach, one of decreasing certain aspects of strict Sharia law.

The Afghanistan Taliban has never appeared on the U.S. State Department's list of Foreign Terrorist Organizations, nor does it appear on similar lists maintained by Britain, the European Union, Canada, and Australia (U.S. Department of State 2011). Tehrik-e- Taliban is on the U.S. State Department's list. They are a Pakistan based terrorist organization with no official affiliation to Afghanistan, which has claimed responsibility for numerous terrorist acts against Pakistan and U.S. interests.² Only the Russian government officially considers the Afghan Taliban to be terrorists.

The translation of the word 'Talabeh' means religious student.³ They call themselves 'Taliban' as in religious students who are imposing religious law (Kaplan 2006). They are not officially a terrorist group, just insurgents. The Afghan Taliban is a local insurgent group whose activities and scope are limited to Afghanistan, and to a lesser extent, the border areas of Pakistan (Goodhand 2005). At this stage of its insurgency, the Taliban movement is opportunistic and religiously centric.

² The statement was on September 1, 2010 from the State Department Assistant Secretary of Public Affairs, Phillip Crowley.

³ Taliban is the plural form of "Talabeh"

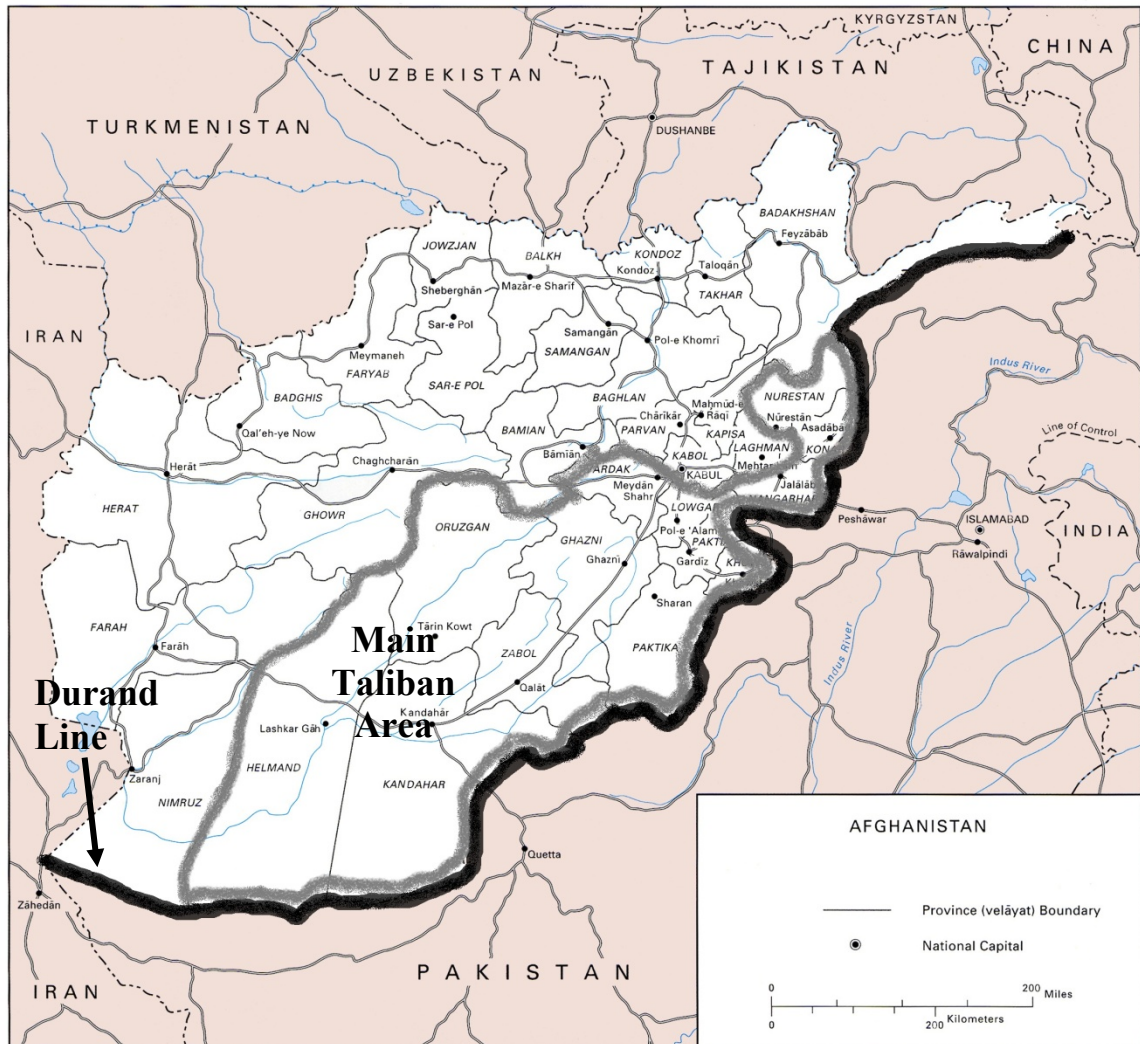


Figure 2.1 Afghan insurgent controlled area as of 2010 (U.S. Department of State 2011).

Rise

During the tail end of the Cold War the U.S. saw an opportunity to weaken the Soviets and gain the Afghans as allies. The U.S. and other nations provided the training and equipment for the Mujahidin in the 1980s. The end of the Mujahidin battle with the Soviet forces in 1989 did not provide political cohesion, leaving the Afghan government in disarray. After the Soviets left and foreign aid diminished, Mujahidin warlords were in constant conflict. The law and order of the country was in shambles, but the Taliban implemented governance once they gained control of Kabul. This was their “rise” to

power. Once the Afghanistan civil war was settled in 1996, the Taliban implemented strict Sharia law governing Afghanistan until 2001.

Prior to the Taliban rise to power, the Mujahidin warlords collected tax revenue from the opium market.⁴ Copying the Mujahidin warlords efforts in opium taxation, the Taliban mirrored this scheme, but improved its efficiency. The centralization of authority under the Taliban movement in 1996 ignited Afghan poppy cultivation and opium production.

The ability to govern the population allowed control over laws and taxation. During the Taliban's centralization of government, they collected an agricultural tax (approximately 10%), known as *ushr*, and a traditional Islamic 'tithe' known as *zakat* (variable percentages, 5-10%).⁵ The Taliban also taxed opium traders and transport syndicates involved in the transportation of opiates (UNODC 2010). Areas under Northern Alliance control have taxed opium production and transportation, but it was not as consistent practice as for their foe, the Taliban.

Effective control over the population was displayed from 1996 to 2001. Under the Taliban regime, Sharia law was interpreted to ban a wide variety of activities in Afghanistan: movies, television, videos, music, dancing, kite flying, and beard trimming. Possessions depicting living things were forbidden, whether it was a drawing, painting, photograph, stuffed animal, or doll (U.S. Department of State 2011).

International notoriety followed the Taliban's treatment of women. Women had a rigid list to follow in public:

Women were forced to wear the burqa in public. They were allowed neither to work nor to be educated after the age of eight, and until then were permitted only to study the Qur'an. They were not allowed to be treated by male doctors unless accompanied by a male chaperon, which led to illnesses remaining untreated.

⁴ Opium is processed chemically to produce heroin. Heroin production is dependent on opium production.

⁵ This form of Zakat applies to production goods in Islam from wealth, production, and animals. Zakat is usually 2.5 percent of their income typically for the madrasah or masque, typically given in the form of cash. Muslims fulfill this religious obligation by giving a fixed percentage of their surplus wealth, beyond one's personal needs.

Employment for women was restricted to the medical sector. They faced public flogging in the street, and public execution for violations of the Taliban's laws.

(Rashid 2000)

The employment ban for women caused primary school for boys and girls to close because almost all the teachers there were women (Rashid 2000). Taliban restrictions became more severe after they took control of the capital. In February 1998, religious police forced all women off the streets of Kabul and issued new regulations ordering people to blacken their windows so that women would not be visible from the outside (Rashid 2000).

The Taliban did not hold elections because Sharia law does not allow politics or political parties (Rashid 2000). Insurgents did not receive salaries, just food, clothes, shoes, and weapons. A March 1996 interview with Taliban member, Mullah Wakil, an aide to former Taliban leader Mullah Omar, reflects a fundamentalist view of justification of their war against non-Muslims: “We want to live a life like the Prophet lived 1400 years ago and jihad is our right. We want to recreate the time of the Prophet and we are only carrying out what the Afghan people have wanted for the past 14 years” (Rashid 2000).

Fall

In August 1999 the Taliban issued a decree to reduce poppy cultivation by one-third (Goodhand 2005). Taliban leader Mullah Omar issued this decree due to international pressure about heroin production. The second edict passed in July 2000 declared the cultivation of poppies for opium as ‘unIslamic’ or *haram* and the ban was enforced rigidly, bringing down production to 200 metric tons, see Figure 2.2 (Goodhand 2005).

In 2001 opium production was 200 metric tons, one of the lowest production rates in recent history. Undesirable weather conditions and the U.S. invasion to subdue terrorism after 9/11 also influenced the production decrease. The production decrease did not affect heroin distribution because of an excess Taliban stockpile. The Taliban’s

downfall began because of international pressure from the UN, the U.S., and other European countries for human rights violations and opium production. Refer to Figure 2.2 for Afghanistan opium production rates from 1990 to 2008.

The Taliban appeared desperate to lift the UN sanction demanding the closure of terrorist camps, a halt of illicit drug activity, and the turning in of Usama Bin Laden.⁶ Taliban leader Mullah Omar wanted to publically denounce the planting of poppies for drug production. Despite the ban on growing poppy, the Taliban seizure and arresting of traffickers was still an issue (Peters 2009). The Taliban crackdown on heroin was never intended to have real enforcement power, but to just please the UN. This was due to the profit the Taliban received from the poppy cultivation and drug smuggling convoy protection.

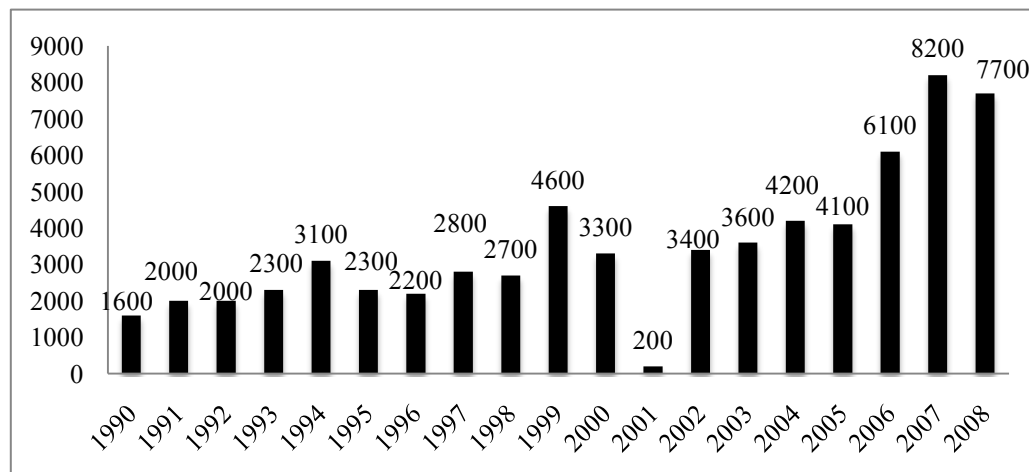


Figure 2.2 Afghanistan opium production in metric tons, 1990-2008 (UNODC 2010).

Comeback

The Taliban's comeback was successful due to weak Pakistani border control, utilization of the heroin network, corruption, and a decrease in strict Sharia law. The area bordering Pakistan is a nexus for the Taliban and poppy cultivation, refer to Figure 2.1.

⁶ UN Security Council 1333- Sanctions against the Taliban

In areas such as the Swat Valley in Pakistan, the Pakistani military needs permission from insurgents to enter. The Pakistan government does not have control of land within their country. Campaigns by Swat Valley insurgents have been the most destructive anywhere in Pakistan. Insurgents and terrorists have targeted security forces, police, secular politicians, and government-run schools. Without border control from Pakistan or Afghanistan, a network of weapons, drugs, and people can freely enter and exit Afghanistan.

The U.S. is constrained by using a conventional military force for fighting an asymmetric war against the Taliban. Asymmetric warfare is between a conventional military force fighting an unconventional guerilla/insurgent force. Asymmetric war is a broad and unpredictable spectrum of military, paramilitary, and information operations, conducted by nations, organizations, or individuals. Specifically in Afghanistan, the Taliban uses their ability to attack and blend in with society because they are not wearing uniforms. The conventional forces can not seek and destroy the Taliban for this reason. Larger conventional forces are more prone to a weaker security protection, thus allowing the Taliban to pick their battles. Taliban fighters are local, and largely accepted by the Afghan population in the South (Pashtun areas). Former British Commander Richard Kemp said, “Taliban in Southern Afghanistan are masters at shielding themselves behind the civilian population and then melting in among them for protection. Women and children are trained and equipped to fight, collect intelligence, and ferry arms and ammunition between battles” (United Nations Office on Drugs and Crime 2009).

Not only do Western governments have to fight an asymmetric war; they have to fight the drug trade. Opium cultivation represents a continuing threat to Afghanistan’s governance and has made a ‘comeback’ possible for the Taliban. This will hinder long-run economic development and governmental efforts to structure institutions because of a system of corruption. Corruption within the Afghan government destroys the credibility and confidence to rid Afghanistan of the Taliban.

The opium threat will be contained and reduced by providing access to credit and subsidizing legal markets. State and foreign government cannot stop opium production by eradication and law enforcement; they need to provide incentives for the producers.

Small scale foreign aid and Afghan government subsidized crop substitution programs alone will not eliminate drugs from Afghanistan. Economic incentives will work for the farmers, only if the country's corrupted elite is forced to cease collecting from this highly lucrative drug trade (Olcott 2010).

2.4. Heroin Market in Afghanistan

The economic effects of the Afghanistan drug trade have implications on the Afghan GDP, government stability, and property rights. The fact that an illicit commodity disrupts social and economic activity globally displays the indirect power of politically unstable states. When using the basic comparative advantage model, a country rich in a particular resource would be better off specializing in supplying that resource to a country with less resource abundance. If there is a downturn in prices or the resource extraction is deemed illegal, the manufacturing sector of this resource can leave quickly. Opium's byproducts (heroin) can be treated as a resource. Afghanistan is set up for opium production by having an ample supply of labor, land, and minimal law enforcement. Opium is currently a low-risk crop in Afghanistan due to lack of law enforcement and political conflict (Masfield and Pain 2007).

Farmers in war torn Afghanistan cultivate poppies to earn three times the profit per hectare (Ha) compared to wheat.⁷ In 2009 the United Nations reported that Afghan farmers earn \$3562 per Ha from poppies compared to \$1101 per Ha of wheat (UNODC 2010). Ninety-nine percent of the opium was cultivated in seven provinces located next to Pakistan in the South and West, with the Helmand province leading the way (UNODC 2010). The Helmand province is the leading producer because of its proximity to the Durand line and use of water runoff from the mountains to irrigate crops.

The post-2001 Taliban allowed drug profits to trump religion. The practice of Islam does not allow the use or sale of intoxicating substances. The lure of profitability has caused Muslims to shed their religious practices in farming. The opportunity cost of farming an illicit commodity is presently worth the low risk in Afghanistan.

⁷ 1 hectare(Ha) = 2.471 U.S. survey acres

Production has dropped less dramatically than it did in the previous decade because farmers have extracted more opium per bulb. This is done because of increased eradication policies implemented under Afghan President Karzai. In 2009 Afghan poppies yielded 56kg/ha; a fifteen percent increase from the previous year (UNODC 2010). The 2009 cultivation has decreased by twenty-two percent in Afghanistan and production was down ten percent to 6900 tons (UNODC 2010). By increasing opium production, production costs for other agricultural sectors are also increased. Opium farms require an abundance of labor to produce a final product; this will raise wages within the country.

During the Afghan 1979-1989 war with the Soviets, a system flourished where landowners and drug merchants would hire the Mujahidin to protect their drug shipment (Peters 2009). The Mujahidin used the profits to support the resistance against the Soviets. The CIA and Saudi Government funds were not evenly distributed by the Pakistani Inter Services Intelligence (ISI) among the insurgents in Afghanistan providence with a high Pashtun population. The ISI distributed the funds to certain insurgent groups (i.e. Pashtun leaders) while excluding others. The exclusion from ISI funds was partially due to the not being an ethnic Pashtun in Afghanistan. This exclusion provoked some non-Pashtun Afghani insurgents to produce more opium, strengthening their grasp on the heroin trade to increase their profits.

From the dawn of their inception the Taliban's political objectives and religious principles were rigid. Since 2001, the insurgency had decreased their requirements of strict Sharia law because of reliance on the financial backing of drug smugglers (United Nations Office on Drugs and Crime 2009). There is a common misconception when an outside perspective is used to analyze the Taliban. The misconception is religion trumps securing profits from drug production and smuggling. Their rise to power was derived from a capitalist agenda of smuggling drugs for profit and using Allah for justification or the "ends justify the means" (United Nations Office on Drugs and Crime 2009).

Afghanistan's opulent history of drug smuggling tactics has developed since the 1979 Afghan War with the Soviets. U.S. and NATO officials reported attacks on security checkpoints to allow convoys to pass and major diversions to draw troops and law

enforcement to certain strategic areas or away from checkpoints. The Taliban's application of ingenious diversion is not as well established in their accounting for drug profits. The United Nations Office of Drug and Crime (UNODC) and the U.S. Institute for Peace estimate a profit of \$125 million per year from heroin production and \$250 million for convoy protection (Peters 2009).

2.5. Hawala Network

The hawala is an underground banking system that facilitates money transfer without money movement (U.S. Army 2009). This is a form of a remittance system developed out of necessity in order to provide financial services in remote or underdeveloped regions where official banking systems are not present. The hawala relies on a theological law for regulations where the conventional 'Western' banking systems has faith in secular law.

A hawala network is simple to set up; all that is need is a phone line, and a trusted hawaladars (individuals involved in the hawala network). Customers in one city give their local hawaladar money. That hawaladar then contacts his counterpart in another location. The counterpart hawaladar then distributes the money from his own account to the recipient. Within the heroin trade the extent of this invisible cash network is not known, but is assumed to be substantial.

The Hawala network does not require a person's social security number or identification card to open an account. The efficiency of the network can allow a transfer to take place in a day or two, unlike a wire transfer that can take up to month to arrive (U.S. Army 2009). An example of being able to send money without authorities noticing is when two traders agree to a misprice deal. A shipment that would normally cost \$100,000 would have a value of \$150,000 on paper. The extra \$50,000 is the drug money needed to finalize the deal.

Because of the large volume of transactions channeled through the network, the hawaladars do not have to worry about debt settlement (U.S. Army 2009). Hawaladars are often members of the same clan or ethnic groups. Thus, the individuals are able to

carry each others' debts for long periods of time. The hawala is mainly used because the money sent avoids a paper trail.

Money smuggling is a different aspect of the heroin trade not related to the hawala network. It is common practice for insurgent groups and heroin dealers in the Middle East and South Asia. Drug cartels and insurgencies usually operate with U.S. currency. Smuggling involves the physical movement of money. Weak border controls in the Middle East and Eastern Europe facilitate this activity. The Taliban utilizes traditional smuggling routes from the Islamic Caliphate and methods established by drug traffickers, arms dealers, and other organized crime activities.⁸ The Taliban also utilize air and ship transportation assets used by the Al Qaeda and various African insurgencies (U.S. Army 2009).

2.6. Seizures

Recent conflict in Afghanistan has increased production, lowered European heroin prices, increased seizure rates, and provided funding for Taliban, criminal, and organized crime networks. Only 10% of the heroin produced is seized. An estimated 735,799kg of heroin was produced in 2008 and a mere 73,667.16kg was seized in route to final destination (UNODC 2010). During 2003 to 2008 production of heroin increased by 81% and the seizure rate increased by 37% (United Nations Office on Drugs and Crime 2009).

In the Middle East and Southwest Asia seizure rates have gone from 10,759.76kg in 2003 to 28,642.07kg in 2008 (UNODC 2010). Political pressure and international task forces have increased the seizures reported within close proximity to Afghanistan, but not every country targeted drug smugglers. Pakistan has the lowest seizure rate based on proximity and drug flow. During this time period seizures in Pakistan went from 6,363.93kg to 1,900.36kg.

⁸ Islamic Caliphate refers to the Ottoman Empire (1299-1924). Caliphate is a system of government established in Islam and is politically united Muslim Ummah (nation).

The Pakistan decrease in seizures is a result of weak border controls. The insurgents use the border between Pakistan and Afghanistan (Durand Line) to their advantage, see Figure 2.1. The rugged geography and political issues make this an ideal place for the drugs to flow. The Pakistan government does not have control of the Durand Line. The Durand Line marks the modern border with weak law enforcement and excessive corruption of government officials in both Pakistan and Afghanistan. The Taliban in Afghanistan and the Pakistani Pashtun do not recognize its validity because the border was drawn by the British government in 1893 (Hussain 2007). Since 2001, U.S. forces in Afghanistan have forced the Taliban to increase their dependency on a weak Durand Line. The U.S. was only allowed to use a very limit amount of Pakistan air space just across the Durand Line and Pakistan did not have control of their Pashtun population near the Afghan border. The insurgents fighting the U.S. can cross into Pakistan and disappear.

Transportation of supplies for producing heroin and the final product can effortlessly be moved across the Durand Line. An estimated 50% of heroin is produced from laboratories in Afghanistan and Pakistan (UNODC 2010). The other 50% is produced in Iran, Russian, and Eastern Europe (UNODC 2010). Precursor chemicals for laboratory use include acetic anhydride, ammonium chloride, ether, acetone, lime, and sodium carbonate. The labs are far from elaborate; many are outdoors and use crude oil barrels, wood, straining cloth, and litmus paper. In the end, roughly 10 grams of raw opium can be converted into 1 gram of heroin.

On the Western European front, the UK and Portugal have seen decreasing seizure rates since 2003 (UNODC 2010). The lower seizure rates in the UK and Portugal are directly related to increased seizure rates in Turkey and increased heroin consumption in Eastern Europe (UNODC 2010). Turkey's increased seizure rate benefits European countries by reduced heroin consumption. In 2003 Turkey seized 4,705kg of heroin and by 2008 that number climbed to 15,447kg. Turkey is a heroin gatekeeper for Western Europe. Due to insufficient data from Eastern European governments the consumption can only be implied based on the shift in the structure of Western European markets.

2.7. Europe

Europe was the ideal geographical area in which to analyze the heroin markets because of diverse demographics and heroin consumption per capita in the European Union compare to other nations. The price of heroin has been decreasing since 1990 due to increased availability of heroin prescriptions and a steady increase in supply. UNODC, Interpol, and the European Monitor Center for Drugs and Drug Addiction (EMCDDA) are leading agencies involved with EU heroin issues.

Currently 90% of the heroin consumed in Europe comes from Afghanistan (UNODC 2010). Prior to 1990, the majority of heroin consumed in Europe came from Southeast Asia (EMCDDA 2011). The heroin produced in Latin American is rarely seen in Europe, which is confirmed by the DEA, EMCDDA, and Interpol.

There are many shipping routes through which smugglers can transport heroin to the European Union. The heroin travels from Afghanistan to Russia, Iran, or Pakistan before reaching the Balkans or Turkey. If traveling through the Russia route, the heroin travels through Eastern Europe before entering Western Europe. When going through Iran and Pakistan, the heroin travels to Turkey before entering Western Europe. Interpol has released this information about the shipping routes into Europe:

Two primary routes are used to smuggle heroin: the Balkan Route, which runs through southeastern Europe, and the Silk Route, which runs through Central Asia. The anchor point for the Balkan Route is Turkey, which remains a major staging area and transportation route for heroin destined for European markets. The Balkan Route is divided into three sub-routes: the southern route runs through Turkey, Greece, Albania and Italy; the central route runs through Turkey, Bulgaria, the Former Yugoslav Republics of Macedonia, Serbia, Montenegro, Bosnia and Herzegovina, Croatia, Slovenia, and into either Italy or Austria; and the northern route runs from Turkey, Bulgaria and Romania to Austria, Hungary, the Czech Republic, Poland or Germany. Large quantities of heroin are destined for either the Netherlands or the United Kingdom.

Although the Balkan Route is considered the primary supply line for Western Europe, Afghan and Central Asian traffickers smuggle heroin along the Silk Route into Russia, the Baltic States, Poland, Ukraine, the Czech Republic and other parts of Europe. Tajikistan, Uzbekistan, Kyrgyzstan, Kazakhstan, and Turkmenistan are vital transit countries.

(Interpol 2011)

The many shipping routes of heroin smugglers and organized crime networks provide a sufficient flow into the European Union. Substantial profits allow criminal and organized crime networks to prosper. These perpetrators can afford to pay for protection: ordinance (e.g. military grade weapons and supplies), mercenaries, and incentives to corrupt government officials.

Once the smugglers and drug dealers give the heroin to the street level “pushers,” the heroin consumers have options in how to consume the final product: inject, snort, smoke, or ingest.⁹ The heroin comes as a solid and must be turned into a liquid, through an endothermic process. Those intending to inject this form of heroin must first mix it with, for example, citric acid or ascorbic acid. Heat is not a necessary component for injection, just a vial to mix up the solution.

The majority of Afghanistan heroin in Europe is consumed by smoking, snorting, or injection. Injection is preferred due to the initial “rush” and length of “high.” The injection consists of three uses for the hypodermic needle: intravenously, subcutaneously, and intramuscularly. A typical dose is 100 mg at street level purity ranging from 7%-43% in Eastern Europe to 30%-50% in Western Europe (EMCDDA 2011). Smoking and snorting is prevalent when the purity level of heroin is higher. Smoking is done through a vaporization process, heating the solid heroin on a metal foil above a small flame and inhaling the vapor. Snorting is popular due to no preparation compared to smoking or injection, but the length of the “high” is reduced. There is a fourth method of consuming heroin, ingestion, but it is much less popular. Ingestion does not give the consumer the “rush,” and the effects are far less potent.

⁹ “Pusher” is a low level drug dealer.

Afghanistan produces a brown heroin (chemical base) and countries in the Golden Triangle produce white heroin (a salt form). The heroin in the Golden Triangle is suitable for injection without heat, but is rarely seen in Europe. Most of the world's heroin came from the Golden Triangle (Burma, Myanmar, Laos, Thailand, and Vietnam) until the early 21st century when Afghanistan became the world's largest producer. The Burmese warlord, Khun Sa "Opium King," surrendered to Burmese authorities in 1996 to avoid U.S. criminal charges for importing heroin to the U.S. Burmese officials would not extradite the "Opium King" to the U.S. The production of Golden Triangle heroin production never recovered and Afghanistan increased their market share of opium production since 1996.

3. Literature Review

The research in this thesis uses the two-stage least squares econometric model for simultaneous heroin markets to test key assumptions made by earlier research. This literature review covers previous efforts to analyze the heroin market, conflict, seizure rates, and heroin prescriptions. Some of the conclusions are: conflict in Afghanistan has a negative effect on Europe by increased cost of law enforcement to combat organized crime, cartels, excessive drug use, and political corruption. Significant profits from narcotics cultivation and trafficking negatively influence establishing a legitimate government in Afghanistan. Seizure rates and heroin prescriptions are a European issue. Seizure rates show how law enforcement can influence the price of heroin. Heroin prescriptions can reduce the burden on law enforcement by reducing drug related crimes and violence. A negative aspect of prescriptions is that they may increase drug use in the country. These issues will be discussed accordingly in section 4, Hypothesis, Model, and Data.

3.1. Previous European Heroin Market Analysis

Amy Gibson et al. (2005) produced a trend analysis of the European heroin market similar to other analyses done by the UNODC, U.S. Congressional Research Service (Christopher Blanchard), and the World Bank. The authors' examine the price of wholesale and retail heroin under general heroin market conditions in Western Europe, the United States, and Australia over the 2001 period of Afghanistan opium supply reduction (Gibson et al. 2005). The trend analysis found little evidence of a price shift in these three heroin markets as a consequence of the decrease in opium production in Afghanistan. There was no consequent shift in the overall price of heroin in either Europe (Gibson et al. 2005).

The amount of opium may have been stockpiled in Afghanistan or already in the supply traveling to Europe. Dry opium can be stored for decades and then converted to heroin when the demand is present. Despite the drastic decline of the 2001 Afghanistan heroin production, 20 metric tons as compared to an average of 200 metric tons in previous years, there was no evidence of a direct impact on the illicit heroin in the

European Union. Many large harvests in the 1990s and short duration of the Afghanistan production ban allowed the heroin supply network to utilize dry-opium stockpiles (Gibson et al. 2005). The stockpiles contributed to the price being unaffected in the European heroin market because of the decrease poppy production in 2001.

The authors' observations highlight the complexity of factors influencing drug prices in destination heroin markets and suggest caution in predicting retail level changes in Europe due to opium production in Afghanistan. The Taliban ban on opium production may have been a ploy to profit from existing stockpiles of opium. The authors observed that the ban was only on opium production, not opium trafficking (Gibson et al. 2005). The trafficking provides a significant profit for the Taliban.

The socioeconomic factors of law enforcement activity and other drug market conditions in a country play a significant role in the heroin market (Gibson et al. 2005). Law enforcement action along the supply chain of heroin can disrupt market conditions. Trafficking routes and supply destinations shift to areas that have a low number of law enforcement officers or a high number of corrupt government officials. Law enforcement activity will also influence the number of property and violent crimes committed. An area within a country that suffers from significant drug use has less law enforcement available to deter violent or property crimes (Varano et al. 2004).

3.2. Conflict

In Afghanistan, there is a long history of heroin production. Svante E. Cornell's research focuses on the interaction of narcotics and conflict revealing that few of the conflict zones produce the final illicit commodity, but instead focus on cultivation (Cornell 2007). Once the conflict increases, large-scale industrial production of the drugs followed suit. The narcotics correlation with conflict has been a trend in Afghanistan, Burma, Columbia, and Peru over the last 15 years (Cornell 2007).

Developmental economists suggest political conflict is a characteristic of every country, but violent conflict is concentrated in the lowest- income countries (Collier 2007). Economic development has a dynamic effect by allowing groups to engage in political debate rather than violence. Economic development is crucial for preventing

civil war, which matches the ‘poverty trap’ proposed by Paul Collier. A ‘poverty trap’ is a country with violent conflict, bad governance, landlocked with bad neighbors, and natural resource abundance (Collier 2007). Slow growth, low income, and a dependency on a primary commodity for export are three economic characteristics destined for economic and political disaster (Collier 2007).

3.3. Seizures

The research of Weatherburn and Lind pertains to the impact of heroin seizures on the market price. The hypothesis proposed by Weatherburn and Lind is that large scale seizures of heroin which influences price and/or purity in the final stage of consumption (Weatherburn and Lind 1992). In theory, as price increases an addict will quit using heroin, decrease their consumption, or commit more crimes to pay for the activity.

Supply side law enforcement can increase the price of a drug if effective, but costs and benefits are difficult to quantify. Weatherburn and Lind’s conclusion is that expected losses due to seizure are accounted for by dealers. The substitution effect will take place with a high seizure rate reducing drug dealer’s supplies. The drug users will switch to a different drug until their old drug is available for distribution in the market.

To go one step further than Weatherburn and Lind, a large influx of Muslims immigrated to Europe in the last decade; this can provide a base for a hawala network or organized crime from Eastern Europe and the Middle East (U.S. Department of State 2011). This network will be efficient in the distribution of the heroin and difficult for European law enforcement to infiltrate due to the ethnic and religious demographics.

3.4. Heroin Prescriptions

The impact of heroin on society has caused many European countries to change their law enforcement practices, domestic drug policy, and foreign policy. Currently, heroin is legal with a license in Belgium, Denmark, Germany, Ireland, Netherlands, Portugal, Switzerland, and the UK.

Switzerland has one of the most liberal drug policies in Europe, leading to more illegal drug use per capita than other countries in Western Europe. The development of

“needle parks” in the 1990s brought negative international attention to Switzerland. Zurich experimented with a needle park where addicts could openly purchase drugs and inject heroin without police intervention (U.S. Drug Enforcement Agency 2011). The “needle park” was done to reduce HIV by providing sterile injection materials and injection rooms in large cities. Addicts migrated across Europe to Zurich making it the nerve center for heroin use. The “needle parks” in the end were a social hazard because of increasing crime rates and health risks. Closing these sites in 1995 did not eradicate the high heroin use per capita in Switzerland. After the failure of the “needle parks,” the heroin prescription program launched in 1998 with 87% of the participants having a criminal background. Many of the participants relied on criminal activity for income to sustain their drug use. By providing heroin to users, violent and property crime decreased within the test program, thus reducing the strain on law enforcement.

Research conducted by Killias and Aebi, who surveyed 600 addicts in the Switzerland’s heroin program for up to 24 months, found methadone to be an insufficient substitute for heroin (Killias and Aebi 1998). Methadone’s ineffectiveness has brought a new policy to Belgium, Denmark, Germany, Ireland, Netherlands, Portugal, Switzerland, UK, and other countries. Killias and Aebi’s research provided the criterion to receive heroin from the Swiss Government:

- In order to qualify, users have to (1) be at least 20 years of age; (2) have been addicted to heroin — daily use — for at least two years; (3) present signs of deterioration of health and/or social relations as a result of drug use; and (4) be engaged in conventional treatment without success despite two or more attempts.
- Those prescribed heroin are assigned to special clinics that offer also a wide array of medical and social assistance. No clinic has more than 150 patients.
- Heroin can be obtained solely at the clinic, and it has to be injected on the spot. No heroin can be taken away. If the patient is unable to attend the clinic, he/she will be aided by receiving methadone.

(Killias and Aebi 1998)

The heroin program by the Swiss Government provided insight about an addict’s means of obtaining heroin, supplemental drug use, and crimes committed. The prescription program covers 3000 users, who prior to the program, generally sold drugs

to finance their own habit. If a drug market relies on users to be suppliers, then decreasing users reduces narcotics availability in Europe.

Heroin users will reduce their search for alternatives when the presence of government intervention through administration is available. Heroin users will be susceptible to the substitution effect if heroin is not available; they just want their “fix or high.” The data collected from Killias and Aebi shows a decline in nonprescription heroin and other illicit drugs when the government administers the heroin. Killias and Aebi’s research found illicit drug use in which 15% of users did not consume other alternatives after six months and 41% after 18 months. After 18 months of treatment, 75% of daily users did not use nonprescription heroin. Only 7% of the government prescriptions users consumed illegal and legal heroin. The Switzerland heroin prescription program does significantly reduce illegal drug purchases and drug-related crimes, but does not reduce heroin consumption. The number of heroin users stayed constant or increased.

4. Hypothesis, Data, and Model

The initial intent of this research was to determine the negative effects of increased opium production created by Operation Enduring Freedom. The research would have measured the number of U.S. troops and the effects of poppy production. However, as the research progressed it became apparent that the issue is more dynamic than merely tracing the effects of Operation Enduring Freedom. The research uses national security policy, criminal justice theory, international economics, and world politics to provide the necessary components to model the heroin market.

Afghanistan has been in the international spotlight since 1979. International pressure from many European countries and the United Nations about Afghanistan's poppy production, Taliban's governance in regard to human rights, corruption in the Afghan government, allies of the Taliban (i.e. terrorist camps), how drug use affects the crime rate in Europe, and price decrease in the European heroin market since 1990 (refer to Figure 5.1) lead to invasion by 'Western' forces in 2001. These circumstances have caused changes in European drug policy, law enforcement policy, foreign intervention in Afghanistan to stabilize the region, and general political unrest.

Since 1979, the two stable job markets in Afghanistan have been war and poppy farming. Recent violent conflict has caused a surge of refugees to leave Afghanistan for Iran and Pakistan. By 2001, over seven million Afghan's were displaced and at the start of 2002 at least 4.8 million people have returned to Afghanistan (Margesson 2007). The return was caused by the U.S. bringing some political stability to the country. Despite the massive returns, up to 2.46 million refugees remain in Pakistan and more than 900,000 in Iran, which makes Afghans the second-largest refugee population in the world (Margesson 2007). Generally, refugees are not particular in what job they do, they just want to survive.

Comparative advantage is a factor in the access that poppy farmers have to labor (i.e. high refugee population and unemployment rate) and opium distribution markets. They do not see the difference between a poppy or wheat field. Opium is considered a low-risk crop in a high-risk Afghanistan environment. In many ways, the Afghanistan labor market benefits from opium production.

Heroin prices are a reflection of supply and demand, just like anything else. This leads to many variables that influence a simultaneous supply and demand model for heroin. After further research, more information in the global heroin market developed. Europe's heroin consumption is part of the recent history and data was readily available from the United Nations Office on Drugs and Crime (UNODC), European Monitoring Center for Drugs and Addiction (EMCDDA), and the White House Office of National Drug Control Policy. Afghanistan's poppy production fuels 90% of the world's heroin supply, creates work for the unemployed and refugees, and contributes to violent conflict.

An application of the two-stage least squares (2SLS) model to the heroin market in Europe will attempt to predict the socioeconomic consequences of Afghanistan opium production. 2SLS is a method of systematically creating an instrumental variable to replace an endogenous variable where they appear as explanatory variables in simultaneous equation systems (Studenmund 2010). An endogenous variable is determined within a system of equations which represent in this case, the price of heroin.

The main reason for using 2SLS is to develop a simultaneous set of equations to describe the market conditions of the time period. In the heroin market there is dual causality and 2SLS reduces the bias and inconsistency of the estimates (Studenmund 2010). Through optimization it was shown that consumption and supply decisions were not separable. The econometric model specified dual causality between heroin consumption and supply, and thereby used a simultaneous equation system. A 2SLS estimation with instruments was used in the price function estimation to control the endogeneity in the model. Endogeneity is the correlation between the error term and independent variable in the econometric model.

The first stage will use predetermined variables to estimate a heroin price, which is used in the second stage supply and demand equations. Predetermined variables are exogenous to the system and individual variables such as the amount of foreign aid a country receives, the amount corruption based on an index, homicide rate within the country, the number of law enforcement officers in the country, if heroin prescriptions are legal, if the country is a major shipping route, and if at least 50% of the country follows the Islamic religion. These exogenous variables will estimate a heroin price for

the equation systems in the current time period. Once the price is estimated from the exogenous variables, the second stage begins. The estimated price from stage one is substituted on the right side of the supply and demand equations for the heroin market.

4.1. Hypothesis

What is hypothesized by this research is that the increasing Afghanistan opium production has socioeconomic consequences affecting European countries by changing foreign policy, drug enforcement laws, corruption, and crime rates. The intent of the research is to examine how the change in Afghan poppy production due to political conflict affects Europe's heroin market. Heroin prices are a reflection of supply and demand, and similar to any other market, profits motivate participation. Each country is unique in their governance and demographics. The independent variables have a specific purpose in navigating the heroin markets. This market is dynamic and ever evolving.

Multiple sources form a cross-sectional data set of 36 countries for 2008, shown in Table 4.2. The variables used in the econometric model are listed in italics. The main variables are the price (*PRICE*), number of heroin users (*USER*), and the supply of heroin available for consumption in each country (*SUPPLY*). These data are obtained from United Nations Office on Drugs and Crime (UNODC). The estimates obtained from the UNODC were cross referenced with the European Monitoring Center for Drugs and Addiction (EMCDDA). Estimates from the UNODC are reliable in regard to narcotic data; the information is submitted directly to the UN by the countries government.¹⁰ In the data set there was a requirement that each country's population had to be greater than 1,000,000. *USER* and *SUPPLY* are per 100,000. To calculate *SUPPLY*, the heroin supply minus the heroin seizures estimates the variable in kilograms.

PRICE is the price per gram of heroin in each country (2008 dollars). *AID* is the amount of foreign aid dispersed to a country for loans, military aid, and relief assistance (2008 dollars). *INCORRUPT* is a measure where the higher score means less perceived corruption ranging from 0 to 10. *HOMICIDE* is the amount of assaults that lead to death

¹⁰ Some information is collected by survey to check the accuracy of the government information handed to the UNODC.

per 100,000. *LE* is the number of local and providential officers per 100,000. *MUSLIM* is a dummy variable assigned a value of 1 if Muslim religion population is greater than 50% and 0 otherwise. *SCRIPT* is a dummy variable assigned a value of 1 if a licensed medical professional can prescribe heroin and 0 otherwise. *SHIP* is a dummy variable pertaining to heroin flows that were above 70 metric tons (mt) assigned a value of 1 and 0 otherwise.

With regard to *LE*, the law enforcement officers per capita will determine the reduction in heroin supplied. Heroin distribution is illegal and government sets law enforcement policy. An allocation of funding will be determined by the amount of illicit transactions that cause social problems. Thus, spending money to control heroin trafficking is a valid option. In theory if this scenario works out, law enforcement will have a negative effect on the supply. Another alternative is increasing the punishment for the offense. This will enable a country to have fewer law enforcement officers, due to the high penalty for committing the offense. *LE* is only used in the supply model because most heroin users do not worry about the police due to their addiction.

Officials from the governing bodies, agencies, and organizations use of power for private gain were surveyed for this measure. This means that *LE* can increase *INCORRUPT*, which should have a negative effect on *SUPPLY*. If the country has more corruption (i.e. a lower score), then a larger supply of heroin will be present.

HOMICIDE, which is an indicator of the number of violent crimes in a country, correlates with drug use, but it is not a predetermined cause. Drug use does not cause a violent event, but there is a correlation between mood altering substances and increased likelihood of violence. The research by Killias and Abei in Switzerland has shown that heroin users are often also street level dealers (Killias and Aebi 1998). The highest-level dealers are not generally drug users, but are motivated by profit and use violence to protect their assets. Organized crime networks, drug dealers, and insurgents protecting their product or general business will result in more violent crime. A high *HOMICIDE* rate per 100,000 indicates weak law enforcement and high presence of organized crime, which may lead to a higher presence of drug related crime.

Foreign aid (*AID*) from the World Bank, IMF, UN, EU, and U.S. provide for development and sustainable independent government function. The amount of *AID* received by a country will be a proxy for violent conflict and political stability. Foreign aid also correlates with high unemployment rates and flat or regressive economic growth. These factors are correlated with high drug use. A country with high levels of *AID* may have increased *USER* and *SUPPLY*, but will be tested in the *USER* equation.

Rampant heroin use in Europe provoked legal heroin prescriptions to reduce heroin user's dependency and control transmissible diseases. *SCRIPT* may have a positive impact on *USER* because heroin users will migrate to the countries with legal prescriptions, thus increasing the demand. From the Switzerland research done on prescriptions, some users may quit using heroin, but the program will entice others due a decrease in legal repercussions (Killias and Aebi 1998).

Going in the negative direction is *MUSLIM*. This variable will have a drastically negative effect on heroin consumption because Sharia law is a deterrence factor for believers in Islam.

Thus *SHIP* has a positive effect on *SUPPLY*. The major shipping routes are predominately through countries with a Muslim population greater than 50%.¹¹ This network of Muslim countries allow for the hawala network to work efficiently and increase the drug flow into Europe.

Heroin price is significant in the market, but different factors affect the suppliers and users, thus two different assumptions for *PRICE* can be hypothesized. The number of heroin users in the network is assumed to have remained relatively flat, new users enter the market and prolonged users exit the market due to death, imprisonment, etc. A drastic price increase will be a deterring factor. *PRICE* should have a negative effect on *USER*. The average price at the street level throughout the 36 countries has decreased consistently since the 1990s. The supply of heroin entering these countries has also increased during that period. Heroin consumption has decreased in Western Europe, but increased in Eastern Europe. *PRICE* increases will have a positive impact on *SUPPLY*, if inputs remain constant. Within the heroin network prices per gram have fluctuated, but

¹¹ 15% of Russia's population is Islamic.

average heroin price in the 36 countries analyzed have decreased. The heroin market is hypothesized to follow the law of demand and supply, but when the drug is combined with other opioids and opiates the market change and will be explained in section 5.

4.2. Model

A potential simultaneity issue confronts price. Several independent variables that affect supply also influence demand. The model in the regression is two-stage least squares (2SLS), a common method of analysis for a supply and demand model. An estimation bias in 2SLS is common; between the independent variable and the error term. The 2SLS model accounts for this and the regression is unbiased.

Price is a sufficient proxy for the endogenous variable and can be used as an instrumental variable. This will create an explanatory variable uncorrelated with the error term. The first stage will use Ordinary Least Squares (OLS) equation to run the reduced-form equation for the endogenous variable *PRICE* that appears as an explanatory variable in the structural equations in the system. These exogenous variables will be used to create an estimate of the endogenous variable. A new variable developed from the equation is $PRICE^{\wedge}$, which can be used in the second stage of the regression.

The first regression in stage two estimates the effect that the independents have on the *USER* in each country. *SUPPLY* is the dependent variable for the next regression using $PRICE^{\wedge}$. Both of these equations work simultaneously to model the quantity supplied and demanded. The quantity demanded is the supply minus heroin seizures.

The independent variables used in each regression:

- $(PRICE)^{\wedge}$: the price per gram of heroin in each country (2008 dollars).
- (AID) : the amount of foreign aid dispersed to a country for loans, military aid, and relief assistance (2008 dollars).
- $(INCORRUPT)$: a measure where the higher score means less perceived corruption ranging from 0 to 10.
- $(HOMICIDE)$: the number of deadly assaults per 100,000.
- (LE) : the number of local and providential law enforcement officers per 100,000.
- $(MUSLIM)$: a dummy variable assigned a value of 1 if Muslim religion population is greater than 50% and 0 otherwise.
- $(SCRIPT)$: a dummy variable assigned a value of 1 if a licensed medical professional can prescribe heroin and 0 otherwise.
- $(SHIP)$: a dummy variable pertaining to heroin flows above 70 (mt) per year are assigned a value of 1 and 0 otherwise.
- (i): the country in the cross sectional data

The main heroin supply and demand regression is specified as:

First Stage:

$$(PRICE_i) = \beta_0 + \beta_1(AID_i) + \beta_2(INCORRUPT_i) + \beta_3(HOMICIDE_i) + \beta_4(LE_i) + \beta_5(MUSLIM_i) + \beta_6(SCRIPT_i) + \beta_7(SHIP_i) + \varepsilon_{it}$$

Second Stage:

$$(USER_i) = \beta_0 - \beta_1(PRICE_i)^{\wedge} + \beta_2(AID_i) + \beta_3(HOMICIDE_i) - \beta_4(MUSLIM_i) + \beta_5(SCRIPT_i) + \varepsilon_{it}$$

$$(SUPPLY_i) = \beta_0 + \beta_1(PRICE_i)^{\wedge} - \beta_2(INCORRUPT_i) - \beta_3(LE_i) + \beta_4(SHIP_i) + \varepsilon_{it}$$

where $PRICE_i^{\wedge}$ is the estimated value of $PRICE_i$ from the first regression.

4.3. Data

When price is a component, it is in 2008 U.S. dollars. The heroin price per gram ($PRICE$) is taken from the UNODC 2010 World Drug Report. $PRICE$ is compared against reports from the White House Office of National Drug Control Policy and the EMCDDA to judge accuracy.

Major shipping routes (*SHIP*) are derived from UNODC; tracing the amount of heroin produced, exported, and consumed in each country. This is an integral source for analysis. *SHIP* is a dummy variable used for heroin flows in metric tons (mt) that were above 70mt assigned a 1, otherwise a 0. Global heroin consumption is an estimated 340mt (UNODC 2010).

Law enforcement (*LE*) is provided by each individual country in reports published by their executive branch, embassy, or national law enforcement agency per 100,000 people. Most reports establish the number of office workers and actual police officers. This measure looks at the officers employed by local or provincial authorities.

Aid (*AID*) is a combination of loans, military aid, and relief assistance in 2008 U.S. dollars. The information was obtained from the IMF, World Bank, European Union, Brookings Institute, and the United Nations. Foreign aid is a proxy for GDP in this pricing model; displaying the efficiency of the government. A country that receives a significant amount of foreign aid is generally assumed to have bad governance and inefficient law enforcement, creating a conflict trap (Collier 2007). The governance and law enforcement can lead to increased corruption allowing for a prosperous illicit drug market.

A variable to account for religion (*MUSLIM*) provides population distribution for each country being at least 50% Islamic (U.S. Department of State 2011). *MUSLIM* is a dummy variable assigned a 1 if the country in question is 50% or greater and 0 otherwise.

A country that is incorrupt (*INCORRUPT*) has a higher score meaning less perceived corruption ranging from 0 to 10. Transparency International has published an annual Corruption Perceptions Index (CPI) since 1995, in which corruption is assumed to exist among public officials and politicians, who use entrusted power for private gain. The CPI uses polls and surveys institutions.¹² The CPI produces a single score per country, which as noted above, cannot be compared year-to-year.

¹² Institutions surveyed are Columbia University, Economist Intelligence Unit, Freedom House, Information International, International Institute for Management Development, United Nations Economic Commission. Only experts are polled.

The homicide rate per 100,000 people (*HOMICIDE*) is determined by Interpol, the United Nations (UN), or the World Health Organization (WHO) for the year 2008. The legal definition of homicide may differ between countries and the demographics are affected by trauma care, which determines the lethality of the violence. This is a general measure of societal violence and may not capture some countries violent crimes.

Heroin can be legally prescribed with psychological care in a few countries. A dummy variable (*SCRIPT*) has been assigned a value of 1 if the country allows this practice and a 0 if not. The information was provided by the European Legal Database on Drugs from the EMCDDA and government policy. A summary of statistics is shown in Table 4.1

The U.S. is not included due to Mexico having the capability to produce 30 to 40 metric tons (mt) of heroin each year and the U.S. consumes only 20mt. The Drug Enforcement Agency (DEA) has stated that a majority of the heroin the U.S. consumes is from Mexico and South America.

Table 4.1
Summary of statistics.

| Variable | Mean | S.D. | Min | Max |
|--------------------------------|---------|----------|-------|----------|
| <i>USER</i> (per 100,000) | 277.75 | 199.63 | 22.71 | 1155.52 |
| <i>SUPPLY</i> (per 100,000) | 17.33 | 11.50 | 0.75 | 51.75 |
| <i>HOMICIDE</i> (per 100,000) | 3.10 | 3.65 | 0.70 | 18.90 |
| <i>LE</i> (per 100,000) | 253.84 | 155.29 | 15.14 | 754.50 |
| <i>PRICE</i> (\$ per gram) | 64.08 | 35.69 | 2.40 | 150.00 |
| <i>SHIP</i> | 0.14 | 0.35 | 0 | 1 |
| <i>MUSLIM</i> | 0.14 | 0.35 | 0 | 1 |
| <i>SCRIPT</i> | 0.42 | 0.50 | 0 | 1 |
| <i>INCORRUPT</i> | 5.43 | 2.38 | 1.50 | 9.40 |
| <i>AID</i> (hundred thousands) | 5299.86 | 11357.15 | 0 | 53446.60 |
| Observations | 36 | | | |

Table 4.2
List of countries analyzed.

| | | | |
|------------------------|---------|--------------------|----------------|
| Afghanistan | Denmark | Latvia | Serbia |
| Albania | Finland | Lithuania | Slovakia |
| Austria | France | Netherlands | Slovenia |
| Belarus | Germany | Norway | Spain |
| Belgium | Greece | Pakistan | Sweden |
| Bosnia and Herzegovina | Hungary | Poland | Switzerland |
| Bulgaria | Iran | Portugal | Turkey |
| Croatia | Ireland | Romania | United Kingdom |
| Czech Republic | Italy | Russian Federation | Ukraine |

5. Empirical Results

Table 5.1 presents the estimates of heroin users and supply in a cross section of data. Results of the first stage regression build a simultaneous system for the price of heroin. This stage ran an OLS of the endogenous *PRICE* variable against all other exogenous variables.

Table 5.1:
2SLS estimation results.

| | First Stage PRICE | | 2SLS USERS | | 2SLS SUPPLY | |
|---|----------------------|---|----------------------|----|-------------------|----|
| constant | 33.871 (20.706) | | 385.59 (144.459) | ** | 1.111 (6.541) | |
| <i>AID</i> | -0.0006 (0.0004) | | 0.005 (0.003) | | | |
| <i>INCORRUPT</i> | 5.755 (3.135) | * | | | -0.598 (1.203) | |
| <i>HOMICIDE</i> | 3.235 (1.753) | * | 33.769 (8.386) | ** | | |
| <i>LE</i> | -0.043 (0.032) | | | | 0.009 (0.01) | |
| <i>MUSLIM</i> | -29.541 (23.428) | | -246.51 (154.153) | ** | | |
| <i>SCRIPT</i> | 12.374 (12.13) | * | 188.27 (83.207) | ** | | |
| <i>SHIP</i> | -27.906 (23.719) | | | | 26.803 (6.607) | ** |
| <i>PRICE</i> [^] | | | -3.964 (2.303) | * | 0.228 (0.111) | ** |
| Observations | 36 | | 36 | | 36 | |
| F-statistic | 5.209 | | 3.702 | | 4.387 | |
| R-squared | 0.565 | | 0.379 | | 0.361 | |
| Adjusted R-squared | 0.457 | | 0.275 | | 0.277 | |
| * = significant at 10% level, ** = significant at 5% level, standard errors are in parentheses. | | | | | | |

The dependent variables in second stage regressions are influenced differently than those influencing $PRICE^*$. In theory, drug seizures reduce the supply of drugs, which causes a new equilibrium where the price is higher and quantity lower. In the *USER* estimation, *PRICE* matches the law of demand. The simultaneous *PRICE* effect occurs in the *SUPPLY* estimation. As the price of heroin increases, the supply of the drug will increase as well. Results from Table 5.1, heroin suppliers will increase shipment by 0.22kg when price increases by one.

Contrary to the results of this research, one alternative assumption to the significance of *PRICE* is that having an inelastic demand for heroin causes total revenue to increase for drug dealer. Heroin dealers can increase prices until the user switches to an alternative. A switch to other drugs if heroin becomes expensive is not necessarily considered, but this research suggests otherwise. The substitution effect is significant at the distribution and consumption levels because heroin consumers are more affected by *PRICE*.

Demand is relatively inelastic for heroin, because drug addicts are typically constrained by their monetary budget. This constraint causes a shift to other drugs waiting for the market price of heroin to decrease. Overall, a drug user's demand is inelastic for a product that produces a "high," but their consumption of a specific drug will utilize the substitution effect for a limited time period.¹³ The substitution effect increases demand for alternatives to heroin that produce a similar "high" such as opiates and opioids; these narcotic analgesics (painkiller) act on the central nervous system of humans (Kee and Hayes 2002).

Opiates are naturally occurring opiate alkaloids found in the opium poppy, basically only morphine and codeine. Opioids come in two forms, semi and fully synthetic (Kee and Hayes 2002). Semi-synthetic opioids are drugs that do not naturally occur and ones that are "chemically built" on opiates (Kee and Hayes 2002).¹⁴ Fully-

¹³ Usually one to three months, could be prolonged if the heroin price per kilogram is too expensive. This is possible within Europe, due to law enforcement seizure rates in a country.

¹⁴ Examples of semi-synthetic opioids include hydrocodone, oxycodone, oxymorphone, hydromorphone, and diacetylmorphine (heroin).

synthetic opioids are completely man made and not chemically related to opiates (Kee and Hayes 2002).¹⁵ Demand is inelastic when the opioid and opiate market is combined, unlike the demand a specific opiate or opioid (e.g. heroin) is relatively inelastic.

From Table 5.1, in the *USER* column, the p-values for *MUSLIM*, *HOMICIDE*, and *SCRIPT* are significant 5%. *MUSLIM* has a large negative effect on the *USER*, because Sharia Law prohibits use of such intoxicants.¹⁶ The *USER* decreases by 246.51 per 100,000 in a country at least 50% follow Islam.

HOMICIDE has been shown in many empirical studies to increase the presence of narcotics. When the number of heroin users increases by 1 then the rate of homicides increases by 33.77 per 100,000 people. *HOMICIDE* is not a predetermined cause of drug use, but is an indicator of the number of violent crimes in a country. Drug use does not cause a violent event, but there is a correlation between mood altering substance and increased likelihood of violence. The flow of heroin through a country will increase violence.

SCRIPT is significant and has a large effect on heroin users because these countries were already prone to excessive use. The problem was drastic enough to make prescribing heroin legal, because methadone is an insufficient substitute. If prescribing heroin is legal in a country, then *USER* will increase by 188.27 per 100,000 people. The increase can be from various factors such as immigration, historically high drug use, and proximity to countries on the main heroin supply network.

The p-value for *PRICE* is significant at a 10% level, and reduces *USER* by 3.96 per 100,000 people. Killias and Aebi's Switzerland trials in research studies confirm the results in this research (Killias and Aebi 1998).

Results in the *SUPPLY* column in Table 5.1 displayed the expected sign for *PRICE*. The supply increased when the price increased; if *PRICE* goes up by \$1, then *SUPPLY* in each country increases by 0.22 kg. *PRICE* reflects the law of supply offering

¹⁵ Examples of fully-synthetic opioids include methadone, fentanyl, dextropropoxyphene, tramadol, and pethidine.

¹⁶ Quran, Noble Verse 2:219: They will ask thee about intoxicants and games of chance. Say: "In both there is great evil as well as some benefit for man; but the evil which they cause is greater than the benefit which they bring."

more of the commodity at a higher price. This may be true for one year, but the trend differs from heroin prices over the last two decades. Heroin supply increased by an average 10% each year since 1990 because the seizure rate in the majority of the 36 countries analyzed are increasing.¹⁷ The supply curve may not be shifting after 2001, but just moving along the demand curve because the number of heroin users has remain relatively stable.

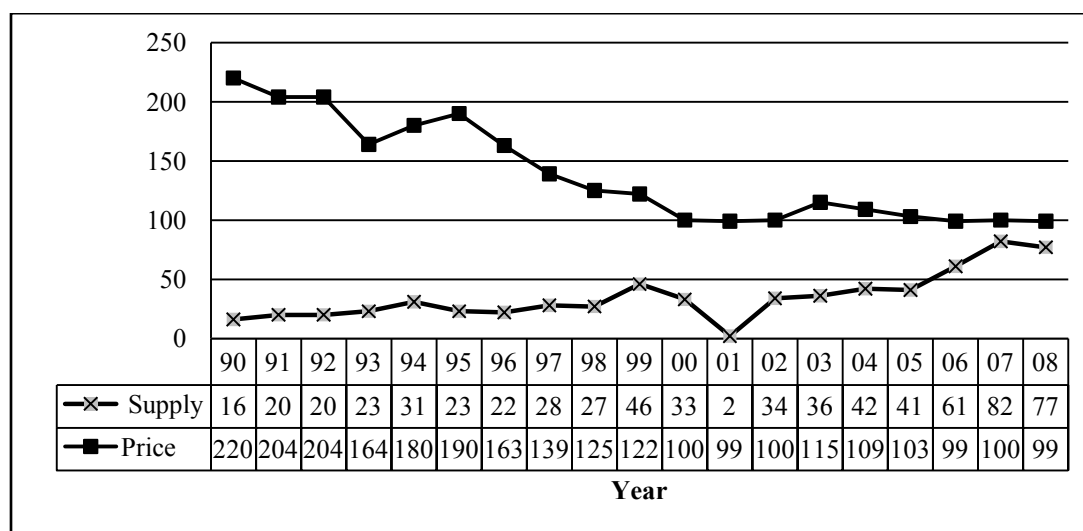


Figure 5.1 Western Europe price (\$/gram) and Afghanistan heroin supply (kg) (UNODC 2010).

Figure 5.1 provides significant evidence until 1998 there was a constant supply and declining price. After 1998, foreign governments and the United Nations influenced Afghanistan by the UN Security Council sanction against the Taliban. The Taliban partially complied with the sanction to end illicit drug cultivation, but not to cease terrorist support.¹⁸ Even the end of drug cultivation was a ‘front.’ The Taliban complied because they had an excess supply from previous years, which is why from 1999 till 2002 the price remained constant. From 2002 until 2008 the supply increased, but the price is constant because the seizure rates have increased along the heroin supply route.

¹⁷ Seizure rates have drastically decreased in Pakistan.

¹⁸ UN Security Council Sanction 1267.

The seizure rates lead back to Table 5.1 to explain *SHIP*. It is expected that major shipping routes see a large influx of heroin, demonstrating the proximate effect of bordering nations to Afghanistan. Law enforcement and the public at large are aware of the ample supply of heroin leaving Afghanistan. The shipping routes adjust to law enforcement changes causing drug smugglers to move heroin through different regions. These changes in drug smuggling routes will cause shortages and surpluses affecting the heroin user's behavior. Higher revenue generated from consumption and distribution of heroin can increase the crime rate straining law enforcement in these regions. *LE* and *INCORRUPT* from Table 5.1 may not be statistically significant due in part to the vast range of economic factors, legal rights, harsher punishment for the user or dealer, and level of organized crime in 36 different countries.

The government controls legislation for social programs and the proper use of foreign aid. The intent of the aid may be direct and properly legislated, but corruption and poor implementation can render no positive value for society. Throughout the 36 countries analyzed, there is an immense diversity in political processes. *AID* is not significant in Western European countries, but can display the other countries failure to govern. 'Western' governments develop social programs that do not meet specific and general social needs of a country, leading to failure. The misuse of *AID* by governments and the diversity of use led to the variable having no statistical significance in Table 5.1 *USER* column.

6. Discussion

The data and model in this research provide a basic starting point that can inspire further research with robust data. Ideally, a panel data set starting from 1988 to present would be formulated. Data before the Afghan Civil War is needed to show the change since the Taliban takeover. Problems with the empirical work pertaining to the purity of heroin in each country can cause inconsistent pricing throughout the European Union. The data was derived from the peak of the heroin trade in 2008. Markets operate significantly different when working with maximum profits.

In this research a variety of reasons for the heroin markets prosperity can be supported by changes in Europe's foreign and domestic policy, law enforcement, corruption, and crime rates. The recent conflict in Afghanistan has lowered European heroin prices, increased seizure rates, and provided funding for insurgents. The Taliban's profits are an estimated \$125 million per year from heroin production and another \$250 million for convoy protection (Peters 2009). As a result of an increased supply of heroin and reduced price, European law enforcement and government officials face a larger drug war against heroin because the scale of production in Afghanistan has increased.

The use of the two-stage least squares model has shown the effect of Europe's heroin issues in Table 5.1. The data reveals the impact of government policies such as legal heroin prescriptions and increased law enforcement. In the *USER* column, *HOMICIDE*, *MUSLIM*, and *SCRIPT* are statistically significant at the 5% level and *PRICE* at 10%. As *PRICE* increases by one U.S. dollar per gram, *USER* decreases by 3.96 per 100,000. In the *USER* estimation *PRICE* matches the law of demand. The simultaneous price effect occurs in the *SUPPLY* estimation. If the price of heroin increases, smugglers and dealers that only ship larger quantities of the drug will see a greater profit. Heroin suppliers will increase shipment by 0.22kg when price increase by one dollar per gram.

When heroin users increases by 1 then the rate of homicides increase by 33.77 per 100,000 people. An increase in heroin use has been shown to increase violent crime, property crime, and decrease social welfare. A future study of specific crime rates, social welfare, and a measurement of heroin consumption could test this hypothesis. Europe

must find a level of deterrence that effectively distributes the punishment to the dealer and consumer.

The reduced punishment of heroin consumers can decrease the cost of incarceration if prescribing heroin is legal in a country. When heroin can be legally prescribed the *USER* will increase by 188.27 per 100,000. An option to counteract the increase in *USER* is to increase the punishment for drug dealers in a country. By punishing the drug dealers more than users, the heroin prescription program may have a larger positive social impact. The increase of heroin users can come from various factors such as immigration for heroin prescription use, historically high illicit drug use, insufficient punishment of drug dealers, and proximity to countries on the main heroin supply network. Further analysis is required for a specific cause between the prescription drug program and the penalty for drug dealers in a country.

Shipping routes are a significant factor in the heroin network because larger influxes of supply will occur when the demand increases. As the demand increases, drug cartels and dealers add impurities to increase their supply. As the heroin leaves Pakistan, Iran, and Russia the purity decreases and quantity seized increases. The impurities will benefit the drug cartels or dealers because they know that a certain percentage will be seized. Higher seizure rates in a country may lead to an increase in violence and corruption, which has been seen in many Islamic countries within close proximity to Afghanistan. In Islamic countries (e.g. Turkey, Iran, and Pakistan) the low quality of law enforcement and high corruption will lead to heroin smugglers being protected by government officials, warlords, or insurgents because of the profits from the heroin market.

The scale of heroin use in Islamic countries compared to non-Islamic countries is revealed by this research, the *USER* decreases by 246.51 per 100,000 in a country in which at least 50% of the population follows Islam. These actions of corruption and drug trafficking are against Sharia law and the violation is considered to be 'haram' or performing an action forbidden by law. The shipment of heroin through Islamic countries reveals that the drug profits outweigh their religious beliefs. In Islamic countries, the high heroin flows and low consumption rates allow the drug to be cheaper

for the effective 'high' than other drugs in the European market. Averages from the EMCDDA estimates a heroin user typically administers 100mg at a cost of 5.87 Euros and a 100mg of cocaine is 6.26 Euros (EMCDDA 2011). Heroin is more popular in Europe than other regions of the world, because of the history of use and the low price due to a consistent supply from Afghanistan.

This research displayed a general estimation for heroin use and distribution between countries that are supplied by Afghanistan. Heroin is unique because it can generate wealth to facilitate conflict. Whether heroin directly supports insurgent's vitality, or simply provides critical revenue which facilitates the violent pursuit of other objectives does not matter. The ever evolving heroin profits give insurgents political justification and have changed government policies in Europe. The effects of the heroin trade are global, but substantially affect Europe. Each European country is unique in demographics, but shares a common problem, heroin use.

7. Bibliography

- Addiction, Crime, and Insurgency. New York: United Nations, 2009.
- Blood Money. US Army, 2009.
- European Monitoring Center for Drugs and Drug Addiction. 2011.
- The Opium Economy in Afghanistan. New York: United Nations, 2010.
- Public Drug Information. 2011.
- U.S. DEA. 2011.
- U.S. State Department. 2011.
- World Drug Report. New York: United Nations, 2010.
- Collier, Paul. The Bottom Billion. Oxford: Oxford, 2007.
- Cornell, Svante. Narcotics and Armed Conflict: Interaction and Implications. Washington, D.C.: Central Asia Caucasus Institute-John Hopkins University, 2007.
- Gibson, Amy, Louisa Degenhardt, Carolyn Day, and Rebecca McKetin. Recent Trends in Heroin Supply to Markets in Australia, the United States and Western Europe. *International Journal of Drug Policy* (2005): 293-99.
- Goodhand, Jonathan. Frontiers and Wars: The Opium Economy in Afghanistan. *Agrarian Change* (2005): 191-216.
- Gress, Michael, and Lester Grau. The Soviet-Afghan War: How a Superpower Fought and Lost. Lawrence: University of Kansas Press, 2002.
- Hoffman, Bruce. Inside Terrorism. New York: Columbia University Press, 2006.
- Hussain, Zahid. Frontline Pakistan: The Struggle with Militant Islam. New York: Columbia University Press, 2007.
- Kaplan, Eben. The Taliban Resurgence in Afghanistan. Washington D.C.: International Institute for Strategic Studies, 2006.
- Kee, Joyce, and Evelyn Hayes. Pharmacology: A Nursing Process Approach. Philadelphia: Saunders, W.B., 2002.
- Killias, Martin, and Marcelo Aebi. The Impact of Heroin Prescription on Heroin Markets in Switzerland. *Crime Prevention Studies* (1998): 83-99.

- Kopczyk, Bob. *The Terrorist Group - Al Qaeda*. US ARMY, 2004.
- Lissitz, Lorraine. *Al Qaeda*. US Army, 2003.
- Margesson, Rhonda. *Afghan Refugees: Current State and Future Prospects*. Washington D.C.: Congressional Research Service, 2007.
- Masfield, David, and Adam Pain. "Evidence from the Field: Understanding the Changing Levels of Opium Cultivation." *Kabal: Briefing Paper Series*, 2007.
- Olcott, Martha. *Drugs, Terrorism, and Regional Security*, Carnegie Endowment (2010). <http://www.carnegieendowment.org/publications/index.cfm?fa=print&id=936>.
- Peters, Gretchen. *How Opium Profits the Taliban*. Washington, D.C.: United States Institute of Peace, 2009.
- Rashid, Ahmed. *Taliban: Militant Islam, Oil, and Fundamentalism in Central Asia*. New Haven: Yale University Press, 2000.
- Safi, Ali. *Warlords Toughen Us Task in Afghanistan*. New York: Time Magazine, 2008.
- Studenmund, A.H. *Using Econometrics: A Practical Guide*. Boston: Addison-Wesley, 2010.
- Thomas, Troy. *Warlords Rising: Confronting Violent Non-State Actors*. Lanham: Lexington Books, 2005.
- Varano, Sean, John McCluskey, Justin Patchin, and Timothy Bynum. *Exploring the Drugs-Homicide Connection*. *Journal of Contemporary Criminal Justice* (2004): 369-94.
- Weatherburn, D., and B. Lind. *The Impact of Law Enforcement Activity on a Heroin Market*. *Addiction* (1992): 557-69.