EMPLOYEE THEFT FROM PASSENGERS AT U.S. AIRPORTS:

AN ENVIRONMENTAL CRIMINOLOGY PERSPECTIVE

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Abstract

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After 9/11 a number of security measures were implemented at U.S. airports, which included the creation of the Transportation Security Administration (TSA), the mandate to scan all air passengers and their luggage, and the prohibition for passengers to lock their suitcases with any system other than TSA approved locks. Some of those measures have opened up opportunities for employees to steal from passengers' luggage.

This dissertation uses an environmental criminology perspective to examine why some U.S. airports experience more employee theft from passengers than others. Given the lack of previous research, it is necessary to analyze first the prevalence of this crime at U.S. airports, which airports experience more theft of this kind, and whether theft concentrates mostly in a few airports. Then, the features associated with an increased risk of employee theft at each airport are examined using bivariate and multivariate analyses. The unit of analysis is the airport. Theft rates calculated using data of claims from passengers against the TSA are used as dependent variables. Two subtypes of theft are studied: theft at the security checkpoint, and theft from checked-in luggage.

Findings show that theft rates are very low. No pattern of concentration is found when analyzing large and medium airports. While theft at checkpoint is very homogeneous

across airports, variation in the opportunities provided by different checked baggage inspection systems allows for some concentration of theft in smaller airports. Results suggest that passengers' packing practices and airlines' baggage handling systems can also facilitate opportunities for theft from checked luggage. Further research is needed to unpack these findings.

This research proves that there are exceptions to "The Iron Law of Troublesome Places" (Wilcox and Eck, 2011): standardized strict antiterrorist measures have the beneficial side effect of reducing theft risk and ironing out large differences in theft risk among airports. From a practical perspective, this study shows that there are more opportunities for theft at smaller airports. Considering that individuals involved in employee theft are often involved in other crimes as well, smaller airports could constitute vulnerable points of entry into the aviation industry in this country.

Table of Contents

List of Tables

List of Figures

1. THE COMMERCIAL AVIATION INDUSTRY

Every year, millions of passengers in the United States choose air travel as their mean of transportation. They take many valuables with them, either in their carry-on or in their checked-in baggage, which are vulnerable to theft. Before going into the issue object of this dissertation (the problem of luggage theft by employees at airports in the United States) it is necessary to understand the context of the commercial aviation industry in this country. This chapter provides a general introduction to air transportation and passenger air travel in the U.S. The first section explains the concept of commercial aviation, and provides some descriptive information on how this industry works. The second section describes the changes it has recently suffered, and the challenges it must face in the 21st century.

1.1. Civil aviation, regulators, airports and airlines

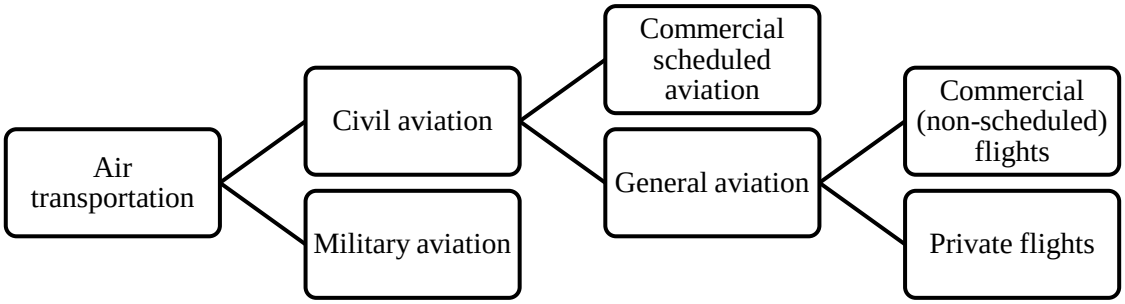
Civil aviation

Air transportation can be divided into two main categories: civil and military aviation. Civil aviation includes all non-military aviation, and can be further divided into:

- *Commercial scheduled air transport*, that is, all flights (passenger and cargo) that operate on regularly scheduled routes; and
- *General aviation*, which include all other civil flights (passenger and cargo), from gliders to medical transports, charter services, flight training or non-scheduled cargo jet flights. General aviation operations include *commercial* and *private* flights, depending on whether aircrafts are flown to generate a profit (i.e. charter

flights), or pilots fly without any remuneration (i.e. recreational flying) (Price & Forrest 2009).

Figure 1. Categories of air transportation



The economic impact of civil aviation activity and its related goods and services in the U.S. has been estimated to be $1.3 trillion, and to have generated more than 10 million jobs in 2009. Civil aviation accounted for 5.2% of the U.S. GDP that same year (FAA 2011b). Commercial scheduled air transport generates most of the revenue (it is responsible for 93% of the economic contribution of civil aviation) (FAA 2011b) and transports most of the passengers (commercial airlines transport over 80% of air passengers in scheduled flights in the U.S.) (DRI-WEFA, Inc. 2002). However, general aviation constitutes the larger in the number of flights.

Regulators

Civil aviation is internationally regulated by the International Civil Aviation Organization (ICAO), which serves as a forum for cooperation among its 191 Member States and establishes international regulations with regards to “aviation safety, security, efficiency and regularity, as well as for aviation environmental protection” (ICAO, “About ICAO”).

Each member has a National Aviation Administration that handles aviation regulation within each country. The largest aviation agencies in the world are the Federal Aviation Administration (FAA) in the U.S and the European Aviation Safety Association (EASA) in Europe. One of the roles of the FAA is to ensure that airports operate safely. Therefore, apart from issuing operating certificates to airports and, with the goal of assisting airport owners, the FAA also issues advisory circulars about aviation requirements, safety standards and technology. These circulars are mandatory for airports receiving FAA grants, and are considered technical advisory documents for the rest (Wensveen 2011).

Airports

There are more than 19,700 airports in the United States (including civil and joint-use civil-military airports, heliports, short takeoff and landing ports, and seaplane bases in the United States and its territories). Of those, in 2009 (the time period studied in this dissertation) only 559 airports were commercial service airports[1] (certificated for air carrier service), and the rest were general aviation airports.

[1] http://www.bts.gov/publications/national_transportation_statistics/html/table_01_03.html (accessed September 26, 2012)

The FAA classifies airports by categories of activities[2]:

Table 1. FAA airport categories

Airport Classifications		Hub Type: Percentage of Annual Passenger Boardings	Common Name
Commercial Service: Publicly owned airports that have at least 2,500 passenger boardings each calendar year and receive scheduled passenger service	**Primary:** Have more than 10,000 passenger boardings each year	**Large:** 1% or more	**Large Hub**
		Medium: At least 0.25%, but less than 1%	**Medium Hub**
		Small: At least 0.05%, but less than 0.25%	**Small Hub**
		Nonhub: More than 10,000, but less than 0.05%	**Nonhub Primary**
	Nonprimary: Have between 2,500 and 10,000 passenger boardings each year	**Nonhub:** At least 2,500 and no more than 10,000	**Nonprimary Commercial Service**
Nonprimary (Except Commercial Service)		Reliever Airports are high-capacity general aviation airports in metropolitan areas designated by the FAA to relieve congestion at commercial service airports and to provide improved general aviation access to the overall community (FAA 2010a).	**Reliever**

Source: FAA

The term "hub" used by the FAA refers to very busy primary airports, and differs from the (more popular) meaning of the same term used by the airlines in the "hub-and-spoke" system, which refers to airports with significant connecting traffic by one or more carriers (FAA 2010a).

[2] http://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/categories/ (accessed September 26, 2012)

This study will focus on commercial service airports which, according to the classification seen above, and considering that in 2009 there were 698,003,098 passenger boardings (also called enplanements) (FAA 2011a), can be classified as follows:

Table 2. Commercial service airports by category in 2009

Airport category	% of enplanements by category	# of enplanements by category	Total # of airports[3]	% of total enplanements in the U.S.
Primary airports				
• Large hubs	1% or more	More than 6,980,000	29	69.5%
• Medium hubs	0.25% - 1%	1,745,000 – 6,980,000	36	18.9%
• Small hubs	0.05% - 0.25%	349,000 – 1,745,000	72	8.3%
• Non-hubs	10,000 – 0.05%	10,000 - 349,000	231	3.1%
Non-primary airports	2,500 – 10,000	2,500 – 10,000	126	0.1%
Total			**494**	

Source: FAA 2011a and own calculations

Large hubs tend to focus on airline passenger and freight operations, and have limited general aviation activity. Some examples of large hub airports are:

- Hartsfield - Jackson Atlanta International (GA)
- Chicago O'Hare International (IL)
- John F. Kennedy International (NY)
- Los Angeles International (CA)
- Dallas/Fort Worth International (TX)
- Denver International (CO)

[3] The number of commercial service airports in each category reported in the *Historical Passenger Enplanements at U.S. Airports* used in this table (FAA 2011a) differs from the number reported in the *National Plan of Integrated Airport Systems (NPIAS) 2011-2015* (FAA 2010a): 503 airports (29 large hubs, 37 medium hubs, 72 small hubs, 244 non-hub primary airports, 121 non-primary airports). In this study the numbers used will be the ones displayed in Table 2, as they are consistent with the FAA document that constitutes the source of data on enplaned passengers per airport (FAA 2010b).

Medium hubs have air carrier operations, but also substantial amount of general aviation activity. They include, among other airports:

- Lambert-St Louis International (MO)
- Cincinnati/Northern Kentucky International (KY)
- Memphis International (TN)
- Kansas City International (MO)

Some examples of small hubs are the following:

- El Paso International (TX)
- Tulsa International (OK)
- Long Beach /Daugherty Field (CA)
- Albany International (NY)
- City of Colorado Springs Municipal (CO)
- Long Island MacArthur (NY)

In these airports airline operations use less than 25% of the runway capacity, so they can accommodate a great amount of general aviation activity. Non-hubs constitute the largest group, and are heavily used for general aviation activity. They include airports like:

- Grand Canyon National Park (AZ)
- Phoenix-Mesa Gateway (AZ)
- Fort Wayne International (IN)
- Key West International (FL)
- Nantucket Memorial (MA)

Finally, non-primary airports serve mainly general aviation operations (FAA 2010a, Price & Forrest 2009). Appendix I includes a list of the top 25 U.S. airports ranked according to number of passengers enplaned and aircraft takeoffs and landings in 2009.

Airlines

Airlines, or air carriers, are "the commercial system of air transportation, consisting of domestic and international certificated and charter carriers" (Wensveen 2011, p. 532). Airlines can be classified in three categories according to their annual gross revenue (AGR): major airlines (AGR over $1 billion), national carriers (AGR from $100 million to $1 billion), and regional carriers (AGR under $100 million) (Wensveen 2011, A4A n.d.). Some examples of major airlines in 2010 include:

- Air Tran Airways
- Alaska Airlines
- American Airlines
- American Eagle Airlines
- Atlantic Southeast Airlines
- Atlas Air
- Comair
- Continental Airlines
- Delta Air Lines
- Frontier Airlines
- JetBlue Airlines
- Mesa Airlines
- SkyWest Airlines
- Southwest Airlines
- United Airlines
- US Airways

National air carriers included airlines such as:

- Air Transport International
- Allegiant Air
- Amerijet International
- Florida West Airlines
- Mesaba Airlines
- North American Airlines
- Pinnacle Airlines
- Southern Air

- Hawaiian Airlines
- Horizon Air
- Spirit Airlines
- Sun Country Airlines

Some examples of regional carriers in 2010 were:

- Chautauqua Airlines
- Colgar Air
- Midwest Connect
- Silver Airways
- CommutAir
- GoJet Airlines
- Mokulele Airlines
- Shuttle America

Appendix I includes a list of the top 25 U.S. airlines ranked according to number of passengers enplaned, aircraft departures, and operating revenues in 2009.

Most airlines use a "hub-and-spoke" network to route their plane traffic. An airline "hub" is an airport used by the airline as a major transfer point, in order to facilitate transport to/from various smaller destinations (the "spokes"). Each airline can have one or multiple hubs, which can be primary or secondary (also called "focus cities", "mini-hubs", etc.). The main advantage of this system is that it allows airlines to reach a larger number of destinations than with the "point-to-point" system of direct flights between city-pairs. Other advantages of the hub-and-spoke system are the increase of chances of filling up airplanes (which, as will be explained below, results in lower costs), and that, once a carrier has established a solid hub at a particular airport, it is very difficult for other carriers to do the same at that particular location. However, this system also has some drawbacks such as "congestion delay", which happens when the aircraft volume at a hub approaches the capacity of a hub: excessive taxi waits and the spreading of delays system wide are some of its consequences. Delays also increase the chances of mishandled baggage, as the time allotted to unload baggage and to transport it and load it onto the following flight decreases. Also, a higher number of flights increases the amount of fuel

needed to operate, which in turn increases the airline's operating costs (Wensveen 2011). A "point-to-point" network focuses on origin and destination (O&D) traffic, without connecting passengers through a third airport. Low cost carriers tend to use the point-to-point system of direct flights between cities: the classic example is Southwest Airlines.

Regional airlines limit their operations to certain regions, they fly smaller aircraft, and they cover shorter distances than larger airlines, providing service to smaller communities. They also connect with bigger hubs, so passengers can connect (or "interline") to flights operated by larger airlines. Approximately 90% of regional airline passengers make those connections (Wensveen 2011, A4A n.d.), which are facilitated by code-sharing agreements between regional and major airlines. These agreements allow an airline to sell a ticket on a flight that is actually operated by another partner airline, which results in a larger number of destinations being offered by each carrier, and an easier way for passengers to book flights that include multiple carriers.

1.2. Commercial aviation in the U.S. in the 21st century

The initial boom in passenger air travel occurred after World War II, especially in North America, when many pilots and aircraft that had flown for military purposes became available. In the past decades, air travel has become one of the preferred means of transportation in the United States and worldwide, especially for long distance trips. Some of the most cited advantages of commercial air travel are its speed, safety, comfort, and cost (David, n.d.; Wensveen 2011), which become apparent when compared to other modes of transportation such as trains, buses and cars (Bluejay 2010). From a business

standpoint, by making executives and sales personnel more mobile, air transportation has enabled companies to decentralize production and distribution, and to expand their market areas. Leisure travel patterns have also changed: more and more people choose this mode of transportation for personal or pleasure travel and, at the same time, more regions have become accessible for tourists and travelers.

The number of passengers in the U.S. grew from 310 million enplanements in 1980, to 710 million by 2000 (FAA 2010a). However, that increase has not been steady. During the second half of the 20th century, commercial aviation experienced a series of cycles, which mirrored the cycles experienced by the world economic activity. During periods of recession, the airline industry suffered great economic losses: in times of crisis, travel is one of the easier expenses to cut. On the other hand, when the economy strengthened, the industry obtained important profits (Price & Forrest 2009, Wensveen 2011).

In 2000 both the number of passengers and airlines' profits reached a record high, but the slow turn of the economy at the beginning of the decade and the terrorist attacks on the World Trade Center in NY in September 2001 caused a very steep decline in the number of passengers (USDOT 2011b). The number of enplanements did not surpass 2000's data until 2005, only to sink again with the 2008 global economic crisis (FAA 2010a). According to the FAA (2011), in 2009 there were 698 million enplanements. Additionally, in the past decade the airline industry has had to deal with other challenges such as the outbreak of Severe Acute Respiratory Syndrome (SARS) in 2003, the rise of low-cost carriers, the shift towards governmental control of airports, the rise of fuel prices, and major airline debt (Wensveen 2011).

In order to face such unfavorable situation, since 2000 the airline industry has undergone major changes (USDOT 2011b, Wensveen 2011):

- Efforts have been made to increase the passenger load factor, which measures the percentage of airline capacity utilization by dividing the number of passengers flown by the number of available seats. In order to make a profit with each flight, the load factor needs to be around 70-80% (Price & Forrest 2009). The goal is to make sure that planes are as full as possible, since every empty seat is a loss for the airline. To that end, main airlines have implemented more code-sharing partnerships with regional airlines, which fly smaller aircraft.
- The top cost for airlines is fuel, which in 2008 constituted 34.2% of all airline operating costs in North America (IATA 2010). As a response to increased fuel costs in the last years, there has been a "de-hubbing" process, with an increase of direct flights between origin-destination.
- The second top cost for airlines is labor. As a result of cost cutting strategies, airline employment has been decreasing during the last decade. According to the U.S. Department of Transportation[4], the number of employees dropped by 22.3% from 2000 to 2009.
- With the rise of low-cost carriers, competition between airlines has remained strong, making very difficult for main airlines to obtain additional revenue by increasing ticket prices. For this reason, airlines have turned to other sources of income, called "ancillary revenues". Airlines have added separate fees for a

[4] http://www.bts.gov/publications/transportation_statistics_annual_report/2009/html/chapter_01/table_01_04_07.html, accessed September 26, 2012

number of services, such as checking baggage, changing and cancelling tickets, seats with certain characteristics (with more legroom, on the aisle, etc.), snacks, pillows, headsets, etc.

- Finally, other strategies adopted by airlines to cut costs and to cope with the changing environment have been declaring bankruptcy (i.e. US Airways and United Airlines in 2002, Delta Air Lines and Northwest Airlines in 2005, American Airlines in 2011), and conducting mergers between airlines (i.e. Delta Airlines + Northwest Airlines in 2009, United Airlines + Continental Airlines in 2010, Skywest + Atlantic Southeast Airlines + ExpressJet Airlines in 2010, Southwest Airlines + AirTran in 2011).

One of the most important changes suffered by the aviation industry has been the increasing emphasis on airline and airport security for all commercial scheduled and non-scheduled flights. Some of the regulations that had a larger impact on the air travel experience before 9/11 are the following. A series of skyjackings in the 60s led the U.S. Congress to enact the Anti-Hijacking Act of 1974 that mandated the airlines to conduct a three-stage screening of all passengers: (1) checking passenger lists for indications of hijacker personality profile, (2) search of carry-on items, and (3) metal detector screening (Rust 2009). The Aviation Security Improvement Act of 1990 included more comprehensive regulations on personnel identification systems and airport access control systems. The Aviation Security and Antiterrorism Act of 1996 mandated background checks on employees with access to secure areas and called for the deployment of explosive detection technology, among other measures (Price & Forrest 2009).

In September 11, 2001, a team of terrorists gained control of four commercial flights and used them to attack the World Trade Center in New York and the Pentagon in Washington DC. The legislative response to that attack was the Aviation and Transportation Security Act of 2001, which addressed numerous issues, including the creation of the Transportation Security Administration (TSA), the requirement that all checked baggage should be screened before being loaded into the plane, the reinvigoration of the air marshal program, and the creation of a $2.50 per passenger fee to help airports cover security expenses. After that, and following the detection of a liquid bomb plot in the United Kingdom, liquids and gels were banned from carry-on luggage, although later on that ban was modified to allow a limited amount of liquids per passenger (Price & Forrest 2009). All these security measures are directed toward increasing safety and reducing the risk of attacks against civil aviation. However, they impose a burden and certain disturbances to the passengers that make air travel more stressful and less attractive. Annex 9-Facilitation (of Annex 17) of the ICAO Chicago Convention addresses this issue, establishing that all security measures must be applied in a manner such that they do not interrupt the flow of personnel, baggage, and aircraft through the system (ICAO 2006). Nowadays, the typical process followed by a passenger when travelling by air includes: arrival to the airport, check-in of luggage, border control, airport security baggage and passenger check before entering the gate, boarding, flying and pick-up of luggage from the baggage claim and -limited to international flights- another border control at the host country's border.

From the passenger’s perspective, the experience of travelling by air has undergone a myriad of changes, including the types of aircraft used, the services offered, the

destinations reached, the costs of tickets, or the amount of luggage allowed (less than 40 pounds until 1965, two or three pieces of luggage per passenger from the 70s until the beginning of the 21st century, to the actual one bag per international flights and fee per checked-bag in domestic flights). Apart from stress, jet lag, the increasing airfares and baggage fees, and the hassles caused by the screening procedures, air travelers complain about a number of different issues. According to the Department of Transportation, the major issues experienced by passengers in 2011 were, in order of importance: flight problems (cancellations, delays, etc.), mishandled baggage, ticketing/boarding, customer service, fares, disability related issues, and oversales (USDOT 2012). There were a total of 1,907,769 baggage-related complaints in domestic flights in the U.S., which constitutes a rate of 3.39 reports per 1,000 (domestic) enplanements (p. 31). This rate is based on the total number of reports each carrier received from passengers concerning lost, damaged, delayed or pilfered baggage. Despite being the second cause of complaint among air travelers, to date no further information is available regarding what percentage of those 1.9 million complaints is due to pilferage. This dissertation will focus precisely on this issue, in particular when the theft it is committed by airport employees.

Chapter summary

This chapter provided a broad overview of the commercial aviation industry in the U.S. How airports and airlines work, how they are classified, and what are the most recent changes and developments in the industry are key to understanding the environment in which the problem studied in this dissertation takes place. Next chapter will address the problem of luggage theft by employees at airports, and will explain how some of the regulations and practices mentioned above facilitate this type of crime.

2. THE PROBLEM OF LUGGAGE THEFT BY EMPLOYEES AT AIRPORTS

In any given day, approximately 1.8 million people board an airplane in the U.S. Almost everybody travels with some sort of carry-on bag, and many passengers travel with luggage that they need to check-in. Apart from clothing and toiletries, many of us pack in our travel bags a number of valuables: currency, laptops, digital cameras, jewelry, cell phones, GPS devices, iPods, etc. Despite the large number of passengers, and of valuables that travel with them, in the recent years the study of crime at U.S. airports has focused on crimes like terrorist threats and smuggling of illegal goods. No attention has been paid to the problem of theft of and from luggage, and very little is known about the incidence or prevalence of this type of crime. However, the problem exists. This chapter outlines the problem of theft from/of luggage and explains how post 9/11 policies on passenger screening and on inspection and handling of baggage at airports open up opportunities for theft by airport employees.

2.1. Theft OF luggage vs. theft FROM luggage

A previous study on this issue based on press releases of cases of luggage theft at U.S. airports during 2008 and 2009 (Marteache, 2009) showed that, when analyzing luggage theft at airports, it is important to differentiate between theft OF luggage and theft FROM luggage. These two problems differ in what is stolen, how and when the theft is committed, who steals it and how it is reported, as shown in the table below. In one case, the whole suitcase is stolen, while in the other only selected items are removed from the bag. The modus operandi is also very different: the thieves of luggage just take the bag,

while those who steal only some items need to open the bag, go through the contents, pick the items they want and close the bag again. Therefore, the place where this type of theft occurs is different as well: most suitcases are stolen at the baggage carousel, and most thefts of items from the luggage occur in areas with restricted access, since some privacy is needed to go through the contents of the suitcase.

Table 3. Characteristics of theft of luggage and theft from luggage at airports

	Theft OF luggage	**Theft FROM luggage**
What	Whole suitcase	Selected items
How	Steal the suitcase	Open the suitcase
Where	Baggage claim area	Areas with restricted access
By whom	Other travelers **Other individuals**	**Airport and TSA employees**
Reported as	Lost luggage	Theft

According to media reports, very often thieves of suitcases are individuals who enter the airport baggage claim area as if they were travelers, take one or two bags and leave again; while in most of the cases of thefts from luggage, some airport and Transportation Security Administration (TSA) employees are involved. This makes sense considering that they are the ones with privileged access to the luggage in order to perform their functions of handling and screening the baggage. Although thefts from luggage may not be exclusive to airport and TSA employees, the analysis of the cases reported in the media shows they represent a very large percentage of offenders (see textboxes below).

Finally, if checked bags do not show up at the baggage claim area, travelers assume that the airline didn't load them, that it sent them somewhere else, or it simply lost them. Passengers report missing bags as lost, even if they have been stolen, which makes the

study of theft OF baggage at airports very difficult. On the contrary, the passenger who finds that only some items are missing from the bag can be certain that he has been the victim of theft, and he reports it as such.

Some examples of theft OF luggage:

Miami International Airport *and* ***Fort Lauderdale-Hollywood International Airport (FL):*** *A husband and wife were charged with stealing luggage from baggage carousels at least 5 times since early March. South Florida Business Journal Online. May 22, 2012.*

Rogue Valley International-Medford Airport (OR): *A couple was arrested for stealing a $2,000 laptop off the baggage carousel. The laptop was packed in a box identifying the contents, and arrived before the man traveling with it. Mail Tribune. February 3, 2012.*

Spokane International Airport (WA): *Three individuals were arrested for stealing baggage from the baggage claim areas of the three concourses of the airport. The Spokesman-Review. October20, 2011.*

Phoenix Sky Harbor International Airport (AZ): *A woman was arrested for stealing at least 30 pieces of luggage. In December 2009 a couple had been arrested at the same airport for stealing nearly 1,000 pieces of luggage from the baggage carrousel. Associated Press Newswires. February 11, 2010.*

Hartsfield-Jackson International Airport (GA): *Eight people were arrested between mid-May and the end of June on charges of stealing luggage from the baggage carousels. The Atlanta Journal – Constitution. July 18, 2008.*

Buffalo Niagara International Airport (NY): *Two individuals were arrested for stealing 55 pieces of luggage from the carousel during a 12-day period in December 2007. The Buffalo News. March 5, 2008.*

Some examples of <u>theft FROM luggage</u> involving **baggage handlers**:

(Wall Street Journal. December 17, 2009, "Latest Airport Hassle: Carousel Crooks")

*"(...) This year, Delta Air Lines Inc. baggage handlers were caught rifling through suitcases in the belly of airplanes in **Hartford, Conn**., pocketing laptops, cameras, iPods, GPS units, jewelry, watches and earrings, according to Lt. J. Paul Vance of the Connecticut State Police.*

*Authorities also broke up a ring of airline thieves in **St. Louis** who, according to Lambert Airport Police Chief Paul Mason, were targeting soldier's bags that were shipping off to war. Baggage handlers pulled soldiers' duffels off a conveyor belt in a tunnel, stashed loot and then picked it up later, taking it home under their coats or in backpacks. Among the stolen items recovered: laptops, electronic game systems, cameras, cigarettes, battery chargers, sunglasses and firearms. (...)*

*In **Portland, Ore.**, Northwest Airlines baggage handlers were caught in April stealing items and posting them for sale on eBay right from a supervisor's airline-owned computer. Baggage theft reports are up nearly 50% this year, according to airport spokesman Steve Johnson. Portland airport police have received 195 reports of baggage theft this year through October, compared with 132 reports in the same period of 2008. At least 43 of the reports this year relate to the ring at Northwest, Mr. Johnson said.*

*In **New York**, police caught baggage handlers in July stealing items from bags and then switching destination tags so that the luggage would be lost. If the bag was reunited with owners, the circle of possible suspects who handled it had been expanded, covering the tracks of the thief.*

Airlines say baggage theft is rare among the millions of passengers who fly each year, but law-enforcement officials say it has been growing significantly. "There's been a tremendous increase in the last five years. It's pretty bad—a lot is getting stolen every day," said a prosecutor in the Queens County district attorney's office, which handles airport theft cases in New York."

Some examples of theft FROM luggage involving **TSA officers**:

(Wall Street Journal. February 2, 2012, "NYC agent arrested in latest TSA theft allegation")

*"A Transportation Security Administration agent stole $5,000 in cash from a passenger's jacket as he was going through security at **John F. Kennedy International Airport**, authorities said Thursday, the latest in a string of thefts that has embarrassed the agency.*

Alexandra Schmid took the cash from a Bangladeshi passenger's jacket as it went along an X-ray conveyor belt Wednesday night in Terminal 4, said Al Della Fave, spokesman for the Port Authority of New York and New Jersey's police force. Surveillance video showed Schmid taking the money from a jacket pocket, wrapping the cash in a plastic glove and taking it to a bathroom, Della Fave said. The money hasn't been recovered, he said. Police are investigating whether Schmid gave it to another person in the bathroom. (...)

*Wednesday's arrest came the same day that a federal judge sentenced former TSA screener Ricky German to eight months in prison for trying to steal a laptop from a passenger at the **Memphis airport** in December 2010. (...)*

The cases are part of a series of recent theft allegations against TSA employees:

*— Last month, an agent who worked searching checked luggage at the **Dallas-Fort Worth International Airport** was suspended after the owner of a stolen iPad used the tracking feature on the device to locate it at the agent's home. Police found seven other iPads there.*

*—On Jan. 10, former TSA agent Paul Yashou pleaded guilty to stealing a $15,000 watch from a passenger's belongings at **Los Angeles International Airport** in May. He is awaiting sentencing.*

*— Two other former TSA agents at **JFK** were sentenced on Jan. 10 to six months in jail and five years' probation for stealing $40,000 from a piece of luggage in January 2011. The agents, Coumar Persad and Davon Webb, had pleaded guilty to grand larceny, obstructing governmental administration and official misconduct.*

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*— Also in January, authorities charged an agent at **Miami International Airport** with swiping items and luggage and smuggling them out of the airport in a hidden pocket of his work jacket. He was arrested after one of the items, an iPad, was spotted for sale on Craigslist. Another TSA employee was arrested in July at nearby Fort Lauderdale-Hollywood International Airport after an airline employee reported that the man slipped an iPad into his pants.*

*— In December, police charged a TSA screener at New York's **LaGuardia Airport** with lifting a laptop after a Detroit-bound passenger left it behind at the security station.*

*— Earlier last year, a TSA supervisor and one of his officers pleaded guilty in a scheme that lifted $10,000 to $30,000 from passengers' belongings at **Newark Liberty International Airport**. A federal judge sentenced the supervisor, Michael Arato, to 2½ years in prison and his subordinate, Al Raimi, to six months of home confinement."*

This dissertation will focus on theft FROM luggage at airports which, as shown above, is committed mostly by airport employees. Despite the lack of information about this issue, the problem does exist. In the very limited literature available that will reviewed in Chapter 3, airport officials identify employee theft as a prevalent problem (Nunn 1993; Royal Canadian Mounted Police 2008), and the media recounts multiple cases of baggage handlers or screeners arrested for stealing from passengers' bags (from 2009 to 2012 "at least 32 instances of luggage-theft operations –involving both baggage handlers and TSA screeners- have been exposed at U.S. airports." Peterson 2012).

There are many situations in the airport in which the contents of passengers' luggage may be stolen, such as in the restrooms, waiting areas, parking lots, stores, restaurants, etc.,

and those thefts can be committed by employees, other travelers, or other individuals. This research concentrates specifically on thefts occurring when the passenger is required to hand over his or her bag for transportation or screening, that is, when the passenger has no direct contact with the luggage and it is difficult or impossible for them to exert effective guardianship over the bag. In this situation, only employees have access to the valuables that are being stolen. Those settings are basically the passenger security screening checkpoint, and the checked baggage inspection and handling system.

2.2. Passenger and baggage screening at airports

After the terrorist attacks on the World Trade Center in New York City on September 11 2001, security policies for air travel changed drastically. On November of that same year the federal government passed the Aviation and Transportation Security Act (ATSA) with the objective of increasing air passenger safety. The Transportation Security Administration (TSA) was created as an agency within the Department of Transportation, although it was later transferred to the Department of Homeland Security. The TSA is responsible, among other duties, for overseeing security operations at all commercial airports in the United States (Blalock, Kadiyali & Simon, 2007). That includes the screening of all air passengers, their carry-on and their checked luggage. The screening procedures have evolved since they were first implemented in 2001, and have adapted to the new technologies and policies developed since then. A general description of these procedures, and of how the screening and handling of baggage generates opportunities for theft, is provided below.

2.2.1. The passenger security screening checkpoint

The goal of the passenger and carry-on luggage screening procedures is to make sure that passengers do not bring a firearm, explosive, or dangerous device into a passenger cabin to prevent acts of unlawful interference (ICAO 2006). The passenger security screening checkpoint (SSCP) divides the public and the sterile area of the airport. A sterile area is a portion of an airport that provides passengers access to boarding aircraft and to which access generally is controlled by TSA through the screening of persons and property (TSA 2011a). Only passengers with boarding passes and employees with cleared access are allowed in the sterile area. The different steps included in the basic screening process are the following (Price & Forrest, 2009, pp. 222-223):

1. The divestiture process.
   The passenger or employee is called by security staff to remove outer attire and anything that may set off the metal detector, such as belt buckles, watches, jewelry, coins, mobile phones, or PDAs. These items are placed in a polymer container and sent through the X-ray machine. Laptops and personal DVD players are often removed from their containers and placed in separate bins. In the United States and many other countries, individuals must also remove their shoes, but this policy changes both from airport to airport and country to country. The individual also loads their baggage onto the bag belt for analysis by the X-ray machine. Security staff may then realign or space the bag to randomize its position and to allow proper separation of bag images enabling a static image.

2. Passenger screening.
   The passenger is requested to move through the metal detector. Passengers who set off the detector's alarm are asked to step aside until a secondary search can be conducted, usually consisting of a pat-down or hand wand metal detector. A holding station holds passengers temporarily until screeners are available to escort them to the proper area to conduct secondary screening. In some instances, passengers may be allowed to go back through the metal detector after divesting themselves of additional items that may have triggered the alarm, rather than going to secondary screening. In some airports, Explosive Trace Portals (ETP) are used for secondary screening. ETPs detect microscopic traces of explosives on a person's body or clothing by blowing air onto the passenger. More recently, the TSA has incorporated Advance Image Technology (also known as body scanners)

at more than 180 airports[5], which screens passengers for metallic and nonmetallic threats including weapons, explosives and other objects. If a suspicious object is detected, a secondary search consisting of a pat-down is conducted.

3. Carry-on baggage screening.
   As the passenger is being screened, security staff members analyze the contents of the passenger's bag using conventional X-ray technology or explosive detection systems (EDS) technology. Baggage that contains questionable items or threat items is often checked physically through a bag search, analysis by an Explosive Trace Detection (ETD) machine, or, in some cases, both. If a bag contains an apparent bomb, then the screener will likely keep the suspect item within the X-ray machine, hinder attempts by the owner to pull the bag away from the security staff, and notify law enforcement and supervisory personnel for further assessment of the X-ray image. If the item appears to be a bomb, then an immediate evacuation of the security screening checkpoint and surrounding area may be required.

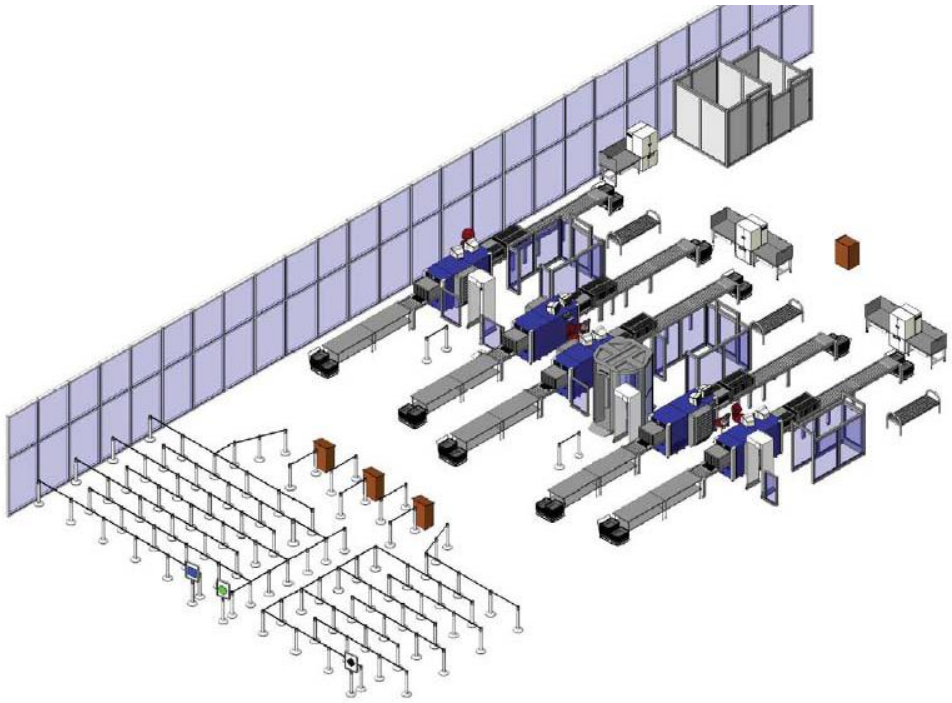
4. Exit process.
   Provided passenger belongings have been cleared through the X-ray analysis, passengers are reunited with their belongings and allowed to proceed into the sterile area.

5. Special circumstances.
   Disabled passengers and those in wheelchairs often must be hand searched.

6. Newer technology.
   New technology is being developed, including explosive trace portals, liquid explosive detectors, and document scanning devices. These technologies are being integrated into the passenger and carry-on baggage screening process.

[5] http://www.tsa.gov/approach/tech/ait/index.shtm (accessed September 26, 2012)

Figure 2. Standard security screening checkpoint layout



Source: TSA (2011a)

If everything goes smoothly, the passenger and the carry-on bag should be reunited in less than a minute after entering the security checkpoint. However, being held for secondary screening can prevent the passenger from keeping an eye on their belongings, and secondary screening of carry-on bags is conducted by hand-searching the contents of the bag. Both provide the opportunity to TSA officers to commit theft from carry-on luggage. Anecdotal evidence from two cases of theft at checkpoint at Newark International Airport in 2009 and 2010 (see textboxes below[6]) show that those thefts were committed precisely during secondary screening of passengers' carry-on luggage, and the

[6] United States v. Arato: information retrieved from http://www.justice.gov/usao/nj/Press/files/pdffiles/2010/Arato,%20Michael%20Complaint%20PR.pdf (last access, September 26, 2012).
United States v. Ray: information retrieved from http://www.justice.gov/usao/nj/Press/files/pdffiles/2010/Ray,%20Leroy%20Complaint%20PR.pdf (last access, September 26, 2012).

victim was not able to exert effective guardianship over the bag because she was either not present or was being distracted by the Transportation Security Officers (TSOs).

Examples of how theft FROM luggage is committed at checkpoint by TSA officers

CASE 1: United States v. Arato

(United States Attorney, District of New Jersey)

"Arato was the Supervisory Transportation Security Officer at the B-3 security checkpoint for Terminal B at Newark Airport. Another Transportation Security Officer for that checkpoint, identified in the Complaint as the "Co-schemer," had been stealing regularly from passengers passing through the checkpoint from approximately October 2009 to September 13, 2010. Since that time, the Co-schemer has been cooperating in the government's investigation into the thefts.

Arato, who was the Co-schemer's immediate supervisor, and the Co-schemer agreed that when the Co-schemer stole cash from a passenger traveling through the B-3 checkpoint, he would "kick up'" half of the stolen money to Arato. On average, the Co-schemer would take approximately $400 to $700 from passengers during each shift, with approximately $200 to $400 going to Arato. In exchange for the payments, Arato never notified his superiors at TSA or any other law enforcement agency about the Co-schemer's thefts. Arato accepted $3,100 in bribes from the Co-schemer between September 13 and October 5, 2010.

(Continues on the next page)

(cont'd)

In order to facilitate the theft and bribery scheme, the conspirators targeted predominately non-English speaking victims, including women of Indian descent and nationality who were returning to India after visiting the United States.(…)

In addition to taking bribes related to another's theft, Arato is charged with stealing from passengers for himself, occasionally giving a portion of his take to the Co-schemer. Arato would pocket approximately $400 to $700 from passengers during a given shift."

Federal case files show that, on August 31, 2010, the Co-schemer removed a white envelope containing $5,000 cash from a passenger's carry-on bag during secondary screening. While Arato distracted the victim, the Co-schemer placed the envelope in a drawer attached to the x-ray machine and covered the envelope up with other items inside the drawer. Once the victim left the checkpoint, the Co-schemer placed the envelope in his pocket and hid it in an empty locker in a TSO break room.

On September 15, 2010, Arato conducted a lengthy secondary search of a passenger's bag, and stole two $100 bills from it. He placed them inside the EDS machine and told the Co-schemer to retrieve them. The Co-schemer removed them from the machine and placed them into a white bowl, which in turn was placed on top of the EDS machine. Then the Co-schemer gave Arato one of the bills and kept the other.

On September 27, 2010, Arato stole a small red purse from a female Indian passenger's handbag during a secondary search. During the search he first removed several items (including the purse) and placed them in a plastic tray. He then handed back to the victim all the items except the red purse. Arato removed the tray from the secondary search table while concealing the red purse between the tray and his hand so that it could not be seen by the victim. He walked to another area in the checkpoint where he emptied out a box containing rubber gloves and hid the red purse in the empty glove box. He brought the glove box with the purse inside his office where he removed the purse and placed it in his desk drawer.

Examples of how theft FROM luggage is committed at checkpoint by TSA officers

CASE 2: United States v. Ray

(United States Attorney, District of New Jersey)

"On February 3, 2010, a female passenger passed through the security screening process at Newark Liberty International Airport. After the passenger's belongings went through the x-ray machine, Ray pulled the tray from the machine to search it at another table.

After Ray found a white object in the victim's bag, he took his gloves off and held them in one hand. Once the victim retrieved her personal property and proceeded towards her departure gate, Ray moved away from the checkpoint and placed the gloves in a pocket of his pants. After throwing the gloves away, Ray continued touching the pocket, in which an object was visible, numerous times.

Several minutes later, the victim returned and indicated she was missing an envelope containing approximately $300 in cash, as well as approximately $195 in cash from inside a zippered pocket of her bag.

Shortly thereafter, Ray abruptly began walking quickly away from the location where he was working. He went into his supervisor's office, pulled his left hand out of his pocket, and placed a white object in a "lost and found" tray.

Ray then returned to the area around the check point. Several officials had gathered around the victim, to begin investigating her complaint regarding the missing money. Without being asked, and without being told that the victim was missing anything, Ray stated to these other officials that – in sum and substance – he remembered the victim, he knew what she had left behind, and that he had found an envelope on the floor and had recovered it. An official retrieved a white envelope from the "lost and found" tray in the supervisor's office. The envelope contained approximately $300, which the victim identified as hers."

Closed circuit television (CCTV) is used at most security checkpoints. According to TSA guidelines (2011a) they should cover each lane, all secondary screening areas, and exit lanes, and they should be positioned to show the front view of the passengers' face and any other identifying characteristics. The emphasis is placed on the surveillance of passengers, not of TSA officers, although they can serve as a deterrent for theft.

Personal observation at Newark International Airport.

On February 22, 2012, I went through a security checkpoint at Newark International Airport. I sat down just at the exit of the checkpoint to reorganize my belongings, check that nothing was missing, and tie my shoelaces. Three TSA officers (two men and a woman) were chatting near me, and one of them suddenly realized that a passenger had forgotten his wallet in one of the empty plastic trays. He told the other two TSOs, who instructed him to check if there was an ID so they could return it to its owner. He looked at them and said "But… it's right in front of the cameras!" The other two insisted that he needed to check the wallet to be able to return it, so he went to the pile of empty trays, turned his back to the cameras, and took the wallet. Then he moved a couple of steps back until he was sure to avoid the camera's viewshed while he was checking the wallet (he double-checked that by looking up a couple of times). He identified the passenger, and he and the other male TSO left for the gate to try to locate the passenger and give him his wallet.

While the whole situation was perfectly legal, it was very interesting that the TSO was so aware of the cameras' locations and took precautions to not be recorded as he was retrieving the wallet. This situation calls into question whether CCTV can be an effective deterrent of employee theft at checkpoint.

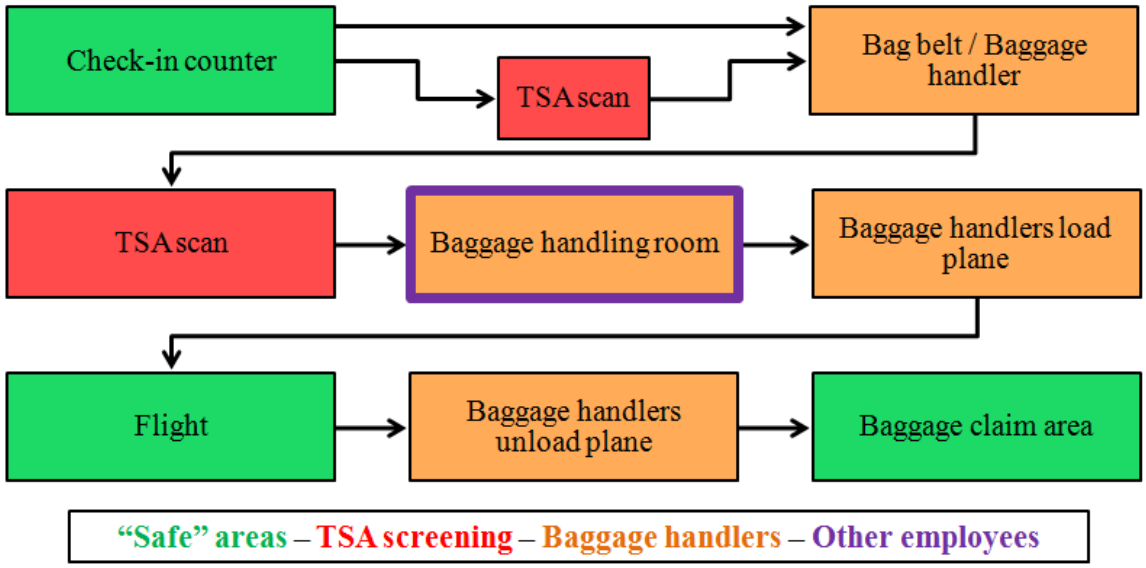
2.2.2. Checked baggage handling process and inspection system

The handling process of checked baggage can be broadly described as follows: the passenger arrives at the airport with his or her luggage and goes to the check-in counter. At the counter the bag is weighted to see if it meets the allowed weight limits, and it is tagged with the information of the passengers' destination. If the passenger takes connecting flights, most of the times the bag is tagged directly with the information of the last destination where the passenger is flying, since the passenger will not recover the luggage until that final destination is reached. Then there are two options. (1) In most cases, the bag is sent directly to the TSA screening area, either automatically (by placing it on a bag belt) or manually (pick up by a baggage handler). After being screened by the TSA, the bag is sent to the airport baggage handling area. This is called an in-line screening system, and will be described in detail below. (2) In the second option the passenger is asked to carry the bag themselves to a TSA screening node placed in the airport lobby, near the check-in counter, and to bring it back to the check-in counter, where the suitcase is sent to the baggage handling room. Option (1) does not inconvenience the passengers since the luggage is automatically sent to the screening area, and such screening is done out of the passenger's view; while in option (2) the baggage-screening process requires additional time and effort on the part of passengers, and the screening is done in front of or near them (Blalock et al, 2007). More details about the TSA's bag screening procedures will be given below.

In the baggage handling room luggage is sorted according to its destination, and it is held until the time when it can be loaded onto the plane. After completing the flight, luggage is unloaded from the plane and brought to the baggage claim area (when it is its final

destination) or to the baggage handling area of that airport, until it can be loaded onto the next flight. In each step of this process, different employees have access to the luggage. Bags are screened by TSA officers, transported and loaded/unloaded onto the plane by baggage handlers and, while they are being held in the baggage handling areas, they are available to other airport employees with access to that area (i.e. cleaning crews). Figure 3 illustrates this process and the possibilities of access to the luggage by the different types of employees. "Safe" areas are those in which the luggage is either with its owner or cannot be accessed by any employee.

Figure 3. Inspection and handling process of checked baggage with likely access by employees



While the figure above illustrates in rather generic terms the possibility of accessing the luggage of each type of employee, the truth is that each of those groups has very different opportunities and justifications to access the bags. The role of TSA officers is precisely to scan the contents of the bags by either automated or manual methods, while baggage handlers are supposed to transport the bags, without opening them, from one point to

another. The TSA estimates that after the bag is screened by their agency, between 5 and 8 other employees touch that same bag[7]. Airlines employ their own baggage handlers at their busiest hubs but tend to subcontract these services at other airports (Peterson 2012). Baggage handlers working for subcontractors are less unionized, they have worse pay and work conditions and a higher turnover rate than the ones employed directly by the airline. Finally, other employees can physically access the bags while they are in the baggage handling room, although they have no excuse for doing so without looking suspicious.

The main goal of the screening of checked baggage conducted by the TSA is to prevent the placement of an explosive device in the baggage being boarded into an aircraft. However, checked baggage screening can also be used to detect and prevent the illegal transport of hazardous materials, narcotics, and weapons (Price & Forrest, 2009). All checked baggage is screened before being loaded into the plane, and although there are generic procedures that apply to all luggage, the specific screening process of baggage differs among airports, and even among terminals within airports, depending on various factors such as the throughput rate (the number of bags being processed hourly), available space, and available funds (TSA 2011b). The standard system used in the United States is that all baggage be checked by explosive detection system (EDS) machine, although other systems such as explosive trace detection (ETD), physical inspection, and K-9 inspection are also used (Price & Forrest, 2009). EDS machines are essentially an X-ray machine that uses computerized tomography to analyze the contents of a bag and therefore the screening process can be automated and more bags can be screened per

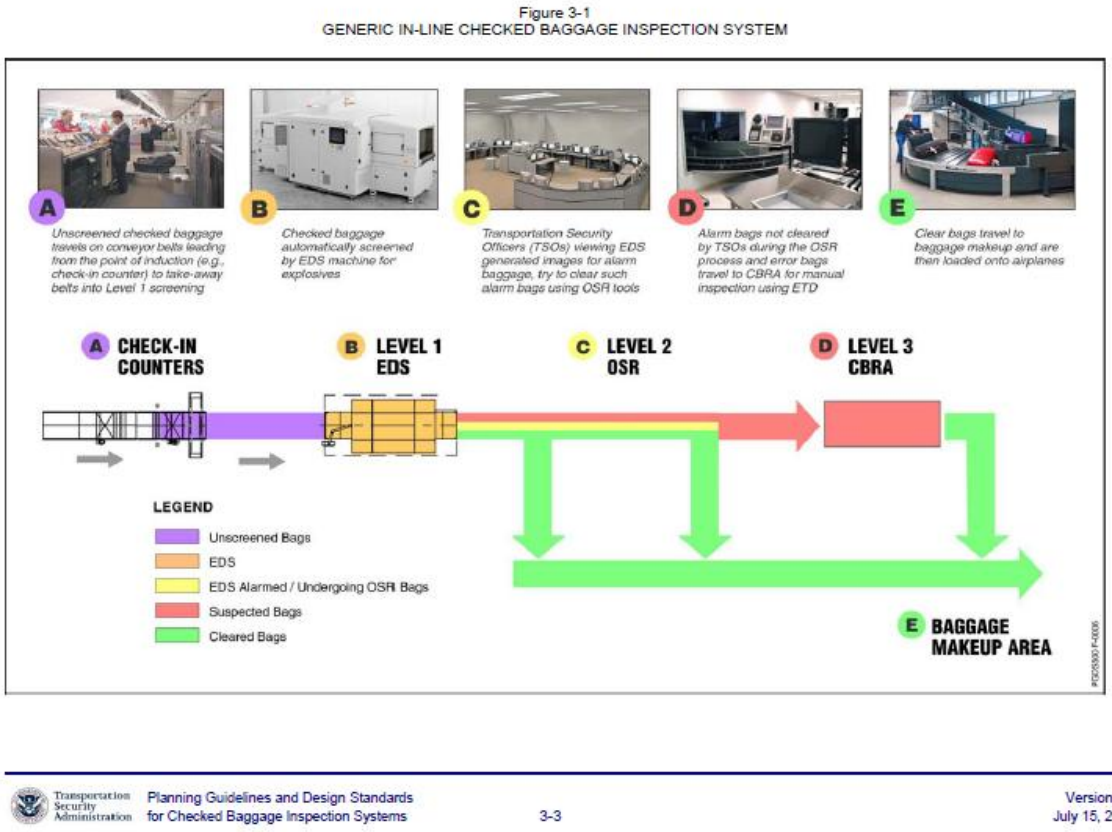
[7] http://blog.tsa.gov/2008/02/tsa-our-officers-public-and-theft.html (accessed September 26, 2012)

hour. ETD machines, on the contrary, are more labor intensive, since they require that a Transportation Security Officer conducts a manual swap of each individual bag.

As described by the TSA (2011b), the generic in-line screening process is structured in three levels, which are shown in the figure below. According to Shanks & Bradley (2004), 70% of the bags are cleared at Level 1 screening, and another 25% are cleared at Level 2, leaving about 5% of the bags to be subject to Level 3 screening (p. 13).

> Level 1 screening is performed with EDS units. All bags that can physically fit in an EDS unit are directed to Level 1 screening and scanned using an EDS. All bags that automatically alarm at Level 1 are subject to Level 2 screening.
>
> During Level 2 screening, TSA personnel view alarm bag images captured during the Level 1 EDS scan, and clear any bags whose status can be resolved visually. This process is referred to as OSR (On-Screen Resolution), which, for in-line systems, allows the continuous flow of bags through the system until a decision is made. Although OSR typically occurs in a remote screening area, it may occur locally at the individual EDS unit, but this is not recommended. All bags that cannot be resolved at Level 2, and all bags that cannot be directed to Level 1 because of size restrictions, are sent to Level 3 screening.
>
> Level 3 screening is performed manually and involves opening the bag and the use of ETD technology at the Checked Baggage Resolution Area (CBRA). Bags that do not pass Level 3 screening (typically, a small percentage of total bags) are either resolved or disposed of by a local law enforcement officer (LEO). (p. 3-2)

Figure 4. Generic in-line checked baggage inspection system



Source: TSA (2011b)

In the cases in which an in-line system is not installed at the airport, stand-alone EDS or ETD machines are used. In general, bigger airports opt for a fully integrated in-line EDS system because it is the fastest and most effective, but it is also costly and requires some remodeling of the terminal. Smaller terminals and airports tend to opt for stand-alone machines (EDS or ETD). The differences between all the screening options are summarized in Appendix II.

Oversized and fragile bags, and other baggage that cannot be screened using EDS go directly to Level 3 screening, where ETD technology and manual inspection are used as the primary screening methods. Airports located near tourist facilities (golfing, skiing,

scuba diving, etc.) will receive a higher number of oversized bags. Depending on the geographic location of the airport, between 5% and 20% of the total checked baggage is oversized (Shanks & Bradley, 2004, p. 51).

In order to be able to screen all checked baggage, and to access the contents of suspicious baggage, the TSA recommends that passengers do not lock their bags, or that if they do, they use a TSA-approved lock for which the TSOs have a master key. The instructions can be found in the TSA's website: "Please refrain from locking your checked baggage or use one of our accepted and recognized locks. If your baggage alarms and our Security Officers cannot gain access to your checked bag, unrecognized locks may be broken.[8]"

The inspection and handling process of checked baggage offers some opportunities for theft: (1) the "don't-lock-your-bag policy" prevents passengers from effectively securing their bags, forcing them to either leave them unlocked or to use a TSA-approved lock; (2) TSA's inspection process includes X-ray imaging of the contents of the bag, and possibilities for manual inspection, giving potential offenders information about and access to passengers' valuables; (3) the luggage is then transported to and from the baggage handling area by baggage handlers, where the bags are accessible for baggage handlers (and other employees), especially if they are not locked or their locks have been removed or broken; and (4) baggage that is travelling through more than one airport is stored at two or more baggage handling areas during the process, increasing the time at risk for theft and decreasing the risk of being caught of the offender. Finally, oversized and fragile baggage is always manually inspected, which increases the access to its contents by TSOs. In words of Scott Mueller, author of *The Empty Carousel* and system

[8] http://www.tsa.gov/travelers/airtravel/assistant/editorial_1052.shtm (accessed September 26, 2012)

manager of baggage services for several U.S. airlines for over 20 years, baggage theft "happens far more than the traveling public knows. If anything, it has gotten worse in the past decade. The arrival of the TSA, which should have heightened security throughout airports, actually created an opportunity for petty thievery. After the TSA took over back in 2001, my pilferage claims quadrupled. Before the TSA came into the game, passengers' bags could be opened by another party only if a law-enforcement officer was present." (Peterson 2012, p. 2).

Examples of how the screening and handling process creates opportunities for theft:

EXAMPLE 1

(Associated Press Newswire. August 11, 2012, "Midway baggage handler charged with laptop theft", ***emphasis added****)*

"A baggage handler at Chicago's Midway Airport has been charged with stealing laptop computers from travelers' luggage. (…)

The Cook County State's Attorney's Office said Saturday the investigation began after numerous complaints of thefts of laptops belonging to Southwest Airlines customers.

Police identified Johnson as a suspect. ***Prosecutors say his work station was near a security screening area where he could see what types of computers were in specific bags and later steal them****.*

Authorities say a search of his home turned up numerous Apple and other laptops as well as records showing he pawned many computers. (…)"

Examples of how the screening and handling process creates opportunities for theft:

EXAMPLE 2

*(New York Post. July 25, 2011, "Rash of TSA thefts at New York airports", **emphasis added**)*

"A TSA screener is suspected of teaming up with a baggage handler at Kennedy Airport to loot the luggage of at least one flier in the latest in a rash of theft allegations against metropolitan-area airport workers, The Post has learned.

JFK screener Jamel Martin, 30, was fired after allegedly filching an expensive camera from an East Hampton photographer's bag in late June.

***Surveillance video and cell phone records caught him searching the bag of a 49-year-old photographer and then making a cell phone call to a baggage-handler cohort at JetBlue**, sources said.*

Martin later allegedly admitted to cops that he had called the baggage handler to tell him that there was an item in the flier's bag."

Chapter summary

Luggage theft at airports can take mainly two forms: theft of the whole suitcase, and theft of certain items from inside the bag. The first is reported by the passenger as lost luggage, while the latter is reported as theft. Theft from the bag is committed mostly by airport employees, who have privileged access to the luggage while the owner is either absent or is in no position to exert effective guardianship over the bag. This chapter showed how passenger screening and baggage inspection and handling procedures facilitate this type of theft. In the next chapter the current literature on employee theft from passengers at airports will be reviewed.

3. LITERATURE REVIEW

Very little is known about employee theft of passengers' belongings at airports. The reports analyzed in the first section of this chapter show that, although it is believed to be a widespread problem, there is limited systematic information about this type of theft. Studies of theft from passengers at mass transit systems in general provide some information about the individuals most targeted by thieves. Literature on cargo theft at airports addresses the characteristics and special challenges posed by this type of crime. In the second section of the chapter the literature on employee theft is analyzed, with special focus on its fit within the wider area of white-collar crime, theoretical explanations of employee theft, and the importance of the role of opportunities in analyzing this type of crime.

3.1. Theft at airports

3.1.1. Theft from passengers at airports

The problem of theft from passengers at airports has not been widely addressed in the academic literature, and information about this crime is therefore scarce. A study conducted by the Royal Canadian Mounted Police (2008) on organized crime infiltration at Canada's largest airports found that, although drug smuggling was by far the most common offense committed, theft from baggage was also among the crimes conducted by the criminal groups operating at the airports. There were employees involved in criminal activity at all eight of the airports studied. Most employees involved in illegal activities worked on jobs that facilitate access to aircraft and/or luggage, as well as security companies, public agencies, courier companies, etc. The way organized crime groups

infiltrated the airport was mainly by corrupting existing airport employees, although in some cases they would place associates into the airport workforce too. As stated in the report, "While incidents of theft involving airport employees might not appear to be as significant as other more serious offences, they could signal more serious criminal activity" (p. 19). These findings are consistent with the recently uncovered case of an organized crime group operating from JFK airport in New York (Secret, December 9 2011) composed by baggage handlers and crew chiefs that worked together to smuggle drugs into the U.S. and to steal from cargo and from passengers' luggage.

The most comprehensive study on crime at airports was conducted by the Home Office (Nunn, 1993), which found that theft from passengers' luggage was hardly ever reported and was therefore very difficult to estimate. The report listed the following forms of theft as some of the most prevalent at Heathrow Airport in London (p. 15):

- Theft of briefcases/baggage from the tops of passengers' trolleys by means of teams employing distraction tactics. Such teams prey upon the holiday-making, jet lagged victims, by awaiting their chance when the unsuspecting dupe is forced to leave his trolley out of his sight, whilst queuing at the bureau de change, information desks or in the inadequately sized toilet cubicles.
- Theft from passengers' luggage while being loaded or unloaded from the aircraft hold, after it has been checked in under the terminal or when being checked by security guards for suspect electrical goods

The study also analyzed crime in other international airports, five of them in the United States: JFK and Newark International Airports (New York City Area), Anchorage International Airport (Alaska), Seattle-Tacoma International Airport (Washington), and Los Angeles International Airport (California). Although the Airport Police at those airports identified employee thefts from passenger luggage as a prevalent problem, they had very little statistical information to back it up due to the lack of reporting by the

passengers, the airlines, and other employees. This, in turn, led to the difficulty in identifying patterns of crime. Pick-pocketing and theft of baggage from passengers were some of the other problems identified, with tourists (mainly Asian passengers) being the most targeted victims.

Theft from passengers at other mass transit systems

Several studies have identified theft from passengers as one of the most prevalent crimes against passengers in mass transit systems in general (Morgan & Smith 2006; Levine and Wachs 1985; BDoT 1986). For example, in 2010/11, the largest category of serious offenses in railways in the UK and the London subway recorded by the British Transport Police (2011) was "theft from passenger property", which represented 27.5% of the total. Within this category, the BTP statistics differentiate between theft of luggage (suitcases), theft of personal property (i.e. bag snatching) and theft from the person (pick-pocketing), which constitute 9%, 39% and 52% of the total number of thefts against passengers, respectively. Most of these studies have focused in train, subway and bus systems, mainly in the US and the UK, and they have found that women, tourists, and shoppers are the most victimized groups (Levine and Wachs 1985; BDoT 1986), probably due to the fact that they tend to carry valuables with them (Morgan & Smith, 2006).

3.1.2. Cargo theft at airports

Cargo theft refers to theft of commercial merchandise while it is in transit from point of origin to final destination, whatever the mode of transportation being used (trucks, planes, trains, ships, etc.). It is difficult to detect as any theft from cargo will remain undiscovered until the shipment arrives to its destination and the missing items are noted, which gives the thieves some time to dispose of them (Mayhew 2001). The specific

location where the theft happened very often remains unknown, and may be far away from the destination where merchandise is delivered (Tyska 2004). It is frequently an underreported crime, since companies often choose to avoid the bad publicity and the higher insurance rates that reporting the theft would probably affect them (FBI 2010, Mayhew 2001). Although any merchandise is a potential target, the most stolen products in cargo theft are cigarettes, pharmaceuticals, and very especially computers and electronic components (FBI 2010) which are considered "hot products", that is, objects that are easy to resell but that still retain a high value (Mayhew 2001, Clarke 1999). Pilferage is one of the most costly causes of cargo theft. It is an opportunistic crime committed mostly by employees of large transportation facilities or of other transport-related companies, whose jobs provide them with access to the area where the merchandise is located (Tyska 2004). While pilferage tends to be largely dependent on available opportunities, theft of larger volumes of merchandise tends to be planned and premeditated, and very often is linked to organized theft rings or organized crime networks that facilitate the disposal of the stolen goods (Tyska 2004). The FBI considers cargo theft a "gateway" crime, as "in many instances, a cargo theft investigation will turn into a case involving organized crime, public corruption, health care fraud, insurance fraud, drug trafficking, money laundering, or possibly even terrorism" (FBI 2010).

Air cargo has some particular characteristics that make theft even more difficult to identify, such as "miss-shipping and international liaison difficulties; overlapping responsibilities between airlines, customs, police and airport security; and multiple carrier-handling involving freight-forwarding companies, consignors and consignees" (Mayhew 2001, p. 5). While only a small percentage of all cargo is carried by air, "items

shipped on aircraft generally consist of time-sensitive and high-value commodities (…) Common examples of air cargo include high-value machine parts and manufacturing equipment, electronic components for manufactured goods, consumer electronics, jewelry, and perishable items such as flowers, fruits, and fresh fish" (Elias 2010, p. 1). Airlines are reluctant to report crime (they tend to only report it if it has become a great problem), and therefore the true extent of cargo theft at airports remains unknown. There is also the problem of determining the jurisdiction of the police agency that should investigate these crimes, as they can happen at origin, at destination, or anywhere in between (Nunn 1993).

Most of the air cargo (about 75%) is shipped in bulk pallets or special containers called unit load devices. Some of the measures implemented to prevent air cargo theft are tamper-evident and tamper-resistant packaging, cargo tracking technologies, and screened cargo identifiers (Elias 2010). All domestic air cargo transported on passenger aircrafts is subject to TSA screening in a very similar way as how passengers' luggage is screened. TSA uses random and risk-based assessments to focus screening on shipments transported in all-cargo planes (Elias 2010).

3.2. Employee theft

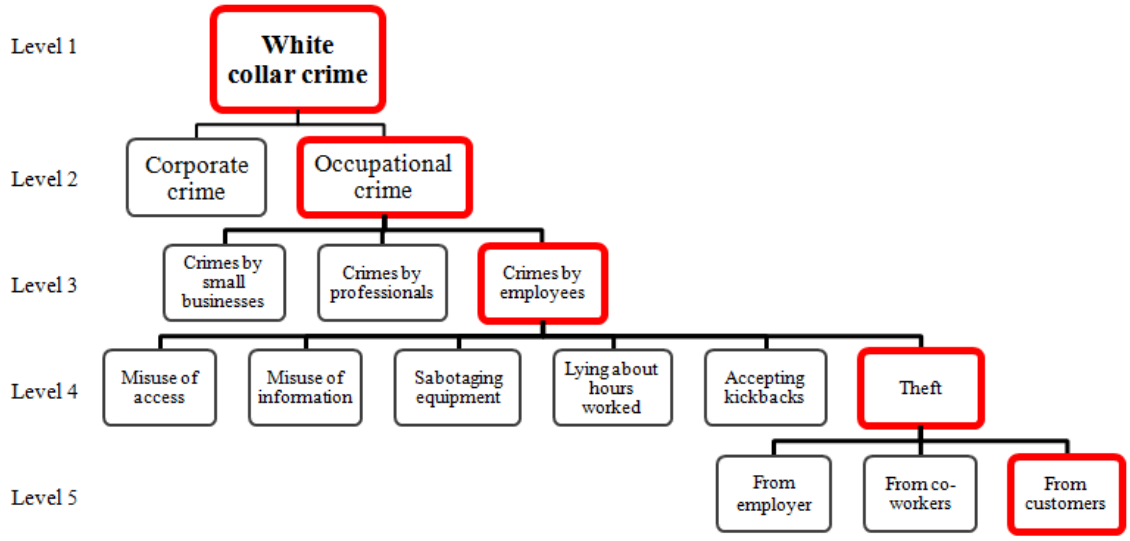
3.2.1. Definition and classification of employee theft within the white-collar crime literature

Employee theft is a typology of crime embedded in the general category of *white-collar crime*. Since the birth of this concept in E.H. Sutherland's Presidential Address to the

American Sociological Society in 1939, there has been much discussion and confusion about what exactly does the term "white-collar crime" refers to. After reviewing the wide array of existing definitions, Friedrichs (2007) arrives at the conclusion that there is consensus among most of the scholars who do research in this area with regards to the core elements of this category of crime: it "(1) occurs in a legitimate occupational context; (2) is motivated by the objective of economic gain or occupational success; and (3) is not characterized by direct, intentional violence" (p. 4).

Figure 5 shows how employee theft from customers fits within the general category of white-collar crime (red boxes). The review of the literature has been divided in 5 levels, according to the structure of the figure, and can be found below.

Figure 5. Classification of theft from customers by employees within the general category of white-collar crime



Level 1. White-collar crime

The same degree of confusion found in the definition of the concept is also found in the classification of white-collar crime. One of the most widely accepted classifications was proposed by Clinard and Quinney (1973), who differentiate between two sub-categories: corporate crime and occupational crime. Corporate crimes are "offenses committed by corporate officials for their corporations and the offenses of the corporation itself" (p. 188), while occupational crime "consists of offenses committed by individuals for themselves in the course of their occupations and the offenses of employees against their employers." The topic analyzed in this dissertation falls into the second category.

Level 2. Occupational crime

Hollinger and Davis (2006) identified 3 basic elements of occupational crime consistently cited in the literature: these crimes "(1) take place during the course of a legitimate occupation; (2) involve a violation of trust; and (3) are committed primarily for the benefit of the individual either financially or in terms of social status" (p. 204). The efforts to further develop a typology of occupational crime has encountered the problem that, in the literature, scholars have used this term as a synonym of occupational deviance (which includes deviant behaviors such as drinking in the workplace) or workplace crime (which refers to any crime that happens physically in the workplace; i.e. assault) (Friedrichs 2002). Several scholars have made an additional differentiation of occupational crime/deviance: *production deviance* and *property deviance*. Production deviance refers to counterproductive behavior, that is, behavior that affects and reduces the productivity of the employee or the company. Property deviance refers to the

unauthorized taking of property (i.e. cash, merchandise, etc.) However, some of these authors consider that theft is a type of property deviance (Robinson & Bennett 1995; Slora 1989), while others consider that both production and property deviance fall within the general category of theft (Hollinger & Clark 1983). This different understanding of the categories of property and production deviance, and how they relate to theft can be confusing. For example, a behavior like spending time at work checking Facebook (*theft of time*) would definitely be considered production deviance, but depending on the perspective adopted it could be considered theft or not. Another problem with this classification is the use of the term deviance, which includes conduct that contradicts the expected behavior at the workplace, but does not necessarily constitute offenses. For all those reasons the differentiation between production and property deviance will not be included in this classification. Friedrichs (2007) suggests restricting the term of occupational crime to "financially oriented offenses committed by individuals within the context of a legitimate occupation and specifically made possible by that occupation" (p. 88), and proposes three different sub-types according to the type of offender: crimes by small businesses (retail crime and service fraud), crimes by professionals (medical, legal, academic and religious), and crimes by employees.

Level 3. Crimes by employees

Employees can engage in a variety of crimes: misuse of access or information, sabotaging equipment, lying about the hours worked, accepting kickbacks, and theft, among others. With regards to theft, Friedrichs (2007) identifies five different forms of commission: pilfering (petty theft), larceny (grand theft), chiseling (cheating or swindling), fraud (theft through misrepresentation), and embezzlement ("the destruction or fraudulent

appropriation of another's money or merchandise which has been entrusted to one's care", Altheide et al. 1978, p. 91, cited in Friedrichs 2007, p. 106).

Level 4. Employee theft

Once again, the literature on the issue of employee theft is defined by the lack of consensus on one particular definition, and on the scope or the range of behaviors that are encompassed within the concept of employee theft. Hollinger and Clark (1983) define it as "the unauthorized taking, control, or transfer of money and/or property of the formal work organization that is perpetrated by an employee during the course of occupational activity" (p.2). A similar definition is given by Greenberg (1995), who considers employee theft "any unauthorized appropriation of company property by employees either for one's own use or for sale to another" (p. 154). These are the two most widely accepted definitions. They basically exclude all theft committed by employees against clients, customers or co-workers, as they consider that the target of the crime must be company property. In fact, theft of customer property by employees has been neglected in the literature, probably because it has not been widely considered as employee theft per se.

Level 5. Employee theft from customers

The only scientific approach to the study of employee theft from customers has been provided by research on the hospitality industry (Hawkins 1984; Gill 1994). In his study of self-reported theft techniques used by waiters in the restaurant trade, Hawking (1984) identifies three possible targets: the restaurant, customers of the restaurant, and co-workers. The results of his research showed that, although theft against the restaurant

was more prevalent, over two thirds of the participants in the study knew others involved in bill padding, short-changing customers, and adding tip to credit card. 28%, 23% and 15% of the sample admitted to engage in those activities themselves, respectively. Similar results were obtained in the research by Gill (1994) on fiddling within hotel bars. Four out of the 9 most common fiddles were committed by employees against customers: overcharging, short changing, bill padding, and presenting a wrong bill to the customer. All these behaviors have something in common: offenders are able to engage in these conducts due to their professional position and the specialized access that it provides. Apart from the studies cited above, some other examples of theft of customer's property committed by employees are: theft from cars by parking valets, theft by maids in hotel guest rooms, theft of valuables left in coat rooms committed by the attendants, theft from packages delivered by courier companies committed by their personnel, and theft from passengers' luggage committed by airport employees.

Felson's "Crimes of specialized access"

In an effort to simplify this ongoing discussion, and to find the characteristics that differentiate white-collar crime from other categories of crime, Felson (2010) suggests that this category should be renamed *crimes of specialized access*. He argues that having privileged access to crime targets via a particular profession or job is the single general feature common to all white-collar crimes, which differentiates them from the other typologies. He defines this type of crime as "a criminal act committed by abusing one's job or profession to gain specific access to a crime target" (p. 119). He also proposes a classification of crimes of specialized-access based on the type of harm inflicted to the victims, and the type of victim affected by the crime. Offenders can harm victims in four

ways: 1) by conducting illicit transfers of money, goods or other resources to the detriment of others; 2) by misinforming others; 3) by manipulating others; and 4) by endangering the health and safety of others. The victims can be employees, customers/clients/patients, the public, the own organization, and other organizations. When using this classification it is clear that theft from customer's property committed by employees would be an illicit transfer of goods to the detriment of the customers.

3.2.2. Prevalence of employee theft

One of the problems of employee theft is that it is very difficult to determine its incidence or prevalence, due mainly to the lack of official data about this crime. According to the National Retail Federation[9], employee theft accounts for 43.9% of all retail shrinkage. The 24th Annual Retail Theft Survey reports that, on a per company basis, one in every 36 employees was apprehended for theft from their employer in 2011[10]. However, employee theft cases are usually dealt with internally at the company, as businesses try to avoid the negative outcomes that could arise, such as a bad public image of the company (Hollinger & Davis 2006; Shury et al 2005). For this reason, estimates of employee theft have been calculated using mainly self-report studies. After reviewing the literature, Hollinger and Clark (1983) concluded that "theft by employees is a significant and pervasive part of the work experience with between on-half and one-quarter of the typical work force involved in taking company money or property sometime during their employment" (p. 6). In a more recent effort to calculate base rates of employee theft, Wimbush and Dalton (1997) conducted a study using samples of employees who had

[9] Preliminary results of the National Retail Security Survey 2011, retrieved from http://www.nrf.com/modules.php?name=News&op=viewlive&sp_id=1389 (accessed September 26, 2012)

[10] http://hayesinternational.com/news/annual-retail-theft-survey/ (accessed September 26, 2012)

experience “in businesses with high theft exposure due to easy access by employees to cash, supplies , and merchandise easily converted to cash” (p. 760). When using direct questions about theft behavior, they found that 28.2% of employees admitted to having committed theft. That percentage rose to 57.9% and 59.2% when using another two more subtle methods of detection.

Some of the key findings of two of the major research studies conducted in the topic of employee theft show which employees are more likely to steal (Clark & Hollinger, 1983; Baumer & Rosenbaum, 1984):

- Young (16 to mid-twenties), unmarried and male employees
- Employees with lower-paying, lower-status jobs
- Jobs providing easiest access to merchandise and money
- Jobs providing the opportunity for numerous and frequent social interactions with co-employees
- Employees dissatisfied with their employment (job conditions, workload, supervisors, organization, etc.)
- Employees with the lowest perception of the risk of being caught (the greater the perceived risks, the less the theft)
- Employees considering that the consequences of being caught would not be very serious (because neither management nor co-workers would care)
- Organizations with fewer prevention measures (e.g. pre-employment screening or anti-theft policies) experience more theft

The fit of these predictors in broader theoretical frameworks is explained in the next section.

3.2.3. Theories that explain employee theft

Three main groups of theories have been used to explain employee theft (Hollinger & Davis 2006): 1) job satisfaction or workplace equity theories, 2) organizational theories, and 3) opportunity theories.

Job satisfaction theories consider that employee theft happens as a consequence of the employee's perception of being treated unfairly, being exploited, etc. According to these theories, workers' dissatisfaction with their work situation motivates them to commit theft in the workplace as a way of revenge, of "getting back" at the employer. Employees who feel like they are underappreciated or underpaid would also turn to theft as a way of compensating for the lack of recognition of their work and value. In one sentence, theft is a reaction against the employer for the perceived inequity in the work relationship, and a way of redressing its effects. The level of dissatisfaction of employees at any given industry or company can be measured by examining the levels of turnover. Empirical studies have found that dissatisfied employees, those who were looking for another job, and those who perceive that they are not being valued or compensated fairly are more involved in employee theft (Hollinger & Clark 1982 and 1983; Ditton 1977; Mars 1974; Harris & Benson 1998; Greenberg & Scott 1996; Tucker 1989; Kulas et al, 2007; Murphy 1993).

Organizational theories are based on Sutherland's theory of "differential association" (1947). The idea is that employee theft is the effect of the informal organizational

structure at the workplace, when there is a prevalent "culture of dishonesty". Employees learn the motivations and techniques for committing theft through interaction with their peers, as well as rationalizations to remove the feeling of guilt and shame (Shover and Hochstetler, 2002). Sykes and Matza's (1957) techniques of neutralization become central to this theory as a way of "normalizing" this offending behavior through justifications involving denial of responsibility, of injury, of victim, condemnation of the condemner, etc. As stated by Murphy (1993), "There is evidence that many individuals engaged in employee theft believe that their acts are not theft at all, that theft is common, in the sense that most employees do the same thing, and that it is socially acceptable" (p. 41). Research findings support this group of theories (Mars 1982; Clark & Hollinger 1983; Baumer & Rosenbaum 1984; Parilla, Hollinger and Clark 1988; Kulas et al, 2007; Greenberg 1997).

Opportunity theories consider that crime is the result of the interaction between disposition and situation and, hence, employee theft is highly dependent on the criminal opportunities facilitated by the environment, in which employees have privileged access to valuable assets due to their jobs (Felson, 2010). As will be explained in Chapter 4, opportunity theories do not try to explain the motivations of the offender (as the two previous groups of theories): they focus on the analysis of the opportunity structure of the crime event in order to find points of intervention to prevent it. In their study *Theft by Employees* (1983), Hollinger and Clark found that employees with uncontrolled access to valuables and cash reported higher levels of theft, and that the characteristics of the merchandise or goods available to them also played an important role in the amount of theft. Despite the potential value of the opportunity perspective in understanding and

preventing employee theft, this approach has not been widely followed or tested empirically. As stated by Hollinger and Davis (2006), "Given its obvious importance, we find it interesting that there has been so little systematic research on the role that opportunity plays in the employee theft equation" (p. 211). Some recent literature (Benson, Madensen & Eck, 2009; Benson & Simpson, 2009) studies white-collar crime from an opportunity perspective, but the analysis is not focused specifically on employee theft. To date this issue has not been addressed from this point of view, which will be precisely the perspective adopted in this dissertation.

3.2.4. Occupations, work relations and opportunity for crime

Mars (1982) conducted an analysis of the characteristics of occupations according to the social structure and the opportunities that such work organization provides for deviant behavior. He classified jobs into four types, depending on whether work is carried out individually or in group, and to the level of autonomy or submission to strong rules that people experience in the course of their work. Jobs sharing the same category have similar structural characteristics, criminal opportunities, and justifications. TSA employees and baggage handlers crews at airports, as well as dockworkers (the example used by Mars) would be best characterized as having less autonomy, stronger workgroups, and well-defined and coordinated tasks. Fiddling and pilferage by these employees is likely to involve participation of several group members, following the same coordination required for the performance of the job (Mars 1982).

Example of theft from luggage involving several group members:

(The New York Times. January 3 2007, "Bag Handlers Held in Theft of Luggage in Houston")

"(…)Officials on Tuesday announced the arrest of five men suspected of stealing the bags, including 23-year-old twins. All worked for a contractor at George Bush Intercontinental Airport handling luggage between connecting flights within a secure area of the airport. (…)

The arrests followed the discovery on Dec. 26 of 68 pieces of looted luggage in a trash bin outside a pet store in north Houston. Since then, said Capt. Rick Bownds, commander of the Houston Police Department's airport division, more than 90 additional pieces have turned up in two other locations.

"We're still uncovering leads and information as we speak," he said, adding that virtually every airline at the airport was probably affected by the thefts.

The five men, all charged with one felony count of engaging in an organized criminal activity, worked for Menzies Aviation, which operates in 23 countries and 100 airports, including 15 in the United States, providing passenger, ramp and cargo services. All had credentials to work in secure areas of the airport, and all the luggage taken was being transferred between connecting flights, Captain Bownds said."

Kleemans and Van de Bunt's (2008) research, based on Mars' typology, studies the role of work settings and relations in providing opportunities for organized crime in the Netherlands. They analyzed the occupations of 1,623 suspects of organized crime using files of closed Dutch police investigations, and they found that many of those occupations involved some degree of mobility or transport (i.e. garage owner or airport baggage handler), and that a relatively large percentage of the occupations are "social", meaning that it is easy to find partners in crime. Criminal activities and certain occupations can be

interrelated, as some occupations are used as a cover-up for criminal activities, they provide specialized knowledge or access to certain targets or methods to commit crime, and sometimes criminal activities are directly embedded in work relations. One of the examples used by Kleemans and Van de Bunt (2008) to illustrate the embeddedness of organized crime activities in work settings is precisely the case of airport baggage handlers. The list below (left column of table 4) shows some of their findings with regards to the opportunities to commit organized crime provided by this occupation (pp. 192-193). These opportunities are also useful when analyzing their opportunities to commit theft from passengers' luggage. The right column of the table shows that most of the findings apply as well to the opportunities for theft that TSA personnel encounter while performing their job duties.

Table 4. Opportunities for theft related to the characteristics of the job

Airport baggage handlers (Kleemans & Van der Bunt, 2008)	**TSA officers (TSOs)**
• Airport baggage handlers are low-paid employees.	➔ TSOs are among the lowest paid of all federal employees[11], with salaries starting at $25,500[12]
• They have many opportunities to make illegal extra earnings, towards which there is certain level of tolerance.	➔ The criminal opportunities exist, but there are no studies that can support the statement about the level of tolerance toward them.
• They work in groups, with a strong social cohesion, which can discourage crime but also can promote it.	➔ The same applies to TSOs, although they work in smaller groups (2-3 screeners) and, depending on the size of the airport, they might even work alone
• A number of employees from the same company are involved in the same criminal activities.	➔ All TSOs belong to the same agency.
• The context of licit work (i.e. unloading planes) provides the opportunity structure for criminal activities, as well as for concealing them.	➔ That is especially true in the case of TSOs, whose job consists precisely on screening the contents of the bags.
• The baggage basement at the airport is a "closed" environment, where outsiders are easily spotted.	➔ In most airports baggage screening is performed in restricted areas. Carry-on luggage, however, is screened in public.
• Additional factors are the time pressure when loading and unloading planes and the absence of effective checks between the airside (areas accessible to aircrafts) and landside (access roads, parking lots, public transportation).	➔ Time pressure is certainly a factor for TSOs as well. With regards to effective checks, TSOs undergo checks when they enter the screening areas, but not when they leave them (the focus is on terrorism, not on theft[13])
• If employees of a higher rank are involved in the criminal activities, they can be used to make sure that specific persons are placed in specific crews, and assigned to specific shifts or flights.	➔ This applies as well to TSOs. As a matter of fact there have been some examples of supervisors involved in theft rings along with TSA screeners.

[11] http://www.npr.org/templates/story/story.php?storyId=122948752 (accessed September 26, 2012)

[12] http://www.tsa.gov/join/careers/pay_scales.shtm (accessed September 26, 2012)

[13] http://www.tsa.gov/what_we_do/layers/employee_screening.shtm (accessed September 26, 2012)

Chapter summary

There is evidence that employee theft from passengers' luggage at airports is a problem, but at this point it is not known how prevalent it is, which airports experience more theft, what objects are most stolen, or whether certain kinds of victims are most targeted. From the literature reviewed in this chapter we can infer some likely characteristics of this crime:

- It is often committed by groups of employees working together
- Small, valuable objects are targeted primarily
- Privileged or specialized access is key to the commission this crime
- It is often an opportunistic crime
- Companies (airlines and airports) are not keen on reporting this crime
- The fact that the objects stolen are "in transit" makes it difficult to determine where the theft was committed, or what agency has jurisdiction over the thefts
- Theft from passengers' luggage is likely to be related to other forms of criminality like smuggling of drugs

This chapter described how employee theft fits in the broader literature of white-collar crime, and what theories have been used to explain this type of crime. Although the opportunity perspective holds potential value in understanding and preventing employee theft, it has not been widely followed or tested empirically in the literature. This will be precisely the perspective adopted in this dissertation. Chapter 3 provides an overview of opportunity theories, and a detailed explanation of the theoretical framework that will be used in this research.

4. THEORETICAL FRAMEWORK

The goal of this research is to study why some U.S. airports experience more employee theft from passengers than others. To do so, the theoretical framework of risky facilities will be used (Eck, Clarke & Guerette 2007), which explores the concentration of crime in homogeneous sets of establishments. The variables that explain such pattern of concentration will be analyzed using also the concept of "choice-structuring properties" (Cornish & Clarke 1987), which refers to the characteristics of offenses that influence offenders to engage in each particular type of crime. The chapter begins with an overview of environmental criminology, routine activity theory and rational choice perspective, which provide a broader framework to the two theories mentioned above.

4.1. Broader theoretical framework: Environmental Criminology

Environmental criminology is a term that refers to a group of criminological theories that focus on the crime event and on the role that the environment plays in generating crime opportunities (this is why they are also called "opportunity theories"). While traditional criminology has focused on understanding why people commit crimes and in reducing criminal disposition, this perspective starts from the premise that crime is the outcome of the interaction between disposition and situation. Considering that criminal dispositions have extensively been addressed in criminology, the environmental perspective focuses its efforts in understanding and reducing the crime opportunities present in each situation or setting (Wortley & Mazerolle, 2008).

Recognizing the importance of situational factors leads to another premise: considering the unique constellation of features present in each setting, the distribution of crime

opportunities among them will not be homogeneous (Felson & Clarke, 1998). On the contrary, crime concentrates around places, people or targets with characteristics that facilitate criminal activity. This concept follows the Pareto principle (also called the 80/20 rule), which states that a small percentage of any group will experience, or will be responsible for, a large percentage of any outcome. Applied to crime, the Pareto principle suggests that a small proportion of any group of places, products, victims, etc. will account for the majority of crime experienced by that group. Various forms of crime concentration have been studied: hot spots, repeat victims, hot products, risky facilities, etc. (Clarke & Eck, 2005) Studying the patterns of crime concentration is useful for at least two reasons. First, comparing high-crime and low-crime places (or targets, facilities, times, etc.) immediately suggests some features that differentiate them and that may be responsible for the differences in risk. Second, focusing resources and efforts in the small percentage of the group that experience the most crime will be the most efficient way to prevent it. Since the main focus of this dissertation is to analyze why some U.S. airports experience more employee theft than others, the theoretical framework that will guide this research will be provided by the concept of risky facilities, which will be described in detail below.

The three main theories that compose environmental criminology are crime pattern theory, routine activity theory, and rational choice perspective. The last two are discussed further in this section, as they help understand the problem of theft from passengers' luggage by airport employees.

4.1.1. Routine Activity Theory

Cohen & Felson (1979) developed Routine Activity Theory as a macro-level explanation of trends in rates of direct-contact predatory crimes based in changes in society's "everyday activities". The core idea of this theory is that, in order for a crime to happen, it is necessary that three elements converge in time and space: a motivated offender, a suitable target, and the lack of a capable guardian. Like the rest of "opportunity theories", routine activity theory focuses in the crime event, without entertaining the analysis of why people commit crime. The existence of a motivated offender is taken for granted under the consideration that there will always be people willing and able to offend. A target (which can be a person or an object) is considered suitable if it is valuable (the value can be material or symbolic), accessible, visible, and has inertia (understood as the possibility of being removed from its location in the case of property crimes, or the capacity to resist attackers in the case of personal victims). Guardianship can be exerted by systems of formal surveillance (such as the police or CCTV) but it must be interpreted widely, including a wide array of other options, such as dogs, alarms, bystanders, etc.

Changes in the patterns of routine activities can increase or reduce crime by facilitating or impeding the chance (or opportunity) that all three elements coincide. This approach was used to explain the rise in daytime residential burglaries experienced by the U.S. in the 1960s, a period of economic prosperity. The increasing incorporation of women to the workforce left more houses unattended during the day, removing the element of guardianship from the homes. At the same time, new technologies became available (i.e. televisions and audio systems) and the purchasing power of families improved due to the growing economy, generating a rise in the number of valuables available in the homes.

Therefore, the opportunities for a motivated offender to coincide in time and space with a suitable target, without the presence of a capable guardian increased accordingly.

4.1.2. Rational Choice Perspective

The Rational Choice Perspective was developed by Cornish and Clarke (1986) and follows the idea that offenders are reasoning criminals, that is, they make rational decisions about whether or not to offend and how to go about committing the crimes. This perspective focuses in the role of the situational context on the individual's decisions. Offenders use environmental cues to weigh the costs, risks and benefits of the alternative options presented to them, and make decisions accordingly, with the objective of benefiting themselves. Therefore, their behavior is purposive (driven by needs for things like money, sex or excitement) and rational.

However, offenders' rationality is far from perfect: Cornish and Clarke use the concept of "bounded rationality" to explain that offenders' decisions are subject to information and time constraints, as well as the individual's skills, experience and perception of the opportunities offered by the situation. The final choices made by offenders will favor those crimes in which the perceived costs and risks are lower and the perceived benefits are higher, leading to "good enough" decisions, as opposed to optimal ones.

The analysis of criminal choices has to be very crime-specific, since each crime is committed for different purposes in a different environment, and therefore the opportunity structure that each particular type of crime presents varies greatly. Even within narrow categories of crime the differences between crime types are great, depending on the goals pursued when committing the crime and the modus operandi used

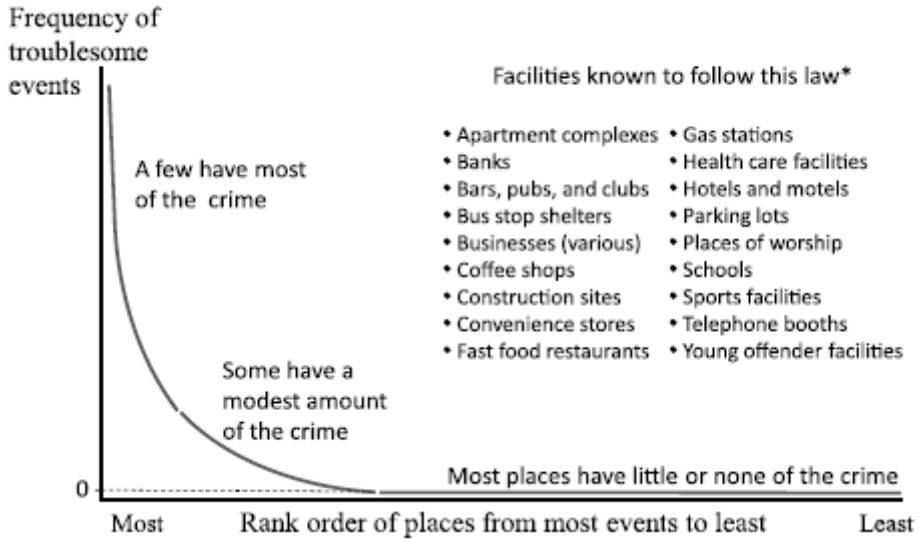
to carry it out. The typical example is car theft: subtypes of this crime such as joyriding, breaking into cars to steal items left inside or carjacking are extremely different and must be analyzed separately in order to fully understand the factors at play and what the possible points for intervention are in order to prevent them.

Criminal decisions are made at two different levels: involvement and event. Involvement decisions concern the criminal career of the offender, and they include decisions about initiation, habituation and desistance. They are basically decisions related to whether or not to start/continue/stop committing a certain type of crime. Initiation decisions depend on the background of the offender, their skills and experience, as well as the characteristics of the particular type of crime and the opportunities that present themselves. Habituation and desistance decisions depend on the history of success of previous crimes, and whether or not the benefits obtained did outweigh the costs of committing that type of crime. Event decisions, on the contrary, are centered on the crime event, and they involve decisions about how, when and where to commit it, what victims to target, how to avoid being caught, etc. The whole array of decisions made in each particular type of crime, from the preparation for the crime until the disposal of stolen property (in the case of theft) are event decisions. For this reason the most immediate environment is considered. This idea, together with the need to be crime-specific, will be further developed below, when addressing the concept of "choice-structuring properties".

4.2. Risky Facilities

Used as the main theoretical framework for this research, the concept of risky facilities (Eck, Clarke & Guerette, 2007) refers to a form of concentration of crime, which happens among homogeneous sets of establishments. The idea is that "for any group of similar facilities, a small proportion of the group accounts for the majority of crime experienced by the entire group" (p. 226). Clarke & Eck (2007) define facilities as "places with specific public or private functions, such as stores, bars, restaurants, mobile home parks, bus stops, apartment buildings, public swimming pools, ATM locations, libraries, hospitals, schools, parking lots, railway stations, marinas, and shopping malls" (p. 3). Although the concept of risky facilities is relatively new, Eck et al. (2007) were able to identify 37 studies from 4 countries of different types of facilities (i.e. bus stops, bars, schools, gas stations, etc.) that showed that a small proportion of facilities produce a much larger proportion of the crimes, and most facilities had little or no crime. This finding was true regardless of the crime type examined, the size of the facilities, or event the subcategories of facilities analyzed. In a recent article Wilcox and Eck (2011) have named this distribution of crime across facility types "The Iron Law of Troublesome Places". Since 2007 and up to now, every single study conducted to test for concentration of crime in any given set of facilities has confirmed these findings.

Figure 6. The Iron Law of Troublesome Places



Source: Wilcox & Eck, 2011

The importance of studying risky facilities is clear. Like in other forms of crime concentration listed above such as repeat victims, hot products, or hot spots, identifying the facilities that experience the most and the least crime, and analyzing the variables responsible for such differences in risk, allows us to focus our crime prevention efforts and resources to where they are most needed. Although risky facilities can be treated as an extension of the concept of repeat victimization, and it would show as a hot spot when doing a geographical analysis of crime in a certain area, this perspective allows us to take into account additional variables that differentiate that particular facility (i.e. a bar) from the rest included in the analysis, in order to investigate what features of that particular bar, or what differences in management or layout account for the important differences in risk when compared to other nearby bars. One of the goals when conducting this type of

research is to identify good and bad practices that can be used to reduce and prevent crime.

A number of variables have been suggested in the analysis of risky facilities to explain the differences in the number of crime incidents experienced. Some variables such as variation in size, reporting practices, and random variation can be potentially misleading, in the sense that they fail to distinguish the particular characteristics of the facilities that make them more crime prone. Larger facilities with more users are more likely to have more crime than smaller ones simply because there are more opportunities. One way to address this issue is not to limit the analysis to the volume of crime at each facility, but to calculate crime rates based on the amount of opportunities present at each facility in order to see which ones really present greater risk of crime (Clarke, 1984). Taking into account any potential differences in reporting practices is also important: if some facilities tend to report all incidents to the police, but others do not, the former would seem to be more problematic when compared to the rest, when in reality the difference between them will be mainly due to different reporting procedures. Finally, random variation in the volume of crime can also be misleading if some facilities experience abnormal spikes precisely in the time period that is being analyzed. One way to control for random instability is to compare crime rates in two different time periods: if the facilities with higher rates in one time period tend to be also at the top of the list in the other, and if the same happens with the low-crime facilities, one can assume that there are other variables responsible for the differences in risk. Other circumstances that can make the analysis difficult are the existence of small numbers of facilities in the study area (a larger region will have to be studied to have a big enough population), the lack of information on facilities with no

events (if our data source is police data), studying infrequent events (in which case it would be necessary to analyze longer periods of time in order to find meaningful patterns), changes in the facilities over time (with regards to size, management, number of facilities, etc.), or inaccurately defined recording due to incomplete address matching or mixed used locales (Clarke & Eck, 2007).

On the contrary, there are some other variables about the facility itself that can be useful to understand why some experience more crime than others. Facilities with a larger volume of hot products, located in high-crime areas, with poor design and layout, with ineffective management, that contain high volumes of repeat victims, or that attract a large number of offenders will experience more crime than the rest. Identifying the precise mechanism at play provides invaluable information for designing crime prevention strategies.

The goal of this research is to understand why some U.S. airports experience more theft by employees from passengers' luggage than others. For all the reasons outlined above, the risky facilities framework is especially suited for this task. Just like railway stations and bus stops, airports fit the definition of facilities provided by Clarke & Eck (2007). Apart from being the first time that crime at airports is analyzed from this point of view, this research can help advance the understanding of risky facilities, since the characteristics of airports and of the database used in this project allows us to focus on the explanatory variables by controlling for the potentially misleading ones such as variation in size, reporting practices, or random variation.

4.3. Choice-Structuring Properties

Stemming from Rational Choice Perspective, the concept of "choice-structuring properties" (Cornish & Clarke, 1987) is used to define the unique group of features of each particular type of crime that makes it attractive for certain offenders and not for others. For example, although bank robbery is likely to yield much greater economic rewards than pick-pocketing, the planning, effort, risk of apprehension and legal consequences are also greater. Depending on their individual characteristics, background and expertise, some offenders prefer to commit bank robbery, and others lean towards pick-pocketing. Offender decision-making is influenced not only by the characteristics of the crime (with regards to effort, risks, costs and rewards), but also by the needs, preferences and skills of the offender, who conducts a cost-benefit analysis of the crime (although such analysis is "bounded", as seen above) and acts accordingly. Understanding exactly what factors are taken into account in this analysis can shed light on criminal decision-making processes.

The concept of choice-structuring properties requires a separate analysis of each specific crime type, and has been used to explain that displacement is more likely to occur between crimes that share many of those properties, than between those that are intrinsically different. Cornish and Clarke (1989) used this concept to analyze gambling behavior and to explain how the different forms of gambling offer unique combinations of opportunities, risk and benefits that determine why they are appealing for certain people and not for others. For example, while playing poker requires a high degree of personal participation, certain skills, some nerves, and the amount staked per play tends to be high, playing lotteries does not require any of those elements, but the probability of

winning and individual bet is low and the time elapsed before payment is long. So it is not likely that somebody would turn to poker if prevented from playing lotteries. Fruit-machines, however, share some important properties with lotteries. Although the amount of earnings is considerably lower, the probability of winning is higher, and with regards to the skills needed, both share the fact that no or little skills are needed, and the amount of money invested is also low. The concept of choice-structuring properties was also used to understand the differences among methods of suicide. Applying this concept helps break up the multiple factors that can play a role in choosing among those methods and shows that, should the method of choice become unavailable, the displacement to other methods that have a completely different group of opportunities, risks and rewards is very unlikely. A study conducted by Clarke and Mayhew (1988) showed how the detoxification of domestic gas in the UK in the 1960s led to a reduction of over 50% of all suicides, since this method had certain properties that made it appealing ("was painless, very widely available, required little preparation, was highly lethal, was not bloody, and did not disfigure" - Cornish and Clarke, 1987, p. 937-) and, once it was no longer available, no other alternative with those properties existed.

Pires (2011) classifies choice-structuring properties in two groups: static properties and variance properties. *Static properties* are used to describe the opportunity structure of the type of crime, and the features that might influence eventual displacement to other crimes with similar structure. *Variance properties* are the factors that, once the decision to commit a particular type of crime has been made, are weighed by the offender to select a certain target, modus operandi, location, etc. That is, to make event-related decisions.

Variance properties are therefore used to explain variation and crime concentration among a number of targets, places, facilities, and so on.

When applying the concept of choice-structuring properties to the problem of employee theft from passengers at airports, a number of factors that makes this crime attractive to potential offenders come to mind. Air passengers carry many valuables when travelling, and employees have privileged access to them. Their job provides a perfect cover for such criminal activity, since screening and transporting the bags is part of their work description. The great majority of suitcases are either unlocked, or are secured using TSA-approved locks, which allow TSA officers to open them. Furthermore, airport employees fit many of the characteristics outlined in the literature (see section 3.2.2.) as predictors for employee theft: these are jobs with low pay and high turnover, with an overrepresentation of young males, and their work provides easy access to merchandise and opportunities for social interactions. These would be the static factors of employee theft from passengers at airports in general.

However, when further analyses on each of the two sub-types of theft studied in this research are conducted, one can see that while theft at checkpoint and theft from checked-in baggage share a number of static properties, they differ in many others. Theft at checkpoint takes place at a semi-public area of the airport, where a lot of potential witnesses are present, including the owner of the bag. The time to commit the theft is short, as it only takes a couple of minutes for a passenger to go through the security checkpoint. In this area, only TSA officers have access to the belongings of the passengers. On the contrary, theft from checked-in luggage happens in a restricted area, with fewer time constraints, and without the presence of the owner. As seen in Chapter 2

(section 2.2.2.), different types of employees have access to the checked-in bags: baggage handlers, TSA officers, and others. In general, theft at checkpoint can be considered to be more risky than theft from checked-in luggage, but it is also likely to yield more economic benefits, since passengers are encouraged to carry their most beloved valuables in their carry-on luggage, and not in the suitcases they check-in. Actually, close examination of the specific static factors at theft at checkpoint and theft from checked-in luggage (goods available, time constraints, public/private nature of the location where the crime is committed, guardianship over the target, and risk of immediate detection) shows that they are similar to the ones that would be found when analyzing the same factors in other crimes like pick-pocketing (or distraction thefts) and burglary, respectively.

Variance properties are the factors that will be analyzed in this dissertation to explain why some airports experience more employee theft than others, and will be described in detail in the methodology section of this document. As shown in the table below, some of the variance factors are common to both types of theft, and some are specific to one of them.

Table 5. Choice-structuring properties of employee theft from passengers at airports

Static properties		
For employee theft from passengers in general	People carry goods when traveling	
	Some of those goods are valuable and fit the CRAVED model	
	Employees have privileged access	
	X-rays provide overview of what is available	
	Their job disguises their criminal activity: touching, transporting and checking the bags is part of their job	
	Employee dissatisfaction, high turnover, low pay, part-timers	
	Baggage handlers tend to be young males (TSA officers are more diverse)	
	Don't-lock-your-bag policy	
Static factors that differ between the two types of theft analyzed	**Theft at check-point**	**Theft from checked-in luggage**
• Goods available	Cash, electronics… Small, valuable, concealable goods (CRAVED)	More bulky and heterogeneous goods (some valuable, some not)
• Area of airport	Open area, many witnesses	Enclosed, out-of-sight setting
• Amount of time	Brief time to commit the theft	Time to open the suitcases
• Guardianship	Owner of the bag is present	Owner is separated from his bags
• Risk	High risk of being caught	Low-risk of being caught in the act
• Employees with access	Only TSA has access	Both TSA and baggage handlers (and other employees) have access
• Excuses		Some pilferage not seen as a crime by baggage handler crews
Variance properties	**Theft at check-point**	**Theft from checked-in luggage**
Number of targets		
• # passengers/bags	✓	✓
Attractive targets		
• % international passengers	✓	✓
• Tourist destination	✓	✓
• Business destination	✓	
Time at risk		
• % delayed departures		✓
Poor management		
• Customer satisfaction	✓	✓
• % service operated by risky airlines		✓
Location		
• Theft rate in the city where airport is located	✓	✓

The most obvious source of data to determine the choice-structuring properties of a crime would be information from offenders themselves. But as explained by Cornish & Clarke (1987), in the absence of this type of data a priori selection can be made of properties that are considered likely to be salient to offender decision making. This selection needs to be theory-driven and, when possible, tested using data on the commission of the crime at hand, which is the approach taken in this dissertation.

As explained above, choice-structuring properties can be used to analyze any aspect of a crime that is relevant for its commission. Each of those separate aspects can be further investigated and broken down, in order to understand specifically what variables are taken into account when offenders are making those decisions. For instance, in the case of theft, those features would include decisions about what, from whom, where and how to steal; and how to dispose of the stolen goods (Clarke, 1999; Natarajan, 2012).

Chapter summary

The theoretical framework of this dissertation is provided by opportunity theories and by their application to explain why theft from luggage by employees clusters at certain airports (risky facilities) and what the opportunity structure is for each type of theft (choice-structuring properties). These theories will be the starting point to develop the research questions that will guide this research.

5. RESEARCH DESIGN

The first section of this chapter gives a broad overview of the research design and the questions that will be addressed in this dissertation, as well as a description of the structure of chapters 6 and 7, which include the hypotheses, data sources, analyses and results for each of the two questions. In the second section of this chapter, the dependent variables of this study and their data sources are discussed.

5.1. Overview of research design

The aim of this dissertation is to examine why some U.S. airports experience more employee theft from passengers than others. Given the lack of previous research in this particular topic, it is necessary to address first some basic issues like the prevalence of this crime at U.S. airports, which airports experience more theft of this kind, and whether there is a pattern of concentration that allows us to apply the conceptual framework of risky facilities to this type of crime. Once those preliminary analyses have been conducted, the features associated with an increased risk of employee theft at each airport will be examined. The two research questions that will lead this study are:

- RQ1 - Does employee theft from passengers at U.S. airports follow the pattern of risky facilities?
- RQ2 - What are the features of airports with higher rates of employee theft from passengers' luggage?

Two subtypes of employee theft from passengers are studied: theft from checked-in luggage, and theft at the security checkpoint. The unit of analysis of this study is the

airport, with the exception of one of the hypotheses (H5), which will focus on the type of objects that are most stolen in the two settings studied.

Chapter 6 will address the first research question, and chapter 7 will address the second one. At the beginning of both chapters, the theoretical background and its application to the formulation of hypotheses will be explained. Then, the hypotheses derived from each research question, and the variables and data sources used to test them, will be described. Next, there will be a section on the analyses performed on the data and the results obtained. The last section of both chapters will summarize the findings and will include a discussion of their interpretation. Chapter 8 will include the implications for theory and policy of this study, its limitations, and avenues for future research.

5.2. Dependent variables: number of thefts and theft rates from checked baggage and at checkpoint in 2009

The focus of this dissertation are thefts occurring when the passenger must hand over the bag to an airport employee or security officer for transportation or screening; that is, when the passenger has limited or no direct contact with the bag and it is difficult or impossible for him or her to exert effective guardianship over it, and the employee has privileged access to the bag in the normal fulfilling of the functions of the job. For this reason this research will address theft in the two settings that meet these requirements: at the security checkpoint and from checked-in luggage. The first part of this study will be based on the volume of theft at each airport in 2009 and the dependent variable of the

second part of the research will be theft rates at checkpoint and from checked baggage per airport that same year, as it will be explained in detail below.

The aggregated number of thefts per airport at each of the two settings is obtained from the Claims Database compiled by the Transportation Security Administration (TSA)[14]. All claims filed by passengers against the TSA are compiled in this database, which contains records from 2002 until March 2012 (with the exception of 2010). This dissertation will focus on claims affecting flights taken in 2009, which is the last complete year in the database for which data sources for the independent variables are available (as of September 2012). However, data from 2008 will be used to check for consistency throughout the two years, in order to control for random variation in the amount of theft.

Claims are classified in different categories ("employee loss", "personal injury", "passenger property loss", "property damage", "motor vehicle", etc.), where "passenger property loss" is defined as dependent variable. Claim sites are also recorded, and only those records affecting "checked baggage" and "checkpoint" will be selected (the other sites are "bus station", "motor vehicle", and "other"). For each claim filed, the following data is recorded as well: date, airport, airline, item lost, claim amount, status of the claim (approved, denied or cancelled), and close amount (refund given to the passenger). The date, airport and airline refer to the origin of the flight in which the incident happened, as confirmed by the TSA[15].

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[14] http://www.tsa.gov/research/reading/index.shtm (last access, September 26, 2012)

[15] Personal communication (e-mail) with the TSA Claims Office and the TSA Office of Strategic Communications & Public Affairs (Sept 15 and Oct 11 2011, respectively).

One of the advantages of using this database is that all passengers who want to file a claim for a missing object from their luggage in order to get a refund must contact directly the TSA Claims Management Branch. The reporting is centralized, which means that differences among reporting practices at different airports are not an issue. The TSA is the agency in charge of screening bags and passengers at all but 16 airports in the U.S.[16]. Those airports have opted-out from having TSA screeners and use private screeners instead. Therefore, these airports have been excluded from the analysis. The biggest airports that opted out are San Francisco, CA, with 37 million passengers, and Kansas City, MO, with about 10 million. All of the remaining serve a much smaller volume of passengers.

In 2009 there were a total of 494 commercial service airports in the U.S. (FAA 2011a). The initial analysis to determine whether employee theft from passengers at U.S. airports fits the risky facility framework will be performed on the total number of airports using the aggregated number of thefts at each airport in 2009. However, the examination of what airports have a higher theft rate and what features of airports are associated with it will be carried out only on those airports that experienced 10 or more thefts in 2009 (N = 97).

[16] http://www.tsa.gov/travelers/customer/claims/forms.shtm (last access, September 26, 2012)

Theft rates will be calculated as follows:

Numerator: aggregated number of thefts per airport

The numerator for both theft rates is will be the aggregated number of thefts of each type (theft at checkpoint and theft from checked-in luggage) reported at each airport in 2009 (from the TSA Claims Database, as described above).

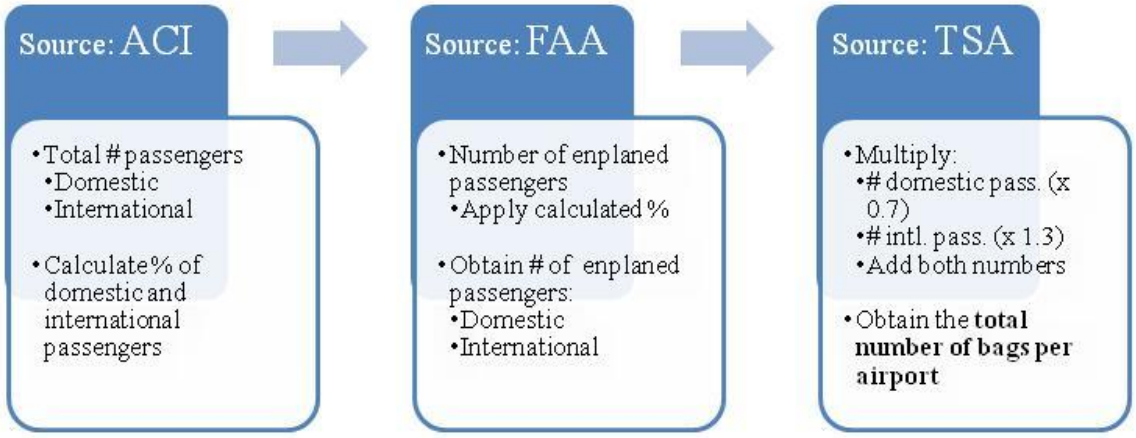
Denominator: number of enplaned passengers / number of checked-in bags per airport

The denominator of the two rates will be the following:

1. Theft rate at checkpoint: the number of enplaned (or departing) passengers per airport in 2009. This information is obtained from the Federal Aviation Administration records (FAA 2010b), which is the national aviation authority of the U.S. and belongs to the Department of Transportation.

2. Theft rate from checked-in luggage: the denominator is the number of bags checked-in at the airport in 2009. The calculation of the number of checked bags at every airport involves a 3-step process.

Figure 7. 3-step process to calculate the total number of checked-in bags per airport



The starting point for the calculation is the information obtained from Airports Council International, a non-profit organization that represents over 1,600 airports from around the world. ACI-North America's members concentrate 95% of all domestic flights, and "virtually all the international airline passenger […] traffic in North America"[17].Their publication *World Airport Traffic Report 2009* (ACI 2010) includes the number of domestic and international passengers (departing and arriving) that traveled through each airport[18]. From these data the percentage of domestic and international passengers at each airport is calculated.

[17] http://www.aci-na.org/content/mission-vision (accessed September 26, 2012)

[18] No data on the number of domestic and international passengers was available in the WATR 2009 (ACI 2010) for four of the airports with 10+ thefts in 2009. The percentage of international passengers was obtained from the airports' websites (for ISP-Long Island MacArthur and LBB-Lubbock International, which only have domestic passengers) and by personal communication with airport officials (for PWM-Portland International Jetport and STT-Cyril E. King International).

Examples STEP 1:

Airports	# passengers 2009 (departing and arriving)	% passengers 2009
John F. Kennedy Int'l (JFK)	24.0 domestic	52.3% domestic
	21.9 international	47.7%international
Hartsfield-Jackson Atlanta Int'l (ATL)	79.1 domestic	90% domestic
	8.8 international	10% international

In the second step the data from the Federal Aviation Administration on the number of enplanements (departing passengers) at each airport is used (FAA 2010b). By applying the percentage obtained before, one can calculate the number of domestic and international passengers enplaned in 2009.

Examples STEP 2:

Airports	# total enplanements 2009	# enplanements 2009
John F. Kennedy Int'l (JFK)	22.7 million	11.9 M domestic
		10.8 M international
Hartsfield-Jackson Atlanta Int'l (ATL)	42.3 million	38.1 M domestic
		4.2 M international

Finally, the TSA (2011b) has a simple formula to calculate the number of bags at each airport, which consists of multiplying the number of departing domestic passengers by 0.7, and the number of departing international passengers by 1.3. After doing that, both numbers need to be added to obtain the number of bags checked-in at the airport.

Examples STEP 3:

Airports	# checked bags 2009	# total checked bags 2009
John F. Kennedy Int'l (JFK)	8.3 M domestic	22.1 million
	14.1 M international	
Hartsfield-Jackson Atlanta Int'l (ATL)	26.7 M domestic	32.2 million
	5.5 M international	

Although ATL has twice as many passengers as JFK, the difference in the total number of checked-in bags is much smaller (JFK = 22M, ATL = 32M).

5.2.1. Limitations of the TSA Claims Database

There are some limitations related to the use of the TSA claims database as the source of data for the dependent variables in this study. Passengers who file those claims report that an object has gone missing either from their checked bag or as they went through the security checkpoint. Some issues arise: What percentage of passengers in this situation end up filing a claim with the TSA? Is it possible that the theft is committed by an individual other than an airport employee? How probable are fraudulent claims?

With regards to the problem of underreporting, any passenger who finds out that an item is missing from his or her checked-in luggage has 5 options: report it to the airline, to their insurance company (if they bought travel insurance), to the police, to the TSA, or fail to report it at all.

- The airlines in general establish very narrow time limits to report theft from luggage and apply for reimbursement. These time limits range from 4 hours upon arrival (JetBlue, SouthWest), or 4 hours upon discovery of missing items (United) to 24 hours (Delta, American Airlines). US Airways is an exception, with 45

days. Furthermore, industry regulations preclude any liability on the part of the airlines for the "loss, damage or delay" to a laundry list of items including money, jewelry, business documents, computers, video equipment, cell phones, cameras, electronics, etc. Airlines' contract of carriage details all the objects they are not responsible for (see Appendix III). Therefore, if passengers know that they will not get any reimbursement for their loss, they are less motivated to report the theft.

- Filing a claim with the insurance company, which in general provide reimbursement for stolen luggage, is certainly a viable option. In order to obtain reimbursement, insurance companies require that the passenger reports the theft to the airline (but not to the TSA) before filing a claim[19].
- Reporting the theft to the police has two problems: first, the passenger is likely to discover the theft at the destination, and that is where the report would be filed. However, the theft would most probably have happened out of that police agency's jurisdiction, either at origin or in transit. Second, the police do not provide reimbursement for items reported stolen.
- Filing a claim with the TSA solves these two issues: since it is a federal agency and the Claims Management Branch is centralized, it does not matter where somebody files the claim and, if the claimants can provide enough evidence of the theft, the TSA reimburses them for the lost items.

[19] Information obtained through personal communications (phone) with agents of three of the largest travel insurance companies in the U.S.: Amex Travel Insurance, Allianz Global Assistance (former Access America) and Travelex (April 2012).

The conclusion of all this is that, although the measure of thefts from checked-in luggage used in this dissertation is not perfect and they are likely to be underreported, it is the only unified database with information on all national airports. Retrieving comparable data from airlines, insurance companies or police agencies nationwide would be a very challenging and time consuming task.

If the theft happens at the security checkpoint, the passenger has only two options: report it to the police or to the TSA. Reporting the theft to the police has the drawbacks mentioned above. Considering that the passenger will probably point at the TSA as the author of the theft (as it will be explained next), and taking into account the possibility of obtaining a reimbursement for the missing item, reporting the theft to the TSA is the most plausible choice. Therefore, the TSA database is the best option to study thefts at checkpoint.

With regards to whether it is possible that the offenders are not airport employees, it is very unlikely that other individuals without such qualified access have the opportunity to steal the valuables carried by passengers. Once a traveler checks in a bag, it is no longer accessible to the general public, and only personnel in charge of inspecting or transporting the bag should have access to it. Other airport personnel can have such access too (i.e. cleaning crews), which would still fall into the category of employee theft. With regards to theft at checkpoint, there have been some reports of thefts committed by other passengers going through the same security checkpoint. However, two studies (Johnson, Yalda and Kierkus 2010; and Rosbough 2011) have analyzed how the heightened levels of security to prevent terrorist attacks at Chicago-O'Hare International and Atlanta International Airports after 9/11 have had a deterrent effect among thieves as

well. It is important to note that they studied reported theft in general, not theft committed by employees. Both studies found an abrupt and permanent reduction in reported larcenies at those two airports after anti-terrorist measures were put in place in October 2001. For this reason, and due to the strict surveillance all travelers are subject to, it is not likely that other passengers will commit a theft precisely at the security checkpoint, where they are surrounded by TSA officers.

Finally, fraudulent claims could possibly be an issue, as they are in any police or insurance database. This database is not a perfect measure for employee theft at airports, but it is the best option available to carry out this research.

Chapter summary

Two main issues are addressed in this dissertation: (1) Does employee theft from passengers at U.S. airports follow the pattern of risky facilities?, and (2) What are the features of airports with higher volumes of employee theft from passengers' luggage? To examine these questions, data of claims from passengers against the Transportation Security Administration (TSA) will be used, and theft rates will be calculated using the aggregated number of thefts as numerator, and the number of passengers and checked bags as denominators. Despite its limitations, the TSA Claims Database is the best available source of data to perform this exploratory research and to compare airports with one another.

6. AIRPORTS AS RISKY FACILITIES

As explained in Chapter 4, the theoretical framework to analyze the differences in risk among airports is provided by the concept of *risky facilities*, which assumes that, in any given set of homogeneous establishments, there will be a pattern of concentration of crime in which a small subgroup of establishments will account for most of the crime affecting the whole group. This pattern of concentration has been confirmed with all types of facilities analyzed so far (Eck, Clarke & Guerette, 2007; Wilcox & Eck, 2011), but it has not been applied to airports. For this reason the first research question of this dissertation will be:

RQ1 - "Does employee theft from passengers at U.S. airports follow the pattern of risky facilities?"

6.1. Hypotheses RQ1

According to the concept of *risky facilities*, one can expect not only variation in the volume of theft among airports, but also a clear pattern of concentration consistent with the "Iron Law of Troublesome Places" as stated by Wilcox & Eck (2011): a few airports will concentrate most of the theft, and most airports will experience little or no theft at all. This pattern should also be apparent when analyzing all U.S. airports at once, and also when running the analysis separately on high-traffic and low-traffic airports to account for the increase in the amount of opportunities provided by a higher volume of targets (Wilcox & Eck, 2011).

Although knowing what airports experience more incidents is important, in order to identify what airports are riskier it is necessary to take into account the size of each

facility. As mentioned in Chapter 4, one of the potentially misleading variables when applying the risky facilities framework is the variation in size among facilities. One way to account for such variation and to allow comparisons between facilities is to use crime rates instead of number of crimes as a dependent variable. To that end, theft rates will be calculated for all airports that experienced 10 or more thefts in 2009, using as the denominator the number of passengers (in the case of theft at checkpoint) or the number of checked-in bags (when analyzing theft from them).

Finally, according to the concept of *choice-structuring properties,* and due to the differences in the opportunity structure of the two types of theft explained in Chapter 4, one could expect that airports that concentrate most theft at checkpoint may not coincide with those that concentrate most theft from checked-in luggage. Following the same idea it would be logical that the objects most stolen at checkpoint differ from those stolen from checked-in luggage. When thinking about what passengers carry in their carry-on luggage or on themselves, one can see that the valuables available to be stolen are very similar to the ones that are available in other thefts from personal property like pick-pocketing or robbery, in which the thief can only access what the person is carrying at that particular moment. Checked-in luggage is different, since passengers fill those bags with clothing and toiletries, accessories and other valuables. The bag basically contains all the objects that a person will be using when staying at some place other than their home, which will actually be their home for a few days. For this reason it can be expected that hot products at checkpoint will resemble the objects most stolen by pickpockets or robbers, while hot products from checked-in luggage will be more similar to what gets

stolen in burglaries (except for the big electronic items that are not carried in the luggage for obvious reasons).

The following hypotheses will be examined:

H1 – Employee theft from passengers' luggage (of both types) will be concentrated in a few airports, while most of the airports experience little or no theft

H2 – The same pattern of concentration will be found when airports are subdivided into groups according to their volume of traffic: for all groups, a small subset of airports will account for the majority of the thefts

H3 –Controlling for airport size, airports with higher theft rates will not be the same ones that had higher theft volume

H4 – Airports with higher theft rates from checked-in luggage will not be the same than those with higher theft rates at check-point

H5 – Objects most stolen from checked-in luggage will be similar to those most stolen in burglaries, while objects most stolen at checkpoint will be similar to those most stolen in thefts from the person

6.2. Variables and data sources RQ1

The data required to test H1-H4 are the aggregated number of thefts at checkpoint and from checked-in luggage per airport, as well as theft rates of both types. The sources of the aggregated theft volume per airport and the specifics on the calculations of theft rates

have been discussed in section *5.2. Dependent variables: number of thefts and theft rates from checked baggage and at checkpoint in 2009*. Airport size will be determined following FAA guidelines, which have been explained in Chapter 1. Large airports are those with more than 6,980,000 enplanements in 2009; medium airports are the ones that had between 1,745,000 and 6,980,000 departures that year; small airports had between 349,000 and 1,745,000 departures; and in non hub airports between 10,000 and 349,000 passengers took a departing flight in 2009.

The last hypothesis (H5) refers to the objects that are most stolen from passengers' luggage at airports. The units of analysis for this particular hypothesis are not the airports, but the items stolen from luggage at U.S. airports. The data required to test it are, in the first place, the list of objects reported stolen at each recorded theft for the two types of theft analyzed. This information is available in the TSA Claims Database. This list will be compared to the list of most stolen at items burglaries and thefts from the person, which will be obtained from the British Crime Survey 2010 supplementary tables[20]. The BCS 2010 provides a very detailed list of what gets stolen in incidents of theft from the person and at residential burglaries. Although the Bureau of Justice Statistics also provides a similar list based on the National Crime Victimization Survey[21], the list of items included is shorter because many objects have been aggregated in a few categories, which does not allow a fine analysis and comparison of the two types of theft studied here.

[20] http://www.homeoffice.gov.uk/science-research/research-statistics/crime/crime-statistics/bcs-supplementary-tabs/ (accessed September 26, 2012)

[21] http://www.bjs.gov/content/pub/pdf/cvus0804.pdf (accessed September 26, 2012)

6.3. Analyses and results RQ1

6.3.1. Describing theft from passengers' luggage

Considering that this research is exploratory in nature, the first set of analyses and results will provide an overview of the characteristics of theft from passengers' luggage reported to the TSA in 2009.

Prevalence of theft from passengers' luggage

According to the TSA Claims Database, in 2009 there were a total of 12,473 passenger claims reported to the TSA. Of those, 7,327 were claims for passengers' property loss from checked-in baggage and at checkpoint (6,083 and 1,244 incidents, respectively)[22]. This is quite a low number considering that, during that year, there were almost 700 million air passengers in the U.S. On average, there were 10.5 reported thefts per million air passengers in the U.S. (8.7 thefts from checked-in luggage per million passengers; and 1.8 thefts at checkpoint per million passengers). The rarity of this type of crime becomes evident when these rates are compared to the national larceny-theft rate of 206 thefts per million inhabitants[23].

Seasonal variation

Although more people travel during the summer, incidents of theft from luggage spike during the winter months. Table 6 shows the monthly distribution of the total number of thefts from checked luggage and thefts at checkpoint, compared to the percent monthly

[22] 742 additional cases of passenger property loss were removed from the database, because the only items reported stolen were "locks", "bags" or "luggage". This research addresses theft FROM bags, and therefore the instances in which only the lock is missing or when the whole bag is stolen must be excluded.

[23] http://www2.fbi.gov/ucr/cius2009/data/table_01.html (accessed September 26, 2012)

distribution of the number of checked bags and enplaned passengers in 2009, respectively. Differences in one point or more are highlighted in bold, and the red/green colors show if the percentage of thefts for each month is higher or lower than the percent of passengers flying during that period.

Table 6. Seasonal variation of theft from luggage, 2009

	% of theft from checked luggage	% of checked-in bags	% of theft at checkpoint	% of enplaned passengers
January	**9.7**	7.5	**9.9**	7.4
February	7.5	7.0	**9.1**	7.0
March	8.4	8.6	7.9	8.6
April	8.0	8.4	8.8	8.4
May	8.9	8.4	8.0	8.4
June	8.7	9.0	8.7	9.0
July	8.8	9.7	9.1	9.7
August	**7.5**	9.4	**6.7**	9.3
September	7.8	7.8	**6.8**	7.8
October	8.4	8.3	8.0	8.4
November	7.0	7.7	7.6	7.8
December	**9.2**	8.2	**9.6**	8.1
Total in 2009	**100.0**	**100.0**	**100.0**	**100.0**

Source: Own calculations based on data on TSA and BTS[24] data

As explained by Scott T. Mueller, an expert in lost and stolen luggage who was system manager of baggage services for Midwest Airlines for many years, "Wintertime brings out skiers and snowboarders who travel with expensive sports equipment and designer clothes. Thanksgiving, Christmas, Hanukah and Kwanza are major travel holidays when thieves target the gifts they hope you have packed in your checked luggage." (Mueller 2005, p. 28). The table shown above seems to confirm this idea which, interestingly,

[24] http://www.transtats.bts.gov/Data_Elements.aspx?Data=1 (accessed September 26, 2012)

applies to both theft from checked-in luggage and theft at checkpoint. Although there is no data to further confirm this hypothesis, there are some examples of Christmas gifts stolen from checked bags in the media and travel blogs[25]. Another factor contributing to the heightened risk during the winter months is that winter clothing (i.e. coats, jackets) provides further opportunities to conceal stolen objects, as can be inferred from the two cases in the textbox below.

[25] Miami, 2012: a TSA agent stole two new iPads from a passenger's checked luggage that were wrapped as Christmas presents http://www.palmbeachpost.com/news/news/crime-law/tsa-agent-accused-of-selling-stolen-property-fro-1/nL3Qb/; Minneapolis, 2011: the contents (sports clothing) of a Christmas gift bag disappear from a passenger's checked suitcase http://articles.chicagotribune.com/2011-12-22/business/ct-biz-1222-problem-kennedy-20111222_1_jim-fotenos-tsa-christmas-gift; Denver, 2009: Christmas presents are stolen from a soldier's checked luggage http://www.kirotv.com/news/news/local-soldiers-christmas-gifts-disappear-from-lugg/nDPKs/ (accessed September 26, 2012)

How winter clothing provides further opportunities for theft:

1. Example from a case of drug smuggling by baggage handlers, which could also be applied to theft by this group:
"(…) Trafficking was heaviest during the winter months, when customs agents assigned to the tarmac were less likely to leave their cars, and when baggage workers could hide some of the bricks of cocaine inside their coats. (…)"
(The New York Times. December 9, 2011. "In Bags at J.F.K., Handlers Found Niche for Crime")

2. Example of theft from checked luggage by a TSA officer who added a hidden pocket in his work jacket:

"(…) Police arrested a TSA worker at Miami International Airport after investigators say he stuffed goods from passengers' luggage inside a hidden pocket in his work jacket. (…)

Miami-Dade Detective Steve Kaufman said Pujol's secret pocket was large enough to conceal a device as big as a laptop. The pocket is not a part of the uniform, Kaufman said.

"We examined another TSA jacket and that pocket was specifically added," he said.(…)"

(The Miami Herald, January 21, 2012. "TSA agent accused of selling stolen property from luggage on Craigslist")

Most stolen items

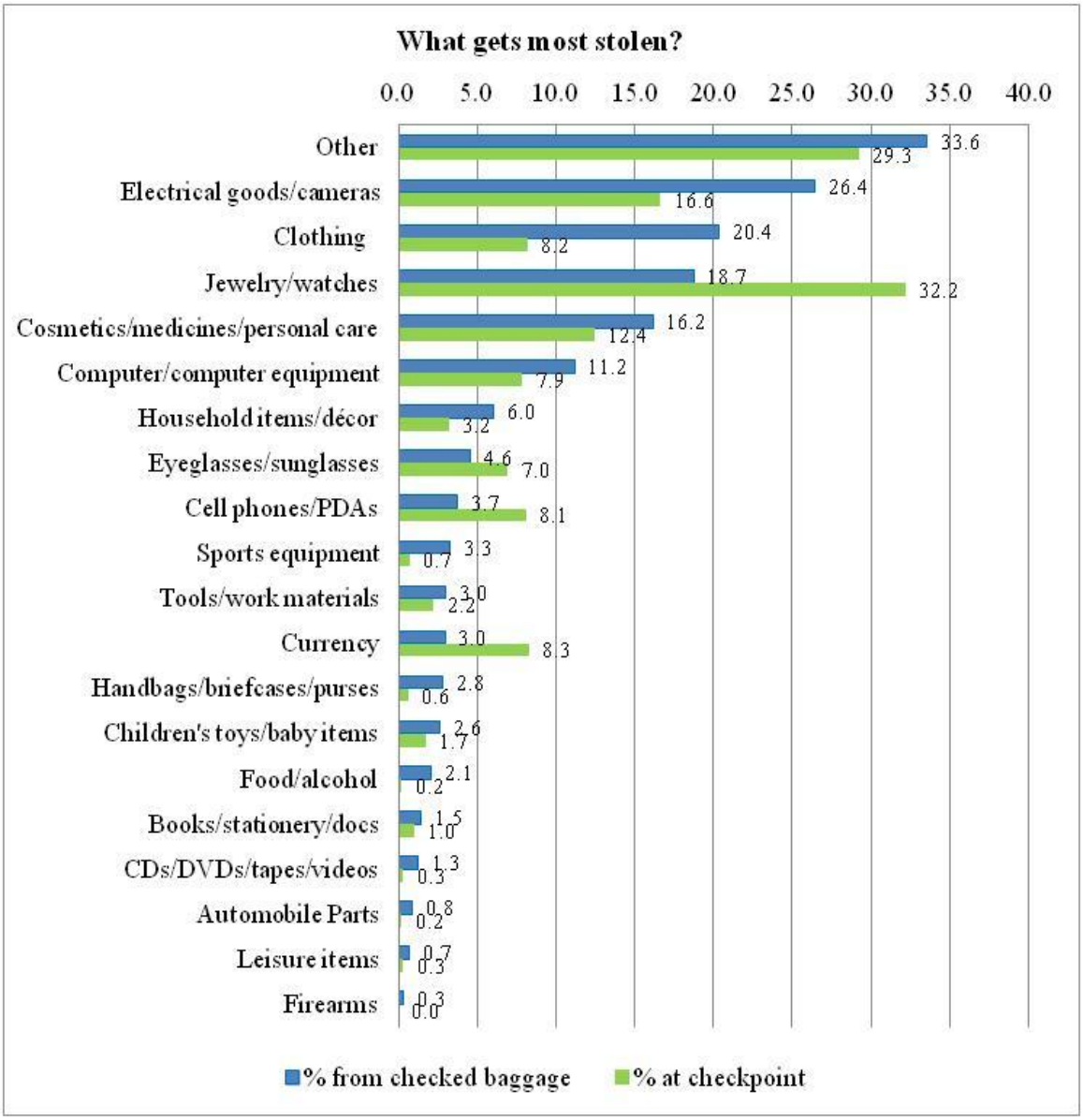
In 80% of the incidents reported in 2009 the TSA Claims Database identified what items were missing (4,873 incidents of thefts from checked baggage and 991 incidents of theft at checkpoint). In the rest of incidents the field "item" was left blank. A total of 7,898 and 1,391 items were reported missing from checked luggage and at checkpoint, respectively.

There are more items than incidents because in many instances more than one object was missing (that is the reason why percentages shown in the figure below don't add up).

There were more than 100 different types of items recorded. For this analysis, objects have been grouped into broader categories. For example, the category "Electrical goods/cameras" includes cameras (film and digital, as well as lenses and projectors), recorders, GPS devices, DVD/CD players, stereo items and accessories, etc.

Figure 8 shows that the more valuable, enjoyable and disposable items appear at the top of the list. These findings are consistent with CRAVED, the target selection model created by Clarke (1999) to understand and predict which objects are more at risk of theft. According to this model, objects that are concealable, removable, available, valuable, enjoyable and disposable are at a higher risk of being stolen. CRAVED has been used to explain variation in theft in a number of crimes: shoplifting, residential burglary and car theft (Clarke, 1999), bag theft in licensed premises (Smith et al., 2006), stolen items in pawn shops (Fass and Francis, 2004), and poaching (Pires and Clarke, 2011), among others. The results of this research show that it is applicable to employee theft from air passengers' luggage too.

Figure 8. Items stolen from checked baggage and at checkpoint in 2009, ranked from the most to the least frequently stolen



Electronics, jewelry, cosmetics and computer equipment are among the most stolen items for both types of theft. At checkpoint, smaller and more expensive objects such as currency, cell phones, glasses, jewelry and watches are stolen in a higher proportion, while electrical goods, clothing and cosmetics make a higher percentage of what is stolen from checked luggage. This is most probably due to what is most available at each of the

two settings studied in this research (i.e. after the ban on liquids it is more difficult to pack cosmetics in the carry-on bag). In order to examine what objects are more at risk of being stolen it would be necessary to have a baseline of what the average passenger packs in his/her suitcase, and what travelers carry with them through the security checkpoint. That information is unfortunately not available at this point.

Following the idea of choice-structuring properties, one of the hypotheses of this research was that the objects most frequently stolen from checked luggage will be similar to what gets stolen in incidents of burglary, while the items most stolen at checkpoint will be more similar to what gets stolen more frequently in incidents of theft from the person (pickpocketing, robberies, etc.). In order to test that hypothesis, the list of items was ranked from 1 to 20, from the most stolen to the least stolen, and the same was done for the list of items stolen in thefts from the person and in residential burglaries according to the BCS 2010 (displayed in table 7 below).

A Spearman Rho correlation test was used to examine the relationship between those ranks and, contradicting the initial hypothesis, the rank of the items stolen in incidents of thefts at checkpoint was positively correlated with the rank of the items stolen in residential burglaries ($r_s = .48$, $p < .05$), but not with what is most frequently stolen at thefts from the person. No correlation was found between the rank of items stolen from checked baggage and the BCS data. The interpretation of these findings can be found in the section *6.4. Summary and discussion of findings RQ1*.

Table 7. Items stolen in incidents of residential burglary and theft from the person, BCS 2008/09

Residential burglary	%	Theft from the person	%
Purse/wallet/money etc	45.8	Cash/foreign currency	49.1
Electrical goods/cameras[3]	35.6	Purse/wallet	48.4
Computer/computer equipment	29.2	Mobile	34.3
Jewellery	23.0	Credit cards	29.6
Mobile	18.8	Documents	7.2
Handbag/briefcase/shopping bag	12.4	Briefcase/bag	6.3
CDs/tapes/videos/DVDs	12.2	House keys	4.0
Food/toiletries/cigarettes	7.8	Computers/other electrical goods	3.8
Car keys	7.8	Food/toiletries/cigarettes	2.4
Other	7.8	Cheque book	2.3
Household items/furniture	7.7	Jewellery	1.5
Clothes	6.8	Clothing	1.4
House keys	6.5	Car keys	1.0
Vehicle/vehicle parts	6.3	CDs/tapes/videos/DVDs	0.0
Documents	5.5	Tools	0.0
Tools/work materials	2.9	Other	5.2
Children's toys/baby items	1.8		
Sports equipment	1.6		
Bicycle/bicycle parts	1.2		
Garden furniture	0.2		
Wheely bin/dustbin	0.0		

Source: BCS 2010 supplementary tables

Economic value of items reported stolen

Finally, descriptive analyses of the claim amounts and the reimbursements issued by the TSA to the air travelers show that, in 2009, passengers claimed around 7 million dollars for items missing from their luggage. From those, just over $200,000 were actually approved by the TSA and reimbursed to the claimants. Measures of central tendency and percentile distribution show that the amount claimed follows a similar pattern for theft from checked baggage and at checkpoint: in both cases most of the passengers put in a claim for a couple hundreds of dollars, but they were rarely reimbursed.

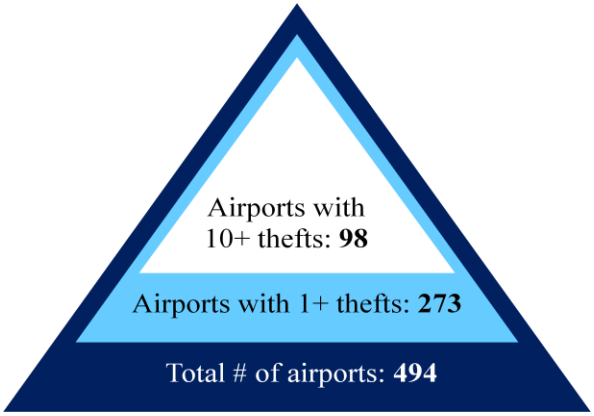
Table 8. Monetary value of claims to TSA, 2009 (in U.S. dollars)

	Checked baggage		Checkpoint	
	Amount claimed	**Approved amount**	**Amount claimed**	**Approved amount**
Sum	5,444,062	104,902	1,500,391	96,146
Minimum	0	0	0	0
Maximum	500,000	2,500	100,000	6,750
25% percentile	91	0	100	0
50% percentile	250	0	268	0
75% percentile	625	0	703	22
Mode	200	0	100	0
N cases	5,991	5,633	1,206	1,140

6.3.2. Do most of the thefts concentrate in just a few airports?

The main aim of this chapter consists of determining whether these thefts follow the pattern of risky facilities, that is, if a few airports concentrate most of the thefts. For this reason, all incidents in which the departure airport is unknown must be excluded from the analysis (109 incidents). According to the TSA Claims Database, from the 494 existing commercial airports in the United States in 2009, 273 suffered at least one theft, and 221 experienced no theft at all (see figure 9). From the 273 airports that experienced some theft, only 98 had 10 or more thefts during that year.

Figure 9. Number of U.S. airports experiencing theft from luggage in 2009



One of the ways of assessing if there is a pattern of concentration is through visual examination of the bar graphs that display the number of thefts per airport (ranked from the one with most theft to the one with the fewest) to look for a J-shaped curve, as shown by Wilcox and Eck (2011) when describing "The Iron Law of Troublesome Places" (section *4.2.* above). This curve is used to examine whether a few facilities experience most of the crime, while the majority of the facilities experience very few or no crime at all. Figures 10 and 11 below show that, when ranked according to number of thefts from checked luggage and at checkpoint in 2009, airports display a perfect J-curve.

Large airports appear first in the rank, followed by medium airports, then small airports, and finally non hub airports, with only some overlapping at the beginning and end of each category (tables 9 and 10 below[26]).

[26] Figure 17 and table 29 (Appendix IV) display the same results for the aggregated number of thefts. The airport with most total number of thefts was JFK with 455 incidents, followed by Orlando, Los Angeles, Atlanta and Miami, which are some of the busiest airports in the U.S.

Figure 10. U.S. airports ranked from the one with the highest to the one with the lowest number of thefts from checked-in luggage in 2009 (N = 263)

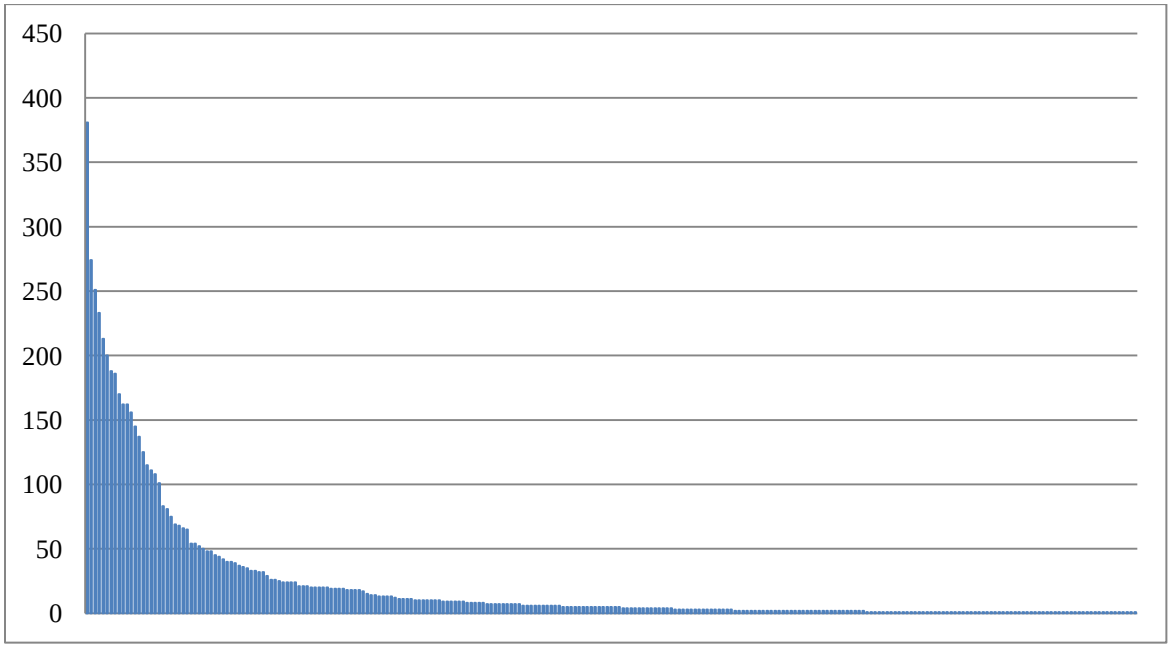


Table 9. Top 20 U.S. airports with highest volume of theft from checked-in luggage in 2009

Rank	Airports	# thefts	Airport size
1	JFK-John F. Kennedy International	455	Large
2	MCO-Orlando International Airport	327	Large
3	LAX-Los Angeles International Airport	312	Large
4	ATL-Hartsfield-Jackson Atlanta International Airport	270	Large
5	MIA-Miami International Airport	257	Large
6	SEA-Seattle-Tacoma International	229	Large
7	LAS-McCarran International	226	Large
8	PHL-Philadelphia International Airport	220	Large
9	EWR-Newark International Airport	218	Large
10	BOS-Boston (Logan) International Airport	200	Large
11	DEN-Denver International Airport	188	Large
12	ORD-Chicago O'Hare International Airport	185	Large
13	PHX-Phoenix Sky Harbor International	177	Large
14	DFW-Dallas-Fort Worth International Airport	161	Large
15	IAD-Washington Dulles International	155	Large
16	LGA-LaGuardia	150	Large
17	FLL-Ft. Lauderdale-Hollywood International	145	Large
18	SAN-San Diego International	120	Large
19	TPA-Tampa International	118	Large
20	BWI-Baltimore/Washington Intl Thurgood Marshall	107	Large

Figure 11. U.S. airports ranked from the one with the highest to the one with the lowest number of thefts at checkpoint in 2009 (N = 150)

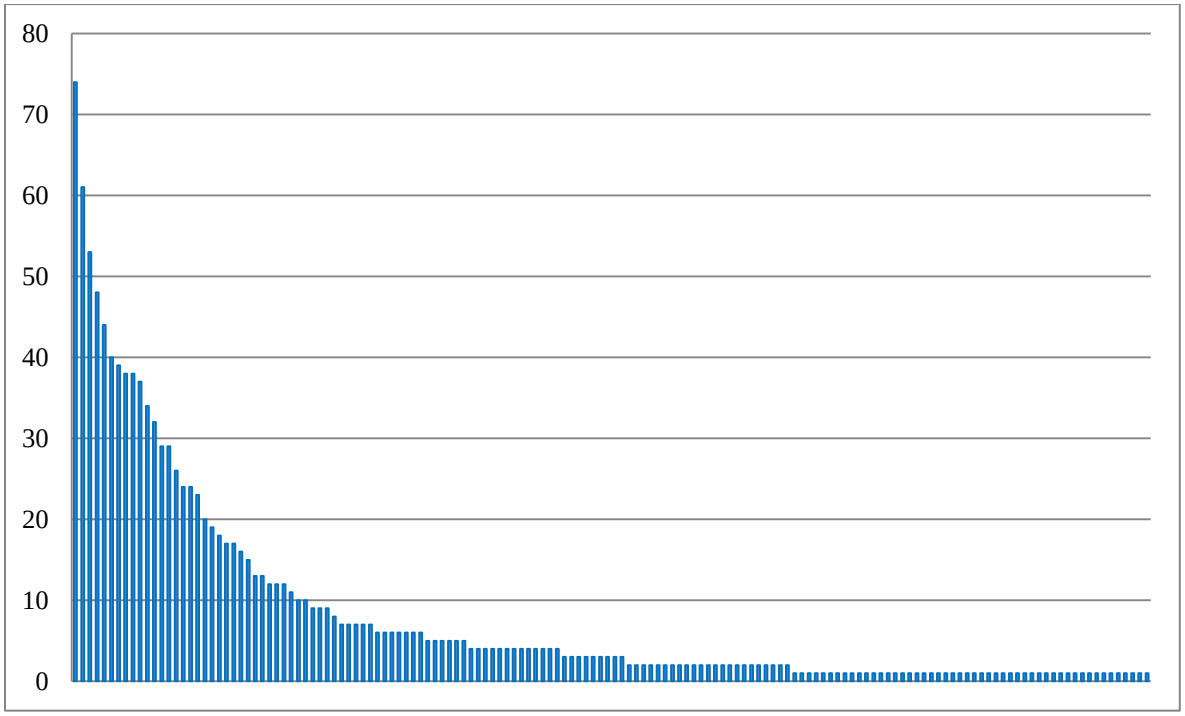


Table 10. Top 20 U.S. airports with highest volume of theft at checkpoint in 2009

Rank	Airports	# thefts	Airport size
1	JFK-John F. Kennedy International	74	Large
2	LAX-Los Angeles International Airport	61	Large
3	MCO-Orlando International Airport	53	Large
4	EWR-Newark International Airport	48	Large
5	MIA-Miami International Airport	44	Large
6	LGA-LaGuardia	40	Large
7	FLL-Ft. Lauderdale-Hollywood International	39	Large
8	LAS-McCarran International	38	Large
9	BOS-Boston (Logan) International Airport	38	Large
10	ATL-Hartsfield-Jackson Atlanta International Airport	37	Large
11	PHL-Philadelphia International Airport	34	Large
12	PHX-Phoenix Sky Harbor International	32	Large
13	SEA-Seattle-Tacoma International	29	Large
14	ORD-Chicago O'Hare International Airport	29	Large
15	DEN-Denver International Airport	26	Large
16	DFW-Dallas-Fort Worth International Airport	24	Large
17	BWI-Baltimore/Washington Intl Thurgood Marshall	24	Large
18	DCA-Ronald Reagan Washington National Airport	23	Large
19	IAD-Washington Dulles International	20	Large
20	CLT-Charlotte/Douglas International Airport	19	Large

Table 11 displays descriptive statistics on the volume of thefts per airport size[27], and shows that the average number of thefts increases as the number of enplanements increase.

Table 11. Descriptive statistics on the number of thefts from checked baggage and at checkpoint, 2009 (airports with 1+ thefts)

Number of thefts from checked baggage 2009					
Airport size	N	Minimum	Maximum	Mean	Std. Deviation
Large	29	12	381	137.2	82.7
Medium	36	5	68	30.8	14.2
Small	70	1	54	8.5	7.6
Non hub	128	1	11	2.4	2.0
All airports	**263**	**1**	**381**	**22.8**	**49.9**
Number of thefts at checkpoint 2009					
Airport size	N	Minimum	Maximum	Mean	Std. Deviation
Large	29	2	74	28.9	16.8
Medium	35	2	18	6.5	3.8
Small	50	1	7	2.4	1.6
Non hub	36	1	2	1.2	0.4
All airports	**150**	**1**	**74**	**8.2**	**12.8**

Another concept commonly used when analyzing patterns of concentration is the Pareto principle or 80-20 rule, which states that, for many events, roughly 80% of the effects come from 20% of the causes. Applied to crime, the Pareto principle suggests that a small proportion of any group of places, products, victims, etc. will account for the majority of crime experienced by that group. With regards to theft from luggage, table 12 shows that, in 2009, there were a total of 7,218 claims for theft from luggage. From those, almost

[27] As explained in Chapter 1, there are a total of 29 large airports (more than 6,980,000 passengers); 36 medium airports (1,745,000 – 6,980,000 passengers); 72 small airports (349,000 – 1,745,000 passengers); and 231 non hub airports (10,000 - 349,000 passengers). There are also 126 non-primary airports (between 2,500 and 10,000 enplanements), no theft was reported to the TSA in any of them in 2009.

6,000 were about theft from checked bags, and around 1,200 were about theft at checkpoint. Further analyses of the origin of these claims show that 80% of all claims come from just 48 airports (which constitute 17.5% of all that experienced some theft). This pattern of concentration is very similar for thefts from checked-in baggage. For thefts occurred at checkpoint, 43 airports (or 28.5% of all that experienced some theft) accumulated 80% of the incidents.

Table 12. Pattern of concentration of theft from luggage at U.S. airports in 2009 (airports with 1+ thefts)

	# airports with 1+ theft	Total # thefts	80-20 rule: % airports	80-20 rule: % theft
• Checked baggage	263	5,993	18.2 (48)	80.1
• Checkpoint	150	1,225	28.5 (43)	80.3
Total theft	**273**	**7,218**	**17.5 (48)**	**80.1**

If the same calculation is performed on all 494 airports (instead of including only those who experienced some theft), the pattern of concentration becomes even more evident: 80% of thefts from checked baggage concentrate in 9.7% of all airports, and 80% of thefts at checkpoint concentrate in 8.7% of them.

The risky facilities framework states that the same pattern of concentration found above should apply when facilities are divided according to their size. That is, among the larger airports, a small subset should concentrate most of the theft occurring in larger airports. The same should be true for each category of airport according to size. However, results displayed in table 13 contradict that idea and show that, when airports are subdivided according to their traffic volume, the pattern of concentration disappears.

Table 13. Pattern of concentration of theft from checked luggage and theft at checkpoint in 2009 according to airport size (airports with 1+ thefts)

Concentration of theft from checked baggage 2009				
Airport size	# airports with 1+ thefts	Total # thefts from checked baggage	80-20 rule: % airports	80-20 rule: % theft
Large	29	3,980	58.6	80.6
Medium	36	1,110	66.7	80.9
Small	70	596	52.9	80.2
Non hub	128	307	52.3	80.1
Concentration of theft at checkpoint 2009				
Airport size	# airports with 1+ thefts	Total # thefts at checkpoint	80-20 rule: % airports	80-20 rule: % theft
Large	29	837	58.6	80.1
Medium	35	227	60.0	79.7
Small	50	118	56.0	80.5
Non hub	36	43	75.0	79.1

Within each category, there is variation in the volume of crime but no subset of airports stands out for experiencing an unparalleled number of thefts. This is the first time that no pattern of concentration is found when analyzing a group of facilities, and can be explained by the especial characteristics of airports, as it will be discussed in the section *6.4. Summary and discussion of findings RQ2*.

If controlling for the size of the establishments is usually important when analyzing risky facilities, the results obtained so far show that in this case it is essential to do so in order to identify which airports are riskier with regards to theft from passengers' luggage. For this reason the next step is to take into account the number of passengers and bags at each facility by calculating theft rates.

6.3.3. Identifying risky airports using theft rates

Theft rates per million passengers (for theft at checkpoint) and per million bags (for theft from checked-in luggage) have been calculated only for the airports that had at least 10 reported thefts in 2009. A total of 98 airports experienced 10 or more thefts, but one of them (SFO-San Francisco International) has been excluded from the analyses because it is one of the 16 airports that opted out from TSA screening, and it hires private screeners instead. The list with the 97 airports used in this analysis can be found in Appendix V, which includes 28 large airports (all existing large airports except SFO), 35 medium airports (all of them except MCI-Kansas City International, which has also opted-out from TSA screening –and had less than 10 reported thefts in 2009), 31 small airports and 3 non hub airports. In order to facilitate the analyses, the three non-hub airports[28] have been included in the "small airport" category.

Descriptive statistics on theft rates of both types by airport size are displayed in table 14.

Table 14. Descriptive statistics on theft rates from checked baggage and at checkpoint, 2009 (airports with 10+ thefts)

Theft rate checked baggage 2009					
Airport size	N	Minimum	Maximum	Mean	Std. Dev.
Large	28	4.6	22.2	11.3	4.8
Medium	35	5.1	26.7	13.0	5.6
Small	34	5.1	128.3	26.5	24.8
All airports	**97**	**4.6**	**128.3**	**17.3**	**16.6**
Theft rate checkpoint 2009					
Airport size	N	Minimum	Maximum	Mean	Std. Dev.
Large	28	0.6	3.8	1.9	0.9
Medium	35	0.5	6.0	1.9	1.2
Small	34	0.0	12.3	2.8	2.6
All airports	**97**	**0.0**	**12.3**	**2.2**	**1.8**

[28] The three non-hub airports that experienced 10 or more thefts in 2009 are MFR-Rogue Valley International, HDN-Yampa Valley Regional, and PIA-Greater Peoria.

The pattern observed before (larger airports have more theft) is reversed once theft rates are examined: smaller airports have higher theft rates, both from checked luggage and at checkpoint. Figures 12 and 13 and tables 15 and 16 below show what are the airports with higher theft rates of both types of theft.

The bar graphs display a clear pattern of concentration. There are a few airports at the very top of both ranks that stand out for having markedly high theft rates. They are mostly small airports, and the three non-hub airports that were included in the "small" category (MFR-Rogue Valley International, HDN-Yampa Valley Regional, and PIA-Greater Peoria) appear in the top 10 positions for both types of theft. Therefore, in general, smaller airports seem to be riskier than medium or large airports.

When subdivided in 3 categories according to their size, the pattern of concentration disappears for large and medium airports, but it is present for small airports: four or five airports have much higher rates than the rest. Figures 14 and 15 (below) show these results: when examining them, it is important to notice the differences in the scale of each graph.

The possible explanations for these phenomena will be explained in the section *6.4. Summary and discussion of findings RQ1*.

Figure 12. 97 airports with most theft in 2009, ranked from the one with the highest theft rate from checked-in luggage per million bags to the one with the lowest

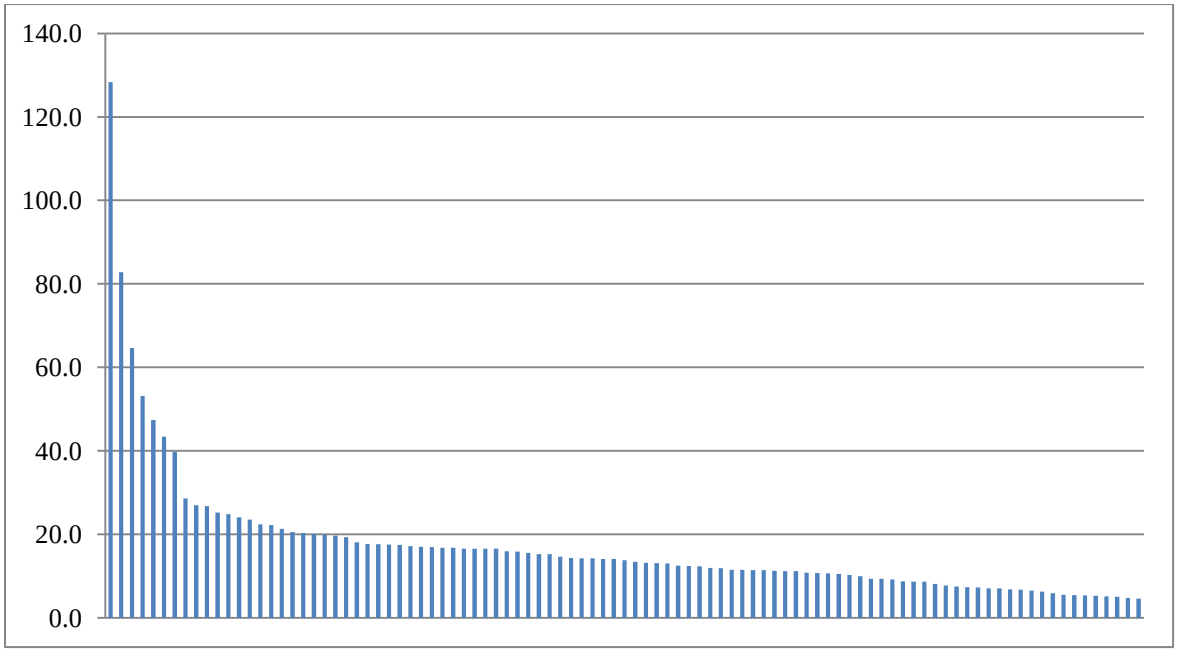


Table 15. Top 20 airports with the highest theft rate from checked-in luggage per million bags, 2009

Rank	Airports	Theft rate checked luggage	Airport size
1	HDN-Yampa Valley Regional	128.3	Small
2	COS-Colorado Springs Municipal	82.8	Small
3	SGF-Springfield-Branson National Airport	64.6	Small
4	PIA-Greater Peoria	53.1	Small
5	HSV-Huntsville International Airport	47.4	Small
6	GSP-Greenville-Spartanburg	43.4	Small
7	MFR-Rogue Valley International	39.7	Small
8	BTV-Burlington, VT	28.5	Small
9	XNA-Northwest Arkansas Regional	26.9	Small
10	OMA-Eppley Airfield	26.7	Medium
11	STT-Cyril E. King International	25.2	Small
12	CHS-Charleston International	24.8	Small
13	LBB-Lubbock International	24.0	Small
14	PBI-Palm Beach International	23.5	Medium
15	SJC-Norman Y Mineta San Jose International	22.4	Medium
16	MCO-Orlando International Airport	22.2	Large
17	SJU-Luis Munoz Marin International	21.3	Medium
18	ANC-Ted Stevens Anchorage Int'l Airport	20.5	Medium
19	MYR-Myrtle Beach International	20.3	Small
20	GEG-Spokane International	20.1	Small

Figure 13. 97 airports with most theft in 2009, ranked from the one with the highest theft rate at checkpoint per million passengers to the one with the lowest

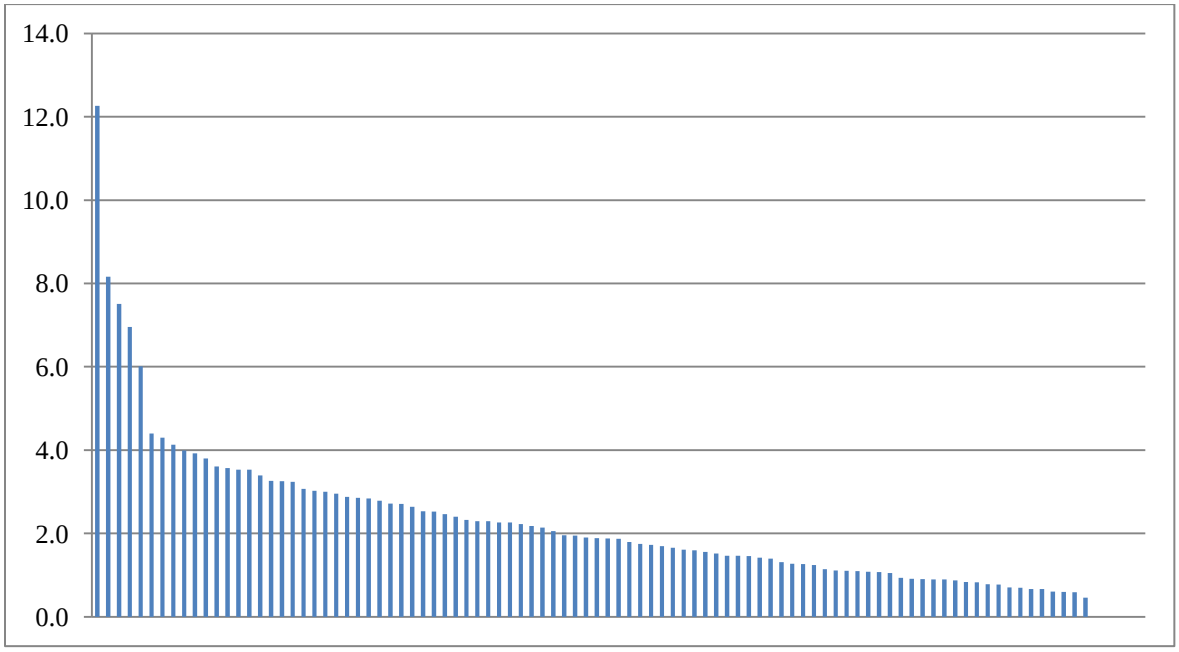
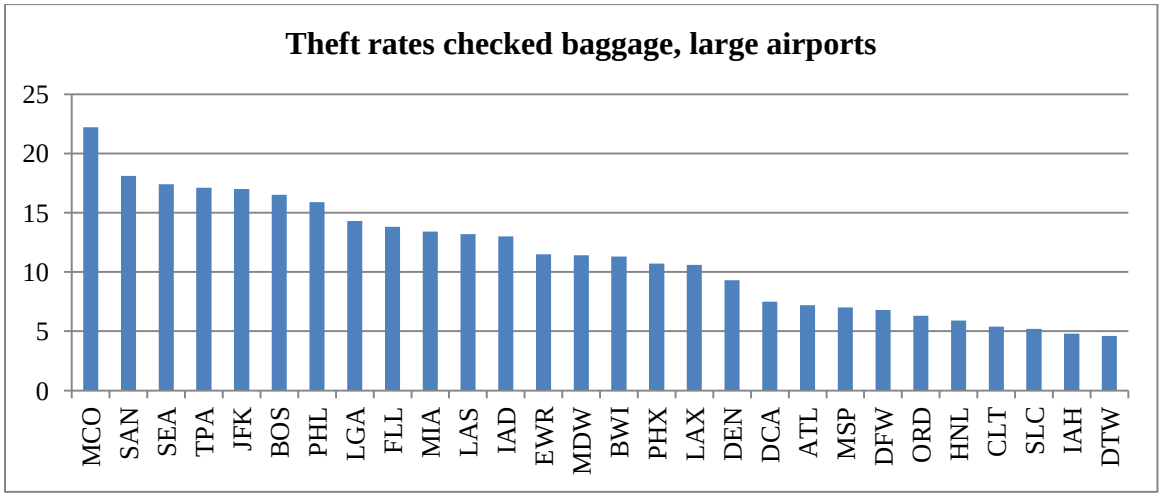
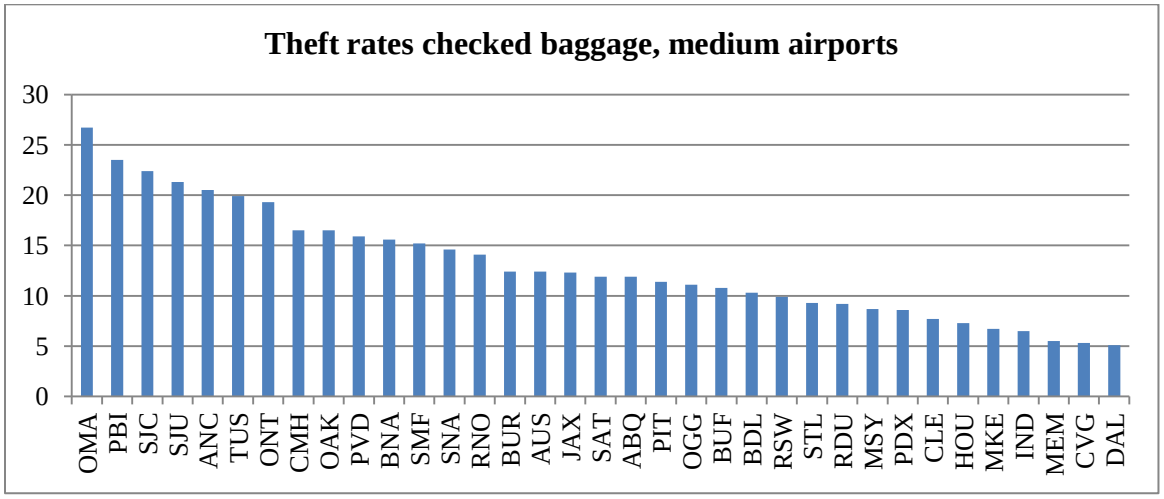


Table 16. Top 20 airports with the highest theft rate at checkpoint per million passengers, 2009

Rank	Airports	Theft rate checkpoint	Airport size
1	FNT-Bishop International, Flint	12.3	Small
2	HDN-Yampa Valley Regional	8.2	Small
3	COS-Colorado Springs Municipal	7.5	Small
4	MFR-Rogue Valley International	7.0	Small
5	OGG-Kahului-Maui, HI	6.0	Medium
6	SJU-Luis Munoz Marin International	4.4	Medium
7	ISP-Long Island McArthur, Islip	4.3	Small
8	PIA-Greater Peoria	4.1	Small
9	PBI-Palm Beach International	4.0	Medium
10	BUR-Bob Hope	3.9	Medium
11	FLL-Ft. Lauderdale-Hollywood International	3.8	Large
12	LGA-LaGuardia	3.6	Large
13	LGB-Long Beach	3.6	Small
14	TUL-Tulsa International Airport	3.5	Small
15	ORF-Norfolk International	3.5	Small
16	GRR-Gerald R. Ford International Airport	3.4	Small
17	JFK-John F. Kennedy International	3.3	Large
18	LIH-Lihue Airport	3.3	Small
19	MCO-Orlando International Airport	3.2	Large
20	ALB-Albany International	3.1	Small

Figure 14. Large, medium and small airports ranked according to their theft rate from checked baggage in 2009





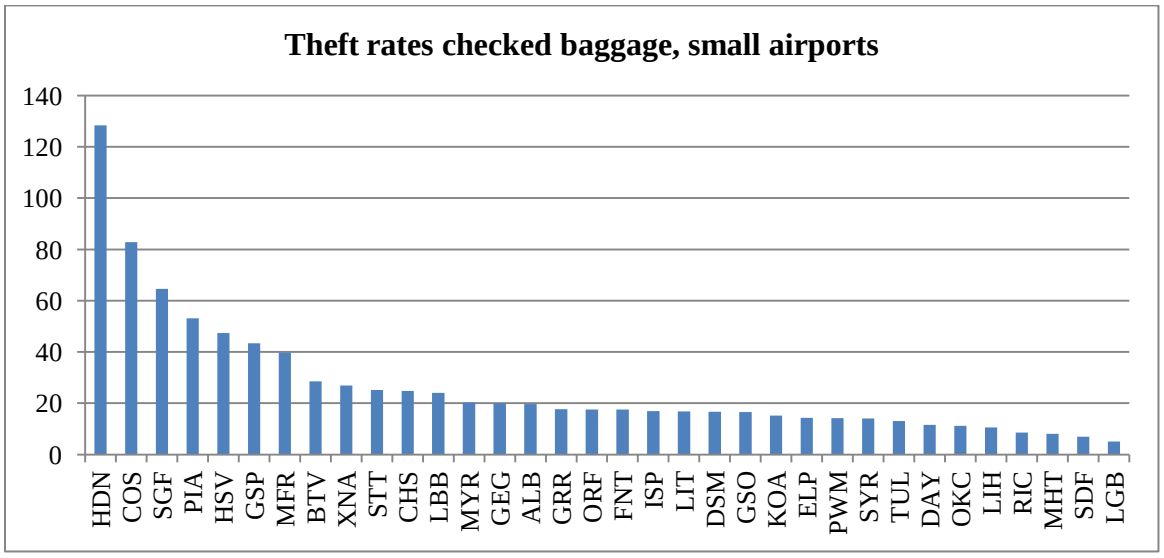
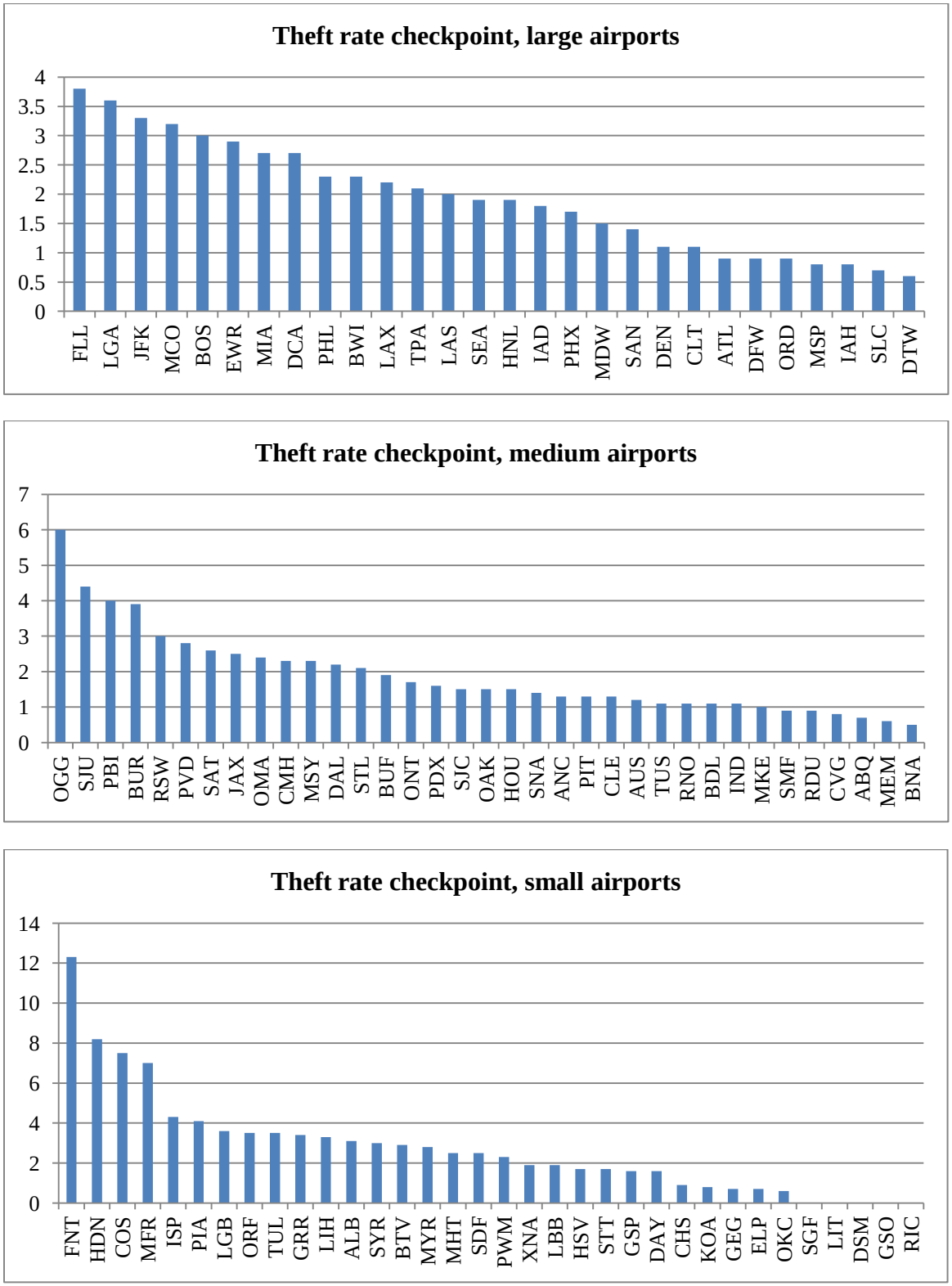


Figure 15. Large, medium and small airports ranked according to their theft rates at checkpoint in 2009



6.3.4. Comparing 2008 and 2009 theft rates

Apart from the establishment's size or the reporting practices existing at each of them, random variation is another confounding variable that can be misleading when identifying what facilities are riskier. In order to rule out the possibility that in the time period studied (2009) the facilities with higher theft rates were experiencing abnormal spikes of crime, theft rates for 2008 have been calculated and Pearson correlation analyses have been performed.

Theft rates from checked baggage in 2009 and 2008 are strongly positively correlated ($r = .77$, $p < .000$), which indicates that airports with higher theft rates in 2009 had also high rates in 2008. Table 17 illustrates this fact by displaying theft rates from checked baggage per million bags (2009 and 2008) for the twenty airports with highest theft rates in 2009.

Theft rates of HDN-Yampa Valley Regional (emphasized in bold) indicate a twofold increase from 2008 to 2009, which could suggest an abnormal spike of crime in the latter year. However, the theft rate for 2008 is also very high, showing that HDN was among the riskier airports with regards to theft from checked baggage that year as well. It is important to keep in mind that these rates show the number of thefts per million bags. Only 11 thefts from checked baggage were reported at HDN in 2009 (6 thefts in 2008), but the rates are so high because HDN saw 9,000 fewer checked bags in 2009 relative to 2008 (around 95,000 in 2008 and 86,000 in 2009).

Table 17. Comparison of theft rates from checked baggage per million bags 2009-2008 for the top 20 airports with highest theft rate in 2009

Rank	Airports	Airport size	Theft rate checked b. 2009	Theft rate checked b. 2008
1	**HDN-Yampa Valley Regional**	Small	**128.3**	**62.7**
2	COS-Colorado Springs Municipal	Small	82.8	96.0
3	SGF-Springfield-Branson National Airport	Small	64.6	56.3
4	PIA-Greater Peoria	Small	53.1	46.2
5	HSV-Huntsville International Airport	Small	47.4	46.6
6	GSP-Greenville-Spartanburg	Small	43.4	61.2
7	MFR-Rogue Valley International	Small	39.7	39.7
8	BTV-Burlington, VT	Small	28.5	42.0
9	XNA-Northwest Arkansas Regional	Small	26.9	20.9
10	OMA-Eppley Airfield	Medium	26.7	26.1
11	STT-Cyril E. King International	Small	25.2	49.9
12	CHS-Charleston International	Small	24.8	37.7
13	LBB-Lubbock International	Small	24.0	20.3
14	PBI-Palm Beach International	Medium	23.5	18.8
15	SJC-Norman Y Mineta San Jose Intl	Medium	22.4	15.1
16	MCO-Orlando International Airport	Large	22.2	26.1
17	SJU-Luis Munoz Marin International	Medium	21.3	35.0
18	ANC-Ted Stevens Anchorage Intl Airport	Medium	20.5	27.8
19	MYR-Myrtle Beach International	Small	20.3	48.6
20	GEG-Spokane International	Small	20.1	22.8

Theft rates at checkpoint in 2009 and 2008 are also positively correlated (r = .54, p < .000), which again indicates that airports with higher theft rates in 2009 had also high rates in 2008.

Table 18 displays theft rates at checkpoint per million passengers for 2009 and 2008 for the twenty airports with the highest theft rates in 2009. Theft rates emphasized in bold indicate a very sharp rate increase from 2008 to 2009. In two of the three cases (FNT-Bishop Intl and MFR-Rogue Valley Intl) 2008 theft rates can also be considered among

the highest for that year. Only BUR-Bob Hope would not have been considered risky in 2008, but became one of the top 10 regarding theft rate at checkpoint in 2009.

Table 18. Comparison of theft rates at checkpoint per million passengers 2009-2008 for the top 20 airports with highest theft rate in 2009

Rank	Airports	Airport size	Theft rate checkpoint 2009	Theft rate checkpoint 2008
1	**FNT-Bishop International, Flint**	Small	**12.3**	**3.8**
2	HDN-Yampa Valley Regional	Small	8.2	7.3
3	COS-Colorado Springs Municipal	Small	7.5	6.0
4	**MFR-Rogue Valley International**	Small	**7.0**	**3.5**
5	OGG-Kahului-Maui, HI	Medium	6.0	5.7
6	SJU-Luis Munoz Marin International	Medium	4.4	5.0
7	ISP-Long Island McArthur, Islip	Small	4.3	4.8
8	PIA-Greater Peoria	Small	4.1	3.6
9	PBI-Palm Beach International	Medium	4.0	4.6
10	**BUR-Bob Hope**	Medium	**3.9**	**1.5**
11	FLL-Ft. Lauderdale-Hollywood Intl	Large	3.8	2.9
12	LGA-LaGuardia	Large	3.6	3.2
13	LGB-Long Beach	Small	3.6	2.8
14	TUL-Tulsa International Airport	Small	3.5	3.7
15	ORF-Norfolk International	Small	3.5	3.9
16	GRR-Gerald R. Ford Intl Airport	Small	3.4	2.2
17	JFK-John F. Kennedy International	Large	3.3	2.9
18	LIH-Lihue Airport	Small	3.3	3.9
19	MCO-Orlando International Airport	Large	3.2	3.5
20	ALB-Albany International	Small	3.1	2.9

Theft rates from checked baggage and at checkpoint in 2008 and 2009 are also highly correlated when disaggregating the airports according to their size, although the correlation coefficient is very strong for large airports (for both types of theft) and moderate for theft at checkpoint in small and medium airports.

Table 19. Pearson correlation on theft rates 2008/09 by airport size

	Theft rate from checked baggage 2008/2009	Theft rate at checkpoint 2008/2009
Large airports	.89**	.86**
Medium airports	.73**	.65**
Small airports	.71**	.42*

*** p < .01 *p < .05*

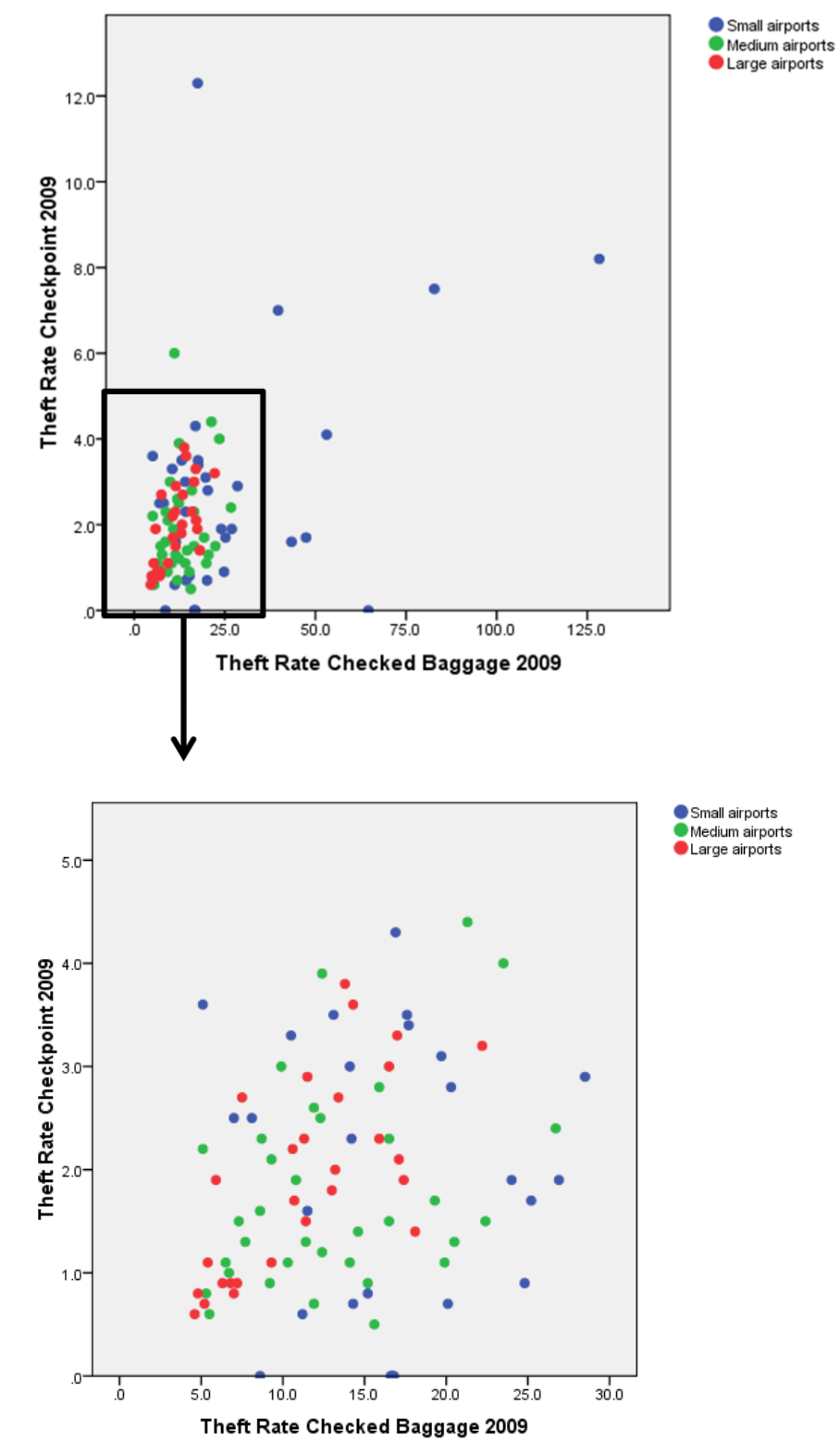
6.3.5. Theft rate from checked baggage vs. theft rate at checkpoint

In this dissertation it was hypothesized that theft from checked luggage and theft at checkpoint would differ in many aspects and that, as a consequence, airports experiencing higher theft rates of one type of theft would not have high rates of the other. However, tables 17 and 18 (above) show that a total of 7 airports are among the riskiest for both types of theft. Four of them (HDN-Yampa Valley Regional, COS-Colorado Springs Municipal, PIA-Greater Peoria, and MFR-Rogue Valley International) appear on the top 10 on both lists. For this reason, a correlation analysis was performed on theft rates from checked baggage and at checkpoint in 2009. Results show that they are positively correlated (r = .44, p < .000), which points to the idea that certain characteristics of the airport act as facilitators of theft in the two settings studied, and that despite the differences between the two types of thefts, they may be influenced by similar variables.

The relationship between the two rates is displayed graphically in figure 16. The graph suggests that the correlation between theft rates from checked baggage and at checkpoint might be stronger for larger airports, as the dots representing large airports seem to be

distributed in a linear fashion, while the dots representing small and medium airports are dispersed all over the graph.

Figure 16. Scatterplot of theft rates from checked baggage and at checkpoint by airport size, 2009



Additional statistical analyses by airport size confirm that such correlation only exists for large airports, but not for medium or small ones. That is, the hypothesis that theft from checked baggage and theft at checkpoint would follow different patterns is confirmed for the small and medium airports, but in the larger airports, as one type of theft increases, the other does so too. This result will be discussed in the next section *(6.4. Summary and discussion of findings RQ1).*

Table 20. Pearson correlation of theft rates from checked baggage and at checkpoint, by airport size, 2009

	Correlation of theft rates from checked baggage and at checkpoint 2009
Large airports	.68**
Medium airports	.24
Small airports	.40

** $p < .01$

NOTE: Correlation coefficients reported in this chapter were calculated using the original theft rates. However, due to the fact that the data distribution of both theft rates was highly skewed, the data were transformed by calculating their natural logarithm and correlation analyses were performed again (more details about the data transformation in chapter 7). The new correlation coefficients are very similar to the ones reported above:

- LN theft rate checked baggage 2009 v. 2008, all airports: $r = .82$, $p < .01$
  - Large airports: $r = .89$, $p < .001$
  - Medium airports: $r = .76$, $p < .001$
  - Small airports $r = .71$, $p < .001$
- LN theft rate checkpoint 2009 v. 2008, all airports: $r = .53$, $p < .001$
  - Large airports: $r = .89$, $p < .001$
  - Medium airports: $r = .55$, $p < .001$
  - Small airports: $r = .44$, $p < .01$
- LN theft rate checked baggage v. checkpoint 2009, all airports: $r = .33$, $p < .01$
  - Large airports: $r = .75$, $p < .001$
  - Medium airports: $r = .28$, *ns*
  - Small airports: $r = .24$, *ns*

6.4. Summary and discussion of findings RQ1

This is the first study specifically focused on employee theft from passengers' luggage at airports, and it is therefore exploratory in nature. As seen above, this type of theft is a relatively rare crime (17 thefts from checked luggage and 2 thefts at checkpoint per million bags/passengers, on average), it peaks during the winter months, and thieves target primarily small expensive (CRAVED) objects such as jewelry and electronics, with losses valued at a couple hundred dollars per passenger on average.

The aim of the first research question of this study was to examine whether employee theft from passengers at U.S. airports follows the pattern of risky facilities. To that end, it is necessary to determine if a few airports experience a disproportionate amount of theft, while the rest experience just a few incidents or none at all. Until this day, every single type of facility analyzed in the literature fits the risky facilities framework and, when analyzing the volume of theft, airports are no exception: a few airports concentrated most of the incidents of theft from checked baggage and at checkpoint in the U.S. in 2009. A closer look into which ones accumulate most theft shows that the concentration detected is due mostly to airport size (as one would expect, larger airports have more theft, because there are more available targets and therefore more opportunities to commit theft in them). This finding shows that applying the classic 80-20 rule to volume of theft in order to find out which airports are riskiest is not useful in this research, as this rule points to the airports with more targets, which are not necessarily the riskiest.

A second clause of the risky facilities framework states that the pattern of concentration will be present even when disaggregating the establishments according to their size. That does not hold true in this research when focusing in number of thefts. When examining only large airports, medium airports, small airports and non-hub airports among themselves there was variation, but not concentration in the amount of theft. Although the volume of theft is very homogeneous within each airport size group, it is important to keep in mind that the airports included in each of the groups vary greatly in size. For example, both Tampa International and Hartsfield-Jackson Atlanta International Airports belong to the "large airport" category, but the latter is 6 times bigger than the former (Tampa International had just over 8 million enplanements in 2009, while Hartsfield-Jackson had around 42 million). A finer measure that takes into account the potentially misleading factor of airport size is needed in order to examine what airports are riskier.

Theft rates from checked baggage and at checkpoint were calculated, and bar graphs were created to explore if there was any underlying pattern of concentration. Some small airports were identified as the most risky of all 97 airports analyzed, as they had markedly higher rates than the others. When subdivided according to size, no pattern of concentration was found for large and medium airports, but it was present for small ones.

These findings can be explained by the fact that, in the past decade, airports have been one of the most regulated establishments, in which security was tightened up to prevent possible breaches and terrorist attacks. All airports need to have an Airport Security Program (ASP) in place before they can conduct scheduled service. The ASP[29] is a

[29] Detailed information about the description and regulation of ASPs can be found at http://www.gpo.gov/fdsys/pkg/CFR-2010-title49-vol9/pdf/CFR-2010-title49-vol9-part1542-subpartB.pdf (accessed September 26, 2012)

document that lays out the whole security system at the airport and explains, among others, what are the security areas, how access to those areas will be controlled, what are the approved identification for personnel and the requirements to submit to screening, the employee criminal history records checks procedures that need to be followed, the general code of conduct in the security areas, etc. (Price & Forrest 2009). The ASP is customized for each airport and is then approved by the TSA; its contents are considered Sensitive Security Information and must not be disclosed to the public. The security requirements included in it vary according to factors like traffic volume, proximity of the airport to other security-sensitive locations (military bases, nuclear facilities, etc.), as well as other factors. As explained by Price & Forrest (2009):

> For security purposes, Airport Security Programs classify commercial service airports as Category X, Category I, Category II, Category III, or Category IV.
> - Category X airports are the largest commercial service airports in the United States.
> - Category I, Category II, and Category III airports are large, medium, and small commercial hub airports.
> - Category IV airports are usually non-hub or GA airports with more than 2,500 enplanements per year.
>
> Some Category I airports, considered Category I based on the level of enplanements, are treated as Category X because of their proximity to other security sensitive location. Baltimore/Washington International Airport and Ronald Reagan National Airport are two examples. A smaller airport may have higher levels of security based on the geopolitical circumstances at the time, if a civilian airport is co-located with a military base, or other factors as determined by the TSA (p. 153)

Airports within the same category will have similar security measures. Given the weight of traffic volume in determining to what category each airport belongs, one can expect homogenization of management practices and security procedures among airports of the same size, with tighter security being present at larger airports. Strict standardized security measures would flatten out the risk of theft and would explain the lack of

concentration when disaggregating airports according to their number of enplanements. These security measures are probably more relaxed in smaller airports, which would allow for more variation within this group.

Smaller airports proved to be the most risky, with higher theft rates than medium or large airports for both types of theft, although theft rates at checkpoint were extremely low for all airports (1.9 thefts per million passengers at large and medium airports, and 2.8 at small airports). Random variation in 2009 was controlled for by calculating the same theft rates for 2008 and running a correlation analysis, which showed consistency throughout the two years. There are several arguments that could explain why smaller airports experience higher rates of employee theft from passengers' luggage than larger airports:

(1) First, as mentioned above, airport size is one of the most important factors in determining the facility's security needs. Larger and busier airports are considered to be at a higher risk of being targeted by terrorists, reason why security is tighter in them. Although designed to prevent terrorism, these same measures could also be preventing theft, either by reducing the existing opportunities to commit crime (i.e. improving access control to restricted areas) or by increasing the risks of getting caught. This would be an example of "diffusion of benefits", which would be consistent with the findings of Johnson et al. (2010) and Rosbough (2011), who found that post 9/11 security measures at airports generated a decrease in the number of thefts in the Chicago O'Hare International Airport and Hartsfield-Jackson International Airport in Atlanta, respectively. These authors studied theft in general at the airport, not employee theft from passengers' luggage specifically,

but the same rationale could be applied here. It could therefore be expected that if security measures are tighter at larger airports, the diffusion of benefits will be larger in them too.

(2) Another potential explanation of why smaller airports experience more theft from passengers' luggage relates to the fact that in many occasions, these crimes are committed by several employees working together. At smaller airports the chances to get to know and to collude with other colleagues might be better, due to the reduced number of employees and the likelihood that they often work together with the same people. At larger airports the number of employees is much higher and there is usually a manager in charge of organizing shifts. In order to be able to work with the same "right crew" or to access the "right flight", the manager would have to be implicated in the collusion which, although it has happened before, makes crime more difficult (the example below refers to a case of smuggling, but the same scenario would be possible in case of theft).

Example of the involvement of crew chiefs at bigger airports to facilitate access: *(The New York Times. December 9, 2011. "In Bags at J.F.K., Handlers Found Niche for Crime")*

"(...)Handlers like Mr. Asencio worked in crews of three or four, and Mr. Bourne paid each of them from $3,000 to $5,000 each time they smuggled, they said. Mr. Bourne also paid crew chiefs, the employees who assigned the flights, about $500 each time they assigned his crews to Flight 1384.

Steven Zografos, a crew chief who pleaded guilty to conspiracy to import cocaine, described the first time he was approached by a baggage handler. "He tell me his aunt was coming off the flight," Mr. Zografos said in court, stumbling over his English. "I looked in the schedule, and I took away the flight they were supposed to have, him and his crew, and I assigned him the flight that he wanted to work."

"At first, I thought it was a pretty expensive aunt," he added, "but then I said, 'Obviously something else is going on here.' " Before long, he kept a bottle of correction fluid next to his crew schedule. Whenever someone from Mr. Bourne's crew approached him, he would just Wite-Out the flight that he was supposed to have, and take Flight 1384 from a crew that had it, and make the switch. (...)"

(3) A third possible explanation, which would affect only checked baggage, would be that in larger airports, the luggage screening and handling system described in Chapter 2 is almost fully automated. Physical contact with the bags is reduced to the very minimal instances. At smaller airports many of these processes are conducted manually, which provides more opportunities for theft and a perfect excuse and cover for potential offenders. In words of the airport consultant Michael Boyd (Frank 2010), "Every time you handle a bag, you've got a great

> opportunity for baggage theft and baggage damage by screeners. In the airline business, the key thing is to reduce human contact of all types."

Contradicting the initial hypothesis based on *choice-structuring properties*, theft from checked baggage and theft at checkpoint seem to share more similarities than differences. Both crimes peak during the winter months, similar objects get stolen (with the difference of what is available at each of the two settings) and the same small airports experience higher rates of the two crimes. However, the two types of theft differ in their rates: about 17 thefts per million bags for thefts from checked luggage, and around 2 thefts per million passengers at checkpoint. Given their similarities, the difference in the rate can be explained by the static choice structuring properties of both crimes that were described in Chapter 4. Theft at checkpoint is more risky than theft from checked luggage, as it is committed in a public area and in front of the owners of the objects stolen; it requires more effort to prevent detection and conceal the goods; the crime must be committed in a very short time span; and only one group of employees (TSA) have access to the passengers' luggage. All these situational factors reduce the opportunities for theft at the security checkpoint.

Interestingly, theft from checked luggage and theft at checkpoint are strongly correlated at large airports, but that correlation is not even significant for small or medium airports. As shown above, although theft rates at checkpoint are higher at smaller airports, they are very low for all types of airports. Theft rates from checked luggage vary much more. This result could be due to the fact that security checkpoints are more homogeneous across airport types (there is just one general procedure in place, described in Section 2.2.1.) than checked baggage screening and handling systems, which depend greatly on the

number of bags that need to be processed every day (Appendix II displays the several existing systems).

Why is then the correlation between both types of theft at large airports so strong? Although it is not possible to obtain specific information about what system and machines are used to screen and handle luggage (the type of screening procedure used at each airport is considered Sensitive Security Information and is therefore not public), it is known that higher traffic volumes need highly integrated and automated baggage handling systems. Traffic volumes of several million passengers per year (an airport is considered large if it has 7+ million passengers) probably require the use of such systems. Medium and small airports, on the contrary, range from 350,000 to 7 million passengers a year (and three of the airports included in the "small airport" category are actually non-hub airports, and had less than 350,000 enplanements in 2009). It would be logic to assume that there is much variation in the baggage handling systems utilized, which can provide very different levels of physical access to the bags, and therefore different amount of opportunities for theft. The conclusion of all this would be that at large airports the differences in theft risk cannot be attributed to the variation in the screening procedures (of passengers or bags), and are due to other explanatory factors, which would affect both theft at checkpoint and theft from checked baggage. The underlying assumption is that, for medium and small airports, differences in baggage handling systems could very well be an important predictor of employee theft from checked baggage as they offer different level of physical access to the bags, which in turn influences the opportunities for theft.

With regards to the items stolen, the objects most frequently stolen at checkpoint are similar to the objects stolen at residential burglaries. This finding could be explained by two phenomena:

(1) First, as established in the literature, many burglaries are impulsive and opportunistic and, in those cases, burglars target small, valuable items that are easy to carry on foot, to conceal, and to dispose of, such as cash and jewelry (Poyner and Webb 1991). The fact that the newest and most expensive electronics are becoming smaller and lighter (iPads, smartphones, laptops, etc.) is also influencing this trend (Fitzgerald and Poyton 2011).

(2) Second, passengers are encouraged by the airlines to pack their valuable items in their carry-on luggage (i.e. United Airlines "recommends that you carry valuable items such as electronic equipment, cameras, film, cash, jewelry, medication, prescriptions and keys with you on board the aircraft[30]"). For that reason carry-on luggage does not only include what a person would usually carry with them on the street (which are the objects what would be available to a street robber or a pickpocket), but also more expensive items, so the passenger can keep them under surveillance. Actually, in everyday life people tend to consider that leaving expensive items at home reduces the risk of them being stolen, while when travelling by air, the concept is the opposite: from all the belongings that are being transported, passengers should keep those that they value most with them all the time. This rationale would explain the similarities in the most stolen items at airports' security checkpoints and at residential burglaries.

[30] https://www.united.com/CMS/en-US/travel/Pages/BaggageChecked.aspx (accessed September 26, 2012)

In this chapter the characteristics of employee theft from passengers' luggage at U.S. airports were explored and the riskiest airports were identified by using theft rates (and not theft volumes, as they proved to be misleading). Results show that smaller airports have higher theft rates, that theft from checked baggage and theft at checkpoint are more similar than anticipated, and that baggage handling systems may play an important role in creating opportunities for theft from checked baggage. Next chapter will address the question "What makes airports risky?" by trying to determine what other factors influence theft rates. Differences between predictors of both types of theft will also be explored.

7. WHAT MAKES AIRPORTS RISKY?

The second research question addressed in this dissertation derives from the concept of *choice-structuring properties*, and is the following:

RQ 2 – "What are the features of airports with higher rates of employee theft from passengers' luggage?"

The concept of *choice-structuring properties* is used to determine the opportunity structure of a certain crime in order to be able to understand the potential for displacement to other crimes that share similar characteristics, as well as the factors that explain the variation of the volume of crime among certain targets, facilities, modi operandi, etc. As explained above, Pires (2011) named the first *static* factors, and the second, *variance* factors. Chapter 4 outlined the static factors of employee theft from passengers at airports, and how some of these factors are different for the two subtypes of theft analyzed in this research: theft at checkpoint and theft from checked-in luggage. This chapter focuses in the variance factors, that is, in the features of airports with higher rates of theft. The 97 airports that experienced 10 thefts or more in 2009 identified in the previous chapter will be analyzed.

The risky facilities literature (Eck, Clarke & Guerette, 2007; Clarke & Eck, 2007; Chula Vista PD 2004; Clarke & Goldstein 2002) identifies some factors that can increase the risk of crime in a facility: an abundance of targets, containing hot products/targets, location in a high crime area, poor design and layout, poor management, etc. These generic factors are based on routine activity theory and rational choice theory. When applying these theories to employee theft from passengers at airports, the features that

may have an impact in the level of risk and that vary from airport to airport can be explored.

However, the literature also points out a series of variables that can be potentially misleading when analyzing risky facilities, in the sense that they do not distinguish the particular characteristics of the facilities that make them more crime prone. The list below identifies such variables and the ways in which this research accounts for their effects:

- Variation in size: rates are calculated using number of passengers and number of checked-in bags at each airport, and multivariate analysis will be conducted using such rates as dependent variables.
- Reporting practices: as explained in section *5.2.* (*Dependent variables: number of thefts and theft rates from checked baggage and at checkpoint in 2009*), the reporting of incidents for all U.S. airports included in this study is centralized by the same agency.
- Random variation: rates for 2008 and 2009 were compared to account for this potential problem. As seen in Chapter 6, the results of correlation analysis between those rates show a strong correlation for checked-in luggage ($r = .77$, $p < .000$), and medium-to-strong for theft at checkpoint ($r = .54$, $p < .000$), which indicates that airports maintained similar rates throughout the two years.
- The existence of small numbers of facilities in the study area: in 2009 there were 494 commercial airports in the U.S., and all of them are included in the analysis of patterns of concentration (which contrasts with previous analysis of risky facilities that tend to include only a sample of the existing facilities of a certain

type, or all facilities in a limited geographical area). Analyses on the features that make airports risky are performed with the 97 that experienced 10 or more thefts in 2009.

- The lack of information on facilities with no events: the exact number of existing airports is known, and therefore the percentage of airports that had no crime during the period of time analyzed can be calculated.
- Infrequent events: the study uses one whole year of data, during which there were 1,244 reported thefts at checkpoint and 6,083 from checked-in luggage.
- Changes in the facilities over time: it is not likely to be a problem when only analyzing one year.
- Inaccurately defined recording due to incomplete address matching or mixed used locales: this is not an issue with airports.

7.1. Hypotheses RQ2

With regards to the variables that do explain variation, one can expect the quality of the targets available at each airport to have an influence in the number of reported thefts. Airports with more attractive targets will experience more theft. However, since the targets of theft are the objects that are stolen and there is no data available on exactly what objects are packed in passengers' luggage at each airport, **target attractiveness** can be measured by examining passenger characteristics. International travelers (who may be foreign or national citizens flying abroad) are more likely to carry money and other valuables both in their checked-in and in their carry-on luggage. Therefore, the higher the percentage of international passengers at an airport, one can expect more theft of both

types. Another high risk group are tourists: as shown in previous research (Harper Jr. 1998, Glensor & Peak 2004), tourists are often targets of theft, because they typically carry large sums of money and other valuables, they are more likely to be relaxed and off guard while on vacation, and because they are often less likely to report crimes or to testify against suspects. The third group of attractive victims are businessmen, who are likely to carry cash, credit cards, laptops, cell phones, PDAs, etc. in their carry-on luggage, but tend to travel without checking bags. For this reason, one could expect airports located in business areas to experience more theft at checkpoint but less theft from checked luggage than other airports.

Following routine activity theory, a **longer time at risk** of passengers' luggage should also be associated with a higher amount of theft, since the likely offenders and the suitable targets will coincide in time and space for a longer period of time, without the presence of a guardian (Cohen & Felson 1979). Following that idea, one can assume that airports with a higher percentage of delayed departures will experience more theft, because the window of opportunity to commit the crime is wider. In this case would only be talking about checked-in luggage, since delays do not affect the time at risk of carry-on luggage.

Poor management is likely to increase the risk of employee theft as well, especially if that inadequate management translates into a lack of control or surveillance. There are no direct measures of airport management available for this analysis, but some proxy measures can be useful. Customer satisfaction surveys can be used to measure the general perception that passengers have of the airport's service, which is an indicator of effective management. Airports that score higher in the customer surveys should experience less

theft. Airlines are also ranked in their effectiveness of handling baggage: mishandled baggage rates per airline are published annually by the Department of Transportation. If at a given airport there are a large number of flights operated by airlines with a high rate of mishandled baggage, the problems of mishandled baggage at that airport will also increase, which can be considered an indicator of poor management. For this reason one can expect that airports with a higher share of service operated by "risky" airlines will experience more theft from checked-in luggage than other airports.

As stated in the risky facilities literature, the general theft rate in the area **where the facility is located** can also have an impact on its theft risk. According to this idea, airports located in areas with higher theft rates would have a higher risk of experiencing theft. However, that might not hold necessarily true in this case. Airports are somewhat insulated from the neighboring environment due to their location (usually on the outskirts of a city), restricted access and increased security, especially after 9/11. Studies on crime in the New York City Subway (Clarke, Belanger and Eastman 1996) and on the Washington Metro (LaVigne 1996) reported that crime rates at the stations were not positively correlated with the crime rates in the surrounding areas, showing that the unique environmental structure of the subway system acted as an insulator from the above-ground crime rates. The same rationale can be applied to airports.

Finally, it stands to reason that, considering the differences in the *static* choice-structuring properties of the two types of theft analyzed, the *variance* factors associated with increased levels of luggage theft should be also **different for theft from checked-in bags and theft at checkpoint**.

The following hypotheses will be examined:

H6 – Airports with more attractive targets will experience more theft

H7 – Airports in which checked-in bags spend longer periods of time at risk will experience more theft

H8 – Airports with poorer management will experience more theft

H9 –Theft rate in the city where the airport is located will not be positively correlated with theft rate from checked-in luggage and at checkpoint at the airport

H10 – Airports' features associated with higher rates of luggage theft will be different for theft from checked-in bags and theft at checkpoint

7.2. Variables and data sources RQ2

The dependent variables for this second research question are the theft rates at checkpoint and from checked-in luggage at each airport in 2009, calculated as explained in section *5.2.* (*Dependent variables: number of thefts and theft rates from checked baggage and at checkpoint in 2009*) above. The 97 airports with at least 10 thefts in 2009 will be analyzed.

Table 21 summarizes the independent variables and the data sources that will be used to test hypotheses 6-10. Detailed explanation of each variable and table with their descriptive statistics can be found below (tables 22 and 23).

Table 21. Independent variables used to test hypotheses 6 through 10

	Independent Variables	Source of data	Level of measurement
Target attractiveness	% of international passengers	World Airport Traffic Report 2009 (ACI)	Continuous
	Tourist destination	America's Top Tourist Attractions (Forbes)	Rank: 0-1-2
	Business destination	Top 26 business destinations (Forbes)	Y/N
Time at risk	% of delayed departures	Air Travel Consumer Report (USDOT)	Continuous
Management	Customer satisfaction survey	2010 North America Airport Satisfaction Study (J.D. Power and Assoc.)	Continuous
	% of service operated by "risky" airlines	Airline Quality Rating 2010 + BTS	Continuous
Location	Theft rate in the area	Crime in the United States (FBI)	Continuous

Percentage of international passengers

The percentage of international passengers per airport is calculated dividing the number of international passengers in 2009 by the total number of passengers during that same year. The data is obtained from the *World Airport Traffic Report 2009*, published by Airports Council International (ACI), which has been described in the previous chapter. This is a continuous variable.

Tourist destination

The determination of whether an airport is located in or near a tourist destination has been made using the *America's Top Tourist Attractions* report, published by Forbes

(Murray 2010), which lists the 25 destinations that received more visitors during 2009. Although there are many lists and ranks of tourist destinations in the U.S., Forbes' report has several advantages. First, it is not only focused on cities, but it also takes into account national parks, commercial areas, and other types of tourist destinations. When explaining the methodology used, the authors say that "In defining a tourist attraction, we considered sites of historical or cultural interest; natural phenomena and landmarks; and officially designated entertainment and recreation centers." Second, locations are ranked using an objective measure: the number of people that visited each destination. And third, the report uses data from 2009, which coincides with the time period of this study.

This variable has been operationalized as follows: each airport receives a score of 0 (not touristic), 1 (touristic), or 2 (very touristic). The airports that service the top 10 destinations according to the report receive a score of 2, the airports located at the other 15 destinations mentioned in the report receive a score of 1, and the rest of airports receive a 0. If several airports can be used to access one of those destinations, all those airports receive the same score. For instance, in the case of New York City, which is among the 10 most visited destinations, Newark International, La Guardia, and JFK airports would receive a score of 2. Information about what airports can be used to access each location is obtained from the websites of each tourist destination (usually under the "how to get there" section). If one airport can be used to access one of the top 10 destinations (for example, Boston Logan International is used to access the city of Boston), but also one of the other 15 (again, Boston Logan Int'l is used to access Cape Cod National Seashore), it receives the higher score of the two.

Business destination

The determination of whether a location is a business destination has been made using an article (Goudreau 2010) published by Forbes Business Travel entitled "Business Travel: 24 Hours in 26 Cities" that lists America's 26 top business destinations. This article cites as one of its sources an August 2009 National Business Travel Association study (available only to members, and membership is only granted to travel industry suppliers or corporate travel professionals).

This is a dichotomous variable: the airports located in those 26 business destinations receive a score of 1, and the remainders receive a score of 0. Like in the case of the variable "tourist destinations", if several airports can be used to access one of the business destinations, they would all receive a score of 1. The determination of what airports service a business city is made by the city's website when available ("how to get there" section) and also by distance to the city: all airports within a 1-hour drive are considered to provide access to the city (measured using GoogleMaps). No discrepancies were found between these two criteria when assigning scores to the business destinations.

Percentage of delayed departures

The percentage of delayed departures at each airport is obtained from the *Air Travel Consumer Report*, published by the U.S. Department of Transportation on February 2010 (USDOT 2010), which contains data on the percentage of flights that arrived and departed on time at each U.S. airport during the year 2009. The percentage of delayed departures is calculated by subtracting the percentage of on-time flights from the total. This is a continuous variable.

Customer satisfaction survey

The data on customer satisfaction is obtained from the *North America Airport Satisfaction Study*, published by J.D. Power and Associates (2010). The sample of the survey includes more than 12,100 passengers who took a round-trip flight between January and December of 2009, and who evaluated both their departing and arrival airports. A measure of overall passenger satisfaction with the airport is constructed using data on six different factors: airport accessibility, baggage claim, check-in/baggage check process, terminal facilities, security check, and food and retail services. Each airport receives a score in a 1,000-point scale and, therefore, this is a continuous variable.

Precise data on the score for each of the six factors is not available for those who do not belong to the air travel industry. In the summary that was made public, generic indications were provided regarding how each airport's score relates to the rest of the group: "among the best", "better than most", "about average" and "the rest". These indications are too generic and do not provide enough information to run additional analyses using each of the factors separately.

Percentage of service operated by "risky" airlines

The *Airline Quality Rating 2010* study (Bowen & Headley 2010) uses the information included in the *Air Travel Consumer Reports* published by the Department of Transportation (described above) to develop quality ratings for U.S. airlines, and includes an annual mishandled baggage rate per 1,000 passengers for each of the airlines analyzed (which include all U.S. airlines with at least one percent of total domestic scheduled-service passenger revenues, and other carriers that report this data voluntarily).

Mishandled baggage claims include any passenger claims for lost, delayed, damaged or pilfered luggage. Claims for pilfered luggage represent less than 5% of the total number of mishandled baggage claims, as it will be explained in section *8.2. Limitations of this study*.

The mean and standard deviation of the mishandled baggage rates of U.S. airlines in 2009 have been calculated, and the airlines with a rate above two standard deviations from the mean are considered "risky". The airlines identified as "risky" in 2009 are American Eagle and Atlantic Southeast.

The information needed to determine the percentage of service operated by "risky" airlines at each airport is obtained from the Bureau of Transportation Statistics website[31]. This website provides the exact share (number of passengers and percentage) of the top 6 airlines servicing any U.S. airport during 2009. Percentages of service of all "risky" airlines were added up for every airport and constitute the independent (continuous) variable used for this study.

EXAMPLE: Carrier shares for January-December 2009 at JFK airport (NY) and at SGF airport (Springfield-Branson National Airport, MO)

JFK		**SGF**	
JetBlue	41.73%	**American Eagle**	**33.22%**
Delta Airlines	19.81%	Allegiant	23.13%
American Airlines	14.11%	SkyWest	12.10%
Comair	7.93%	**Atlantic Southeast**	**11.83%**
United	3.65%	Pinnacle	11.07%
Other	12.77%	Other	8.64%
Percentage of service operated by "risky" airlines	**0%**	**Percentage of service operated by "risky" airlines**	**45.05%**

[31] http://www.transtats.bts.gov/airports.asp?pn=1 (accessed September 26, 2012)

Location in high-crime area

The larceny-theft rate per million citizens in the city where the airport is located is calculated by dividing the number of larcenies by the population of the city and multiplying the result by 1,000,000. These data obtained from the *Crime in the United States* report published annually by the FBI[32]. Although usually theft rates by 100,000 inhabitants are used, for this study the rate has been calculated per million inhabitants so its measurement is consistent with the measurement of the dependent variable of this research (theft rates per million passengers and bags).

Tables 22 and 23 display some descriptive statistics of the independent variables:

Table 22. Descriptive statistics of the continuous independent variables

Continuous independent variables	N	Minimum	Maximum	Mean	Std. Deviation
% of international passengers	97	.0	47.7	4.4	8.9
% of delayed departures	97	8.7	41.4	24.6	5.6
Customer satisfaction survey	58	604.0	777.0	693.5	40.2
% of service operated by "risky" airlines	97	.0	45.1	4.0	8.9
Theft rate in the area	90	122.8	971.2	315.8	128.7

[32] http://www2.fbi.gov/ucr/cius2009/data/table_08.html (accessed September 26, 2012)

Table 23. Frequencies of the IVs "tourist destination" and "business destination"

Tourist destination	Assigned value	Frequency	Percent
Not touristic	0	73	75.3
Touristic	1	9	9.3
Very touristic	2	15	15.5
Total		97	100.0
Business destination	**Assigned value**	**Frequency**	**Percent**
No	0	61	62.9
Yes	1	36	37.1
Total		97	100.0

7.3. Analyses and results RQ2

The analysis of data to address the second research question is divided in three parts. First, diagnostic tests were used to determine the shape of the distributions of the dependent variables, and transforming the data was deemed necessary as each was highly skewed. Then, exploratory analyses were conducted by running bivariate correlations between the transformed theft rates and each of the independent variables to see how they relate to each other. Finally, an OLS regression model was used to determine, when controlling for all other variables, what factors are associated with higher theft rates.

The results obtained in the previous chapter point out that there are differences between large, medium and small airports. For this reason it would make sense to run bivariate and multivariate analyses not only at an aggregate level, but also disaggregated by airport size. However, two problems hinder that possibility: the small number of airports of each size (28 large airports, 35 medium airports, and 34 small airports), and the lack of variation within each size group for some independent variables. For example, 26 of the 28 large airports are considered business destinations but, out of the 34 small airports,

only 1 is a business destination. With regards to being a tourist destination, there is more variation within large airports (11 are non touristic, 6 are touristic and 11 are very touristic). However, 29 of 35 medium airports and 33 of 34 small airports are in the category "non touristic"[33]. As a consequence, all analyses presented in this chapter have been performed with the entire group of airports that experienced 10 or more thefts in 2009 (N = 97).

7.3.1. Determining normality of data of the dependent variables

Diagnostic tests were run on theft rates from checked baggage and at checkpoint (2009 and also 2008, to control for random variation, as explained in the previous chapter) to determine whether these dependent variables were normally distributed. Kolmogorov-Smirnov tests were significant ($p < .000$) for all four variables, and skewness values showed significantly positively skewed distributions, which indicate a non normal distribution. Therefore, the data were transformed calculating the natural logarithm of the variables + 1, since some airports had zero thefts of one of the two types (i.e. RIC-Richmond International had 10 thefts from checked baggage and 0 thefts at checkpoint in 2009)[34]. The analyses reported below represent the full sample of airports (N = 97).

[33] Descriptive information about the independent variables disaggregated by airport size can be found in tables 31 and 32 (Appendix VI).

[34] After transforming the data, K-S tests were performed again, and results showed that only LN theft rate from checked baggage 2009 remained skewed (D (97) = 0.10, $p < .02$). Only one outlier was identified; this was HDN-Yampa Valley Regional. HDN had the highest theft rate from checked baggage, 128 thefts per million bags. Removal of HDN resulted in a normally distributed LN theft rate from checked baggage. All statistical analyses presented in this chapter were performed with the LN theft rates among 97 airports, and then using the dataset without HDN-Yampa Valley Regional (N = 96). Results obtained in the statistical analyses were substantively identical. Therefore, results for the full sample are reported.

Table 24. Descriptive statistics of the LN theft rates in 2009

	N	Minimum	Maximum	Mean	Std. Deviation
LN Theft rate checked baggage 09	97	1.7	4.9	2.7	.58
LN Theft rate checkpoint 09	97	.0	2.6	1.0	.48

7.3.2. Bivariate analyses

Table 25 shows the results of a Pearson correlation analysis performed between the LN theft rates from checked baggage and at checkpoint in 2009 and the independent variables.

Theft from checked baggage is negatively correlated with business destinations, suggesting that airports located in business destinations would have less theft of this type than the other airports. On the other hand, airports with higher percentage of service operated by risky airlines would experience more theft from checked baggage than the rest. Both results are consistent with the outcomes hypothesized above.

Theft at checkpoint is negatively correlated with customer satisfaction, that is, the higher the satisfaction of the passengers travelling through an airport, the lower the theft at checkpoint. Surprisingly, theft at checkpoint is also negatively correlated with the larceny-theft rate in the city, suggesting that airports located in cities with higher theft rates experience less theft at checkpoint.

Interpretation of these findings can be found in the section *7.4. Summary and discussion of findings RQ2*.

Table 25. Pearson correlations between LN theft rates 2009 and independent variables

		LN Theft Rate Checked B.	LN Theft Rate Checkpoint	% Intl. passengers	Tourist destination	Business destination	% delayed flights	Customer satisfaction	% service by risky airlines	Larceny-theft rate in the city
LN Theft Rate Checked Bagg.	*r*	1								
	N	97								
LN Theft Rate Checkpoint	*r*	.33**	1							
	N	97	97							
% Intl. passengers	*r*	-.16	.00	1						
	N	97	97	97						
Tourist destination	*r*	-.13	.12	.39**	1					
	N	97	97	97	97					
Business destination	*r*	**-.35****	.01	.44**	.53**	1				
	N	97	97	97	97	97				
% delayed flights	*r*	.08	.04	.20	.18	.25*	1			
	N	97	97	97	97	97	97			
Customer satisfaction	*r*	-.08	**-.28***	-.63**	-.49**	-.41**	-.25	1		
	N	58	58	58	58	58	58	58		
% service by risky airlines	*r*	**.36****	-.14	-.16	-.21*	-.28**	.11	-.07	1	
	N	97	97	97	97	97	97	58	97	
Larceny-theft rate in the city	*r*	.07	**-.22***	-.20	-.31**	-.24*	-.17	.34**	.29**	1
	N	90	90	90	90	90	90	57	90	90

*** p < .01 * p < .05*

In the next section multivariate analysis will be used to examine these relationships, when holding all other variables constant. Since several of the independent variables are significantly correlated with one another, multicollinearity analyses will also be performed.

7.3.3. Multivariate analyses

Table 26 displays the results of an OLS regression analysis of the independent variables mentioned above on the theft rates from checked baggage and at checkpoint 2009. VIF and tolerance statistics showed no multicollinearity between predictors.

Table 26. OLS regression of independent variables on LN theft rates 2009

Construct measured	Independent Variables	LN Theft Rate Checked Baggage	LN Theft Rate Checkpoint
Target attractiveness	% of international passengers	-.003	.004
	Tourist destination	.077	.102
	Business destination	-.389*	.034
Time at risk	% of delayed departures	.013	--
Management	% service operated by risky airlines	.019**	--
	Customer satisfaction	--	.000
Location	Theft rate in the city	.000	.000
R^2		***.23****	***.15***

N = 89. Unstandardized coefficients reported.
**p < .05; ** p < .01*

The variables included in the first model account for 23% of the variability of the theft rate from checked baggage among airports. The factor "customer satisfaction" was left

out of this model due to its small N (N = 58) and also due to the fact that no customer satisfaction measure was available for small airports (from the 58 airports for which information is available, 28 are large airports and 30 are medium airports). The predictors "business destination" and "percentage of service operated by risky airlines" yielded significant results. Since the dependent variable is the natural log of the theft rates, in order to interpret the regression coefficients it is necessary to exponentiate them using the following formula: $(e^b - 1)*100$. Airports located in business destinations experience, when compared to the airports located in non-business destinations, 32.2% fewer thefts from checked baggage, holding the rest of predictors constant. The other significant predictor is the share of service operated by risky airlines: a one percent increase in the volume of service operated by those airlines at the departure airport is associated with a 1.9% increase in theft rate from checked baggage, controlling for the other variables in the model.

Despite the findings displayed in the bivariate analysis, when examined in the second OLS model none of the variables included explain the variability in theft at checkpoint among airports. After consideration of the limitations of the data available for the variable "customer satisfaction", this factor was included in the second model to examine if the significant correlation found at a bivariate level still held when controlling for the other independent variables. The regression model was run with and without this variable, and the results were the same: neither the model as a whole nor any of the individual variables included were significant. The variables "percentage of delayed departures" and "percentage of service operated by risky airlines" were not included in the model because they do not affect theft at checkpoint.

These results are interpreted in the next section (*7.4. Summary and discussion of findings RQ2*).

7.4. Summary and discussion of findings RQ2

The aim of this chapter is to examine the reasons why some airports are riskier than others.

The potential influence of the different types of baggage handling systems in the risk of theft from checked luggage was mentioned in the previous chapter. When looking at other factors that might be associated with theft risk from checked luggage, both the bivariate and the multivariate analyses shown above yield the exact same results. Business destinations experience less theft than non business destinations. This is consistent with the idea that business travelers tend to rely heavily on carry-on luggage, which reduces the amount of valuables that are transported in checked-in suitcases. Apart from traveling light, business travelers are frequent (and savvy) passengers, who are probably familiar with the risks of checking in expensive or valuable objects, as they can be damaged, lost or stolen. Following that logic, one would expect that less valuables are transported in their checked in luggage than in the suitcases of passengers who do not travel very often, and who may feel compelled to include most of their valuables in their checked baggage in order to travel more comfortably or to avoid the hassles of carry-on screening at the security checkpoint. Checking less bags and not packing expensive objects in their checked suitcases generates a reduction in the number of attractive targets available and, therefore, a decrease in the opportunities to commit theft. In order to

confirm this interpretation, it would be necessary to survey and compare frequent and occasional travelers about their packing practices.

The analyses also show that the higher the share of service operated by risky airlines, the higher the theft rate from checked baggage at that airport. The determination of what airlines are risky is based on their high rates of mishandled baggage. Therefore, it could be inferred that the same conditions that influence the rate of mishandled luggage (layout of the baggage handling areas, lack of adequate equipment, insufficient or inadequate organization and supervision, staff's incompetence or carelessness, etc.) would also have a direct effect on the opportunities to commit theft from checked baggage. Additional information on the specific differences between luggage handling practices of the risky and non risky airlines would be necessary in order to unpack the good and bad practices that prevent or foster theft.

General theft rate in the city where the airport is located is not associated with employee theft rates from checked baggage at airports, confirming the hypothesis that security and management at certain types of facilities have an insulating effect from the crime rate surrounding those facilities.

When analyzing theft at checkpoint, the analyses performed fail to explain what features of airports are associated with it. There are two possible explanations. First, there may not be enough variation in the theft rates of airports to conduct these analyses. As seen in table 14, the average theft rate for large and medium airports is around 2 thefts per million passengers, and close to 3 thefts per million passengers in the case of small airports. Theft rates at checkpoint are in general extremely low and may not be enough to

detect any effect. Another possibility is that there are other variables that could explain differences in theft risk at checkpoint that were not included in this research.

As with all exploratory research, the findings in this chapter should be interpreted with caution. First, as mentioned above, the analyses presented in the previous chapter have shown that there are differences between airports of different size, and therefore it would seem necessary to analyze each size group separately. However, within the same size category, airports are very homogeneous in the independent variables analyzed in this research. This homogeneity in the characteristics of airports makes it very difficult to perform additional analyses by airport size (which would also be limited due to the small N of each group) that could explain why some small, medium or large airports have higher theft rates than others in the same size category.

Second, it should be acknowledged that there are other characteristics of airports and their practices potentially relevant for the study of employee theft from passengers that could not be included in the model due to the lack of available data disaggregated by airport. A few examples of those features/practices are presented in the next chapter.

Everything considered, on their face the results reported in this chapter and the previous one suggest that availability of attractive targets and differences in baggage handling practices (not only at the airport, but also by the airlines) influence the opportunities that employees have to commit theft from passengers' luggage. The gathering of detailed information and the performance of additional research are needed to further explore these findings, as it will be explained in the next chapter.

8. CONCLUSIONS

Sections 6.4. and 7.4. have summarized and discussed the findings related to the two research questions addressed: Do airports fit the risky facility framework? What features of airports make them risky? This last chapter discusses what the implications of this research for theory and for practice are, what limitations should be taken into account, and what further research would be necessary to further understand how employee theft from passengers' luggage works at U.S. airports.

8.1. Implications of this research

8.1.1. Implications of this research for theory

From a theoretical point of view, this research helps advance the "risky facilities" framework (Eck, Clarke and Guerette 2007). This concept has only been used in a handful of projects, never before to study crime at airports. This is also the first study in which all existing facilities of one type are included in the analysis, and the first time that this analysis is conducted at a national level. More importantly, the data used in this study make it possible to control for all potentially misleading variables identified in the literature so far (as explained in Chapter 7), facilitating a more fine tuned analysis of crime at risky facilities. Some of the most important conclusions reached in this study, which should be taken into account in future uses of the risky facilities framework, are the following:

(1) First, for those facilities in which differences in "size" generate very large differences in the number of targets available, the analyses to determine whether or not there is a pattern of concentration of crime and which are the riskiest

facilities should be performed using crime rates and not crime volumes. “Size” is one of the potentially misleading variables that had already been identified by the literature. However, its great importance had not been emphasized enough. The assessment of whether or not “size” is an issue in any particular study should be done before determining what the riskiest facilities are. In those cases in which this variable is not problematic, risky facilities can be identified using the 80-20 rule on the volume of theft, as it has been done in the majority of previous studies. However, when the number of targets varies drastically among facilities, the only viable option is to calculate theft rates. The pattern of concentration can be then explored by using bar graphs and looking for the J-curve shape in the figures.

(2) Second, this research proves that there are exceptions to “The Iron Law of Troublesome Places” as formulated by Wilcox and Eck (2011). Extremely strict regulations, applied in a standardized manner across facilities can iron out the differences among them, eliminating the pattern of concentration. These regulations don’t need to be targeted specifically to the crime at hand. They can be implemented for some other reason and be addressed to another type of behavior, but may flatten out crime risk among facilities as a result of “diffusion of benefits”. This phenomenon has repeatedly been found in the literature (Clarke and Weisburd 1994), and consists in a reduction of crime beyond the intended scope of the prevention measures implemented. In this case, a different crime type (employee theft from passengers) benefits from the crime prevention measures that are put in place to prevent another type of crime (terrorism).

With regards to the concept of "choice-structuring properties" used to compare theft at checkpoint and theft from checked baggage, the results of this research showed that both types of theft share some of their properties: they peak during the same time of the year, the objects stolen are small and valuable, and the same airports experience the highest rates of both types of theft. Despite these similarities, theft rates at checkpoint are much lower than theft rates from checked baggage, which can be attributed to the different static properties related to each type of theft outlined in section 4.3. (area of the airport where the theft is committed, amount of time available, guardianship, risk of apprehension, employees with access, etc.). Even within a very specific crime such as employee theft from passengers' luggage at airports, disaggregation and separate analysis of subtypes of theft helps understand the different properties that make some crimes attractive to certain offenders, but not to others. One can learn from those differences, and use them to design crime prevention measures, as it will be explained in the next section.

Finally, with regards to the literature on employee theft, this dissertation addresses some of its gaps. Employee theft is usually very difficult to study empirically, because there is no dataset where those cases are classified separately: they are either dealt with internally at the company, or they are reported as plain theft. The research that does exist focuses primarily on employee theft from the company or the employer; only a couple of studies (Hawkins 1984; Gill 1994) address specifically employee theft from customers or clients in bars and restaurants. The data used in this dissertation provide a unique occasion to conduct empirical research on the topic, and to test whether or not crime opportunities play an important role in this type of crime. This aspect has been neglected in the

literature, as acknowledged by Hollinger and Davis (2006), who stated that "Given its obvious importance, we find it interesting that there has been so little systematic research on the role that opportunity plays in the employee theft equation" (p. 211) The results of this study show that employee theft from passengers' luggage is greatly influenced by the available opportunities to commit crime, which are highly dependent on situational factors such as easiness of access to and availability of attractive targets, time constraints, level of risk, and amount of effort needed to commit the crime.

8.1.2. Implications of this research for practice

From a practical point of view, the first relevant result from this research is the fact that passenger and carry-on luggage screening procedures at security checkpoint at airports, although designed to prevent other types of crime, have shown to be very effective to prevent theft at this particular setting. Theft rates at checkpoint are extremely low and very consistent throughout airports, which means that strict security and the particular characteristics of checkpoint screening have been able to iron out variation among airports and to reduce employee theft opportunities to a minimum. Time constraints, risk of apprehension, difficulty of concealing stolen goods, and access limited to just one type of employees (TSA) were considered the main reasons why theft rates at checkpoint are much lower than theft rates from checked-in luggage. These findings could point to strategies of prevention for theft from checked-in luggage, by reducing or eliminating the properties that makes it more attractive than theft at checkpoint. For example, whenever possible, TSA screening of checked bags should be performed in public, which would increase the risk and the effort involved in engaging in theft from passengers' luggage. Although difficult to implement in larger airports, this measure should be relatively easy

to implement in the smaller airports that use the stand alone machines described in Appendix II. An example of this measure can be found at JFK's Terminal 1 (see photos below[35]), in which TSA's baggage screening is performed in a restricted, cordoned off area located in the middle of the lower level of the building (open to the public). Screening procedures can be easily observed and monitored by the passengers passing by and by those waiting for their flights in the upper level.

[35] http://boardingarea.com/blogs/flyingwithfish/2012/01/06/tsa-checked-baggage-theft-prevention-reality/ (accessed September 26, 2012)

Employee theft rates from checked-in baggage are also quite low when compared to general theft rates, but differences in the baggage screening and handling procedures among airports allow for variation in their theft rates. This research has determined that, contrary to what is usually depicted in the media, small airports are actually riskier than larger airports, although the number of thefts they experience is smaller. Laxer security measures, higher chance of collusion among employees, and more opportunities to physically access the bags have been identified as potential risk factors. These same factors provide opportunities for the commission of other crimes, such as drug smuggling and terrorism, as less security and higher opportunities to access checked-in bags not only increase the risk that something is taken from the bags, but also increases the chances that something is planted in them. Supporting this idea, the literature shows that individuals involved in employee theft are often involved in other deviant behaviors as well (Murphy 1993) and, as it was shown, this also holds true specifically for airport employees who

steal from passengers (Royal Canadian Mounted Police 2008). For example, after breaking up a cocaine-trafficking ring at JFK, the investigators discovered that baggage handlers were engaged in several crimes: "They stowed drugs in secret panels inside planes; stole laptops, lobsters and fine clothing flown as freight; and rifled through passengers' belongings for perfume, liquor and electronics" (Secret 2011). Given the interconnectivity of all airports in the U.S., smaller airports could constitute vulnerable points of entry for these crimes into the aviation industry in this country.

Another practical implication of this study is that it has been able to identify a few airports that are problematic for both theft from checked luggage and theft at checkpoint, which helps direct investigative and crime prevention efforts to where they are most needed. These airports are:

- HDN-Yampa Valley Regional (CO)
- COS-Colorado Springs Municipal (CO)
- MFR-Rogue Valley International (OR)
- PIA-Greater Peoria (IL)

The results of this study also show other possible points of intervention to reduce employee theft from passengers' luggage: improving the baggage handling procedures of the riskiest airlines, as well as the packing practices of occasional passengers. As will be explained at the end of this chapter, further research is needed to further understand and develop the explanation of why these factors increase theft risk.

Preventing theft would also save the taxpayers' money, as the TSA would reduce the amount of money spent in reimbursements made to victimized passengers. According to the analyses presented in section *6.3.1 Describing theft from passengers' luggage*, a total

of $200,000 was paid by the TSA to passengers who had submitted claims for missing objects from luggage in 2009.

Employee theft from passengers' luggage does not only happen in the United States. Some airports like O.R. Tambo International Airport (Johannesburg, South Africa) are constantly reported in the media due to their very high levels of theft from suitcases by employees. Although not at that extremely high proportion, similar cases have been reported in countries like the UK, Ireland, Spain, France, Russia, Canada, Australia, United Arab Emirates, India, etc. Considering that this is the first study targeting this type of crime, this research could constitute a starting point to study theft from passengers' luggage in other places.

8.2. Limitations of this study

Limitations of this study should be noted, and considered in future research. Internal validity concerns are related to the measurement of certain variables. However, the most important limitation of this research has been the limited publicly available data on airports. External validity issues affect the generalizability of the results of this research.

Limitations related to the measurement of some variables

The measurement of the **dependent variables** and its limitations has been discussed earlier in this document (section *5.2.1. Limitations of the TSA Claims Database*).

The measurement of some of the independent variables deserves some comments too. The first independent variable that could be improved is the measure used for

determining which airports are **business destinations** in the U.S. The publication by the magazine Forbes (Goudreau 2010) used as a source for this variable does not detail exactly how the list of the business destinations was created, which affects the reliability of this measure. However, the article does reference some studies from the industry, to which this researcher cannot have access. An extensive search for an alternative data source for this variable has been conducted, but until now that publication seems to be the most thorough review available.

The construct time at risk is measured by the **percentage of delayed flights** at each airport in 2009. This percentage is obtained by subtracting the percentage of on-time flights from the total. A flight is considered to be on time if it departs less than 15 minutes after the scheduled departing time, which means that delayed flights are all flights departing 15 minutes or more after the scheduled time, without differentiating between lengths of delay (i.e. 16 minutes vs. several hours). A very short delay does not necessarily increase the time at risk for checked baggage, since very often all luggage is loaded into the plane on time and short delays are due to long queues for takeoff. Being able to identify airports with long delays would provide a better measure for the construct "time at risk".

The problem with the measure used for the variable **customer satisfaction** is that it was only available for large and medium airports, but no small airports were included in the study conducted by J.D. Power (2010) that constitutes the source of data for this variable. No other available source of information was found that could provide additional information on the quality of management at airports. There are other airport surveys and

rankings, but their final reports are not made public and they also tend to focus on large and medium airports.

Finally, limitations also affect the **mishandled baggage rate** used as a measure of management. As mentioned in the *Air Travel Consumer Reports* of the Bureau of Transportation Statistics, "The rate is based on the total number of reports each carrier received from passengers concerning lost, damaged, delayed or pilfered baggage." Although the airlines collect data on claims for those four different reasons separately (for example, United Airlines provides different online claim forms for damaged, delayed, lost baggage, or missing items from checked baggage[36]), the Department of Transportation does not distinguish between these typologies when reporting the rates of mishandled baggage. However, it is estimated that 85.6% of all claims for mishandled baggage are due to delayed luggage, 11.9% to damaged or pilfered luggage, and 2.5% to stolen or lost (never recovered) bags (SITA 2012). Damaged luggage includes any claim for broken locks, wheels, handles, zippers; cuts, tears or dirt on the suitcase; damage to the contents of the bags due to water or to the pressure exerted by the weight of other baggage on the suitcase, etc. It seems reasonable to estimate that more than half of that 11.9% of claims for damaged or pilfered luggage are probably related to the first category, which would mean that 5% or less of all mishandled baggage claims are due to pilferage. A better measure for this variable could be calculated by obtaining data directly from the airlines, disaggregated by claim type, which would make possible to leave out the claims for pilferage from the general category of mishandled baggage claims.

[36] https://www.united.com/web/en-US/content/travel/baggage/default.aspx (accessed September 26, 2012)

Limitations in the availability of data

The search for data to conduct this research has encountered several obstacles. First, airports are critical infrastructures. As such, most of the data related to their baggage handling and managing practices, as well security measures is considered Sensitive Security Information, and is therefore not made public. Second, some relevant information that is not "classified" is gathered by agencies and companies that only grant access to the data to members of the industry (i.e. the number of direct passengers vs. the number of passengers who have one or more layovers in their itinerary). Third, the fact that one of the theft types studied in this research (theft from checked luggage) is committed "in transit", makes it difficult to establish where exactly a theft was committed or what type of employee (TSA, baggage handler or other) has committed the crime, without access to detailed police or TSA records.

There are many questions that remain unexplained. Section *8.3. Future research* describes how some of those issues could be unpacked and studied in detail. For many of the future research projects mentioned in that section, privileged access to information would be necessary. Some of the potential sources for future studies that will be mentioned below have been explored for this research, with little success. Access to additional data was requested to the TSA Claims Management Branch, the Unclaimed Baggage Center, a couple of airlines, and the Port Authority Police[37]. Managing this type of access will be, without any doubt, the greatest challenge when performing additional

[37] After not receiving any answer from Port Authority Police for the request for data submitted by this researcher, a Freedom Of Information Act request was filed with this agency over a year ago, which resulted in the need to pay a fee of $340 to locate the files and make them available to me. After paying the fee, this researcher started getting updates from the FOI Administrator from Port Authority Police stating that "Additional time is required to process your request". To this date a letter with such an update is received every two weeks, but no access to the data requested has been granted yet.

research on this topic. Some examples of the information that could help further explain what makes some airports riskier than others would be the following:

For theft from checked luggage

- What is the average length of flight delays at each airport?
- What baggage handling and screening system is being used at each airport?
- What security measures are present in the screening areas of the airports? Is the screening performed at restricted areas closed from the public's view, or is it performed in front of the passengers?
- Do TSA officers work individually, in pairs or in groups? How are these groups put together?
- What security measures are present in the luggage handling areas? What employees have access to these areas?
- In every airport there are strict personnel screening procedures to access restricted areas. Are there also similar screening processes in place when the employees exit those areas? What are they? How do they vary between airports?
- What percentage of travelers departing from each airport are direct passengers? How many are transfer passengers and will have one or more layovers before reaching their final destination? (which would place their luggage at a heightened level of risk)
- Etc.

For theft at checkpoint

- What theft prevention measures are present at checkpoint?
- How are the TSA officer teams that work at the same security checkpoint put together?
- What are the "lost and found" procedures at each airport when a passenger forgets something at the security checkpoint? What is the chain of custody of those items? (There have been instances of theft of items left behind by the passengers, like the TSA officer who was in charge of supervising the lost and found center at Newark International Airport and stole laptops from it instead[38])
- Etc.

Limitations regarding the external validity of this study

The results of this research are affected by external validity threats. Although air travel is becoming increasingly more homogeneous throughout the world, the level and procedures of passenger and baggage screening, as well as the handling process of checked baggage varies among countries. However, this research can help shed light on the mechanisms that are at play in employee theft from passengers at U.S. airports, which could serve as a starting point to conduct further analysis in other parts of the world.

[38] http://www.justice.gov/usao/nj/Press/files/pdffiles/2010/Steplight%20Jennifer%20Complaint.pdf (accessed September 26, 2012)

8.3. Future research

This is the first study to address employee theft from passengers' luggage at U.S. airports. It is therefore exploratory in nature, and the results obtained in the analyses presented in this dissertation open up many new questions and avenues for further research.

The airports with highest theft rates have been identified in this study, and some of these airports happened to be among the riskiest for both theft from checked luggage and theft at checkpoint. Although the question of what makes airports risky has been addressed in this dissertation using all data publicly available, a more in-depth study should compare and try to explain what makes those few airports different from others of the same size, but much lower theft rates. Additional data would have to be collected, and it would be necessary to get access to information on some of the variables mentioned in the previous section (i.e. specific security measures, screening procedures, baggage handling systems, design/layout, etc.), so the best and worst practices that influence differences in theft risk can be identified.

One of the results of this study showed that business destinations experience 32% less theft from checked baggage than non business destinations, which is explained by the idea that business travelers check fewer bags, and they probably do not pack valuables in the ones they have to check-in. To obtain confirmation on this interpretation, and to further investigate this issue, it would be interesting to conduct an air passenger survey. Travelers would be asked about:

- How often they travel by air

- How many bags they travel with (checked-in and carry-on)
- What are the usual contents of those bags
- Any specific security measures or precautions they use to prevent theft. Some examples:
    - For checked-in luggage: TSA approved locks; wrapping the suitcases in plastic; using old, non-attractive suitcases, etc.
    - At checkpoint: packing all loose items in their carry-on bags before going through the security checkpoint (instead of placing them directly in the trays), not going through the metal detector or body scanner until their valuables have been pushed through the X-ray machine, asking if their valuables can be brought to them in case they are selected for additional screening, etc.
- Whether they have been victims of theft from checked baggage or at checkpoint
    - For those who have, to whom they reported the theft (airline, police, TSA, insurance company, etc.)

This survey would help shed light on passengers' packing practices, would make possible the comparison between frequent and occasional travelers, and could be used to construct a victimization rate to validate the finding that theft from passengers' luggage is a relatively rare crime. It would also provide a baseline on the average content of suitcases, which could then be used to further develop our knowledge on what gets most stolen, as will be described below.

Another of the findings of this research suggests that airlines with higher rates of mishandled baggage also have higher theft rates. Another risky facilities study could be

conducted, with airlines as units of analysis, in order to find out the airlines that experience more theft and what makes them risky. Although the TSA Claims Database could be used as a starting point, the best way to go would be to request airline data on theft claims and specific baggage handling procedures. However, this research would face many challenges:

- Getting access to data from all airlines (or at least a few of them),
- Code-sharing procedures (i.e. when somebody books a flight with American Airlines but the flight is operated by American Eagle instead),
- Differences in procedures within each airline (i.e. some airlines have their own baggage handlers at their bigger hubs, but use subcontractors at smaller airports),
- Mergers among airlines (which makes difficult to compare different years, or to study certain problematic airlines. For example, Atlantic Southeast, one of the airlines identified as risky in this research, has recently merged with ExpressJet Airlines)
- Differences in baggage fees policies that make passengers check less bags in some airlines than in others (therefore, data on the number of checked bags per airline would also be necessary),
- Etc.

A broad overview of the objects that are most stolen was provided in this dissertation as part of the descriptive data of theft from luggage. A more detailed study could be conducted on what gets most stolen, by identifying what objects are at greater risk of theft when packed and transported by air passengers. A baseline on the average content of suitcases could be calculated using passenger surveys, or by obtaining data from the

Unclaimed Baggage Center (located in Alabama), a second-hand store that purchases the lost suitcases from the airlines that have not been able to reunite them with their owners after 90 days.

The risky facilities literature considers "hot products" one of the variables that can explain why some facilities experience more crime than others. Studying what actually gets stolen is very important to understand decision-making by thieves. Investigating what exactly gets most stolen at each and every airport, comparing those lists between airports, and checking how those objects relate to their theft rates would certainly provide an important layer of explanation of why some airports experience more theft. However, as shown above, smaller airports are the riskier ones and, despite their high theft rates, their total number of thefts is low (10-20 incidents in 2009). For this reason it is not possible to compare lists of what gets stolen, since there is not enough information to draw conclusions from. However, this research could be conducted with medium and large airports, in which the number of reported thefts is large enough to be analyzed. This same study could be used to analyze if the objects stolen can explain why thefts peak in the winter months.

Finally, obtaining detailed information on how exactly these thefts are committed would make it possible to develop crime scripts, which in turn would constitute an invaluable tool to identify and implement crime prevention measures targeted to the specific opportunities that facilitate these crimes. This type of information could be obtained by interviewing offenders, or by interviewing TSA officers and baggage handlers and asking them how they would go about committing these thefts if they wanted to. Although not as good as interviewing offenders or professionals with first-hand knowledge of the

vulnerabilities of the system, another option would be to access court files on all these thefts, since they usually contain a fairly detailed description of the facts that led to indictment. However, in order to do so it is necessary to have the names of the offenders whose records one wants to access, which could be provided by the TSA (only for TSOs) or by the police agencies that investigate and arrest these offenders.

Final remarks

Although a relatively rare crime, it is surprising that no attention has been paid to the problem of employee theft from passengers' luggage at airports before. Air travel is one of the few instances in which individuals are encouraged to refrain from securing their valuables, leaving them accessible and vulnerable to theft. This study represents the first step to understanding this problem. Despite the limited information available, the use of the risky facilities framework has made possible a comparison of airports at the national level, and an identification of the riskiest airports and the features that influence their level of risk of employee theft.

Employees who commit theft are often involved in other deviant behaviors as well. Therefore, airports that provide larger opportunities for theft could constitute vulnerable points of entry into the aviation industry in this country for other types of crimes. Further research should follow to help unpack the findings offered in this dissertation.

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10. APPENDICES

Appendix I. Top 25 U.S. airports and airlines in 2009

Table 27. Top 25 U.S. airports in 2009 in passengers enplaned, and aircraft takeoffs and landings

	Passengers Enplaned[1]		Thousands		Aircraft Takeoffs/Landings[1,2]		Thousands
1	ATL	Hartsfield-Jackson Atlanta Int'l	42,180	1	ATL	Hartsfield-Jackson Atlanta Int'l	970
2	ORD	Chicago O'Hare Int'l	31,135	2	ORD	Chicago O'Hare Int'l	828
3	LAX	Los Angeles Int'l	27,449	3	DFW	Dallas/Fort Worth Int'l	639
4	DFW	Dallas/Fort Worth Int'l	26,616	4	DEN	Denver Int'l	612
5	DEN	Denver Int'l	23,969	5	LAX	Los Angeles Int'l	545
6	JFK	John F. Kennedy Int'l	22,710	6	IAH	George Bush Intercontinental	539
7	LAS	Las Vegas McCarran Int'l	19,294	7	LAS	Las Vegas McCarran Int'l	511
8	IAH	George Bush Intercontinental	19,289	8	CLT	Charlotte Douglas Int'l	509
9	PHX	Phoenix Sky Harbor Int'l	18,569	9	PHL	Philadelphia Int'l	473
10	SFO	San Francisco Int'l	18,462	10	PHX	Phoenix Sky Harbor Int'l	457
11	CLT	Charlotte Douglas Int'l	17,165	11	MSP	Minneapolis-St Paul Int'l	433
12	EWR	Newark Liberty Int'l	16,659	12	DTW	Detroit Metropolitan Wayne County	433
13	MCO	Orlando Int'l	16,379	13	JFK	John F. Kennedy Int'l	422
14	MIA	Miami Int'l	16,188	14	EWR	Newark Liberty Int'l	415
15	MSP	Minneapolis-Saint Paul Int'l	15,542	15	DVT	Phoenix Deer Valley	402
16	SEA	Seattle-Tacoma Int'l	15,257	16	SFO	San Francisco Int'l	380
17	DTW	Detroit Metropolitan Wayne County	15,196	17	SLC	Salt Lake City Int'l	373
18	PHL	Philadelphia Int'l	15,004	18	IAD	Washington Dulles	366

						Int'l	
19	BOS	Boston Logan Int'l	12,582	19	BOS	Boston Logan Int'l	361
20	IAD	Washington Dulles Int'l	11,130	20	LGA	LaGuardia	357
21	LGA	LaGuardia	11,111	21	MIA	Miami Int'l	351
22	BWI	Baltimore/Washington Int'l	10,296	22	VNY	Van Nuys	351
23	FLL	Fort Lauderdale-Hollywood Int'l	10,235	23	GFK	Grand Forks	346
24	SLC	Salt Lake City Int'l	9,901	24	MEM	Memphis Int'l	339
25	HNL	Honolulu Int'l	8,713	25	SEA	Seattle-Tacoma Int'l	318

[1] All services (scheduled and nonscheduled) by U.S. and non-U.S. airlines.
[2] Includes military and general aviation.
Source: ATA 2010

Table 28. Top 25 U.S. airlines in 2009 in passengers enplaned, aircraft departures and operating revenues

	Passengers Enplaned[1]	Millions		Aircraft Departures[2]	Thousands		Operating Revenues	Millions
1	Delta	108.6	1	Southwest	1,126	1	Delta	$28,910
2	Southwest	101.3	2	Delta	849	2	FedEx	19,963
3	American	85.7	3	American	683	3	American	19,898
4	United	56.0	4	SkyWest	571	4	United	16,359
5	US Airways	51.0	5	American Eagle	461	5	Continental	12,361
6	Continental	43.9	6	US Airways	461	6	US Airways	10,781
7	AirTran	24.0	7	United	435	7	Southwest	10,350
8	JetBlue	22.4	8	ExpressJet	361	8	UPS	4,421
9	SkyWest	21.2	9	Continental	346	9	JetBlue	3,287
10	American Eagle	16.0	10	FedEx	334	10	Alaska	3,006
11	Alaska	15.5	11	Atlantic Southeast	303	11	AirTran	2,341
12	ExpressJet	13.3	12	Pinnacle	271	12	American Eagle	1,846
13	Atlantic Southeast	13.2	13	AirTran	252	13	SkyWest	1,731
14	Mesa	11.0	14	Mesa	243	14	Hawaiian	1,184
15	Pinnacle	10.7	15	JetBlue	216	15	Frontier	1,113
16	Frontier	9.8	16	Mesaba	200	16	Atlas	980
17	Republic	9.6	17	Chautauqua	169	17	Atlantic Southeast	883
18	Hawaiian	8.3	18	Air Wisconsin	157	18	Comair	861
19	Horizon	6.8	19	Republic	157	19	Mesa	633
20	Mesaba	6.7	20	Comair	156	20	Spirit	699
21	Comair	6.3	21	Alaska	151	21	ABX	697
22	Spirit	6.1	22	UPS	137	22	ExpressJet	682
23	Chautauqua	6.0	23	Horizon	137	23	World	658
24	Air Wisconsin	5.6	24	Cape	131	24	Horizon	654
25	Shuttle America	5.2	25	Piedmont	127	25	Kalitta	644

[1] Scheduled service only
[2] All services
Source: ATA 2010

Appendix II. Checked Baggage Inspection Systems (CBIS)

Table 29. Comparison of Checked Baggage Inspection Systems (CBIS)

Type of CBIS system	Level of automation and centralization	Screening capacity (bags per hour – bph)	Other information
High-throughput CBIS types (HS Fully-Integrated In-line EDS)	Typically consolidates baggage flows from multiple terminal zones into one centralized screening matrix	900 to 1,000 bph	Requires several high-speed EDS
Medium-throughput CBIS types (MS Fully-Integrated In-line EDS)	Also highly integrated and automated Less centralized	400 to 550 bph	
Mini in-line CBIS types (Mini-In-line and Semi-Integrated Mini-In-line EDS)	One mini in-line EDS screens bags that flow from a bank of ticket counters of one or two airlines onto a single take-away belt with an integrated EDS	200 to 350 bph	A terminal may have one or several mini in-line machines, each serving a bank of ticket counters.
Stand-alone EDS	Very decentralized systems Typically dedicated to one terminal zone (e.g., a bank of ticket counters for one airline)	180 to 220 bph	Located in small airports or in specific zones with low baggage volumes at larger airports Similar to lobby screening nodes installed today at many of the bigger airports
Stand-alone ETD	ETD equipment is currently used for primary screening (as an alternative to EDS screening and as a means to screen oversized, fragile, and other baggage that cannot be screened using EDS) and for resolution of EDS alarms.	70 bph	

Source: TSA (2011b)

The figures below show the schematic visualization of the different types of CBIS.

Source: TSA (2011b)

Figure 17. Schematic visualization of a high-throughput in-line system

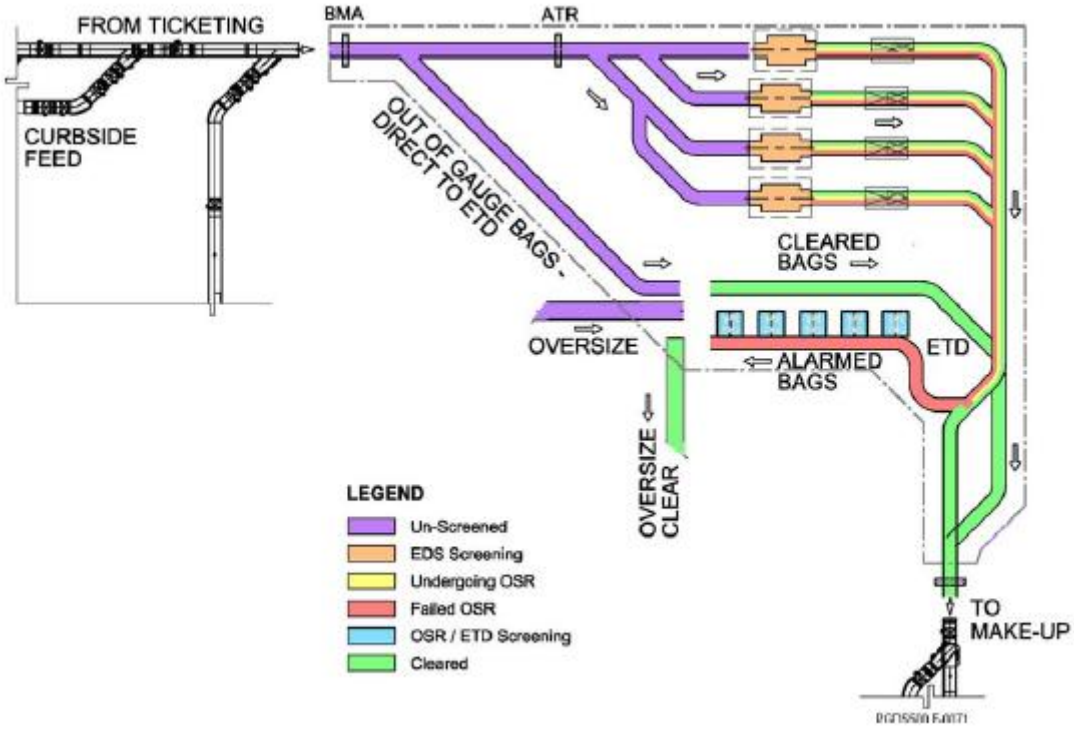


Figure 18. Schematic visualization of a medium-throughput in-line system

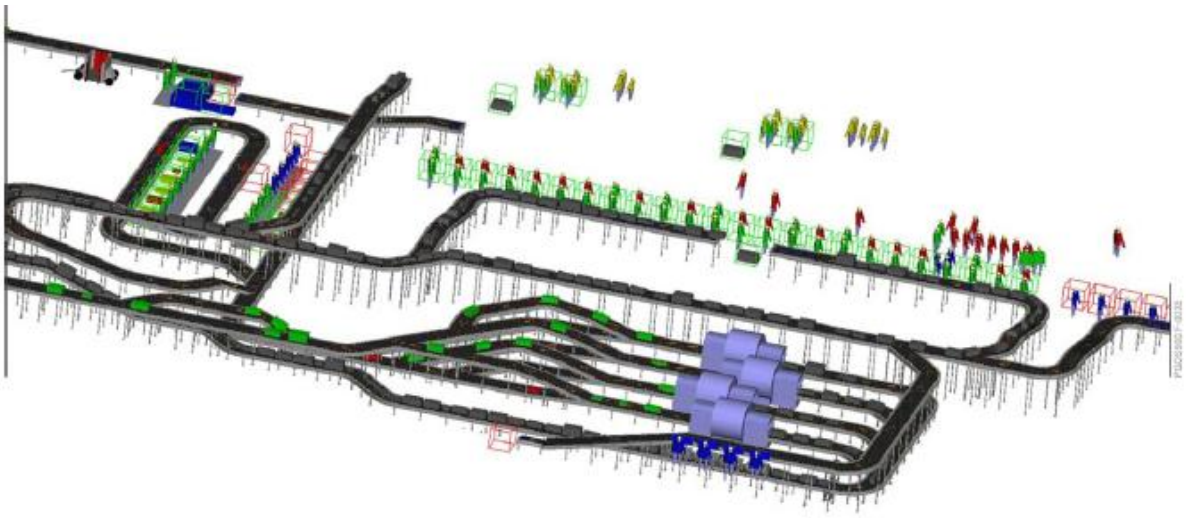


Figure 19. Schematic visualization of a mini in-line system

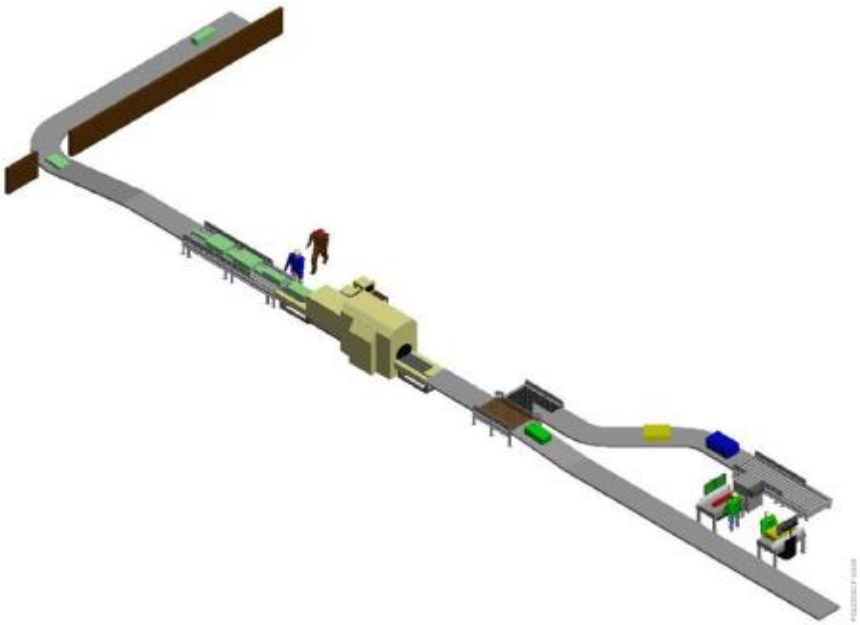


Figure 20. Schematic visualization of a stand-alone EDS

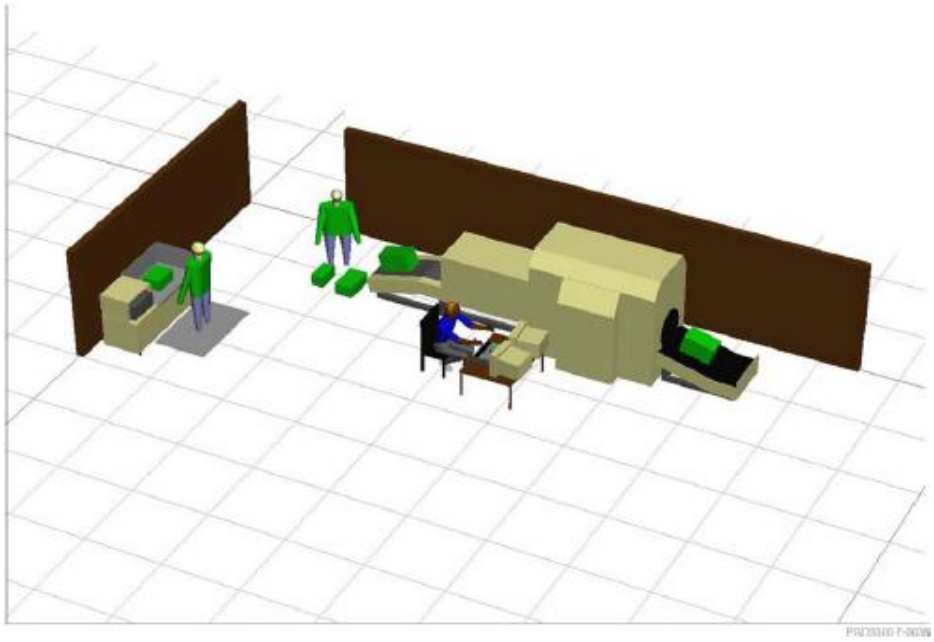
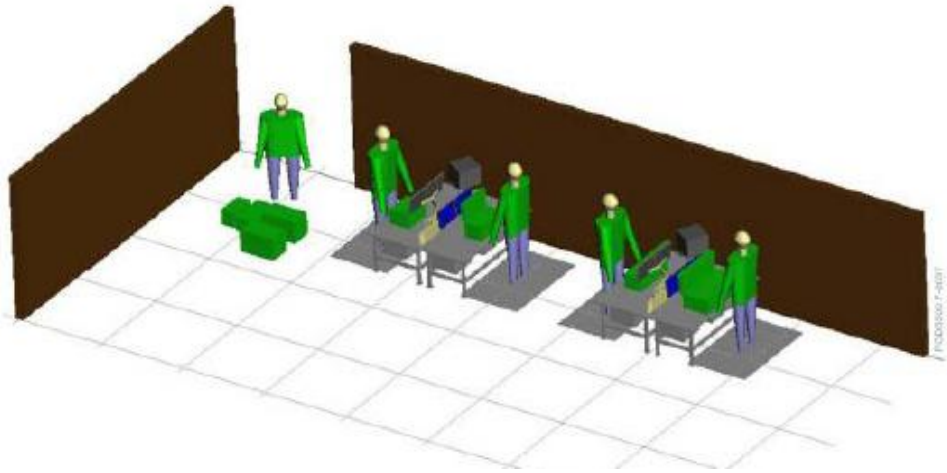


Figure 21. Schematic visualization of a stand-alone ETD system



Appendix III. List of items for which the airline is not liable

The airlines establish a list of items for which their liability is limited or excluded in case of loss, theft or damage. This list can be found in the contract of carriage of every single airline. Just to serve as an example, the list below is the one provided by United Airlines at http://pss.united.com/web/en-US/content/travel/baggage/fragile.aspx (accessed September 26 2012)

> *United recommends that you do not pack high value, fragile or perishable items in your checked baggage. United will accept such items as carry-on baggage (if it adheres to carry-on baggage allowances) and as checked baggage if it adheres to checked baggage allowances. If you choose to pack high value, fragile or perishable items in or as checked baggage in connection with travel within the United States, United is not liable for the loss of, damage to or delay in delivery of such items. For most international travel, United's liability for destruction, loss, delay or damage to checked and unchecked baggage is limited.*
>
> *Examples of high value, fragile or perishable items for which United is not liable (in the case of travel within the United States) or for which United's liability may be limited (in the case of most international travel) include, but are not limited to:*
>
> - *Antiques, artifacts, heirlooms, collectibles, religious items and artifacts*
> - *Antlers*
> - *Backpacks not designed for travel, sleeping bags and knapsacks made of plastic, vinyl or other easily torn material with aluminum frames, outside pockets or with protruding straps and buckles*
> - *Business equipment and business samples*
> - *CDs, DVDs and MP3s*
> - *Chinaware, glass, ceramics and pottery*
> - *Computer hardware/software and electronic components/equipment*
> - *Items checked in sacks or paper/plastic bags that do not have sufficient durability, do not have secure closures or do not provide sufficient protection to the contents*
> - *Items checked in corrugated/cardboard boxes, including cardboard boxes provided by United, except for items that otherwise would be suitable for transportation without the cardboard box (e.g., bicycle, garment bag)*
> - *Electronic and mechanical items, including cell phones, electronic games; and other related items*
> - *Eyeglasses, binoculars, prescription sunglasses and non-prescription sunglasses and all other eyewear and eye/vision devices*
> - *Flowers and plants*
> - *Garment bags not designed for travel*

- *Irreplaceable items*
- *Items made of paper (e.g., advertising displays, blueprints, maps, manuscripts, business/personal documents, historical documents, photos, books, negotiable papers, securities, etc.)*
- *Jewelry*
- *Keys*
- *Liquids, perfumes, alcohol/liquor, jerkins and Zamzam water*
- *Medicines, medical equipment*
- *Money, gift cards and gift certificates*
- *Musical instruments*
- *Natural fur products*
- *Perishable items such as food (e.g., fruits and vegetables, cheese, fresh or frozen meat or poultry, seafood, baked goods, dry ice, tobacco)*
- *Photographic/cinematographic/audio/video equipment, cameras and related items*
- *Precious metals/stone*
- *Tools, battery powered hand tools, tool boxes/containers, automotive towbars*
- *Totally unprotected items such as tennis racquets and umbrellas, either individually checked or tied/strapped to the outside of luggage*
- *Silverware, knives and swords*
- *Watches (timepieces)*
- *Works of art such as paintings or sculptures*
- *Any other similar valuable property or irreplaceable property included in the passenger's checked or carry-on baggage with or without the knowledge of United*

Appendix IV. Pattern of concentration using total number of luggage thefts

Figure 22. U.S. airports ranked from the one with the highest to the one with the lowest number of thefts in 2009 (N = 273)

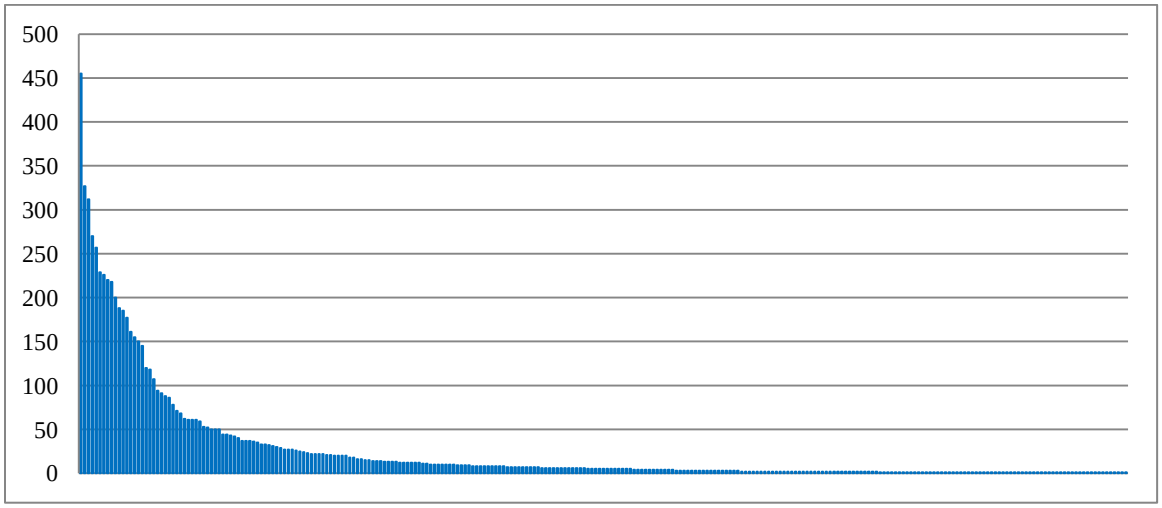


Table 30. Top 20 U.S. airports with highest volume of theft in 2009

Rank	Airports	# thefts	Boardings (million)	Airport size
1	JFK-John F. Kennedy Intl	455	22.7	Large
2	MCO-Orlando Intl Airport	327	16.4	Large
3	LAX-Los Angeles Intl Airport	312	27.4	Large
4	ATL-Hartsfield-Jackson Atlanta Intl Airport	270	42.3	Large
5	MIA-Miami Intl Airport	257	16.2	Large
6	SEA-Seattle-Tacoma Intl	229	15.3	Large
7	LAS-McCarran Intl	226	19.4	Large
8	PHL-Philadelphia Intl Airport	220	15.0	Large
9	EWR-Newark Intl Airport	218	16.7	Large
10	BOS-Boston (Logan) Intl Airport	200	12.6	Large
11	DEN-Denver International Airport	188	50.2	Large
12	ORD-Chicago O'Hare International Airport	185	64.1	Large
13	PHX-Phoenix Sky Harbor International	177	37.8	Large
14	DFW-Dallas-Fort Worth International Airport	161	56.0	Large
15	LGA-LaGuardia	155	22.1	Large
16	FLL-Ft. Lauderdale-Hollywood International	150	21.1	Large
17	IAD-Washington Dulles International	145	23.1	Large
18	SAN-San Diego International	120	17.0	Large
19	TPA-Tampa International	118	17.0	Large
20	BWI-Baltimore/Washington Intl Thurgood Marshall	107	20.9	Large

Appendix V. List of the 97 airports that experienced 10 or more thefts in 2009

Table 31. Airports with 10+ thefts in 2009, ranked by number of thefts

Rank	Airports	Total number of thefts in 2009	Airport size
1	JFK-John F. Kennedy International	455	Large
2	MCO-Orlando International Airport	327	Large
3	LAX-Los Angeles International Airport	312	Large
4	ATL-Hartsfield-Jackson Atlanta International Airport	270	Large
5	MIA-Miami International Airport	257	Large
6	SEA-Seattle-Tacoma International	229	Large
7	LAS-McCarran International	226	Large
8	PHL-Philadelphia International Airport	220	Large
9	EWR-Newark International Airport	218	Large
10	BOS-Boston (Logan) International Airport	200	Large
11	DEN-Denver International Airport	188	Large
12	ORD-Chicago O'Hare International Airport	185	Large
13	PHX-Phoenix Sky Harbor International	177	Large
14	DFW-Dallas-Fort Worth International Airport	161	Large
15	LGA-LaGuardia	155	Large
16	FLL-Ft. Lauderdale-Hollywood International	150	Large
17	IAD-Washington Dulles International	145	Large
18	SAN-San Diego International	120	Large
19	TPA-Tampa International	118	Large
20	BWI-Baltimore/Washington Intl Thurgood Marshall	107	Large
21	MSP-Minneapolis/ St.Paul International Airport	94	Large
22	IAH-Houston - George Bush Intercontinental Airport	91	Large
23	CLT-Charlotte/Douglas International Airport	88	Large
24	SJU-Luis Munoz Marin International	86	Medium
25	MDW-Midway International Airport	78	Large
26	SJC-Norman Y Mineta San Jose International	71	Medium
27	DCA-Ronald Reagan Washington National Airport	68	Large
28	PBI-Palm Beach International	62	Medium
29	COS-Colorado Springs Municipal	61	Small
30	DTW-Detroit Metropolitan Wayne County Airport	61	Large
31	OAK-Metropolitan Oakland International	61	Medium
32	HNL-Honolulu International Airport	59	Large
33	STL-Lambert St. Louis International	53	Medium
34	SMF-Sacramento International Airport	52	Medium

35	BNA-Nashville International	50	Medium
36	PDX-Portland International	50	Medium
37	SNA-John Wayne	50	Medium
38	OMA-Eppley Airfield	44	Medium
39	SLC-Salt Lake City International Airport	44	Large
40	CMH-Port Columbus International	43	Medium
41	SAT-San Antonio International	42	Medium
42	AUS-Austin-Bergstrom International Airport	40	Medium
43	ONT-Ontario International	37	Medium
44	PIT-Pittsburgh International Airport	37	Medium
45	RSW-Southwest Florida International	37	Medium
46	ANC-Ted Stevens Anchorage International Airport	36	Medium
47	OGG-Kahului-Maui, HI	35	Medium
48	MSY-New Orleans International	33	Medium
49	RDU-Raleigh-Durham International	33	Medium
50	CLE-Cleveland Hopkins International	32	Medium
51	JAX-Jacksonville International	31	Medium
52	PVD-TF Green Airport, Providence	30	Medium
53	BUR-Bob Hope	29	Medium
54	HOU-William P. Hobby	27	Medium
55	ORF-Norfolk International	27	Small
56	TUS-Tucson International	27	Medium
57	ABQ-Albuquerque International Sunport Airport	26	Medium
58	BUF-Buffalo Niagara International	25	Medium
59	CVG-Cincinnati/Northern Kentucky International	24	Medium
60	MEM-Memphis International Airport	23	Medium
61	ALB-Albany International	22	Small
62	BDL-Bradley International Airport	22	Medium
63	GEG-Spokane International	22	Small
64	MKE-General Mitchell International Airport	22	Medium
65	DAL-Dallas Love Field	21	Medium
66	IND-Indianapolis International	21	Medium
67	CHS-Charleston International	20	Small
68	GSP-Greenville-Spartanburg	20	Small
69	HSV-Huntsville International Airport	20	Small
70	RNO-Reno/Tahoe International	20	Medium
71	SGF-Springfield-Branson National Airport	18	Small
72	TUL-Tulsa International Airport	18	Small
73	BTV-Burlington, VT	16	Small
74	ELP-El Paso International Airport	16	Small
75	ISP-Long Island McArthur, Islip	15	Small
76	KOA-Kona International	15	Small
77	GRR-Gerald R. Ford International Airport	14	Small

78	OKC-Will Rogers World	14	Small
79	LIH-Lihue Airport	13	Small
80	LIT-Little Rock National	13	Small
81	MHT-Manchester Regional Airport	13	Small
82	SYR-Syracuse-Hancock International	13	Small
83	DAY-James M. Cox Dayton International	12	Small
84	FNT-Bishop International, Flint	12	Small
85	HDN-Yampa Valley Regional	12	Non hub
86	MYR-Myrtle Beach International	12	Small
87	SDF-Louisville International	12	Small
88	STT-Cyril E. King International	12	Small
89	PWM-Portland International Jetport	11	Small
90	XNA-Northwest Arkansas Regional	11	Small
91	DSM-Des Moines International	10	Small
92	GSO-Piedmont Triad International Airport	10	Small
93	LBB-Lubbock International	10	Small
94	LGB-Long Beach	10	Small
95	MFR-Rogue Valley International	10	Non hub
96	PIA-Greater Peoria	10	Non hub
97	RIC-Richmond International	10	Small

Appendix VI. Descriptive statistics of the independent variables, per airport size

Table 32. Descriptive statistics of the continuous independent variables, per airport size

Continuous independent variables	Airport size	N	Minimum	Maximum	Mean	Std. Deviation
% of international passengers	Large	28	.4	47.7	13.0	12.8
	Medium	35	.0	13.4	1.4	2.4
	Small	34	.0	7.0	.5	1.5
% of delayed departures	Large	28	13.1	41.4	26.6	5.9
	Medium	35	11.3	37.8	23.5	4.7
	Small	34	8.7	36.2	24.1	5.6
Customer satisfaction survey	Large	28	604	750	671.9	37.3
	Medium	30	645	777	713.6	31.8
	Small	0				
% of service operated by “risky” airlines	Large	28	.0	11.92	.9	3.0
	Medium	35	.0	9.77	1.0	2.4
	Small	34	.0	45.05	9.6	13.0
Theft rate in the area	Large	28	134.0	602.5	278.9	111.1
	Medium	32	122.8	501.1	312.1	94.7
	Small	30	127.2	971.2	354.4	163.9

Table 33. Frequencies of the IVs "tourist destination" and "business destination", per airport size

Airport size	Tourist destination	# airports	Percent
Large	Not touristic	11	39.3
	Touristic	6	21.4
	Very touristic	11	39.3
	Total	28	100.0
Medium	Not touristic	29	82.9
	Touristic	3	8.6
	Very touristic	3	8.6
	Total	35	100.0
Small	Not touristic	33	97.1
	Touristic	0	0
	Very touristic	1	2.9
	Total	34	100.0
	Business destination	**# airports**	**Percent**
Large	No	2	7.1
	Yes	26	92.9
	Total	28	100.0
Medium	No	26	74.3
	Yes	9	25.7
	Total	35	100.0
Small	No	33	97.1
	Yes	1	2.9
	Total	34	100.0

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