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Does Size Really Matter?

A Study of Banking Sector Size as it Relates to Money Laundering and Anti-Money Laundering Enforcement

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This thesis was written as a part of the Master of Science in Economics and Business Administration at NHH. Please note that neither the institution nor the examiners are responsible − through the approval of this thesis − for the theories and methods used, or results and conclusions drawn in this work.

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PREFACE

Executive Summary

Money laundering has been a problem for governments ever since it began 4000 years ago in China. In recent years though, the problem seems to be spiraling out of control. When HSBC was sanctioned for money laundering in 2010, the amount they laundered, roughly $7 billion, seemed like a huge amount. In the years since, however, this sum has been eclipsed by greater sums allegedly laundered by Deutsche Bank and Danske Bank.

Despite the best efforts of national and international regulators, money laundering continues to occur, and in doing so feeds a vicious cycle of organized crime and corruption. It is all the more surprising then that there has been no research into which types of economies are most vulnerable to money laundering: those with large banking sectors or those with small ones.

Using three different estimates of money laundering, this thesis presents an empirical study of the relationship between the size of a country's banking sector and the amount of money laundering estimated to be going on in that country. Additionally presented is an analysis of whether Financial Intelligence Units become more effective with higher funding levels.

Results found that as the size of a country's banking sector relative to GDP increases, estimated money laundering will, in turn, increase. However, when compared to absolute size, the link is much more tenuous. This signifies that countries more dependent on banking or financial services can expect more money laundering, and thus that the relevant authorities should place more of an emphasis on money laundering prevention and on enforcement of existing anti-money laundering regulations. The reason for this link could be due to connections between politicians and firms, or due to the systemic importance of financial services in countries whose GDP and employment figures rely on that sector.

Regarding Financial Intelligence Units, it was found that no link exists between funding levels and efficiency, apart from efficiency as measured by Suspicious Transaction Reports. This could be due to the high development levels of the countries observed, as there exists a point of funding after which marginal returns will drop off.

Preamble and Acknowledgements

This thesis represents the culmination of my Master's studies in Economics and Business Administration at the Norwegian School of Economics.

My decision to write about money laundering and corruption came as a direct result of my choosing to take Prof. Søreide's course *Corruption – Incentives, Disclosures, and Liability* in the Spring Semester of 2018. Throughout the course of the semester, I became more and more enthralled with the idea of studying some form of corruption and after discussing with Prof. Søreide, I landed on the topic of money laundering.

Although the research and writing process has not always been easy or quick (I had hoped to finish this thesis much earlier), I would like to sincerely thank the following people for their help and support over the course of my work on this thesis: Prof. Tina Søreide, not only for inspiring me to write about money laundering, but also for all the help and support (and patience with my false starts) along the way from our first meeting when the topic was chosen to our Skype calls over my time in Portugal; and PhD Candidate Shrey Nishchal for his having reviewed my thesis before submission and for sending me some of the articles I reference.

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Abbreviation List

AML: Anti-Money Laundering

AMLD: Anti-Money Laundering Directive

BCBS: Basel Committee on Banking Supervision

BCCI: Bank of Credit and Commerce International

BoP: Balance of Payments

CPI: Corruption Perceptions Index

CTR: Currency Transaction Report

EA: Enforcement Action

EEA: European Economic Area

EFTA: European Free Trade Area

EU: European Union

FATF: Financial Action Task Force

FI: Financial Institution

FIU: Financial Intelligence Unit

GDP: Gross Domestic Product

HMA: Hot Money Average

IMF: International Monetary Fund

ML: Money Laundering

NTR: Non-Trial Resolution

OECD: Organization for Economic Cooperation and Development

RBA: Risk-Based Approach

STR: Suspicious Transaction Report

SWIFT: Society for Worldwide Interbank Financial Telecommunication

Country Abbreviations

Abbreviation	*Name (English)*	*Official Name (National Language)*
AUS	Australia	-
AUT	Austria	*Republik Österreich*
BEL	Belgium	*Koninkrijk België / Royaume de Belgique*
BGR	Bulgaria	*Република България*
BRA	Brazil	*República Federativa do Brasil*
CAN	Canada	-
CHE	Switzerland	*Schweizerische Eidgenossenschaft / Confédération suisse*
CYP	Cyprus	*Κυπριακή Δημοκρατία*
CZE	Czechia	*Česká republika*
DEU	Germany	*Bundesrepublik Deutschland*
DNK	Denmark	*Kongeriget Danmark*
ESP	Spain	*Reino de España*
FIN	Finland	*Suomen tasavalta*
FRA	France	*République française*
GBR	United Kingdom	-
GRC	Greece	*Ελληνική Δημοκρατία*
HRV	Croatia	*Republika Hrvatska*
HUN	Hungary	*Magyarország*
IRL	Ireland	*Poblacht na hÉireann*
ITA	Italy	*Repubblica Italiana*
JPN	Japan	*日本国*
LTU	Lithuania	*Lietuvos Respublika*
LUX	Luxembourg	*Groussherzogtum Lëtzebuerg*
LVA	Latvia	*Latvijas Republika*
MEX	México	*Estados Unidos Mexicanos*
MLT	Malta	*Repubblika ta' Malta*
NLD	The Netherlands	*Nederland*
NZL	New Zealand	*Aotearoa*
NOR	Norway	*Kongeriket Norge*
PAN	Panamá	*República de Panamá*
POL	Poland	*Rzeczpospolita Polska*
PRT	Portugal	*República Portuguesa*
ROU	Romania	*România*
RUS	Russian Federation	*Росси́йская Федера́ция*
SGP	Singapore	-
SVK	Slovak Republic	*Slovenská republika*
SVN	Slovenia	*Republika Slovenija*
SWE	Sweden	*Konungariket Sverige*
TUR	Turkey	*Türkiye Cumhuriyeti*
USA	United States of America	-

SECTION 1 – INTRODUCTION

1.1 – Motivation

The consequences of money laundering (ML) are numerous: undermining legitimate financial markets, disrupting a country's economic policy, economic distortion and instability, loss of reputation, and perhaps most important to governments – loss of revenue (McDowell and Novis, 2001). Money laundering is inextricably tied to corruption and crime, given that it is the process by which the illegal monetary flows generated by criminals and their associates enter the global financial system (Cuellar, 2003).

Per the Organization for Economic Cooperation and Development (OECD) (OECD, 2011), these money laundering-specific problems overlap significantly with the problems inherent in political corruption and crime: the undermining of judicial systems, deterring of foreign investment, stifling economic growth and development, weakening competition, distorting political decisions, and funding criminal activity. However, while there have been a great many academic research papers written on the topic of corruption, the topic of money laundering remains relatively unresearched.

While corruption and fraud remain significant problems for governments and businesses, more and more banks and other financial institutions (FIs) are becoming embroiled in money laundering scandals. The most notable of these in the past decade have been HSBC, which in 2012 was fined $1.9 billion for laundering money for the US-sanctioned governments of Iran and North Korea, as well as for Mexican drug cartels (Silver-Greenbers, 2012); and Danske Bank, which was accused of laundering over $230 billion through its Estonian branch (Gricius, 2018).

This thesis aims to shed light on which countries can expect to be beset by money laundering: those with large banking sectors or those with small banking sectors. This will be studied through a small sample of forty countries. The forty countries will have estimates produced for money laundering occurring, for the sizes of their banking sectors, and for their anti-money laundering (AML) efforts.

Given that money laundering is a financial crime and thus difficult to measure, an alternative means must be used to measure the frequency of a country's money laundering. A combination of three estimation methods will be used[1]: the Walker Model, the Hot Money Method, and 3,5% of GDP. These estimates will be calculated and, in an attempt to negate any outlying values produced by one estimate, will also be combined as an average.

In addition to studying money laundering, the effectiveness of Financial Intelligence Units (FIU) will be studied. The methods used for determining their effectiveness will be rates of money laundering, and suspicious transaction reports received. The justification for these measures is that logically a more effective FIU will prevent money laundering, as well as educate financial institutions on their reporting responsibilities. Of course, this will only produce an estimate of how dedicated a country is to fighting money laundering; to measure more accurately would require a more accurate measurement of money laundering.

The question of which types of countries (large or small banking sector) can expect more or less money laundering is a relatively simple one, but it could have significant implications in the fight against money laundering. Any relationship found could show where the bulk of AML efforts should be focused, and similarly a lack of relationship could show that money laundering is simply a problem for all countries. The implications of any results found are quite significant for AML regulators; this is why it seems especially surprising that there has been no research into this specific topic in the past. While there exists a body of research on money laundering, it focuses almost exclusively on the effects of money laundering or on small-scale money laundering, rather than the enormous transnational schemes carried out by Danske Bank or HSBC.

The specific idea of attempting to identify whether there exists a link between banking sector size and money laundering was also inspired in part by recent cases of money laundering in countries which are not considered to have significant banking sectors, most notably Denmark

[1] This thesis was originally going to involve perusing court records, news articles, and company filings to count actual cases of money laundering by corporations and individuals to attempt to find a more precise estimate. This method was abandoned due to the immense difficulty in finding information, as well as the prohibitive cost of obtaining court records from the United States. After some research these three methods were selected based on their general acceptance and use in previous research.

and Estonia. Neither of these countries are considered to be financial powerhouses on the level of New York, London, or Singapore, yet one of the largest money laundering cases of all time involves both Denmark and Estonia. Perhaps this is because regulators thought their small banking systems meant that these countries were immune from the threat of money laundering.

1.2 – Research Questions

Is money laundering more or less prevalent in countries with large banking sectors as opposed to small banking sectors?

Do countries which provide more funding to anti-money laundering efforts experience less money laundering?

1.2.1 – Specification of Research Questions

To answer these research questions, estimated levels of money laundering will be calculated and compared to total size of national banking sectors. Countries' banking sectors will be analyzed both in terms of absolute size and in size relative to the economy as a whole in order to distinguish diversified economies from those with banking as their primary industry. Budgets for law enforcement, specifically for FIUs, will be compared between countries as a method to attempt to determine a given country's motivation to detect and prosecute cases of money laundering.

1.2.2 – Scope

The countries analyzed will be selected members of the European Union (EU), European Economic Area (EEA), as well as Australia, Brazil, Canada, Japan, Mexico, New Zealand, Panama, the Russian Federation, Singapore, Switzerland, Turkey, and the United States. These 40 countries are expected to form a sample with both large and small banking sectors and include several global financial centers. Additionally, they are all developed or on the high end of the developing world, which will ensure freely-available data on their banking sectors and government budgets. This sample also represents eight out of the top ten countries with highest GDPs and twenty-nine out of the top fifty GDPs. This supports the selected countries

as money laundering can be assumed to occur more often in richer countries due to the higher availability of money.

While this sample forms a somewhat representative mix of developed countries, it should be noted that there are no observances from Africa, and that all countries have relatively similar levels of development. Despite the lack of representativeness in the sample, the calculations and comparisons presented later in this thesis provide a straightforward guide to calculating results for other countries, assuming availability of information.

The time period for data collection will be 1st January 2015 to the 31st December 2015. This year was selected as it is the most recent where the required data was available for all countries.

1.3 – Thesis Purpose

The purpose of this thesis is to attempt to find the links, if any, between the size of a country's banking sector and the incidence of money laundering in that country. Regardless of the conclusions, the results will be interesting. It could be found that countries with larger banking sectors have higher rates of money laundering than countries with small banking sectors. This would signify that countries with larger banking sectors should provide more funds to their FIUs and impose more scrutiny on their banks.

Alternatively, it could be found that countries with smaller banking sectors experience more money laundering. Again, this would signify that countries with small sectors need more funding and scrutiny in combating money laundering. There could also be no relationships found between banking sector size and money laundering, which would indicate that money laundering is something all countries should focus on equally.

Regardless of the conclusions, this thesis will aim to show which types of economies should focus more or less on combating money laundering, or if all types of economies should focus equally.

1.4 – Thesis Structure

Having presented the motivation, research question, as well as the scope of the research, the remainder of the thesis is organized as follows:

Section 2 will focus on definitions of key terms and provide an explanation of the money laundering process as well as attempt to convey the seriousness of money laundering as an issue for societies. Section 2 concludes with a look at relevant laws, both national and international regarding AML.

Section 3 will present an analysis of existing literature and theory about money laundering, AML enforcement, regulatory effectiveness, and the measurements used in this thesis. Section 3 will additionally include this thesis' hypotheses.

Section 4 will present the methodology for the thesis.

Section 5 will present the dataset obtained and analyzed. This includes all money laundering estimates, FIU funding, and bank sector size.

Section 6 covers the analysis of the data as well as presenting results from the analysis. Section 6 will also present limitations and issues identified in the thesis and methodology.

Section 7 will present a discussion of the results, any potential conclusions and implications, as well as suggesting further avenues for research.

SECTION 2 – MONEY LAUNDERING: BACKGROUND

2.1 – Definitions

2.1.1 – Money Laundering

According to the US Department of the Treasury, ***money laundering*** is:

> …the process of making illegally-gained proceeds (i.e., "dirty money") appear legal (i.e., "clean"). … First, the illegitimate funds are furtively introduced into the legitimate financial system. Then, the money is moved around to create confusion, sometimes by wiring or transferring through numerous accounts. Finally, it is integrated into the financial system through additional transactions until the "dirty money" appears "clean". (Financial Crimes Enforcement Network, n.d.-a)

As stated above, money laundering is, in essence, 'cleaning' money, hence the name. While all forms of money laundering involve taking money gained through illegal means and making it appear to have come from a legitimate business transaction, there is a distinction to be made between low-level and high-level money laundering. For a low-level criminal who earns a few thousand dollars a year dealing drugs, money laundering can be as simple as making a few small deposits in his account over time so as not to arouse suspicion. For high-level criminals or corporations, the process is quite different (Whistleblower Justice Network, 2019). Given the restrictions imposed by governments worldwide (to be detailed later in this section), no one, corporations or individuals, can deposit large sums of money into a bank account without raising red flags.

Thus, the money laundering process in all of its forms, high- and low-level, involves a number of steps to disguise the transactions and make them appear legitimate. The first step in money laundering is called 'placement'. This involves placing 'dirty' money into the cash flows of a legitimate, cash-based business, usually by simply adding new cash to the business' existing cash. This is followed by 'layering', wherein the 'dirty' money is mixed with 'clean' money from the business. For particularly large sums this can involve moving the money through hundreds of different accounts and businesses throughout the world to disguise its origins. The final step in the money laundering process is 'integration.' At this point the 'dirty' money is

completely integrated into the global financial system as 'clean' money and can be used to make legitimate purchases (Reuter and Truman, 2004).

2.1.1.1. – History of Money Laundering

Money laundering has existed nearly as long as money itself. The first recorded instances of merchants carrying out 'money laundering' schemes to protect their fortunes from governments occurred over 4000 years ago in China (Gelemerova, 2008). Since then, various criminals ranging from Middle Ages moneylenders charging usurious interest rates to the high-seas pirates of the 1700s have used money laundering to disguise the illicit origins of their riches (Gelemerova, 2008).

Although the methods and crimes may have changed (one of the earliest forms of money laundering was melting and re-casting coins to literally create new money (Morris-Cotteril, 1999)), the underlying motives never have: to be able to legitimize and spend criminal gains.

Modern money laundering was developed by Meyer Lansky, the 'Father of Money Laundering', in the US during Prohibition in the 1920s. Lansky invented a scheme, called a 'loan-back', whereby dirty money would be placed into Swiss bank accounts but registered as loans from foreign banks, something that was not verifiable at that time. This then enabled him to claim it as legitimate income and pay income taxes (Paxton, 2015).

The term 'Money Laundering' first appeared in print in the context of the Watergate investigation in 1973, when it was used to describe how the origins of the money used for Richard Nixon's 'slush funds' was criminally obscured (Gelemerova, 2008). Although the term 'money laundering' is said to have originated due to Al Capone's practice of buying cash-intensive laundromats to launder his dirty money, there is no evidence that this is the case (Paxton, 2015). The true origin appears to be that the term 'money laundering' arose simply because it is a process which takes dirty money and 'launders' it clean.

2.1.2 – Enforcement Action

An ***enforcement action*** (EA) is any action taken by a national agency against a business or individual. EAs can take the form of an administrative procedure or a lawsuit (USLegal, 2016). While lawsuits are often the most severe action possible, there are several other

administrative procedures that can be taken by a regulator to attempt to stop an FI from breaking laws, either currently or in the future. Among the most severe sanctions are Cease and Desist orders and Supervisory Agreements, which order an FI to cease all specified activity or to agree to prescribed restrictions and corrective measures, respectively (Byler, et al., 2015). Other, less severe EAs involve fines or penalties directed towards an FI or an individual, memoranda of understanding that act as a precursor to a supervisory agreement, or calling the FI or individual to a hearing after which a more severe EA can be imposed (Byler, et al., 2015). In the United States, the most severe but least used EA is a revocation of an FI's deposit insurance or banking charter, making them unable to take deposits or conduct any banking activities, respectively.

2.1.3 – Settlement

A ***settlement*** is, in a legal context, a compromise and agreement between two parties to settle any pending litigation between themselves (Encyclopaedia Britannica, 2019). Settlements, also known as Non-Trial Resolutions (NTR), are by far the dominant method of settling cases of bribery and other financial misconduct (Makinwa and Søreide, 2018). Settlements will be explored in greater detail in Section 3.3.4.

NB: the terms 'Non-Trial Resolution' and 'Settlement' are widely considered to be synonymous and both will be used interchangeably in this thesis.

2.1.4 – Banking Sector

For the purposes of this thesis, the term ***banking sector*** can be taken to mean the sum total of all banks operating in a market, excluding the central bank. This includes all banks, both domestic branches of domestic banks and domestic branches of foreign banks. When discussing the ***size of the banking sector***, this means the sum of all assets owned by the banking sector. ***Absolute Size*** means the total of all assets taken independently; ***Relative Size*** means the ratio of Absolute Size/GDP.

This definition was chosen as it seems to be the most commonly used and widely accepted definition of a country's banking sector. The specific information on what to include and how to calculate the size was taken from Schoenmaker and Werkhoven (2012).

2.2 – Reasons to Launder

The principle reason for laundering money is to make it appear to have come from a legitimate source, rather than an illegitimate one (Levi, 2002). Money laundering is primarily used so that criminals can spend their ill-gotten gains while attempting to avoid difficult questions about the origins of their funds (Cox, 2011). Money laundering can also be used to let criminals pay income tax on their illicit income in hopes of avoiding arrest for tax-evasion (Cox, 2011).

Despite the desires of career-criminals to pay taxes, a second reason to launder money is to avoid taxes: by laundering income in such a way that its origin is obscured, it is possible to conceal the fact that the taxes due on the income were not actually paid to the relevant governments (Cox, 2011).

Finally, there exists also what is known as 'reverse money laundering'. This is a process by which legitimate funds have their origins obscured and can then be used in criminal or terrorist financing (IFAC, 2004).

2.3 – Money Laundering Methods

In order to gain a more complete view of the problem that is money laundering, this section will provide an overview of the money laundering process, as well as four of the most popular methods currently used in large-scale professional money laundering.

2.3.1 – The Money Laundering Process

The money laundering process is, at its core, quite simple. Although there exists a great deal of variation within the process, it is in essence only three steps (Reuter, 2004):

1. *Placement* – Placement is the step by which illegally-generated cash first enters circulation. Typical entry methods are inflating cash receipts from a cash-heavy business, buying and subsequently cashing casino chips, or making expensive purchases, such as art or real estate, for cash. Given the restrictions on depositing large amounts of cash in nearly every country, placement is often accomplished through the use of 'structuring' (Reuter, 2004).

Structuring involves making a large number of deposits close to but under the reporting threshold into hundreds of accounts controlled by the money launderer. While structuring is common in low- to mid-level money laundering, the sums involved in high-level money laundering are too large for structuring to be effective (Reuter, 2004). For example, to structure the $7 billion laundered by HSBC would take over 700.000 deposits.

2. *Layering* – Through layering, the dirty money in bank accounts is mixed into the legitimate financial system. Using various complex financial transactions, detailed in the following four sections, the illegal origins of the cash are obscured. The layering process often involves the use of intermediaries, shell companies, and accounts located in high-secrecy jurisdictions (Reuter, 2004).

3. *Integration* – Integration is the final step of the money laundering process, during which the launderer regains control of the now-clean funds through a series of financial transactions (Reuter, 2004).

2.3.2 – Method One: Mirror Trades

A mirror trade is a trade where two companies with the same beneficial owner execute the same trade simultaneously in two different jurisdictions (Weber, et.al, 2019).

As an example, imagine a Russian company (RusCo) wants to evade Russia's capital controls and move illegally-generated money out of Russia. RusCo calls their preferred money laundering bank (GermanBank) and places a Buy Order for 1.000.000 shares of Stock A at 653 Russian rubles per share. Simultaneously, RusCo's wholly-owned Cayman Islands subsidiary (CayCo) calls GermanBank and places a Sell Order for 1.000.000 shares of Stock A at $10 per share. RusCo pays 653.000.000 rubles and transfers 1.000.000 shares of Stock A to CayCo. CayCo sells 1.000.000 shares of Stock A to GermanBank for $10.000.000. The end result is that RusCo has converted its illegally-generated rubles to an equivalent amount of clean dollars, which its owners can now use as they please.

2.3.3 – Method Two: Back-to-Back Trades

A back-to-back trade involves obtaining a loan in one country secured against a deposit held in another, then defaulting on the loan to keep the clean money while the dirty money is seized by the bank (Weber, et.al, 2019).

As an example, imagine RusCo wants to move more money out of Russia. RusCo places 653.000.000 rubles in an account at GermanBank Moscow. Using this deposit as collateral, RusCo takes a loan of $10.000.000 from GermanBank George Town. After receiving the money, RusCo defaults on the loan and GermanBank seizes the collateral. The result is that RusCo has $10.000.000 of clean money given it by GermanBank, while GermanBank has 653.000.000 rubles of 'clean' money it received to settle a debt.

2.3.4 – Method Three: Trade Mis-invoicing

Trade Mis-invoicing involves a criminal organization's front business legitimately selling goods to another business in a foreign country. The invoices are doctored to make the totals appear significantly larger than they are in reality. With Trade Mis-invoicing, the now-clean money is received by the front business (Uncontained, 2014). This was the preferred money laundering method of the Colombian Medellín and Cali cartels, and is now commonly used by Mexican cartels (Uncontained, 2014).

Imagine the criminals who own RusCo have more money to clean. They direct RusCo to sell $10.000.000 worth of scrap metal to a Chinese importer. RusCo sells the metal and receives $10.000.000, however the invoice produced by RusCo shows the total price as $50.000.000. The $40.000.000 difference is made up of dirty money received by RusCo from its criminal owners, money which now appears to have been the result of a legitimate, if overpriced, commercial transaction.

Trade Mis-invoicing is particularly hard to detect, especially if the parties involved are reasonable about inflating the invoices, or if the trades are completed through a reseller shell company located in a high-secrecy jurisdiction (Uncontained, 2014).

2.3.5 – Method Four: Laundering through Assets

Laundering money through assets is self-explanatory; an asset, usually real estate or art, is bought for cash, held for a period of time, and sold for clean money. This type of laundering is facilitated, at least in the US and the UK, by exemptions from reporting and Know-Your-Customer requirements for the real estate and art industries (Frank, 2018).

To further conceal the origin of funds, real estate will often be bought and held by shell companies operating in high-secrecy jurisdictions.

Laundering money through real estate is very relevant at present; it is through sales of condominiums and other properties that US President Donald Trump is accused of laundering over $1,2 billion in funds from Russian and ex-Soviet oligarchs (Frank, 2018). Laundering money through real estate is so common, yet difficult to prove, that although the US Treasury's Financial Crimes Enforcement Network (FinCEN) identified that 21% of all Trump properties sold were through high-risk all-cash transactions, no action was taken as the standards of proof were too high (Frank, 2018).

2.4 – Why is Money Laundering a Problem?

After focusing so heavily on the mechanisms and processes that make up money laundering, it is worth considering: if the goal of money laundering is to bring the proceeds of crime into the legitimate financial system, paying taxes in the process, is not money laundering a victimless crime? On the surface this may appear to be the case, after all no one is directly injured by the money laundering process, and in fact governments and businesses can profit from laundering money and use those profits to drive economic growth.

This section will present counterpoints to the above paragraph: money laundering is ***not*** a victimless crime, and in fact hurts a great many people through the promotion of crime and hurts society through the distortion of the economy. It will additionally present the social benefits of strong AML regulation.

2.4.1 – Money Laundering Increases Crime

Crime is a business. No matter if the criminal is a street dealer earning $1.000 per week or a cartel boss earning $1.000.000 per day, their goal is to maximize profit and minimize costs. In a legitimate business, profits are either reinvested, placed into other investments, or paid out as dividends. This does not pose a problem because legitimate businesses produce clean profits; if a cartel boss wants to diversify his business into more legitimate areas or use his money in the legitimate economy, he must launder the money. This is the crux of why money laundering is a problem: money laundering is, apart from the smallest amounts, ***always*** required for a criminal to enjoy the fruits of their labor (Schneider, 2010).

This is especially important when it comes to the drugs trade. Globally, revenue produced by the trade in drugs is estimated at $1 trillion annually, roughly equal to 9% of legitimate global trade (Schneider, 2010). This is an almost unbelievably large number, especially when considering that drugs are almost exclusively a cash-only business. Money laundering supports the drug trade not only by making it easier for criminals to use their profits, but by making it significantly easier to transport and transfer them with no risk of government seizure (Cuellar, 2003). Consider that the Mexican Sinaloa Cartel is thought to earn $3 billion per year in drug revenues (Matthews, 2014). Even assuming that the entire sum is transferred in $100 notes (which it would not be), it would weigh 30 tons and occupy 31 cubic meters; the same sum in $20 notes would weigh 150 tons and occupy 155 cubic meters. By laundering money and placing it in legal bank accounts, the cartel can transfer its profits electronically before using them to further its core business.

Another consideration when regarding the harm money laundering does is that crime begets crime. As with legitimate businesses, criminals will reinvest profits to earn more in the future. Unlike legitimate businesses, criminals often earn more by investing their profits into new drug production or transportation infrastructure, or into new armaments or bribes to help them conquer new markets (Cuellar, 2003).

2.4.2 – Money Laundering Distorts the Economy

If money laundering is unregulated, it becomes easier. If money laundering is easier, there will be more money launderers. If there are more money launderers, the laws of supply and

demand will drive their prices down. If the cost of laundering money is very low, it incentivizes participation in the illegal economy, as profits tend to be larger than in the legal economy and easy money laundering produces easy-to-enjoy gains (Cuellar, 2003).

This economic distortion can take more forms than simply disincentivizing participation in the legal economy. Although the previous section focused on drugs, there are far more crimes than drug dealing. Money laundering can as well be a very useful tool for corrupt officials to enjoy the fruits of their corruption. In this way money laundering can distort competition or even disrupt the course of justice (Cuellar, 2003). Here again the case of US President Trump is significant. Trump is accused of having taken money from Russian oligarchs and laundered it through his condominiums and other properties (Frank, 2014). However, Trump is also accused of having accepted money from Russia in exchange for easing US sanctions, as well as blocking new sanctions. This is reputed to have be done using Deutsche Bank as an intermediary for Russian funds which were then used to buy Trump properties at vastly inflated prices (Hirsh, 2018). Russian money was reportedly vital in keeping Trump afloat throughout his series of business failures, with his son, Eric Trump, quoted as saying "We have all the funding we need out of Russia" when asked how his father financed his real estate empire (Hirsh, 2018).

2.4.3 – Benefits of Strong AML Legislation

Strong AML regulation has been shown to have a strong negative relationship with crime rates; as AML regulations are enacted and enforced, crime rates trend downwards (Barone and Masciandaro, 2010). This is in part due to the marginal utility of cash. If money laundering is difficult to do, or at least difficult to do undetected, the marginal utility of cash is decreased. This in turn provides a disincentive to enter into illegal transactions which only produce profits in the form of dirty cash (Cuellar, 2003). Given the reliance of drug cartels and mafias on money laundering, increasing the cost or difficulty of effective laundering can starve criminal organizations of funds, which can have the effect of shrinking them or even eventually putting them in the illegal equivalent of bankruptcy (Cuellar, 2003).

Stronger AML regulation also has the possibility of disrupting the infrastructure which makes money laundering possible (Cuellar, 2003). This almost inevitably results in a shift to more

expensive or detectable forms of money laundering, the end result of which is less profit for criminals (Cuellar, 2003). AML regulations can also increase the chances of criminals taking the risk of using unlaundered profits for legitimate purchases; while this may sound like a negative outcome, the use of dirty money greatly increases the chances of the criminal being caught (Barone and Masciandaro, 2010).

By far the most comprehensive study on the relationship between money laundering and crime found in the course of this thesis is by Barone and Masciandaro. In addition to concluding that money laundering directly leads to an increase in crime, they found that "Every improvement in the effectiveness of the anti-money laundering regulation—given its cost—will produce a decrease in the money laundering multiplier, consequently in the effects of money laundering activity, and therefore an increase in the overall public benefits" (Barone and Masciandaro, 2010 p. 123).

Using their model, the paper concludes that if AML budgets were increased by $5,45 billion, the public benefit in the form of reduced crime would be $7,71 billion (Barone and Masciandaro, 2010). While spending that much may not be politically feasible, the fact remains that there exists a strong and proven link between money laundering and crime.

In response to the question posed by Section 2.4, this study provides a perfect answer: Money laundering is a problem because as it increases, it increases crime, which in turn harms individuals, businesses, and societies.

2.5 – Money Laundering Cases

To further illustrate why money laundering is problematic for countries, as well as to present a view of the interconnectedness of the problem, this section will present notable cases of money laundering.

The first subsection (Section 2.5.1) will present four cases of money laundering involving large amounts. That all cases are from within the last 30 years (the Danske Bank and Deutsche Bank cases are still under investigation) demonstrates that despite adaptations and changes in AML law and regulations over that time period, money laundering shows no sign of abating.

The second subsection (Section 2.5.2) will illustrate that it is not only large countries, large economies, or large banks which suffer from money laundering. By presenting a number of cases occurring in smaller countries, this thesis will justify its research question by showing that money laundering can occur in any country, regardless of GDP or banking sector size.

2.5.1 – Large Money Laundering

2.5.1.1 – BCCI ($23 billion)

The Bank of Credit and Commerce International (BCCI) was founded in 1972. At the time of its liquidation in 1991 it was ranked the 7th largest private bank in the world, with 400 offices and assets exceeding $20 billion (Kanas, 2005). The BCCI placed emphasis on long-term growth, but in the process built up significant debts through a series of disastrous investments; to be able to maintain solvency the bank turned to financial fraud and to facilitating money laundering for its clients (Whitehead, 2016).

This case illustrates one of the principle reasons banks turn to money laundering – money. The BCCI is estimated to have laundered over $23 billion during its 20 years of operation (Whitehead, 2016). This proved enough not simply to save it from its investment decisions but to propel the BCCI to the world stage as a globally recognized brand. Despite the volume of money the BCCI laundered, it was not liquidated because of money laundering. Rather, it was liquidated because of its numerous other problems and crimes, most significantly its illegal ownership of First American Bankshares (Kanas, 2004).

2.5.1.2 – Danske Bank ($230 billion [est.])

In what is thought to be the largest money laundering scheme ever discovered, Danske Bank, the 53rd largest bank in the world, was found to have laundered an estimated $230 billion USD, primarily through its Estonian subsidiary (Gricius, 2018). Perhaps more impressive than the total is that Danske Bank laundered this money in a mere nine years, equivalent to over $25 billion per year. Note that in the nine years between 2009 and 2018, Estonia's average GDP was only $23 billion (World Bank, 2019a).

Colluding with around 50 Danske Bank employees, a group of Russian and Azeri criminals conspired to launder the proceeds of crimes through suspect financial transactions such as

'back-to-back[2]' and 'mirror[3]' trades (Gricius, 2018). Illustrating the importance of proper and rigorous oversight and effective Financial Intelligence Units, the scheme in Estonia was reputedly allowed to continue because AML documents at Danske Bank Estonia were in Estonian and Russian, and the Danish bankers, being unable to read the documents, simply assumed all proper AML procedures were being followed (Gricius, 2018).

The case of Danske Bank also illustrates a second important point for consideration: money laundering is not equivalent to nor does it require corruption. Denmark in 2018, the year the scandal was uncovered, ranked 2nd on the Corruption Perceptions Index (Transparency International, 2019). This shows that money laundering is not simply a problem in places with lax laws or attitudes towards corruption, but that it can occur even in regions like Scandinavia which is generally held to have stringent AML laws and very low levels of corruption. Indeed this level of trust may even prove beneficial to money launderers if officials trust that bankers are behaving honestly and thus do not inspect them as thoroughly as they may otherwise.

2.5.1.3 – Deutsche Bank ($20 billion [est.])

Deutsche Bank, the 15th largest bank in the world, stands accused of participation in what is being called 'The Global Laundromat': a network of Russian and ex-Soviet criminals who have laundered over $80 billion through European banks (Harding, 2019). This comes a mere two years after Deutsche Bank was fined a combined $588 million by US and UK regulators for its role in a separate mirror trade scheme in Russia (Harding, 2019).

The Deutsche Bank case illustrates the need for effective sanctions and oversight. As a consequence of its involvement in money laundering between 2011 and 2018 the bank was directed to improve compliance with regulations, but evidently failed to do so. Deutsche Bank was able to negotiate a settlement with the US and UK governments which likely reduced the fines they were made to pay (Rodriguez Valladeres, 2019). Though there is no way to be sure,

[2] A 'Back-to-Back Trade' is one in which money is deposited in Country B. A loan is then taken out in Country A for the same amount using the Country B deposit as collateral. The launderer then defaults on the loan in Country A, keeping the money while the bank seizes the deposit in Country B. The result is again the production and transfer of clean money (Weber, et.al, 2019).

[3] A 'Mirror Trade' is one in which a stock is simultaneously bought in one market and sold in another. For example, Stock X is bought in Country A for $10. Simultaneously Stock X is sold in Country B for $10. The result is clean money being produced and transferred instantaneously to Country B. (Weber, et.al, 2019)

higher fines or vicarious liability for its directors after their first infraction could have potentially prevented the next several.

2.5.1.4 – HSBC ($7.23 billion)

Of the examples given in this section, HSBC exemplifies the concept of a systemically important 'too big to fail' bank which cannot be regulated for fear of run-on effects. It is the world's 6th largest bank and, globally, holds assets of $2,558 billion, only $300 billion less than the UK's GDP. Between 2003 and 2010 HSBC was continually ordered by the US and UK governments to implement and follow AML procedures, yet time and time again it failed to do so (O'Toole, 2012).

This culminated in a fine of $1,2 billion for various crimes ranging from knowingly helping the Sinaloa Cartel launder drug money, to helping countries sanctioned by the US avoid those sanctions (Morgenson, 2016). That HSBC's size provided it a measure of immunity is illustrated by the fine handed down: less than 10% of its annual profit. HSBC's impunity seems to result from its size, as well as its importance to the UK both as an employer and as a taxpaying corporation.

2.5.2 – Money Laundering in Small Countries

2.5.2.1 – Cyprus

Since its entry to the European Union, regulators have been concerned about Cyprus. Once a favorite destination for Russians looking to hide their money, Cyprus in 2018 ordered its banks to shut 20.000 suspicious accounts held by foreign nationals, predominantly Russians (TNH Staff, 2018). While widely hailed as a strong move towards better AML implementation, it had the effect of costing the banks over 5,5 billion Euros (TNH Staff, 2018).

2.5.2.2 – Danske Bank Associates

Ignoring the fact that Denmark is itself a small country, laundering such a large amount of money could never have been done alone. In addition to Danske Bank, the following banks stand accused of participating in illicit schemes to help Danske Bank bankers launder Russian money: Raiffeisen Bank (Austria), Swedbank (Sweden), and Nordea (Finland) are also embroiled in Danske Bank's scandal (More Banks, 2019). As with Denmark, these three countries are all small and are not considered to be corrupt. Despite these popular

preconceptions, these three banks have allegedly laundered over $6 billion (More Banks, 2019).

Also worth noting, although perhaps less surprising, is that Deutsche Bank is also accused of working with Danske Bank to launder money (Rodriguez Valladeres, 2019).

2.5.2.3 – Latvia

Very recently the 3rd largest bank in Latvia, ABLV, entered into liquidation. This came after accusations by the US FIU, FinCEN, that ABLV had laundered tens of billions of dollars of Russian funds and that it would thus be issued a 311-order barring it from participating in the US financial system (Coppola, 2018). In addition to money laundering, ABLV stood accused of helping North Korea bypass US sanctions (Couveé, 2018)

2.5.2.4 – Luxembourg

Luxembourg is one of the most important financial centers in the EU if not in the world. This is despite being among the smallest, both in population and in size. In addition to being sanctioned by the EU for not implementing AML regulations (Guarascio, 2018), Luxembourg is also where the BCCI was registered. Luxembourg shows the need for transparency in money laundering cases; Luxembourgish law does not mandate disclosure of pre-trial settlements, likely to protect its resident banks. This was the case with a $10 million fine issued in secret to the Industrial and Commercial Bank of China (ICBC) (Guarascio, 2018).

2.5.2.5 – Malta

As with Cyprus, Malta has been a chief concern of EU AML regulators since it joined the bloc. Although it has not yet had any significant scandals on par with those in the previous section, Malta was one of just two countries (the other being Luxembourg) sanctioned by the EU for failure to implement AML regulations (Guarascio, 2018). This is in addition to the EU taking the unprecedented step of withdrawing Pilatus Bank's banking license over money laundering in 2018 (Malta, 2019).

2.5.2.6 – Nauru

The tiny Pacific island nation of Nauru was once the center of global money laundering. In the late 1990s an estimated $70 billion passed through the small shack which served as

headquarters for countless Nauruan shell banks on its way out of the Soviet Union (Whitehead, 2016). Despite having a population of only 10.000, Nauru saw providing an opportunity for money launderers as its best way out of a financial hole it had spent years digging itself into through disastrous investments (Hitt, 2000). Nauru's role as a facilitator of money laundering was so disruptive to the global economy that at one point it was the most sanctioned country on Earth (Hitt, 2000).

2.5.2.7 – Norway

Despite being ranked one of the least corrupt countries in the world, even Norway is not immune to money laundering. Norway's largest lender has also been accused of participating in money laundering schemes in the Baltics, though on a significantly different scale than Danske Bank or Swedbank (Bergman, 2018). DNB, the largest bank in Norway and 83rd largest in the world is accused of laundering over $500.000 through its Baltic subsidiary Luminor (Bergman, 2018).

2.6 – Regulation

The regulations against money laundering are undertaken almost exclusively at the national level, albeit with a few supranational organizations such as the Financial Action Task Force (FATF) and the OECD providing recommendations or suggestions for specific laws or regulations to implement. As with regulations concerning corruption, the size and influence of the US economy on the world economy gives that country an outsized influence in regulating money laundering. This section will focus on four main actors in AML regulation: the United States, the European Union, the FATF, and FIUs. Also presented will be Suspicious Transaction Reports (STR), a tool used by regulators to detect money laundering.

2.6.1 – US Regulation

The US government's primary weapon in the fight against money laundering is the Bank Secrecy Act of 1970 (BSA), also known as the Currency and Foreign Transaction Reporting Act (Meltzer, 1991). The primary aim of this law was to combat money laundering and other financial crimes by mandating that US banks file Currency Transaction Reports (CTR) [Also called Suspicious Transaction Reports] for all cash deposits over $10.000, and Suspicious Activity Reports (SAR) in cases where the bank suspects their client is attempting to commit a

financial crime. It also requires that US citizens or permanent residents with foreign bank accounts containing more than $10.000 file a Foreign Bank Account Report (FBAR) with the government every year. In addition to the BSA, the US also passed the Money Laundering Control Act of 1986, which defines any amount of money laundering as a federal crime, as well as specifically prohibiting structuring (the act of making numerous deposits under the $10.000 limit to avoid detection) (Money Laundering Control Act of 1986). The designation of money laundering as a federal rather than state crime gives the government more power to combat it as the US Federal Government has significantly more power and resources, both domestically and abroad, than any given state government.

The main enforcement body for all financial crimes in the US is the Financial Crimes Enforcement Network, established in 1990 as a bureau under the purview of the Department of the Treasury (Financial Crimes Enforcement Network, n.d.-b).

2.6.2 – European Union Regulation

Since its inception, the European Union has attempted to take a leading role in the AML world through its introduction of a series of Anti-Money Laundering Directives (AMLD). Beginning in 1990 with 1AMLD, the EU has regularly provided directives which apply to all member states, with the goal of reducing money laundering and terror financing throughout the bloc (European Commission, n.d.). The most significant change to EU AML rules came in 2015 with the introduction of 4AMLD. Significant changes in 4AMLD compared to 3AMLD were requirements to maintain a registry of the beneficial owners of accounts, as well as the introduction of vicarious liability (Yakubu, 2019). Vicarious liability in this context means holding individuals responsible for the actions of their businesses. 4AMLD provides for personal fines of up to five million Euros for directors of companies found to be laundering money (Yakubu, 2019).

The EU is currently on 5AMLD, which was published in 2015 and will come into force in 2020. The 5AMLD has expanded the EU's purview into AML regulation to include cryptocurrency and prepaid cards, as well as requiring banks to begin recording the 'beneficial owners' of bank accounts to determine who the actual owner is (European Commission, n.d.). 5AMLD

also fixed certain problems and loopholes which had been found in 4AMLD since its publication (European Commission, n.d.).

The EU seems especially keen to take a leading role in the global AML fight, especially as it published, in 2018, a proposed text for a 6th iteration of its anti-money laundering directives: the 6AMLD (O'Connor, 2018). This AMLD is expected to change but currently includes a harmonized list of predicate offences to be implemented across the EU, as well as numerous other regulations, some of which are more stringent than those imposed by the US (O'Connor, 2018).

2.6.3 – Financial Action Task Force

The Financial Action Task Force, also known by its French name *Groupe d'action financière* (GAFI) is an intra-national organization founded on the initiative of the G7 (Canada, France, Germany, Italy, Japan, UK, US) to combat money laundering through the development of effective policy (Chohan, 2019). While the group is not part of the UN or the OECD and thus has no actual enforcement powers, its 40 Recommendations for preventing money laundering play an important role in helping other countries develop their own AML law (FATF, 2019a). It is important to note that while the FATF cannot create 'hard law' (actual laws which are enforced), its role in creating 'soft law' is vital. The FATF provides a globally-standardized base for all countries wishing to combat money laundering; the 40 Recommendations provide a list of best-practices, which if implemented, should help any country to reduce its money laundering.

In addition to producing and revising their 40 Recommendations, the FATF regularly performs mutual evaluations of its 36 member states, in order to ensure a high level of compliance with the latest in AML regulations (FATF, 2019b). The FATF also takes a leading role in researching new trends in terror financing and money laundering, to better be able to evaluate and combat these threats (FATF, 2019b).

Unlike the United States or the European Union, the FATF's recommendations carry no legal weight – the organization itself has no power to arrest or prosecute those it suspects of money laundering. Its only recourse is to add countries to its 'Black List' or to deem them 'Non-

Compliant', which increases scrutiny of the blacklisted country to the point of making it impractical to continue financing terrorism or laundering money (Chohan, 2019 and Gelemerova, 2008).

2.6.4 – Financial Intelligence Units

A Financial Intelligence Unit is, per the FATF, an agency that:

> [S]erves as a national centre for the receipt and analysis of: (a) suspicious transaction reports; and (b) other information relevant to money laundering, associated predicate offences and terrorist financing, and for the dissemination of the results of that analysis (FATF, 2012).

An FIU can take many different forms and be responsible for a variety of tasks, but at their core they are designed to analyze and prevent both money laundering and terror financing. FIUs were first established in the late 1980's, with the express goal of forming a central agency dedicated to combating money laundering (Sathye and Patel, 2007). However, in the years following the 9/11 terror attacks when the FATF first added forming an FIU to their recommendations [Recommendation 29], as well as recommending Suspicious Transaction Reports go to FIUs [Recommendation 20], the number of countries with FIUs established has increased significantly (Sathye and Patel, 2007).

Per Al-Rashdan's (2012) paper, FIUs can be grouped into four different organizational models:

1. *Administrative Financial Intelligence Unit* – An administrative FIU will carry out research and analysis of country-specific data in order to gather information about money laundering. This information, as well as any suspected cases of money laundering will then be sent to law enforcement agencies or national regulators for action to be taken. Most FIUs operating today take this model (Al-Rashdan, 2012).

2. *Investigative Financial Intelligence Unit* – An investigative FIU will carry out the same functions as an administrative FIU, but with the important distinction that an investigative FIU will be empowered to conduct investigations of individuals and

corporations. This can range from the ability to request subpoenas be issued for documents, to the authority to request physical searches be conducted (Al-Rashdan, 2012).

Despite having the power to order these investigative methods, investigative FIUs lack the powers to operate in a judicial or law enforcement capacity and must rely on other agencies to execute their orders. As with administrative FIUs, investigative FIUs lack prosecutorial powers and therefore must again pass their findings on to relevant authorities for them to take action against suspected criminals (Al-Rashdan, 2012).

3. *Judicial Financial Intelligence Unit* – A judicial FIU is similar to an investigative FIU but with the important distinction that they are imbued with prosecutorial powers. This means that in addition to all the other powers of an FIU, a judicial FIU will be able to bring charges against suspected criminals and issue legal documents in support of its cases. However, a judicial FIU will still require the cooperation of law enforcement to enforce its orders (Al-Rashdan, 2012).

4. *Law Enforcement Financial Intelligence Unit* – A law enforcement FIU is one which has police powers, and occasionally judicial powers as well. This means that the FIU is fully empowered to execute its own searches and arrest suspected criminals by virtue of it being part of the police force. Law enforcement FIUs are by far the rarest model, as they tend to require much higher funding levels than any other organizational model. Also important to note is that companies report feeling uncomfortable dealing with them (Al-Rashdan, 2012).

2.6.5 – Suspicious Transaction Reports

Suspicious Transaction Reports, also called Suspicious Activity Reports, are documents which certain types of businesses are required to file with regulators if an individual is making a transaction which they believe is ‘suspicious’. Once an STR is filed, it should, in theory, be sent to the relevant agency, typically an FIU, for further analysis. At this stage the FIU can decide to freeze the assets involved awaiting further investigation, as well as move the case on for

prosecution. STRs are enshrined in the FATF's Recommendations [Recommendation 20], as a key pillar in the fight against money laundering (Chaikin, 2009).

When it comes to filing an STR, there are a number of entities which are required to file, as well as two tests for when a report should be filed. Typically all financial institutions, such as banks or wire-transfer businesses, are required to file STRs. Recently there has been a debate about increasing the requirements to other cash-heavy businesses or businesses in industries prone to money laundering; the US Congress is considering bills which would mandate art and antiquities dealers as well as real estate agents begin to file STRs (Hardy, 2019). This could be complicated by the different tests for filing STRs. The first test is subjective: if an employee believes there is something suspicious, which would obviously vary by person, they are mandated to report. The second is objective: if there are reasonable, pre-determined grounds to suspect money laundering, a report is mandated; this is the test used in many countries which mandate reports of transactions over a certain amount (Chaikin, 2009).

While subjective tests may seem as though they would encourage employees to withhold suspicions out of fear of punishment, the FATF recommends [Recommendation 21] judicial protection against false reports in order to incentivize as much reporting as needed (Chaikin, 2019). While this may influence countries mandating a subjective test, the FATF does not currently recommend a minimum threshold above which transactions should be reported (Chaikin, 2019).

Despite the ease of reporting and the protection afforded to reporters, Chaikin (2019) found that the tendency is to under-report rather than over-report. A number of reasons are given for this phenomenon, principally the high cost of action in developed countries (Chaikin, 2019). The costs of legal procedures to freeze or seize assets, notwithstanding any trials, are not taken into consideration by the FATF when it comes to STRs; the costs and difficulties only rise higher when the suspicious activity in question has numerous international links (Chaikin, 2019).

Roule and Kinsell (2003) find a number of other reasons why STRs could be used less than intended. One of their principal reasons found is that some countries mandate STRs but lack

the FIU to interpret and review them; this is especially the case in countries which want to be seen as complying with international norms while still tacitly permitting illegal activity (Roule and Kinsell, 2003). Other reasons can include too-strict reporting requirements, imposed with either good or ill intent; this inevitably leads to a back-log of STRs as the FIU is unable to review all of them (Roule and Kinsell, 2003). This is often coupled with time limits on when action must occur. Such is the case in Albania, where overly-strict reporting requirements produce a huge amount of STRs which, by law, must be acted upon within 30 days or dismissed (Roule and Kinsell, 2003). This overwhelming effect is often compounded by government's refusals to adequately fund and staff their FIUs or protect their reporters; in some countries STRs must be filed but no protections are offered for employees who breach confidentiality to file the STR (Roule and Kinsell, 2003).

SECTION 3 – LITERATURE REVIEW

3.1 – Determinants of Money Laundering

Crime, like any business, is an exercise in profit maximization. Neoclassical economic theory assumes that businesses will take steps to ensure the maximum profit possible for an acceptable amount of risk, and in this respect all businesses are fundamentally the same no matter if they produce hard drives or hard drugs. Thus, it can be expected of businesses to engage in money laundering if the profits they can gain outweigh the potential costs (Becker, 1968).

The most common assumption when dealing with money laundering is that "crime demands crime". As money laundering requires illicit money to be carried out, the natural assumption to make is that areas with more crime will, by necessity, have more money laundering. This is because without money laundering, the profits of the crime cannot be safely used by criminals. This means that money laundering is intrinsically linked to crime; money laundering simply cannot exist without crime.

However, a high crime rate is not the only factor linked to increased money laundering. The most significant determinants of small-scale money laundering appear to be rates of corruption in a society, alongside organized crime activities (Becker, 1968). However, Reganati and Olivia (2018) note that the determinants are different in regions with high development than those with low development. Their study found that in Northern Italy, which is more developed and educated than the South, rates of money laundering were much more positively influenced by political corruption and organized crime (Mafia) activity, and negatively influenced by educational attainment.

Mafia-linked money laundering in Italy is traditionally concentrated in three industries which lend themselves well to political corruption: agriculture, waste disposal, and construction (Becker, 1968). In the well-developed North of Italy, politicians permit organized criminals to maintain de-facto control over these sectors and in return receive sizable bribes, which must then be laundered before the money can be spent. However, in the South of Italy, these industries are significantly less developed. This leads money laundering rates to be tied to incidence of casinos in less developed areas, as casinos can be used to effectively and quickly

launder large sums of money by using dirty money to purchase casino chips which are then cashed out for clean money and tax documents (Becker, 1968).

A similar dichotomy exists with regard to levels of educational attainment. In Northern Italy, higher education is tied to lower rates of money laundering, as the population is increasingly educated, they become both less tolerant of crime and able to find better opportunities which enable them to avoid the life of crime which requires money laundering (Becker, 1968). However, an article by Vaithilingam and Nair (2007) presents an alternate view; they found that as education and technology increase in developing countries, incidence of money laundering increases, albeit with diminishing returns once a country reaches developed status.

Vaithilingam and Nair (2007) found that as cash-based societies experience the educational and technological shifts which connect them to the global financial system, the technology changes very rapidly while the legal infrastructure remains stagnant. As countries develop, levels of money laundering move through three stages. In the first stage the relevant authorities are unwilling or unable to regulate the new technology effectively, either due to a lack of knowledge or a lack of desire, and as such money laundering occurrence rapidly increases. In the second stage the pervasiveness of money laundering drops rapidly as the country adapts its own laws or adopts international standards designed to combat money laundering. Finally, a fully developed country reaches the third stage, where money laundering continues to decrease but at a much lower rate, as all available means of detecting and combating it are already employed (Vaithilingam and Nair, 2007).

Reganati and Olivia (2018) additionally found the most significant determinants of money laundering at each stage of development. In developing countries, the most important action a financial actor can take to reduce money laundering is to improve their human capital, either through education or training (Reganati and Oliva, 2018). Similarly to Becker's (1968) findings, increased levels of education make a society less tolerant of criminal activity, and thus less likely to be complicit in money laundering. Most significant for countries in the second stage was an efficient legal framework. These findings are in line with generally accepted international research regarding reducing money laundering in developing nations (Reganati and Olivia, 2018). As countries reach the third stage, the most effective means of reducing

money laundering was found to be increasing the ethical behavior of firms operating within the country (Reganati and Oliva, 2018).

Other factors theorized to be significant determinants of money laundering were the presence of a large shadow economy, or AML enforcement. Reganati and Olivia (2018) found no connection between presence or size of a shadow economy and occurrence of money laundering. Also not found was a correlation between money laundering and AML enforcement under a certain threshold. At present levels of AML enforcement, money laundering is "worth the risk". That is to say, a criminal, having already committed a criminal act will not be deterred by further punishment for money laundering. This is not to say that AML laws are futile and have no effect; Reganati and Olivia (2018) found that there is a threshold of enforcement after which money laundering drops drastically, however this threshold, although not specifically stated, is stated to be significantly higher than current enforcement levels.

It can be safely said that literature regarding the determinants of large-scale money laundering is scarce, particularly in countries with low levels of crime but where banks actively participate in money laundering. Despite this, two important conclusions can be drawn from this section:

1. Crime demands money laundering – It can be assumed that as small-scale crime does lead to money laundering, a high enough crime level will lead to more money laundering in general. Of course, there is no guarantee that the money laundering will occur in the high-crime country; it can only be said that countries with high crime levels will increase money laundering ***somewhere***.

2. Developed nations launder more – Vaithilingam and Nair (2007) found that as countries develop, they will experience more money laundering purely as a function of increased access to the global financial system and from higher wealth in general. Thus of the countries analyzed in this thesis, the most developed should be expected to have the most money laundering.

3.2 – Regulatory Enforcement

Financial institutions have long enjoyed favorable treatment from politicians and industry regulators. At the height of the 2008 Financial Crisis, the largest troubled banks were deemed to be structurally important to their country's economies and thus "too big to fail". This is emblematic of the regulatory double standards present in the banking industry, as the most politically connected firms enjoy lax regulations and bailouts while smaller firms are forced into liquidation.

At the heart of the problem lies the culture of lobbying representatives of a government to pass laws favorable to banking and financial interests (Tomasic, 2011). This inevitably leads to a loosening of regulations, or the lack of suitable regulations being implemented at all. This deregulation of the industry becomes more pronounced in prosperous economic times, which creates a cycle of less regulation as lobbyists and politicians attempt to tie prosperity to deregulation and to create a permanent culture of low regulation (Tomasic, 2011). However, the lack of effective regulations or efficient regulatory enforcement has been seen to exacerbate economic crises, leading to a public outcry after which regulations and enforcement increase (Tomasic, 2011).

Banks that are deemed "too big to fail" are considered to be so due to their perceived systemic importance to an economy, which is often seen as being tied to their absolute size in terms of assets or deposits. A 2009 study by Chen Zhou for the Dutch National Bank [*De Nederlandsche Bank*] found that while size did somewhat contribute to systemic importance, the most significant factor contributing to systemic importance was the number of different financial activities in which a bank was engaged. From this, Zhou (2009) draws the conclusion that size cannot be used as a proxy for systemic importance in the financial sector, and thus that "too big to fail" should not apply by default to every large bank in any given country.

It is likely due to the perception of banks as systemically important to an economy that very few bankers or banking executives ever face civil or criminal penalties for financial crimes. In fact, in the aftermath of the 2008 Financial Crisis only one bank employee, Kareem Serageldin, at Credit Suisse, received any prison time for his role in causing the crisis (Eisinger, 2014). This is symptomatic of the regulatory distaste for vicarious liability, holding employees and

directors responsible for the actions of their company, in the case of financial crimes (Fisse, 1994).

The lack of effective and efficient regulation in cases of financial crime can also be explained by regulators' preferences for attempting to encourage corporations to police themselves through internal mechanisms. Given their immense size and resources, it can be assumed that banks such as HSBC or Deutsche Bank could have effectively policed themselves and avoided their recent money laundering scandals, but as Fisse (1994) convincingly argues, financial institutions have the capacity but not the will to prevent crime using internal controls. He argues that the ideal solution would be to levy "optimal" fines or deterrents, however the amount needed to dissuade criminality could, in many cases, be more than the bank could bear without going out of business. Thus, banks can effectively dodge efficient regulatory enforcement simply by being systemically important to a country.

This leads to a situation where corporations are essentially regulated internally until there is a significant enough issue that public outcry forces government action. This is, of course, not an ideal situation. By letting the corporate fox into the societal hen house, regulators essentially invite misconduct. This is especially problematic when considering that corporations are allowed to report their own misdeeds to regulators in exchange for more lenient treatment (Ruhnka and Boerstler, 1998). While this can bring to light new cases which may otherwise not have been detected, it also allows corporations to estimate their risk of detection and confess before they are caught, providing them better treatment as well as the possibility of concealing the worst of their crimes.

It might seem then that regulations have no effect on money laundering, but this is fortunately not the case. Chong and Lópes-de-Silanes (2007) have found that tougher regulations will indeed lead to a reduction in money laundering. They found that the most important AML regulations fall into three areas:

1. Confiscation – Confiscation is one of the most powerful and effective weapons a regulator has in combating money laundering. Without an effective and vigorously-applied confiscation regime, criminals are likely to accept jail time as a consequence

of their actions, provided they will eventually be released and free to enjoy the fruits of their crimes (Chong and Lópes-de-Silanes, 2007).

2. Disclosure – Standardized disclosure and liability rules for financial institutions, applied uniformly, go a long way to reducing money laundering (Chong and Lópes-de-Silanes, 2007). This is because it clearly shows the financial institutions required for large-scale money laundering exactly what their responsibilities are, and what will happen to them if they fail to act properly.

3. 'Feeder Offences' – What Chong and Lópes-de-Silanes (2007) call 'Feeder Offences', that is, crimes which are linked to money laundering, must be uniformly criminalized as well. These regulations must be both tough and regularly enforced for the reason that most small-scale money laundering is identified through these 'feeder offences' (Chong and Lópes-de-Silanes, 2007).

3.3 – Regulatory Effectiveness

While most countries do appear to be taking the threat posed by money laundering seriously, the question remains: If such stringent regulations against money laundering exist, why then did three of the largest money laundering cases in history occur in the past ten years? And why again did these crimes occur in Europe, which is likely the most regulated financial market on Earth? The following subsections will examine five factors which can contribute to a lack of effective regulation of the banking sector: Political Connection, or the relationship between politicians and industry; Self-Regulation, the increasing trend towards industries regulating themselves; Regulatory Capture, the phenomenon which occurs when relationships between politicians and industry are so close that regulations cease to be effective; Settlements, an increasingly common pre-trial resolution which lets companies negotiate their own punishment with authorities; and Importance of the banking sector, both in financial and political terms.

While there are likely more than just these five factors affecting the regulation, or lack thereof, of the financial and banking industries, this thesis argues that these are the most significant in the case of money laundering regulation, and regulation of the financial sector as a whole.

3.3.1 – Political Connection

Political connections can be described as the often-personal relationships politicians have with industry leaders. These connections can take many forms, from friendships, to bribery, to the Chinese *guanxi* which is a combination of both. Regardless of what form is taken, overt and excessive connections between politicians and industry do not always but can often cause problems in a country.

Kruger (2006) makes the argument that politicians often engage in rent-seeking behavior with firms; in exchange for preferential treatment of their firm or industry the politician will request firms provide them with favors or money. Of course, this will lead not only to a loss of public welfare as money is allocated unfairly, but such relationships can also influence income distribution in favor of the wealthy (Kruger, 2006). This relationship between politicians, industry, the economy, and income distribution is often described as 'political economy' (Jevons, 1879).

No country or industry is totally immune to the influence of political connections, a phenomenon which has been studied in depth. However, political connections are especially important in two types of industries: those which are dependent on government policy, such as importers or exporters; and those which are heavily regulated, such as manufacturing or finance (Ang and Thong, 2013). Regardless of industry, it has also been found that in general, larger firms will benefit more from political connections than will smaller firms due to larger firms' greater political exposure and dependence on regulations (Agrawal and Knoeber, 2001).

The positive relationship between a firm's success and the election of politicians it supports has been found to exist in every country studied, regardless of corruption level, except Singapore (Ang and Thong, 2013). This was especially obvious in the wake of the 2010 US Congressional elections: as the Republican party made historic wins, the companies which supported them reported increased share prices (Ang and Thong, 2013).

Political connections can distort the economy in other ways than simply giving undue advantage to companies. As connectedness is essentially a give-and-take relationship, politicians need to receive benefits alongside the firms, which can result in a higher cost of

doing business (Faccio, 2006). Indeed, a study into the benefits politicians receive showed that companies can spend vastly inflated amounts of money, for example by financing politicians' unprofitable pet-projects, if it means that in turn the firm can expect to receive larger benefits (Friedman, 2000). Take for example the cases of Airbus, Renault, and Aéroports de Paris in France, all three companies were planning new infrastructure but chose to place their factories and airport in areas which would benefit certain French politicians, not the areas which were most efficient (Shleifer and Vishny, 1994). A more extreme example is *Credit Lyonnais*, a French bank which lost over 150 billion French Francs [30 billion USD] in a series of disastrous loans to Socialist Party politicians and their allies (Shleifer and Vishny, 1994).

Even public companies are not immune from rent-seeking behavior by politicians. While private companies tend to form connections for preferential treatment, Shleifer and Vishny (1994) found that public companies will pay for greater autonomy from political forces.

In the financial sector specifically, there are a number of reasons why politicians may not push for stronger regulations or enforcement. Banks tend to serve the interests of wealthy, politically-connected individuals. In not wishing to anger these potential or actual donors, politicians may turn a blind eye to any infractions committed (Agarwal and Agarwal, 2003). Additionally, lobbying by the financial industry itself may convince politicians that if the industry is subject to regulation, then the country will be at a disadvantage compared to others (Agarwal and Agarwal, 2003). Of course the obvious answer to this claim is not to lower national standards in a 'race-to-the-bottom', but to raise global standards.

3.3.2 – Regulatory Capture

Regulatory Capture can be described as regulations for industry, by industry, to serve their interests instead of the interests of society (Boyer and Ponce, 2012). Regulatory capture occurs when industry leaders are appointed to lead the regulatory bodies of their own industry, or when politicians leave politics to work in an industry which they regulated.

Regulatory capture as a phenomenon is most present in the Anglo-American world, based on a belief that no matter what happens the 'Invisible Hand of the Free Market' will make firms act in the best interests of society (Young, 2012). Within national governments, financial

regulation is typically among one of the most captured regulators. This is particularly evident in the US when looking at current financial industry regulators:

- Steven Mnuchin: Worked for 17 years at Goldman Sachs before forming his own hedge fund. Mnuchin was appointed by President Trump to be Secretary of the Treasury. The Department of the Treasury is responsible for shaping US economic policy, both domestically and abroad, setting and enforcing tax law, and combating money laundering in the US and abroad (US Dept. of the Treasury, n.d.)

- Wilbur Ross: After a long career in Investment Banking specializing in hostile takeovers and asset stripping, President Trump appointed Ross as Secretary of Commerce. In addition to regulating foreign trade and producing economic analyses, the Dept. of Commerce regulates intellectual property and patents (US Dept. of Commerce, n.d.)

- Timothy Geithner: Before 2008, Geithner was the head of the New York Federal Reserve, where he personally approved a number of bailouts to the big banks hurt most by the Financial Crisis. After leaving the Fed, he became President and Managing Director of a private equity fund supported by JP Morgan Chase, a bank he bailed out (US Dept. of the Treasury, 2014).

- The Securities and Exchange Commission: Most commissioners have come from the finance industry, which the SEC regulates. In fact the first chairman was businessman and billionaire Joseph Kennedy. The SEC has been criticized for being too lenient on banks which violate its regulations, preferring to settle for relatively small amounts and not forcing admissions of guilt. This is in addition to a lack of enforcement against recidivism, of which there were 51 cases by only 19 firms since 1994 (Kaufmann and Penciakova, 2011).

Given how captured financial industry regulators are, it should come as no surprise that several authors have found a link between regulatory capture and the 2008 Financial Crisis. In the preceding years to the Crisis the US economy was booming. As Young (2012) and Tomasic

(2011) argue, this is the sort of situation that leads to more regulatory capture. If the economy is doing well and everyone is making money, more regulatory capture will occur as the public will not care enough to protest. More regulatory capture inevitably leads to more profits, generating a vicious cycle until a certain threshold is reached. In the US this threshold was reached in 2008, as the risky investments and low capital requirements allowed by captured regulators caused a collapse and resulted in the failure and near-failure of dozens of banks (Young, 2012). After the threshold is reached, there is a public outcry against regulatory capture as banks makes themselves whole at taxpayers' expense.

Regulatory capture in finance is a problem which occurs not only at the national regulatory level but for international regulations as well (Young, 2012). The Basel Committee on Banking Supervision (BCBS) has been accused of enshrining regulatory capture into international financial regulation, given that its widely-accepted banking standards were essentially written by the banking industry (Boyer and Ponce, 2012). One of the most significant standards injected into the BCBS regulations was giving banks the right to use their own internal rating systems for financial assets, as well as watering down what could have been much stronger regulations (Boyer and Ponce, 2012). Here it is important to note that the 2008 Financial Crisis was in large part caused by improperly rated securities (Young, 2012).

Regulatory capture can also occur due to an imbalance of power between governments and banks. Despite common sense dictating that governments should always be more powerful than companies, the reverse often holds true, especially in countries dependent on their banking sector. For example, in Switzerland and Singapore, where the financial industry employs more than 5% of the total population (Nguyen, 2014) (to say nothing of their contribution to GDP), any new regulation seen as particularly onerous could easily be counteracted with a threat to leave the country, rendering huge amounts of people unemployed (Young, 2012). Even in countries less dependent on financial sector employment, the threat of banks leaving could easily be enough to overturn regulations, or even get bankers appointed as regulators (Young, 2012).

3.3.3 – Self-Regulation

Self-Regulation can be described as "a regulatory process whereby an industry-level (as opposed to a governmental or firm-level) organization sets rules and standards (codes of practice) relating to the conduct of firms in the industry" (Gunningham and Rees, 1997 p. 364). For those in support of self-regulation, it appears to be an ideal system, after all, who is more qualified to regulate an industry than those who know it best? It is argued that self-regulation can free companies from the burdensome regulations of bureaucrats who all too often act only to dampen innovation and reduce profits (Gunningham and Rees, 1997). In theory then, self-regulation is an ideal solution for regulators all too often burdened by too many companies to oversee and not enough employees to do so effectively.

In practice however, the results are less positive. Rather than doing what is best for society, firms will take advantage of self-regulation to 'water down' regulations to the point that they are no longer effective; to this end, the push for self-regulation is often led by the firms and industry groups who want the least done (Helleiner and Pagliari, 2009). Self-regulation can often be used by self-serving industry associations to give the impression that regulation is taking place when in reality firms are running roughshod over the public good (Gunningham and Rees, 1997).

One of the most popular arguments for self-regulation is that the 'Invisible Hand' of the Free Market will allow consumers to punish companies which do not self-regulate effectively. This would be true but for the secrecy so common in self-regulation; while firms are occasionally sanctioned, the punishments are often times set through self-regulation as well, and the entire process takes place behind closed doors (Gunningham and Rees, 1997). Gunningham and Rees (1997) argue that there are essentially three key pieces needed (but all too often lacking) for self-regulation to work effectively: Transparency, 'Moral' behavior from firms, and a strong basis in law. Most important of these is a strong basis in law; companies are rational, profit-driven entities, if the cost of effective self-regulation is high but not mandated, the firm will do the bare minimum needed to comply with the letter of the law (Gunningham and Rees, 1997). After all, there can be no incentive to apply strong industry standards without a strong backing of the same standards in the law.

Again, self-regulation is, and has always been, quite common in the financial and banking sector. Before the Wall Street Crash of 1929, nearly all financial regulation was self-regulation. Following the turmoil of the Great Depression there was a popular push for strong banking regulators to ensure that such an event would never recur (Pagliari, 2012). Despite this, around 15 years before 2008 there was an increasing trend to use the "'invisible hand' of markets and align them with the goals of regulation" (Pagliari, 2012 p. 48). This push for self-regulation was based on the idea that self-regulation would reduce costs for consumers and regulators, as well as the idea that banks were sophisticated, wealthy, and trustworthy enough not to do anything untoward with their power (Pagliari, 2012).

Before the 2008 Financial Crisis, one of the main goals of self-regulation was to act as "a more flexible solution, capable of preserving financial stability without stifling innovation or posing unnecessary costs that could damage the competitiveness of financial firms" (Pagliari, 2012 p. 48). This did indeed work for a while, leading to such innovations as Over-the-Counter (OTC) derivatives, whose market reached $60.000 billion before the crash (Helleiner and Pagliari, 2009), as well as mortgage-backed securities and credit default swaps. Of course what happened next is history: these financial innovations caused a global financial crisis and led to a swing back to regulation based on the 'Visible Hand' of the government, although perhaps due to regulatory capture or political connections there seems to be a lack of political will to regulate the most profitable areas: OTC derivatives, hedge funds, and ratings agencies (Pagliari, 2012).

In looking at the future of financial regulation, the trend would seem to be toward self-regulation. Self-regulation is greatly favored by the Anglo-American global financial system, and this system's dominance means that future regulations will likely take the 'light-touch' approach favored by New York and London as opposed to the more 'heavy-handed' approach favored by the EU and Japan (Helleiner and Pagliari, 2009).

3.3.4 – Non-Trial Resolutions

A further reason that regulations may not be seen as effective is the widespread use of NTRs in cases of financial crime and misconduct. Although NTRs are enshrined in law in only a minority of countries, a majority of countries have 'cooperation processes' used in legal cases

(Rui and Søreide, 2019). Although NTRs are known by a number of different names depending on jurisdiction, Rui and Søreide (2019) provide for there being two forms:

1. *De jure* settlements provide a true alternative to a trial. A *de jure* settlement will offer the lure of a reduced penalty and avoidance of a trial in exchange for good behavior on the part of the target firm. As *de jure* settlements are codified in law, they promote transparency and behavior modification on the part of firms; a firm offered a *de jure* settlement will be incentivized to self-report infractions and self-police itself in the future (Rui and Søreide, 2019).

2. *De facto* settlements are not enshrined in legal codes but serve essentially the same purpose as *de jure* settlements. A de facto settlement trades leniency for cooperation. Unlike a *de jure* settlement, a *de facto* settlement requires an admission of guilt on the part of the targeted firm. As *de facto* settlements are an ex-post punishment they have much less power to modify behavior than *de jure* settlement; for some companies negotiating a de facto settlement could simply be a cost of doing business (Rui and Søreide, 2019).

NTRs can be an ideal method for resolving cases of corporate misconduct, providing a time and cost-effective solution for both governments and firms (Rui and Søreide, 2019). Despite this, settlements can often be seen as unjust; if punishments are too small there could be a public outcry as companies are thought to have essentially 'gotten away with it' (Rui and Søreide, 2019). These feelings of injustice can often arise due to the disparity between different sanctions allowed by different jurisdictions (Makinwa and Søreide, 2018). For example, the largest sanction handed out in an NTR was $3,23 billion in a settlement negotiated by Braskem and Odebrecht with the governments of Brazil, Switzerland, and the US. Contrast this with the smallest, 1 CHF. [0.98 USD] paid to resolve the 2017 Banknotes case in Switzerland (Makinwa and Søreide, 2018).

Per Makinwa and Søreide (2018), "settlements have been the predominant means of enforcing foreign bribery and other related offenses" (Makinwa and Søreide, 2018 p. 13). In a way this makes sense, NTRs are cost-effective and save time in overburdened court systems;

on the other hand this can lead to popular feelings of resentment and injustice against companies. Despite the widespread use of NTRs, it is usually not possible to judge whether they are effective, as sanctions are typically only handed out after trials, something NTRs are used to avoid (Makinwa and Søreide, 2018). Despite this, the use of NTRs combined with political connections, regulatory capture, and self-regulation could easily lead to AML regulations not being effective in stopping money laundering.

3.3.4.1 - Secrecy in Settlements

While NTRs by any name have their place in law and regulation, there is one common characteristic which can significantly impede their effectiveness: Secrecy. A majority of all jurisdictions using NTRs provide for secret agreements between parties, with any disclosures punishable by law. This can have a number of positive effects, particularly as regards individual privacy in sensitive matters, however in the case of settlements between regulators and firms these positive effects do not seem to materialize (Zitrin, 1999).

A main selling point of secrecy in settlements is privacy. For individuals, this could mean keeping private details (for example something embarrassing or particularly personal) out of the press; for companies this could mean not needing to fear further lawsuits from anyone who saw the results of a previous suit (Zitrin, 1999). Also touted as a benefit is that secrecy incentivizes firms to resolve their issues without a trial, reducing the burden on often overburdened courts; indeed this reduction of court cases is one of the principal arguments for NTRs in general (Drahozal and Hines, 2006).

It is plain to see that secrecy can be desirable in some situations, particularly those which involve private citizens and sensitive matters, but while individuals should be afforded at least a modicum of privacy, the literature suggests that no such offer should be made to firms. Secret NTRs turn the court systems, a publicly-funded public good, into an instrument for corporate abuse of the public (Knutsen, 2010). Knutsen (2010), argues that secret settlements can incentivize suppression of information. At best this can disadvantage future litigants in related suits, and at worst it can endanger lives (Knutsen, 2010). Take for example the settlement Firestone Tires negotiated with US regulators: it was found that certain tires on certain vehicles had vastly increased chances of failure, failure which led to the deaths of 148

people (Drahozal and Hines, 2006). Rather than take the case to court, the US government chose to settle with Firestone and allow the details to be sealed; Firestone recalled the tires, but with no public admission of wrongdoing their victims were not able to claim relief, as it was not apparent that the issues were due to negligence (Drahozal and Hines, 2006).

It appears that secret settlements are used most often in important or politically connected cases. An NTR in such a case can quietly allow the government to extract a fine from firms, without alarming shareholders or exposing the firm to further suits (Knutsen, 2010). But perhaps the two greatest arguments against secrecy in NTRs are these:

1. There are no links between secrecy in NTRs and the use of NTRs. The amount of cases resolved without going to trial is not significantly different in jurisdictions which allow secrecy, and those which forbid it (such as Florida and Texas) (Zitrin, 1999). What this means is that firms will be just as likely to take an option which will not burden the courts in a secrecy jurisdiction as they will in a non-secrecy jurisdiction, totally eliminating one of the main stated benefits of NTRs.

2. Secrecy in NTRs provides no deterrent effect. If firms can act in unethical or illegal ways, pay a secret fine, and carry on with impunity, other firms will assume that they can as well (Drahozal and Hines, 2006). While no literature has been found to support this, it is not unreasonable to think that the ability to keep settlements secret may even incentivize more illegal behavior if firms know they will not face a public backlash.

3.3.5 - Importance

While most countries have acknowledged that money laundering is a problem, and may have implemented strong regulations to prevent it, banks in certain countries continue to launder money with impunity. As described in Section 2.5, the sums of money involved in global money laundering schemes are almost impossibly large, thus the profits must be correspondingly large. Herein lies the reason why so many banks launder money and why so many countries turn their backs to it: Profit (Cuellar, 2003).

For banks as well as all businesses, profit is the most important thing in the world, and if record profits can be earned facilitating laundering money it makes perfect business sense to facilitate money laundering. For money laundering banks, fines can simply be a cost of doing business if profits are sufficiently large and regulators sufficiently cowed by the consequences of shutting them down (Cuellar, 2003). Even if regulators feel emboldened to sanction banks for financial misconduct, the threat of their relocation is often enough to get the regulators to back off (Young, 2012).

The importance of a financial sector to its economy gives banks in countries dominated by financial services outsized power in dealing with regulators. Financial services have been proven to stimulate economic growth through capital accumulation and improved economic efficiency (King and Levine, 1993). For countries like Switzerland, where the financial services sector produced 12,8% of gross domestic output and fully 10% of jobs are linked to financial services (Swiss Bankers Association, 2016), even a hint that legislation could harm financial services could be enough to ensure it is not passed. This fits with research by King and Levine (1993) stating that there is not any specific government policy that will strengthen the financial sector. Strengthening the financial sector is as simple as not enacting policy which will harm it.

3.4 – Financial Intelligence Unit Effectiveness

FIUs are designed to combat money laundering and terror financing. However, due to their relatively recent widespread adoption the body of research focusing on their efficacy in their roles is small, and country specific. This may be due in large part to the fact that there are no unified standards for evaluating an FIU, as well as the difficulty inherent in evaluating an agency which may be held to different laws in different countries, to say nothing of the different organizational methods.

One of the main issues which could prevent FIUs from being as effective as possible in combating money laundering is that a majority of them are organized along an Administrative or Judicial Model (Al-Rashdan, 2012). Looking at Table 4.2 it can be seen that twenty five of the forty FIUs evaluated in this thesis are organized following one of these two models, which means that these FIUs must rely on other entities to execute their judicial or law enforcement

orders. A lack of capacity for effective enforcement could lower the efficacy of the most dedicated FIU as their partners in law enforcement or the judiciary might be less enthusiastic about enforcing AML law (Chohan, 2019). In addition to this, FIUs typically act as intermediaries; they collect information from financial institutions, analyze it, and pass it on to relevant authorities (Masciandaro, 2005). Adding an extra step, often to an agency completely separate from the judiciary or law enforcement, in the flow of information could seriously hinder investigation timelines in money laundering cases, particularly in countries with poor infrastructure (Masciandaro, 2005).

Simwayi and Haseed's (2011) paper analyzed the formation and working methods of three FIUs in Zimbabwe, Zambia, and Malawi. In doing so, they found a few key characteristics of an FIU which will enable it to be more effective: Trust from the community in which it operates, sufficient funding from the government, acceptance that its work is necessary, and government support for its activities. The paper found that forming an FIU can significantly reduce the prevalence of money laundering in developing countries which are most prone to it, but that lacking even one of these elements could significantly harm effectiveness (Simwayi and Haseed, 2011). The example is given of Zimbabwe, which formed an FIU but failed to give it the governmental support which it needed, and as a result its efficiency was well below that of its neighbors (Simwayi and Haseed, 2011).

Tied to government support, but perhaps more important than any other quality is sufficient training, not only for the employees of the FIU but for those working in the financial sector (Simwayi and Haseed, 2011). Without adequate training on both what to report and why reporting is important, an FIU will not receive enough STRs to be able to fulfil its duties. While these results may not be applicable to developed countries, there is no reason to think that trust, training, and government support would not also help an FIU in a developed country.

Another set of requirements for FIUs to be effective are high-quality data, independence, and regular publication of reports (Sathye and Patel, 2007). High-quality data from financial institutions, as well as proper information infrastructure can contribute to success for an FIU. This is because the FIU can be thought of as a 'data processor' which takes inputs of financial data and processes them into 'financial intelligence'. This is a process which involves

"information collection, evaluation, collation, integration and analysis" (Sathye and Patel, 2007, p. 393). If the FIU receives high quality financial data then it will output high quality financial intelligence, but with low quality or incomplete data the output will necessarily be of a substandard quality.

Independence is another important requirement. Political considerations can all too often affect prosecutorial and investigatory decisions, thus an independent FIU will be able to investigate whosoever it so choses without fear of political interference. Sathye and Patel (2007) attribute AUSTRAC's status as a leading FIU to its independence from political influence.

Finally, for an FIU to operate successfully, it requires trust: both from the general public and financial professionals. Sathye and Patel (2007) further claim that one of the best ways to build this trust is to publish regular activity reports so that the public and professionals can see that money laundering is being taken seriously, and the STRs will be acted upon, not simply ignored.

Despite the difficulties in evaluating FIUs from different countries, Sathye and Patel (2007) presented an analysis of the differences between AUSTRAC, the FIU of the Commonwealth of Australia, and FIU-IND, the FIU of the Republic of India. The paper makes no secret of the fact that AUSTRAC is far more effective and well-regarded than FIU-IND and instead of simply showing that AUSTRAC is better the authors evaluate them both on the same criteria to attempt to show why AUSTRAC excels where FIU-IND does not. One of the reasons presented is that AUSTRAC, founded in 1988, is simply much older and thus more experienced in its role than is FIU-IND, founded in 2005 (Sathye and Patel, 2007).

Building on previous research, the authors present a list of ten criteria by which an FIU can be evaluated:

1. Rationale and legislative foundation for establishment
2. Ownership and authority vested in FIU
3. Main objectives of the FIU

4. Processes used to achieve the objectives
5. Organization and management of the FIU
6. Financing arrangements for the FIU
7. Role of FIU in relation to other national agencies and government
8. Autonomy and accountability for FIU
9. Dissemination of information
10. Outcomes achieved by the FIU

(Sathye and Patel, 2007, p. 395)

In looking at these ten criteria, what makes FIUs effective can be easily seen. Although the FIUs analyzed for this thesis will not be evaluated according to these criteria, it stands to reason that given such a number of important qualities for an FIU, many will fail to meet the mark of effectiveness. This essentially means that while a country may have an FIU, there is no guarantee that it will be willing to or capable of executing its mission.

This is further compounded by how the International Monetary Fund (IMF) and World Bank check countries for compliance with the FATF's recommendations. Instead of evaluating FIUs for effectiveness, these organizations simply check whether one exists at all, or whether there is a basis to form one in a country's legal code (Sathye and Patel, 2007). This lack of due diligence means that any country who simply establishes an agency called a 'Financial Intelligence Unit' can pass the IMF and World Bank checks of compliance with FATF recommendations. What this could lead to is countries establishing FIUs to appear committed to fighting money laundering on the international stage while failing to properly fund, staff, or support their FIUs at home. Nearly as important as proper staffing and training is a proper basis in law for cooperation. One of the main impediments to cross-border FIU collaboration is an inability for FIUs to share information with FIUs organized along different models (Gelemerova, 2008).

While this section has mostly focused on FIUs with no enforcement power, what of those organized in a Judicial or Law Enforcement model? For FIUs with the power to enforce regulations, the main limit on their effectiveness is the form of sanctions they employ. FIUs with enforcement power almost exclusively use 'soft sanctions', defined by Al-Rashdan as

"persuasion, cooperation, self-regulation, risk-based discretion and, sometimes, "private remedies"" (Al-Rashdan, 2012, p. 488-489). Soft sanctions are distinct from 'harsh sanctions' which include things like heavy fines or criminal charges (Al-Rashdan, 2012). Al-Rashdan (2012) offers three reasons on why most FIUs favor soft over harsh sanctions:

1. *Risk-Based Approach*: More countries have changed to a risk-based approach (RBA) to combating money laundering, marking a shift from the previous rules-based regimes. Rules-based regimes traditionally involved heavy monitoring of financial institutions designed to detect any suspicious behaviors (Al-Rashdan, 2012). The RBA shifted the burden to the financial institutions, effectively making them in charge of monitoring themselves in an effort to avoid overreporting (Al-Rashdan, 2012). The issue with an RBA is that reporters are themselves responsible for deciding what is worth reporting, which adds an element of uncertainty into the process as different institutions and individuals may have different perceptions of what is suspicious (Al-Rashdan, 2012).

2. *Regulatory Capture*: As described in the previous section, regulatory capture occurs when an industry regulator is crippled to the point of ineffectiveness, either by lawmakers or by its own directors. The author gives the example of the US Sentencing Commission, which under pressure from lobbyists reduced the fines it had handed out by up to 97% (Al-Rashdan, 2012). Regulatory capture of an FIU could thus render it ineffective in combating money laundering. This ties in to Section 3.3.2, as it shows that regulatory capture can affect not only the top level financial regulators like the SEC in the US, but also those bodies specifically charged with fighting money laundering.

3. *Existing Legal Infrastructure*: As laws are usually quite slow to change, any FIU wishing to impose harsh sanctions may be barred by law from doing so. This could occur if a legal system is based on soft sanctions and would persist until such a time as it was modified to accept harsh sanctions (Al-Rashdan, 2012).

3.5 – Banking Sector Size and Measurement

Since the 2008 Financial Crisis and the rise of 'too-big-to-fail' banks, there has been increasing interest in measuring the size of any given country's banking sector to determine whether it might hold a systemic risk, that is, a risk that the failure of one bank could cause a domino effect and collapse all the other banks in the system as well (Zhou, 2009). It would seem that the main issue in determining the size and significance of the problem is that there does not seem to be consensus on the ideal method of measuring the size of a banking system.

In their paper Beck, Demirguc-Kunt, and Levine (2000) propose a variety of different relative and absolute ways to measure banking sector size. They provide three methods each for relative and absolute measurement, one for the central bank, one for deposit institutions, and one for all other financial institutions. For the purposes of this thesis, only deposit institutions will be considered. Beck et.al. (2000) thus propose the following two ratios: the ratio of deposit money bank assets to total financial assets, and the ratio of deposit money bank assets to GDP. These ratios should in theory provide an accurate measurement of the size of a country's banking sector.

Schoenmaker and Werkhoven (2012) offer a very similar method, using a different ratio, in their 2012 paper on the appropriate size of the banking system. They propose a ratio of all banking assets in the country divided by GDP. The authors acknowledge that while using GDP ratios is an excellent way to divine the size of a banking sector, it does not fit exactly with their stated goal of determining its ideal size. However, for the purposes of this thesis, any method which produces an accurate estimate of a banking sector is sufficient. Schoenmaker and Werkhoven (2012) also note that when using an assets/GDP ratio, it is absolutely vital that assets be determined on a 'residence basis'. That is to say, assets in a country should be counted regardless of whether they belong to a nationally headquartered institution or a foreign one. This allows a much better estimate of the size of banking sectors in global financial centers which may be home to dozens of banks not headquartered in that country (Schoenmaker and Werkhoven, 2012).

3.6 – Measuring Money Laundering

3.6.1 – Introduction

Measuring money laundering in an economy presents a number of problems: first and foremost is that as an illegal activity, those who launder money strive to avoid detection. Thus, it can be extremely difficult to get an accurate measurement of the money laundering actually occurring. Second, there is no one set method for forming an estimate of money laundered, instead there are a number of different methods, ranging from counting the number of enforcement actions in a country, to using Balance of Payments data to calculate illicit capital flows. For the purposes of this thesis, three different methods will be examined.

3.6.2 – The Walker Model

John Walker's eponymous Walker-Gravity Model was first developed in 1999 as a way to measure the attractiveness of different countries to money launderers (Hendriyetty and Grewal, 2017). This model, as well as the simplified Walker Model, uses economic theory and country-specific information to estimate the financial flows into a country from other countries or the total money laundering activity in any given country, respectively. Hendriyetty and Grewal (2017) note that the main weakness of Walker's models is that they may tend to over exaggerate the problem, that is, that they estimate there to be more money laundering than actually exists. Of course, there are also benefits to this model, namely that it eliminates the possibility of double-counting money.

Of all the models examined here, Walker's would appear to have been the most studied. This provides the benefit of it having been peer-reviewed, as well as examined for accuracy. For instance, in their paper examining the measurement of money laundering, Hendriyetty and Grewal (2017) report that the Walker Model estimates money laundering in the US at $1.3tn, which is reasonably close to the US Office of National Drug Policy's estimate of $858bn.

Despite the widespread acceptance of this model, there are some other issues. First are the components of the model itself, namely what is included and what is left out. The Walker Model uses GDP/capita, Bank Secrecy, Government Attitude towards Money Laundering, Conflict, SWIFT (Society for Worldwide Interbank Financial Telecommunications) membership, and Corruption to attempt to form an estimate of money laundering.

Of these six factors, only two are absolutely objective: SWIFT membership and GDP/capita. This implies that the other four factors are subjective, which is to say that if ten researchers independently evaluated the same country with Walker Models, they would likely all find different results. This poses a serious question as to this model's reliability and places serious doubt on the ability of others to replicate any results dependent on this model obtained in this thesis.

The subjectivity of the four factors is further compounded by the fact that there is no one generally accepted way to measure any of them. The closest would be to use the Corruption Perceptions Index (CPI), as was done in this thesis, but the CPI has its own set of problems, namely that it measures perceptions and not corruption. That the CPI measures perceptions may, however, be significant; if businesses or individuals perceive a country as being corrupt, they may be more inclined to attempt to launder money or engage in corruption which would produce money which needs laundering.

Taking another example, consider Conflict. While some might consider a country like Spain to be in conflict due to separatism and political instability in the Basque Country and Catalonia, others would only consider armed conflict. Others still may consider external armed conflict such as a foreign intervention (for example the US or Turkey in Iraq and Syria) but not domestic non-civil war conflicts (such as the Mexican Drug War or land-clashes in Brazil). Absent a concrete measurement system for the four subjective factors presented in the Walker Model, all results must be taken with a great deal of scrutiny.

There are also questions to be raised about the factors included. The most notable issue is the inclusion of SWIFT. Nearly every bank on Earth is a member of SWIFT, with the main exceptions being those banks in Iran and North Korea who are also excluded from the US dollar-based financial system.

Another issue with the Walker Model is its omissions. As stated in Section 3.1, crime produces illicit money which needs to be laundered. Despite this there is no attempt to measure crime, apart from corruption, in the Walker Method. While the other factors may be seen to

compensate for the lack of crime measurement, it would be interesting to determine whether a revised model including crime rates would produce a more accurate figure.

Despite these misgivings, this thesis will still use the Walker Model to estimate money laundering. Its widespread acceptance and use in other studies indicate that while there may be issues, it has been reliable in the past and should continue to be reliable for the purposes of this thesis.

3.6.3 – Hot Money

The second method to be examined is the so-called 'Hot' Money method, which attempts to measure short-term capital exports using errors and omissions in Balance of Payments (BoP) data provided by the IMF (Hendriyetty and Grewal, 2017). The Hot Money method looks for unexplained amounts, specifically discrepancies and errors which indicate unreported capital flows.

The Hot Money method was first proposed in 1993 by Stijn Claessens and David Naude (1993) in a paper entitled *Recent Estimates in Capital Flight.* In it they discuss four different methods of estimating capital flight from a country, three of which use BoP data and the final which uses Direction of Trade data. While all three of their BoP-based methods seem structurally sound, the authors admit in their paper that all three produce very dissimilar estimates of capital flight (Claessens and Naude, 1993). Despite this, Hendriyetty and Grewal argue that of the three methods presented in Claessens and Naude's paper, Hot Money should be the most accurate for estimating money laundering, as it is based primarily on errors and omissions in the BoP data (Hendriyetty and Grewal, 2017).

This method has two major drawbacks: First, that statistical errors in BoP data will be captured as money laundering as a result of the manner in which it is calculated, an effect which is far more pronounced in developing countries (Hendriyetty and Grewal, 2017). Second, that illegal flows may be overestimated due to legitimate transfers by governments which may not have been recorded (Claessens and Naude, 1993).

Again, despite these misgivings the Hot Money Method's inclusion in this thesis is believed to be justified. Not only does it present an alternative method for estimating something equivalent to money laundering, but that two calculation methods for Hot Money were used and averaged should have the effect of producing a more accurate estimate.

3.6.4 – IMF

The final method examined here is also the simplest, and per Hendriyetty and Grewal, one of the most quoted by researchers. It is the IMF's official estimate of money laundering in any given economy, which they have estimated at between 2 and 5 percent (Camdessus, 1998). While no justification for this figure is found in the report where it is given, that it was produced by the IMF and reported by its Managing Director at the FATF's annual meeting should be seen as indicating its reliability and credibility.

3.7 – Conclusions

The preceding sixteen sections and subsections have covered a great deal of ground regarding a variety of topics related to money laundering, regulations, regulatory enforcement, and measuring money laundering and banking sectors. Thus it is prudent to use this section to present a number of conclusions which can form the basis for the hypotheses presented in the following section.

First and foremost, the literature has revealed that there does not exist specific information on the main drivers of large-scale money laundering; Section 3.1 [Determinants of Money Laundering] rightfully claims that 'crime demands crime' or that crime leads to money laundering which leads to crime. This is supported by Section 2.4 [Why is Money Laundering a Problem?] which highlights that money laundering provides a vital source of funding for multinational criminal groups. The most significant, if vague, driver of money laundering proposed in Section 3.1 is that higher development levels will lead to more money laundering – an intuitive idea as more development is strongly associated with more money.

Sections 2.6 [Regulation] and 3.2 [Regulatory Enforcement] cover the regulation of money laundering, taking an in-depth look at regional regulations in the US and EU; an international AML body, the FATF; and two specific tools used to combat money laundering, FIUs and STRs.

These inform on the specificities of regulation, and the most significant conclusion is that the financial industry is heavily regulated to prevent money laundering and other forms of financial misconduct.

Section 3.3 [Regulatory Effectiveness] presents five theories as to why in such a regulated industry, there remains so much money laundering. Political Connections and Regulatory Capture would suggest that due to the ever-closer union between firms and their allies in government, the balance of power has shifted to firms. This has enabled them to enact such policies as Self-Regulation and to promote the use of secret Non-Trial Resolutions. All of these trends combine to ensure that while lip-service is duly paid to the idea of regulations, regulatory agencies themselves remain toothless in the face of bad actors. One of the most significant conclusions can be drawn from Section 3.3.5 [Importance]. What truly protects banks from regulatory oversight is their importance, not only politically as job creators and political lobbyists, but as contributors to the national coffers. In countries where financial services dominate the economy, financial firms are truly 'Too Big to Regulate'. This gives banks inordinate power as they simply veto any regulations they dislike with well-placed political donations or threats to withdraw from national markets.

Section 3.4 [Financial Intelligence Unit Effectiveness] covers the effectiveness of the agencies charged with investigating and preventing money laundering: Financial Intelligence Units. FIUs vary greatly in their effectiveness, due primarily to their organizational methods. Law Enforcement and Judicial FIUs have the greatest capacity to be effective, but at huge financial cost. Administrative and Investigative FIUs are significantly cheaper but lack important enforcement powers. No matter the model, the fact remains that any FIU can be rendered harmless through regulatory capture. Overall, the main impediment to measuring FIU effectiveness can be said to be a lack of unified standards; there is no accepted 'best model' of an FIU to compare against, creating problems in determining value-for-money when it comes to FIU funding.

3.8 – Hypotheses

Pursuant to the literature analyzed above, the research questions, outlined in Section 1.2, are again considered:

> *Is money laundering more or less prevalent in countries with large banking sectors as opposed to small banking sectors?*
>
> *Do countries which provide more funding to anti-money laundering efforts experience less money laundering?*

On the basis of these questions and the above literature on the determinants of money laundering, money laundering regulation, regulatory effectiveness, and financial intelligence units, two hypotheses were formulated. These are presented below:

3.8.1 – Hypothesis 1

Hypothesis 1 is as follows:

> *Countries with larger banking sectors will experience more money laundering.*

Section 3.1 finds that more developed countries will experience more money laundering, up to a point. It can be expected that developed countries will have larger banking sectors than undeveloped countries, creating a link between the two. Section 3.3 presents five reasons why, although money laundering is regulated, money laundering can be expected to be higher in countries with larger banking sectors. A country with a larger banking sector will have closer ties between politicians and bankers, ties which would undoubtedly help enact policies favorable to banks. A larger banking sector could also indicate systemic importance of banks to an economy, which would afford banks more oversight into their own regulation as well as opening doors for regulatory capture. Finally, the increased use of NTRs and secrecy in settlements means that even when firms are sanctioned for money laundering there will be no deterrent effect on the rest of the industry.

This all adds up to a good amount of support for Hypothesis 1. Based on the literature, it can be inferred that there could very well exist a positive relationship between banking sector size and money laundering.

3.8.2 – Hypothesis 2

Hypothesis 2 is as follows:

> *A higher level of FIU funding does not translate into higher FIU effectiveness among the countries analyzed.*

Sections 2.6.4 and 3.4 provides the basis for this hypothesis. These sections focus on FIUs, and what leads them to be effective in their mission. At its core, this hypothesis is based on the findings that there exists a point of diminishing returns for FIU funding, and as all forty countries analyzed are developed, they can be assumed to have reached this point. It is hypothesized that higher funding will not lead to higher effectiveness as the levels of FIU funding needed to make a significant impact are simply too high.

However, Section 3.3 is also relevant to this hypothesis. Regulatory capture and connections between firms and politicians could lead to higher levels of funding, but any investigation results being suppressed.

SECTION 4 – METHODOLOGY

As stated in the literature review, there are a multitude of methods for calculating both size of a banking sector, as well as for estimating money laundering in economies. This section will focus on the methods used to calculate these values in this thesis, as well as the analyses undertaken on the data.

4.1 – Money Laundering Calculation

The three methods chosen to estimate money laundering in this thesis are the Walker Model, the Hot Money method, and the IMF's estimate of 2-5% of GDP. These methods were specifically chosen due to their use of publicly available data. During the data collection phase, a number of other methods were considered[4] (f. ex. The Dynamic Multiple-Indicators Multiple-Causes [DYMIMIC] model and the Dynamic Two-Sector Equilibrium model) although these were rejected due to significant difficulty in obtaining useful data. It is also worth noting that of the three methods, only the Walker Model and the IMF estimation actually estimate money laundering; the Hot Money method measures capital flows unreported in the Balance of Payments data of a country and uses this as an analogue for money laundering.

4.1.1 – The Walker Model

The first method used was the Walker Model. The Walker Model can be written as follows (Walker and Unger, 2009):

$$M_j = \left(\frac{GNP}{capita}\right)_j \times (3BS_j + GA_j + SWIFT_j - 3CF_j - CR_j + 15)$$

Where:

M_j = The proceeds of crime in country *j* which must be laundered

BS_j = Bank secrecy in country *j*

GA_j = Government attitude in country *j*

$SWIFT_j$ = Whether country *j* is a member of SWIFT

CF_j = Conflict in country *j*

CR_j = Corruption in country *j*

[4] Also considered was counting cases of money laundering as reported by companies, courts, and reporters. However this method was deemed to be cost and time prohibitive.

Of these factors, Walker and Unger (2009) provide a set of 27 recommended questions to help evaluate positions on Bank Secrecy and Government Attitude. The entire set of 27 questions can be found in Appendix 1. The questions are grouped into five categories: *Criminal Law, Company Law, Banking Law, Administrative Regulations, and International Cooperation Provisions*. While no specific context is given by Walker and Unger, for the purposes of this study *Banking Law* and *Administrative Regulations* were taken to mean *BSj*, and *Criminal Law, Company Law,* and *International Cooperation Provisions* were taken to mean *GAj*. This choice was made as a result of the questions themselves; grouping the questions into the selected categories seemed to make them fit together as a better representation of Bank Secrecy and Government Attitudes in any given country. The answers to the questions were gathered from a multitude of sources, most significantly FATF reports and the website of Healy Consultants Group plc., an advisory firm which helps its clients set up businesses in foreign countries and contains a great deal of information regarding *Company Law*, *Banking Law,* and *Administrative Regulations.*

All 27 questions are formed in a very simple way, which while leaving quite a lot of room for ambiguity does let all questions be answered with a simple 'Yes' or 'No'. Because of this simplicity in the questions, a '1' was taken to mean 'Yes' and a '0' to mean 'No'. Once all questions were answered, the totals were added and combined into the final *BSj*, and *GAj* scores. These were then added to the equation.

The next factor is $SWIFT_j$ which represents whether a country counts itself as a member of SWIFT (SWIFT, 2019). SWIFT, founded in 1973, is a service created to facilitate international interbank transfers, replacing the old system of using Telex (SWIFT, 2019). As SWIFT is a globally accepted system, it stands to reason that any countries excluded from it would be more prone to money laundering. As above, there is no in-between in SWIFT, either a territory uses it, or it does not, thus a '1' is used if a country is a member of SWIFT and a '0' if not.

The next factor is *CFj* which signifies if a country is currently in an internal or external conflict. This is valuable to measure as countries which are experiencing conflict, as well as those which border them are prone to experiencing higher levels of money laundering, both as a result of money being moved out of the country illicitly but also money moving in to finance one or

more parties to the conflict (FATF and APG, 2015). For this factor, a bit of subjective judgment was required. Of the forty countries analyzed, five were found to be engaged in domestic or international conflicts: Brazil, Mexico, Russia, Turkey, and the US. Of course, not all conflicts are equal to each other – Russia's invasion and occupation of Ukraine cannot be argued to be the same as Brazil's armed clashes between Amazon tribes and developers. Thus, these countries were ranked on a scale of 10, with a higher score corresponding to more deaths in combat.

The US was ranked a 2, given that 22 soldiers died in its wars in Afghanistan and Iraq in the year 2015 (iCasualties, 2019). Next was Brazil which had 70 soldiers and civilians die in land-clashes in the Amazon rainforest, which gives it a score of 3 (Cowie, 2018). Next was Turkey which saw 1.700 die in separatist violence in Kurdistan, giving it a score of 5 (Mandıracı, 2016). Russia was given a 6 on account of its purported 2.000 combat deaths in Ukraine (Gregory, 2015). Finally, Mexico was given a 10 due to its intense cartel-fueled violence claiming upwards of 23.000 lives (Roberts, 2017). In addition, Greece was given a score of 2 to account for its proximity to Turkey as well as in consideration of the migration crisis.

The final consideration for the Walker Model is its use of corruption. Fortunately, there has already been a great deal of research into quantifying corruption levels in various countries. For the purposes of this thesis, Transparency International's Corruption Perceptions Index (CPI) will be used. The CPI uses a variety of surveys to measure the perceived corruption in public sectors. Although the CPI has come under criticism for merely being a measurement of the *perception* of corruption, a 2002 study found a high degree of correlation between countries with a higher CPI score and other indicators of corruption (Wilhelm, 2002). It is for this reason that its use may be justified in this case.

4.1.2 – IMF Estimates

The second estimation of money laundering in the target countries is to use a generally accepted measure developed by the International Monetary Fund (IMF) of between two and five percent of GDP (Hendriyetty and Grewal, 2017). While this estimation may leave something to be desired when it comes to customization by country, it is exceedingly simple to find information on. In the interest of neither over nor under-estimating values of money

laundering, an average value was calculated and applied to GDP information from each target country. Information about GDP was found on the website of the World Bank. The formula used to calculate this estimate was as follows:

$$ML_j = GDP_j \times \frac{(0.02 + 0.05)}{2}$$

Where:

ML_j = The estimated money laundering in country *j*

GPD_j = The Gross Domestic Product of country *j*

4.1.3 – Hot Money

The final estimation method for money laundering used in this thesis is the Hot Money method. This method used a variety of data contained in the Balance of Payments information of any given country. As stated previously, there are three variations of this method. However, due to unattainable information only the first and third variation were used. Additionally, an average value of both the totals was taken and was used for the analyses. The equations for the Hot Money method are as follows (Claessens and Naude, 1993):

Hot Money Variation 1:

$$Hot\ Money_1 = -(G + C_1)$$

Hot Money Variation 3:

$$Hot\ Money_3 = -(G + C + D_1 + D_2)$$

Where:

$Hot\ Money$ = Estimated unreported capital transfers

G = Net errors and omissions

C = Other short-term capital of other sectors

C_1 = Other assets

D_1 = Portfolio investment – Other bonds

D_2 = Portfolio investment – Corporate equities

The equation producing the final result brought forward to the analyses was as follows:

$$Hot\ Money_{Avg} = \frac{(Hot\ Money_1 + Hot\ Money_3)}{2}$$

All data used in the calculation of capital flows through the Hot Money method was found on the website of the World Bank (World Bank, 2019c).

4.2 – Banking Sector Size Calculation

The method used for calculating the size of national banking sectors is that proposed by Schoenmaker and Werkhoven (2012), a ratio of all banking assets in a country divided by Gross Domestic Product. The equation used to produce this ratio is as follows:

$$Sector\ Size_j = Bank\ Assets_j / GDP_j$$

Where:

$Sector\ Size_j$ = The ratio of bank sector size to GDP in economy *j*, with a larger ratio signifying that the sector is larger

$Bank\ Assets_j$ = Total assets of all banks operating in country *j*, excluding assets of the Central Bank

GDP_j = Gross Domestic Product in country *j*

All information regarding GDP was taken from the website of the World Bank, as it was for previous calculations in this thesis. The information regarding total bank assets used in these calculations was taken directly from the central banks of the target countries, which are listed in the table below:

Table 4.1: Central Banks and GDP by country

Country	Central Bank[5] (National Language)	Central Bank (English Translation)	GDP[6] (100.000 of USD)
AUS[2]	Reserve Bank of Australia	-	$13 490 300,00
AUT[*3]	*Oesterreichische Nationalbank*	Austrian National Bank	$3 820 660,00
BEL[*3]	*Banque nationale de Belgique*	National Bank of Belgium	$4 550 400,00
BRL[1]	*Banco Central do Brasil*	Central Bank of Brazil	$502 013,15
BGR[*5]	*Българска народна банка*	Bulgarian National Bank	$18 022 100,00
CAN[1]	*Banque du Canada*	Bank of Canada	$15 596 200,00
HRV[*5]	*Hrvatska narodna banka*	Croatian National Bank	$6 792 890,00
CYP[*†5]	*Κεντρική Τράπεζα της Κύπρου*	Central Bank of Cyprus	$196 806,25
CZE[*4]	*Česká národní banka*	Czech National Bank	$1 868 300,00
DNK[*†3]	*Danmarks Nationalbank*	-	$33 756 100,00
FIN[*†3]	*Suomen Pankki*	Bank of Finland	$3 012 980,00
FRA[*†1]	*Banque de France*	Bank of France	$11 977 900,00
DEU[*†1]	*Deutsche Bundesbank*	German Federal Bank	$2 324 650,00
GRC[*3]	*Τράπεζα της Ελλάδος*	Bank of Greece	$24 382 100,00
HUN[*4]	*Magyar Nemzeti Bank*	Hungarian National Bank	$28 855 700,00
IRL[*3]	Central Bank and Financial Services Authority of Ireland	-	$1 955 420,00
ITA[*1]	*Banca d'Italia*	Bank of Italy	$494 901,42
JPN[1]	*日本銀行*	Bank of Japan	$1 228 790,00
LVA[*5]	*Latvijas Banka*	Bank of Latvia	$2 906 170,00
LTU[*5]	*Lietuvos Bankas*	Bank of Lithuania	$18 328 700,00
LUX[*†4]	*Banque centrale du Luxembourg*	Central Bank of Luxembourg	$43 949 800,00
MLT[*†5]	*Bank Ċentrali ta' Malta*	Central Bank of Malta	$415 086,09

[5] Sources in Section 9.3 – Financial Intelligence Unit and Suspicious Transaction Reports Sources
[6] World Bank, 2019a

Country	Central Bank (National Language)	Central Bank (English Translation)	GDP (100.000 of USD)
MEX[2]	*Banco de México*	Bank of Mexico	$577 844,95
NLD[*†2]	*De Nederlandsche Bank*	Bank of the Netherlands	$269 728,63
NZL[4]	Reserve Bank of New Zealand	Reserve Bank of New Zealand	$11 705 600,00
NOR[*3]	*Norges Bank*	-	$105 546,70
PAN[5]	*Superintendencia de Bancos Panamá*	Superintendency of Banks of Panama	$7 579 990,00
POL[*†3]	*Narodowy Bank Polski*	National Bank of Poland	$3 866 630,00
PRT[*†4]	*Banco de Portugal*	Bank of Portugal	$1 776 210,00
ROU[*4]	*Banca Națională a României*	National Bank of Romania	$540 917,14
RUS[2]	*Центральный банк Российской Федераций*	Central Bank of the Russian Federation	$4 769 710,00
SGP[†3]	Monetary Authority of Singapore	-	$1 994 200,00
SVK[*4]	*Národná banka Slovenska*	National Bank of Slovakia	$1 778 930,00
SVN[*5]	*Banka Slovenije*	Bank of Slovenia	$13 684 000,00
ESP[*2]	*Banco de España*	Bank of Spain	$3 040 980,00
SWE[*2]	*Sveriges Riksbank*	-	$875 014,24
CHE[†2]	*Banque Nationale Suisse*	Swiss National Bank	$430 724,15
TUR[2]	*Türkiye Cumhuriyet Merkez Bankası*	Central Bank of the Republic of Turkey	$4 979 180,00
GBR[*1]	Governor and Company of the Bank of England	-	$8 597 970,00
USA[1]	Federal Reserve System	-	$181 207 000,00

(*) = Member of EU or EEA.
(†) = Large banking sector.
(n) = Quintile from 1 (Highest) to 5 (Lowest).

4.3 – Measurement of Action Against Money Laundering

As previously stated, the original methodology of this thesis involved heavy research into national court records to determine the exact number of cases brought against individuals and companies for violating AML law. However, due to high fees for accessing these records and the difficulty of finding English-language information, a new method was selected.

This thesis will thus use budgets of national Financial Intelligence Units as a measure of the respective national government's fight against money laundering. This measure may be slightly less effective than counting cases brought, as money might be spent more or less efficiently in different countries. For instance, given the salary differences between Bulgaria and Norway it can be expected that the Bulgaria Financial Intelligence Agency will spend less on salaries than the *Hvitvaskingsenheten.* It should also be considered that countries with larger banking sectors in absolute terms will likely have the capacity to fund FIUs at higher levels owing to their larger economies. These larger economies can also be expected to have more money laundering, as more money in absolute terms leads to more money laundering in absolute terms.

The information on specific FIUs was taken from the website of The Egmont Group of Financial Intelligence Units. The Egmont Group is an informal association of national FIUs who have pledged to cooperate and share information and best practices to improve individual countries' efforts in the fight against money laundering (Egmont Group, 2019).

While information was relatively easy to find, nearly every country chose to publish specific budgetary information in their own language. Given the author's ability to read official documents in English, French, German, Spanish, Portuguese, and Norwegian these were read in the original. All other documents were automatically translated using the built-in translator feature of the Google Chrome web browser. Any faults in the data are entirely attributable to the author.

Additionally, all countries chose to publish their budgetary information in their respective national currency. For ease of comparison, all non-USD currencies were converted to USD at market rates on the first day of the year in which they were reported. To avoid any potential

manipulation by national financial authorities, all currency conversion rates were taken from an independent third party, in this case the currency conversion website xe.com (XE Corporation, 2019). All original currency amounts, USD amounts, and specific conversion rates are available in Appendix 3.

The following table (Table 4.2) contains the FIUs analyzed, as well as their respective operational models, responsible agencies, and budgets in national currencies.

Table 4.2: FIU name, model, agency, and budget

Country	FIU Name[7]	Operational Model[8]	Responsible Agency[8]	Budget[7] (Nat'l currency)
AUS[1]	AUSTRAC - Australian Transaction Reports and Analysis Centre	Administrative	Minister of Justice	$62 662 000,00
AUT*[4]	Bundeskriminalamt (A-FIU)	Law Enforcement	Minister of the Interior	€1 023 000,00
BEL*[2]	CTIF-CFI - Cellule de Traitement des Informations Financières	Administrative	Minister of Finance Minister of Justice	€5 536 000,00
BRL[3]	COAF - Conselho de Controle de Atividades Financeiras	Administrative	Minister of Finance	R$6 143 145,30
BGR*[1]	Bulgaria Financial Intelligence Agency (FIA)	Administrative	Minister of Finance	lev7 363 000,00
CAN[1]	FINTRAC - Financial Transaction and Reports Analysis Centre of Canada	Administrative	Minister of Finance	$52 200 332,00
HRV*[5]	Ured za Sprječavanje Pranja Novca	Administrative	Minister of Finance	kn5 570 000,00
CYP*†[4]	M.O.K.A.S. - Unit for Combating Money Laundering	Judicial	Public Prosecutor's Office	€1 100 000,00
CZE*[4]	Finanční analyticky útvar – (FAU-CR)	Administrative	Minister of Finance	25 194 000,00 Kč

[7] Sources in Section 9.3 – Financial Intelligence Unit and Suspicious Transaction Reports Sources
[8] Al-Rashdan, 2012

Country	*FIU Name*	*Operational Model*	*Responsible Agency*[8]	*Budget* *(Nat'l currency)*
DNK*†[3]	SØK/Hvidvasksekretariatet (HVIDVASK)	Judicial	Public Prosecutor's Office	14 936 000,00 kr
FIN*†[4]	RAP - Keskusrikospoliisi-Rahanpesun selvittelykeskus	Law Enforcement	Police	€1 565 000,00
FRA*†[2]	TRACFIN - Traitement du renseignement et action contre les circuits financiers clandestins	Administrative	Minister of Finance	€4 981 688,00
DEU*†[3]	Zentralstelle für Verdachtsanzeigen-Financial Intelligence Unit	Law Enforcement	Police	€1 872 975,00
GRC*[4]	Committee of Financial and Criminal Investigation (CFCI)	Judicial/ Law Enforcement	Minister of Interior Minister of Finance Minister of Public Administration Minister of Development Central Bank	€1 500 000,00
HUN*[4]	Országos Rendőrkapitányság Pénzmosás Elleni Alosztály (ORFK)	Law Enforcement	Minister of the Interior	Ft.300 000 000,00
IRL*[5]	IFSRA - Irish Financial Services Regulatory Authority	Administrative	Central Bank	€990 825,00
ITA*[1]	Ufficio Italiano dei Cambi (UIC)	Administrative	Central Bank	€10 992 150,00
JPN[2]	JAFIO - Japan Financial Intelligence Office	Administrative	Financial Supervision Authority	¥525 782 000
LVA*[5]	KD - Kontroles dienests, Noziedzīgi iegūto līdzekļu legalizācijas noviršanas dienests	Judicial	Public Prosecutor's Office	€265 200,00

Country	*FIU Name*	*Operational Model*	*Responsible Agency*	*Budget* *(Nat'l currency)*
LTU*[5]	Financial Crime Investigation Service - Mokesčiu policijos departamentas prie Lietuvos Respublikos Vidaus reikalu ministerijos	Law Enforcement	Minister of the Interior	€157 875,00
LUX*†[3]	Cellule de Renseignement Financier (FIU-LUX)	Law Enforcement	Public Prosecutor's Office	€1 948 488,00
MLT*†[5]	FIAU - Financial Intelligence Analysis Unit	Administrative	Central Bank Financial Services Authority Police	€402 375,00
MEX[1]	DGAIO/UIF - Dirección General Adjunta de Investigación de Operaciones/ Unidad de Inteligencia Financiera	Administrative	Minister of Finance	$185 000 000,00
NLD*†[2]	MOT - Meldpunt Ongebruikelijke Transacties	Judicial/ Law Enforcement	Minister of Justice, Minister of Finance	€4 226 250,00
NZL[5]	NZ Police Financial Intelligence Unit	Law Enforcement	Police	$1 311 000,00
NOR*[1]	Hvitvaskingsenheten (ØKOKRIM)	Judicial/ Law Enforcement	Minister of Justice Minister of Finance	153 922 000,00 kr
PAN[5]	Financial Analysis Unit Panama	Administrative	Superintendent of Banks	$768 008,00
POL*†[4]	GIIF - Generalny Inspektor Informacji Finansowej	Administrative	Minister of Finance	€1 288 406,00
PRT*†[3]	Brigada de Investigação Branqueamento	Law Enforcement	Police	€1 814 063,00

Country	*FIU Name*	*Operational Model*	*Responsible Agency*	*Budget* *(Nat'l currency)*
ROU[*3]	ONPCSB - Oficiul Național de Prevenire si Combatere a Spălării Banilor	Judicial/ Law Enforcement	Minister of Interior Minister of Finance Minister of Justice Central Bank	€1 643 400,00
RUS[1]	FMC - Financial Monitoring Committee of the Russian Federation	Administrative	Minister of Finance	1 824 748 000,00 ₽
SGP[†2]	Suspicious Transaction Reporting Office	Law Enforcement	Police	$4 800 000,00
SVK[*5]	OFiS ÚFP - Odbor finančné ho spravodajstva	Law Enforcement	Minister of the Interior	€694 688,00
SVN[*4]	MF-UPPD - Urad RS za Preprecevanje Pranja Denarja Ministrstvo za Finance	Administrative	Minister of Finance	€999 338,00
ESP[*2]	SEPBLAC - Servicio Ejecutivo de la Comisión de Prevención de Blanqueo de Capitales e Infracciones Monetarias	Administrative	Central Bank	€5 941 294,00
SWE[*3]	NFIS - Finanspolisen/Rikspolisstyrelsen	Law Enforcement	Police	25 003 000,00 kr
CHE[†3]	MROS - Money Laundering Reporting Office-Switzerland	Judicial	Minister of Justice	CHF2 000 000,00
TUR[2]	MASAK - Mali Suçları Araştırma Kurulu	Administrative	Minister of Finance	₺17 103 145,00
GBR[*2]	NCIS/FID - National Criminal Intelligence Service/ Financial Intelligence Division	Administrative	Home Secretary	£5 207 000,00
USA[1]	FinCEN - Financial Crimes Enforcement Network	Administrative	Central Bank Secretary of Finance	$152 161 000,00

(*) = Member of EU or EEA.
(†) = Large banking sector.
(n) = Quintile from 1 (Highest) to 5 (Lowest).

A secondary method to measure FIU effectiveness will be the number of Suspicious Transaction Reports received by an FIU. This can be taken as a measure of the FIU's effectiveness because it can be assumed that a more effective FIU will be more efficient and insistent that financial institutions file the required reports. However, the principle focus should be on budget, as there is no guarantee that STRs received will lead to action or investigation. Indeed, Gelemerova (2008) found that more reports is no indication of higher FIU quality and may even signify that the FIU is less effective due to a higher workload.

Given the results in Section 3.3.4.1, neither NTRs nor cases of money laundering will be considered for measuring efficiency. Although this would be the most accurate method, the secrecy which is so common in NTRs makes it nearly impossible to find accurate numbers regarding the number of cases brought. Another consideration in not using cases to measure FIU effectiveness is that money laundering is typically not discovered by FIUs. While FIUs are charged with combating money laundering, and they do discover the majority of large-scale money laundering, large-scale laundering is not the norm (Cuellar, 2003). Small-scale money laundering is far more common, and the majority of small-scale laundering is discovered in the course of investigating other crimes, such as drug dealing (Cuellar, 2003).

4.4 – Analyses

For ease of analysis, all relevant information was combined into one Excel table, where it was sorted by all relevant categories and color-coded into five sets (Quintiles) of eight countries going from Red -> Orange -> Yellow -> Green -> Blue, with Red representing the lowest or smallest number and Blue the highest or largest. This chart is presented in Appendix 2.

In addition to this visual analysis, the relationships between the variables were also measured in a set of regression analyses. The three measures of money laundering and the average of all three estimates were regressed with both total Banking Assets and Banking Assets/GDP to determine if there was any relationship, and if it was statistically significant. All regressions were carried out using the built-in Analytics ToolPak from Microsoft Excel, with the data previously obtained. The eight pairings regressed were as follows:

Assets/GDP and *Money Laundering Average*

Assets/GDP and *3,5% of GDP*

Assets/GDP and *Walker Method*

Assets/GDP and *Hot Money Average (HMA)*

Assets and *Money Laundering Average*

Assets and *3,5% of GDP*

Assets and *Walker Method*

Assets and *Hot Money Average*

For ease of comparison, a separate chart was made combining the most important statistics from all eight analyses to be able to compare them more easily. The selected statistics were

Multiple R

R Squares

Standard Error

T-Statistic

P-Value

Lower 95%

Upper 95%

The results of all regression analyses will be presented in the next section. In addition to the standard regressions described above, a second set of regressions was carried out to test the robustness of the results. In this case, the highest and lowest three values for Banking Assets/GDP and Banking Assets were eliminated and the regressions carried out again in order to determine if the results of the regressions were affected in a significant way by outliers. The results of these regressions will be presented in Section 6.

Furthermore, as well as analyzing data at the national level, all forty countries were grouped into ten geographical regions. National values were then averaged to produce regional results. As with national data, regressions were run to determine whether there exists a relationship on the regional level. In addition to this, the data were visually analyzed to determine whether any regional trends could be detected. Regions were formed on geographical location, as well

as to make evenly-sized groups wherever possible. Although average values may not be ideal to present regional data, given the wide variance in countries included in a region, it is the best method to find comparable values.

SECTION 5 – DATA

5.1 – Money Laundering Estimates

The following three sections will present the accumulated results of the calculations estimating money laundering. Presented will be simply the results of calculations, arranged in a table format.

5.1.1 – Walker Model

The first method used was the Walker Model. As stated above, this method uses information regarding GDP, corruption, and attitudes towards crime, as well as conflict to produce an estimate of money laundering present in an economy. For complete information on the constituent parts of the Walker Model calculation, please refer to Appendix 4.

Table 5.1: Walker Model estimation of Money Laundering

COUNTRY	WALKER MODEL	COUNTRY	WALKER MODEL
AUS[1]	$275 030,54	JPN[1]	$1 023 873,95
AUT[*3]	$60 129,55	LTU[*4]	$7 909,08
BEL[*3]	$69 312,56	LUX[*†5]	$1 007,50
BGR[*5]	$4 295,55	LVA[*5]	$3 378,52
BRL[1]	$291 457,87	MEX[1]	$972 270,58
CAN[1]	$315 650,75	MLT[*†5]	$615,99
CHE[†2]	$89 960,42	NLD[*†2]	$107 869,81
CYP[*†5]	$886,79	NOR[*2]	$137 570,97
CZE[*4]	$22 840,86	NZL[3]	$46 250,91
DEU[*1]	$556 404,21	PAN[5]	$5 107,11
DNK[*†3]	$39 642,19	POL[*†3]	$32 376,88
ESP[*†2]	$86 968,84	PRT[*†4]	$15 783,82
FIN[*†3]	$39 478,75	ROU[*5]	$6 412,33
FRA[*†2]	$244 151,19	RUS[2]	$217 075,67
GBR[*†1]	$294 684,43	SGP[†4]	$25 887,06
GRC[*4]	$19 388,04	SVK[*4]	$14 164,66
HRV[*5]	$4 493,54	SVN[*4]	$10 057,28
HUN[*4]	$11 019,60	SWE[*2]	$130 528,77
IRL[*3]	$55 243,04	TUR[2]	$230 509,79
ITA[*3]	$50 051,77	USA[1]	$3 537 728,48

All amounts in 100.000 USD
(*) = Member of EU or EEA.
(†) = Large banking sector.
(n) = Quintile from 1 (Highest) to 5 (Lowest).

Given the Walker Model's use of GDP/capita information it is perhaps unsurprising that the countries with the largest GDPs are those with the largest estimates of money laundering.

5.1.2 – Hot Money

The second method was an analogue for money laundering as it measures capital flows out of a country. This is, as detailed earlier, the Hot Money Method. As stated previously there exist three different equations for calculating capital flows with the Hot Money Approach, and the following data are the results of Method 1, Method 3, and an average of the two. All information used to make Hot Money calculations is available from the World Bank (World Bank, 2019c), however due to size concerns it will not be included in this thesis' appendices.

5.1.2.1 – Hot Money 1

Table 5.2: Hot Money Method 1 estimation of money laundering

COUNTRY	HOT MONEY 1	COUNTRY	HOT MONEY 1
AUS[5]	$2 184,15	JPN[1]	$1 118 306,32
AUT[*3]	$9 518,20	LTU[*4]	$4 945,72
BEL[*3]	$13 615,40	LUX[*†2]	$74 397,65
BGR[*2]	$27 831,33	LVA[*4]	$5 798,55
BRL[3]	$26 247,25	MEX[1]	$271 368,61
CAN[4]	$4 859,09	MLT[*†5]	$556,93
CHE[†2]	$30 376,00	NLD[*†1]	$112 628,60
CYP[*†5]	$911,64	NOR[*1]	$127 165,33
CZE[*3]	$19 527,01	NZL[3]	$26 348,68
DEU[*3]	$19 988,58	PAN[4]	$6 435,25
DNK[*†4]	$8 927,57	POL[*†4]	$4 996,40
ESP[*†1]	$128 843,58	PRT[*†4]	$5 542,67
FIN[*†3]	$10 108,92	ROU[*5]	$2 113,76
FRA[*†2]	$38 010,24	RUS[2]	$30 432,49
GBR[*†2]	$63 256,63	SGP[†5]	$2 808,00
GRC[*5]	$4 543,07	SVK[*5]	$4 588,34
HRV[*5]	$1 963,06	SVN[*3]	$10 904,78
HUN[*4]	$8 090,39	SWE[*2]	$51 376,40
IRL[*2]	$36 973,79	TUR[1]	$93 159,47
ITA[*1]	$288 427,17	USA[1]	$1 027 114,31

All values in 100.000 USD
(*) = Member of EU or EEA.
(†) = Large banking sector.
(n) = Quintile from 1 (Highest) to 5 (Lowest).

The values in Table 5.2 are presented solely for illustrative purposes, all calculations undertaken regarding the Hot Money method of estimating capital flows will use an average value of Hot Money 1 and Hot Money 3. This average is presented in Table 5.4.

Although a wide range was expected in this data, the most surprising result is that Japan reports the highest value. Although Japan has the 2nd highest GDP of all the countries studied, it is not traditionally thought of as one of the largest financial hubs. Indeed, Table 5.9 shows that Japan is only in the 2nd lowest quintile for Banking Assets/GDP.

The reason for this unusually high score may be that Japan is indeed a large and significant financial center in its own right, although it is often overshadowed (for example in the author's mind) by its Far-Eastern rival Singapore. There may be other factors at work however, the fact remains that Japan's value is nearly 400 times larger than Singapore's; the literature suggests that the cause might be the government moving large sums in and out of the country without reporting it in the BoP.

5.1.2.2 – Hot Money 3

Table 5.3: Hot Money Method 3 estimation of money laundering

COUNTRY	HOT MONEY 3	COUNTRY	HOT MONEY 3
AUS[2]	$136 299,40	JPN[1]	$1 804 137,49
AUT[*3]	$74 763,03	LTU[*5]	$4 451,10
BEL[*3]	$60 801,89	LUX[*†5]	$7 108,57
BGR[*4]	$20 424,00	LVA[*4]	$12 026,77
BRL[2]	$213 729,00	MEX[1]	$831 834,18
CAN[2]	$184 905,39	MLT[*†5]	$10 313,67
CHE[†2]	$119 950,64	NLD[*†2]	$201 233,10
CYP[*†5]	$4 847,20	NOR[*3]	$82 424,12
CZE[*4]	$18 271,51	NZL[4]	$15 964,52
DEU[*1]	$773 908,78	PAN[5]	$7 907,85
DNK[*†3]	$48 408,72	POL[*†4]	$13 112,93
ESP[*†2]	$167 282,14	PRT[*†5]	$5 529,75
FIN[*†4]	$24 258,33	ROU[*5]	$2 338,95
FRA[*†2]	$147 640,54	RUS[1]	$286 719,69
GBR[*†1]	$549 279,06	SGP[†3]	$99 882,25
GRC[*3]	$43 536,27	SVK[*4]	$18 686,68
HRV[*5]	$2 382,53	SVN[*4]	$21 358,50
HUN[*3]	$25 766,76	SWE[*3]	$110 637,55
IRL[*1]	$762 909,86	TUR[2]	$247 104,51
ITA[*1]	$736 110,50	USA[1]	$808 933,24

All values in 100.000 USD
(*) = Member of EU or EEA.
(†) = Large banking sector.
(n) = Quintile from 1 (Highest) to 5 (Lowest).

The values in Table 5.3 are presented solely for illustrative purposes, all calculations undertaken regarding the Hot Money method of estimating capital flows will use an average value of Hot Money 1 and Hot Money 3. This average is presented in Table 5.4.

Again, a large variance was expected although Japan remains a surprising outlier. This time however Japan's value is only 18 times larger than Singapore's. It could be that the Hot Money 3 method is more accurate than Hot Money 1 as Table 4.1 shows that Japan's GDP is 14 times larger than Singapore's, which is much nearer to the ratio of their Hot Money 3 estimates.

This wide variance in estimation between two relatively similar methods may signify that there was a fault in the data for Table 5.2, although this will be covered in Section 6.2.2.

5.1.2.3 – Hot Money Average

Table 5.4: Average of Hot Money estimations of money laundering

COUNTRY	HOT MONEY AVG	COUNTRY	HOT MONEY AVG
AUS[3]	$69 241,77	JPN[1]	$1 461 221,91
AUT[*3]	$42 140,61	LTU[*5]	$4 698,41
BEL[*3]	$37 208,64	LUX[*†3]	$40 753,11
BGR[*3]	$24 127,67	LVA[*5]	$8 912,66
BRL[2]	$119 988,13	MEX[1]	$551 601,39
CAN[2]	$94 882,24	MLT[*†5]	$5 435,30
CHE[†3]	$75 163,32	NLD[*†2]	$156 930,85
CYP[*†5]	$2 879,42	NOR[*2]	$104 794,73
CZE[*4]	$18 899,26	NZL[4]	$21 156,60
DEU[*1]	$396 948,68	PAN[5]	$7 171,55
DNK[*†3]	$28 668,14	POL[*†4]	$9 054,66
ESP[*†2]	$148 062,86	PRT[*†5]	$5 536,21
FIN[*†4]	$17 183,63	ROU[*5]	$2 226,36
FRA[*†2]	$92 825,39	RUS[2]	$158 576,09
GBR[*†1]	$306 272,34	SGP[†3]	$51 345,13
GRC[*4]	$24 039,67	SVK[*4]	$11 637,51
HRV[*5]	$2 172,79	SVN[*4]	$16 131,64
HUN[*4]	$16 928,57	SWE[*2]	$81 006,97
IRL[*1]	$399 941,82	TUR[1]	$170 131,99
ITA[*1]	$512 268,83	USA[1]	$918 023,78

All figures in 100.000 USD
(*) = Member of EU or EEA.
(†) = Large banking sector.
(n) = Quintile from 1 (Highest) to 5 (Lowest).

This table is simply the results of finding an average of Table 5.2 and Table 5.3. This average was taken expressly to reduce uncertainty generated by the data, as well as to provide a singular value to use in comparisons rather than having to use two.

Again, Japan is the highest value although it is only 28 times larger than Singapore.

5.1.3 – 3,5% of GDP

Table 5.5: 3,5% of GDP estimation of money laundering

COUNTRY	3,5% OF GDP	COUNTRY	3,5% OF GDP
AUS[2]	$472 160,50	JPN[1]	$1 538 243,00
AUT[*3]	$133 723,10	LTU[*5]	$14 528,01
BEL[*3]	$159 264,00	LUX[*†4]	$20 224,57
BGR[*5]	$17 570,46	LVA[*5]	$9 440,50
BRL[1]	$630 773,50	MEX[2]	$409 696,00
CAN[1]	$545 867,00	MLT[*†5]	$3 694,13
CHE[†2]	$237 751,15	NLD[*†2]	$265 299,65
CYP[*†5]	$6 888,22	NOR[*3]	$135 332,05
CZE[*4]	$65 390,50	NZL[4]	$62 167,35
DEU[*1]	$1 181 463,50	PAN[5]	$18 932,10
DNK[*†3]	$105 454,30	POL[*†3]	$166 939,85
ESP[*†2]	$419 226,50	PRT[*†4]	$69 797,00
FIN[*†3]	$81 362,75	ROU[*4]	$62 262,55
FRA[*†1]	$853 373,50	RUS[2]	$478 940,00
GBR[*†1]	$1 009 949,50	SGP[†3]	$106 434,30
GRC[*4]	$68 439,70	SVK[*4]	$30 625,50
HRV[*5]	$17 321,55	SVN[*5]	$15 075,35
HUN[*4]	$43 007,65	SWE[*2]	$174 271,30
IRL[*3]	$101 715,95	TUR[2]	$300 928,95
ITA[*1]	$641 504,50	USA[1]	$6 342 245,00

All figures in 100.000 USD
(*) = Member of EU or EEA.
(†) = Large banking sector.
(n) = Quintile from 1 (Highest) to 5 (Lowest).

These results are as expected, each value is exactly 3,5% of the respective country's GDP as presented in Table 4.1.

5.1.4 – Money Laundering Average

Table 5.6: Average of all money laundering estimations

COUNTRY	ML Avg.	COUNTRY	ML Avg.
AUS[2]	$172 136,16	JPN[1]	$1 242 547,93
AUT[*3]	$51 135,08	LTU[*5]	$6 303,74
BEL[*3]	$53 260,60	LUX[*†4]	$20 880,30
BGR[*4]	$14 211,61	LVA[*5]	$6 145,59
BRL[1]	$205 723,00	MEX[1]	$761 935,99
CAN[2]	$205 266,50	MLT[*†5]	$3 025,64
CHE[†3]	$82 561,87	NLD[*†2]	$132 400,33
CYP[*†5]	$1 883,10	NOR[*2]	$121 182,85
CZE[*4]	$20 870,06	NZL[3]	$33 703,76
DEU[*1]	$476 676,45	PAN[5]	$6 139,33
DNK[*†3]	$34 155,17	POL[*†4]	$20 715,77
ESP[*†2]	$117 515,85	PRT[*†5]	$10 660,02
FIN[*†3]	$28 331,19	ROU[*5]	$4 319,34
FRA[*†2]	$168 488,29	RUS[2]	$187 825,88
GBR[*†1]	$299 978,39	SGP[†3]	$38 616,09
GRC[*4]	$21 713,86	SVK[*4]	$12 901,09
HRV[*5]	$3 333,16	SVN[*4]	$13 094,46
HUN[*4]	$13 974,09	SWE[*3]	$105 767,87
IRL[*1]	$227 592,43	TUR[2]	$200 320,89
ITA[*1]	$281 160,30	USA[1]	$2 227 876,13

All figures in 100.000 USD
(*) = Member of EU or EEA.
(†) = Large banking sector.
(n) = Quintile from 1 (Highest) to 5 (Lowest).

Likely because of the inclusion of 3,5% of GDP in the average, all but four countries are in the same quintile as with they were with the 3,5% measure. The four which changed were: Canada, 5th to 4th; Ireland, 3rd to 2nd; Mexico, 2nd to 1st; and Sweden, 2nd to 3rd.

5.2 – Financial Intelligence Unit Data

5.2.1 – FIU Funding

Table 5.7: FIU Funding by country

COUNTRY	FIU FUNDING[9]	COUNTRY	FIU FUNDING
AUS[1]	$511,95	JPN[4]	$44,17
AUT*[4]	$11,36	LTU*[5]	$1,75
BEL*[2]	$61,45	LUX*†[3]	$21,63
BGR*[1]	$88,91	LVA*[5]	$2,94
BRL[3]	$23,10	MEX[1]	$125,80
CAN[1]	$449,44	MLT*†[5]	$4,47
CHE†[3]	$20,20	NLD*†[2]	$46,91
CYP*†[4]	$12,21	**NOR*[1]**	**$206,26**
CZE*[4]	$11,01	NZL[5]	$10,23
DEU*[3]	$20,79	PAN[5]	$7,68
DNK*†[3]	$24,27	POL*†[4]	$14,30
ESP*†[2]	$65,95	PRT*†[3]	$20,14
FIN*†[4]	$17,37	ROU*[3]	$18,24
FRA*†[2]	$55,30	RUS[1]	$310,21
GBR*†[2]	$81,02	SGP†[2]	$36,19
GRC*[4]	$16,65	SVK*[5]	$7,71
HRV*[5]	$8,80	SVN*[4]	$11,09
HUN*[4]	$11,10	SWE*[3]	$32,00
IRL*[5]	$11,00	TUR[2]	$73,20
ITA*[1]	$122,01	USA[1]	$1 521,61

All figures in 100.000 USD
(*) = Member of EU or EEA.
(†) = Large banking sector.
(n) = Quintile from 1 (Highest) to 5 (Lowest).

***NB**: Specific budget data could not be found for the Norwegian FIU (Hvitvaskingsenheten). The above figure is instead the budget for the economic crimes division (Økokrim).*

This data shows that there appear to be two types of countries which have higher levels of Financial Intelligence Unit funding, although neither rule is absolute. The first type are those countries with higher GDPs, f. ex. the US or Canada. Both of these countries are in the 1st quintile for GDP as well as FIU funding; of the 16 countries in the top 2 quintiles 10 are also in the top 2 quintiles for FIU funding. This would make sense as richer countries have more to spend on their government agencies.

The other is countries which have a reputation, deserved or otherwise, for corruption. The most notable examples of these are, among others, Italy, Mexico, Bulgaria, and the Russian

[9] Sources in Section 9.3 – Financial Intelligence Unit and Suspicious Transaction Reports Sources

Federation. The higher-than-average funding from these relatively poorer countries could be explained by the national governments wanting to change the perception of their country to attract businesses or improve international perceptions and relationships.

A further explanation could be that the certain organizational models of FIU require higher budgets than others. For example, of the 4 models proposed by Al-Rashdan (2012) it stands to reason that a Law Enforcement FIU providing its own law enforcement force would need a higher budget than an administrative FIU which may have a smaller staff.

5.2.2 – Suspicious Transaction Reports

Table 5.8: Suspicious Transaction Reports received by national FIUs

COUNTRY	STRs[10]	COUNTRY	STRs
AUS[2]	78 000	JPN[1]	399 508
AUT[*3]	1 793	LTU[*5]	115
BEL[*3]	9 938	LUX[*†4]	800
BGR[*4]	372	LVA[*3]	13 505
BRL[1]	4 304	MEX[2]	51 683
CAN[2]	92 531	MLT[*†5]	407
CHE[†3]	9 756	NLD[*†2]	40 959
CYP[*†5]	209	NOR[*3]	4 714
CZE[*3]	3 480	NZL[5]	596
DEU[*2]	10 051	PAN[4]	1 358
DNK[*†4]	958	POL[*†3]	2 863
ESP[*†4]	2 251	PRT[*†5]	650
FIN[*†3]	9 975	ROU[*4]	2 720
FRA[*†2]	45 266	RUS[1]	700 000
GBR[*†1]	200 000	SGP[†2]	30 511
GRC[*4]	1 250	SVK[*4]	1 573
HRV[*5]	334	SVN[*5]	453
HUN[*2]	14 120	SWE[*3]	6 000
IRL[*2]	10 402	TUR[1]	74 221
ITA[*1]	82 428	USA[1]	696 810

(*) = Member of EU or EEA.
(†) = Large banking sector.
(n) = Quintile from 1 (Highest) to 5 (Lowest).

These results show that there does not seem to be a particular pattern for STRs. Countries with large financial sectors occasionally have small numbers of STRs, and countries with small financial sectors occasionally have large numbers of STRs.

[10] Sources in Section 9.3 – Financial Intelligence Unit and Suspicious Transaction Reports Sources

5.3 – Banking Sector Size

5.3.1 – Size Relative to GDP

Table 5.9: Banking Assets to GDP ratio

COUNTRY	ASSETS/GDP	COUNTRY	ASSETS/GDP
AUS[3]	2,303	JPN[4]	1,931
AUT[*3]	2,396	LTU[*4]	1,332
BEL[*2]	2,806	LUX[*†1]	19,539
BGR[*5]	1,154	LVA[*5]	1,314
BRL[5]	0,927	MEX[5]	0,446
CAN[2]	2,586	MLT[*†1]	4,985
CHE[†2]	3,633	NLD[*†2]	3,773
CYP[*†1]	5,800	NOR[*4]	1,650
CZE[*4]	1,770	NZL[3]	2,241
DEU[*2]	2,689	PAN[4]	2,190
DNK[*†1]	4,313	POL[*†1]	3,913
ESP[*†2]	3,036	PRT[*†2]	3,487
FIN[*†2]	3,171	ROU[*3]	2,354
FRA[*†1]	3,888	RUS[5]	1,031
GBR[*†1]	4,169	SGP[†1]	5,775
GRC[*3]	2,273	SVK[*5]	0,875
HRV[*4]	1,941	SVN[*5]	1,004
HUN[*4]	1,852	SWE[*3]	2,216
IRL[*4]	1,633	TUR[5]	1,019
ITA[*3]	2,400	USA[3]	2,452

(*) = Member of EU or EEA.
(†) = Large banking sector.
(n) = Quintile from 1 (Highest) to 5 (Lowest).

Most of these results were as expected, with countries reputed for being financial centers (f. ex. Luxembourg, Singapore, Cyprus) having well above-average ratios. The more surprising result is that countries which are not considered financial centers, and indeed which are relatively poorer (Portugal, Poland, Finland), were found to have larger-than-average banking sectors. Also interesting is that the least developed or most conflicted countries analyzed have significantly smaller banking sectors. A possible explanation for this could be that there exist lower levels of trust in institutions in countries which are less developed or in conflict. These lower levels of trust could encourage people to avoid their domestic banks wherever possible, in favor of banking in foreign countries when possible or keeping their assets in cash.

For the purposes of this thesis, any banking sector with an Asset/GDP Ratio above the mean value of 2,957 will be considered to be a "Large" banking sector, all those below this value will be considered as "Small".

5.3.2 – Absolute Size

Table 5.10: Absolute Banking Sector size

COUNTRY	BANKING ASSETS[11]	COUNTRY	BANKING ASSETS
AUS[2]	$31 068 859,66	JPN[1]	$84 861 764,40
AUT[*3]	$9 153 679,99	LTU[*5]	$552 691,20
BEL[*3]	$12 770 672,10	LUX[*†3]	$11 290 697,47
BGR[*4]	$376 423,66	LVA[*5]	$354 452,97
BRL[2]	$16 707 147,57	MEX[4]	$5 225 585,55
CAN[1]	$40 324 762,80	MLT[*†5]	$526 108,53
CHE[†2]	$24 675 885,71	NLD[*†2]	$28 596 630,30
CYP[*†5]	$1 141 490,70	NOR[*3]	$6 379 233,48
CZE[*4]	$3 305 977,11	NZL[4]	$3 980 160,60
DEU[*1]	$90 757 318,50	PAN[4]	$1 184 775,20
DNK[*†2]	$12 994 550,89	POL[*†2]	$18 663 521,13
ESP[*†1]	$36 366 930,00	PRT[*†3]	$6 954 549,60
FIN[*†3]	$7 371 576,60	ROU[*4]	$4 186 777,92
FRA[*†1]	$94 798 340,10	RUS[2]	$14 109 950,36
GBR[*†1]	$120 296 164,96	SGP[†2]	$17 561 110,89
GRC[*4]	$4 445 003,70	SVK[*5]	$766 027,57
HRV[*5]	$960 693,02	SVN[*5]	$432 555,90
HUN[*4]	$2 275 362,86	SWE[*3]	$11 032 372,48
IRL[*4]	$4 746 626,40	TUR[3]	$8 761 456,21
ITA[*1]	$43 983 761,10	USA[1]	$444 361 000,00

All values in 100.000 USD
(*) = Member of EU or EEA.
(†) = Large banking sector.
(n) = Quintile from 1 (Highest) to 5 (Lowest).

Unsurprisingly, countries with larger GDPs tend to have larger banking sectors in absolute terms with a few notable exceptions: Brazil is in the 1st quintile for GDP but its banking sector lags behind the others in its quintile to the point that its GDP exceeds its banking sector assets giving it a less-than-one ratio (See Table 5.9). On the other end of the scale there are far fewer exceptions; the only country in the 5th quintile for banking sector size which is not also in the 5th quintile for GDP is the Slovak Republic whose GDP places it in the 4th quartile and Panama whose GDP places it in the 5th quintile but has a 4th quintile banking sector. The majority of

[11] Sources in Section 9.2 – Central Bank Statistics

exceptions (11 of 13) to countries being in the same quintile for GDP and absolute bank sector size are in the middle (2nd, 3rd, 4th) quintiles.

5.4 – Regional-Level Data

To analyze data on a regional level, ten regions were determined:

Northern Europe (NEur) – DEN, FIN, NOR, SWE

Eastern Europe (EEur) – HUN, LTU, LVA, POL, RUS

Southern Europe (SEur) – ESP, ITA, MLT, POR

Western Europe (WEur) – BEL, FRA, GBR, IRL, NLD

Central Europe (CEur) – AUT, CHE, CZE, DEU, LUX, SVK

Balkans (Blk) – BGR, GRC, HRV, ROU, SVN

Asia (Asia) – CYP, JPN, SGP, TUR

Oceania (Oce) – AUS, NZL

Central and South America (CSAm) – PAN, BRA

North America (NAm) – USA, CAN, MEX

Presented below are the regional values for the three ML estimates, ML Average, FIU Funding, GDP, Relative Bank Sector Size, and Absolute Bank Sector Size.

Table 5.11: Regional Level Data

CODE	GDP	ABSOLUTE BANK SIZE	ASSETS/ GDP	3,5%	WALKER MODEL	HOT MONEY AVERAGE	ML AVG	STRS	FIU BUDGET
ASIA	$13 946 389,06	$28 081 455,55	3,631	$488 123,62	$320 289,40	$421 394,61	$409 935,88	126 112	$41,44
BLK	$1 032 397,74	$2 080 290,84	1,745	$36 133,92	$8 929,35	$13 739,63	$19 600,96	1 026	$28,74
CE	$7 948 468,20	$23 324 931,06	5,150	$278 196,39	$124 084,53	$97 590,42	$166 623,78	4 576	$15,45
EE	$4 073 462,95	$7 191 195,70	1,888	$142 571,20	$54 351,95	$39 634,08	$78 852,41	146 121	$68,06
NAM	$69 502 933,33	$163 303 782,78	1,828	$2 432 602,67	$1 608 549,94	$521 502,47	$1 520 885,02	280 341	$698,95
NE	$3 545 860,00	$9 444 433,36	2,838	$124 105,10	$86 805,17	$57 913,37	$89 607,88	5 412	$69,98
OC	$7 633 255,00	$17 524 510,13	2,272	$267 163,93	$160 640,72	$45 199,19	$157 667,95	39 298	$261,09
SCAM	$9 281 508,57	$8 945 961,38	1,559	$324 852,80	$148 282,49	$63 579,84	$178 905,04	2 831	$15,39
SE	$8 101 586,67	$21 957 837,31	3,477	$283 555,53	$38 355,10	$167 825,80	$163 245,48	21 434	$53,14
WE	$13 654 872,00	$52 241 686,77	3,254	$477 920,52	$154 052,21	$198 635,81	$276 869,51	61 313	$51,14

All values in 100.000 USD

5.5 – Regressions

This section will present the results of the regression analyses run to compare the influence of two independent variables: Absolute Bank Sector size as measured by total bank sector assets, and Relative Bank Sector size as measured by a ratio of total bank sector assets to national GDP on the four dependent variables:

1. 3,5% of GDP estimation
2. The Walker Model estimation
3. The Hot Money Average estimation
4. An average of the three estimates

Both National (Table 5.13) and Regional (Table 5.14) regressions are presented below.

The figures presented in Table 5.13 are a summary of the results of these regressions only. Other regressions checking robustness will be presented in Section 6.2.1.

The regressions are numbered, and the variables used in each regression can be found in Table 5.12.

Table 5.12: Regression Key

Independent (X)	***Dependent (Y)***	***Regression***	***Independent (X)***	***Dependent (Y)***	***Regression***
AssetsGDP	*3.5*	*1.2*	*Assets*	*3.5*	*1.6*
AssetsGDP	*Walker*	*1.3*	*Assets*	*Walker*	*1.7*
AssetsGDP	*HMA*	*1.4*	*Assets*	*HMA*	*1.8*
AssetsGDP	*ML Avg*	*1.9*	*Assets*	*ML Avg*	*1.10*
AssetsGDP	*3.5*	*RR1.2*	*Assets*	*3.5*	*RR1.6*
AssetsGDP	*Walker*	*RR1.3*	*Assets*	*Walker*	*RR1.7*
AssetsGDP	*HMA*	*RR1.4*	*Assets*	*HMA*	*RR1.8*
AssetsGDP	*ML Avg*	*RR1.9*	*Assets*	*ML Avg*	*RR1.10*

Table 5.13: Results of Regression Analyses (Country Level)

	1.2	***1.3***	***1.4***	***1.6***	***1.7***	***1.8***	***1.9***	***1.10***
Multiple R	0,98400	0,92559	0,58970	0,06137	0,10023	0,12393	0,116212622	0,877787344
R^2	0,96825	0,85672	0,34775	0,00377	0,01005	0,01536	0,013505373	0,770510621
Adjusted R^2	0,96741	0,85295	0,33059	-0,02245	-0,01600	-0,01055	-0,012455011	0,764471426
Coefficients	184635,62680	224445,19677	232971,49779	1034246,69944	589967,26656	286243,08578	-15715,79692	0,004858119
Std. Error	0,01378	0,00742	0,00230	-20998,24515	-19626,19293	-11805,40091	21789,06895	0,000430099
t Stat	0,00040	0,00049	0,00051	55403,86671	31604,13064	15333,84035	-0,721269778	11,29535324
P-value	34,04187	15,07377	4,50110	-0,37900	-0,62100	-0,76989	0,475158109	1,04019E-13
Lower 95%	0,00000	0,00000	0,00006	0,70680	0,53831	0,44612	-59825,46094	0,003987429
Upper 95%	0,01296	0,00642	0,00126	-133157,50957	-83605,41054	-42847,13783	28393,86711	0,005728808
Lower 95,0%	0,01460	0,00841	0,00333	91161,01928	44353,02469	19236,33600	-59825,46094	0,003987429
Upper 95,0%	0,01296	0,00642	0,00126	-133157,50957	-83605,41054	-42847,13783	28393,86711	0,005728808

Table 5.14: Results of Regression Analyses (Regional Level)

	RR1.2	***RR1.3***	***RR1.4***	***RR1.6***	***RR1.7***	***RR1.8***	***RR1.9***	***RR1.10***
Multiple R	0,200397125	0,2330784	0,10319652	0,98471962	0,96446401	0,81617044	0,14893256	0,96138431
R^2	0,040159008	0,05432554	0,01064952	0,96967273	0,93019083	0,666134186	0,02218091	0,92425979
Adjusted R^2	-0,079821116	-0,0638838	-0,1130193	0,96588182	0,92146468	0,62440096	-0,1000465	0,91479227
Coefficients	-123527,6182	-98265,105	15852,2426	0,01439539	0,00964321	0,002973342	-41206,431	0,00630828
Std. Error	213514,4312	144951,641	54020,1436	0,00090008	0,000934	0,000744226	96729,6476	0,00063846
t Stat	-0,578544586	-0,6779165	0,29345058	15,9934033	10,3246366	3,995212455	-0,4259959	9,88049672
P-value	0,578815611	0,51694821	0,77664633	2,3417E-07	6,6836E-06	0,00397626	0,68134068	9,2846E-06
Lower 95%	-615892,7795	-432524,19	-108718,43	0,0123198	0,0074894	0,001257153	-264265,4	0,00483599
Upper 95%	368837,5431	235993,979	140422,917	0,01647099	0,01179702	0,004689531	181852,536	0,00778056
Lower 95,0%	-615892,7795	-432524,19	-108718,43	0,0123198	0,0074894	0,001257153	-264265,4	0,00483599
Upper 95,0%	368837,5431	235993,979	140422,917	0,01647099	0,01179702	0,004689531	181852,536	0,00778056

SECTION 6 – RESULTS AND ANALYSES

6.1 – Results

6.1.1 – Initial Impressions

In looking at the initial color-coded quintile chart in Appendix 2, it is difficult to identify specific trends. Generally, countries with absolutely larger economies tend to have more money laundering, that is to say countries in the 1st GDP quintile tend to be in the 1st or 2nd quintiles in all money laundering estimates. Interestingly, there are only three countries which rank in the same quintile across all categories except money laundering as a percentage of GDP: the Netherlands, which ranks in the 2nd quintile; Hungary, which ranks in the 4th quintile; and Latvia, which ranks in the 5th quintile.

Thus, it is difficult to draw meaningful conclusions from this chart, apart from the most obvious conclusion that countries with larger banking sectors in absolute terms will have more money laundering in absolute terms. However, when looking at the estimates of money laundering represented as a percentage of GDP the results are different.

Perhaps the most interesting set of information found in the quintile chart [Appendix 2] is the data on the extreme right: Money Laundering Estimates as a Percentage of GDP, excluding, for obvious, reason 3,5% of GDP. Some of this data is presented below in Table 6.1 with GDP and FIU Funding as a Percentage of GDP.

Table 6.1: Money laundering and FIU Funding as a percentage of GDP

Country	ML (% of GDP)	GDP[12]	FIU Funding (% of GDP)	Country	ML (% of GDP)	GDP	FIU Funding (% of GDP)
AUS	2,017%[3]	13 490 300,00[2]	0,0038%[1]	JPN	3,051%[1]	43 949 800,00[1]	0,0001%[5]
AUT*	2,059%[3]	3 820 660,00[3]	0,0003%[5]	LTU*	2,179%[2]	415 086,09[5]	0,0004%[4]
BEL*	1,947%[4]	4 550 400,00[3]	0,0014%[2]	LUX*†	3,576%[1]	577 844,95[4]	0,0037%[1]
BGR*	3,054%[1]	502 013,15[5]	0,0177%[1]	LVA*	2,686%[2]	269 728,63[5]	0,0011%[2]
BRL	1,928%[4]	18 022 100,00[1]	0,0001%[5]	MEX	5,506%[1]	11 705 600,00[2]	0,0011%[2]
CAN	2,044%[3]	15 596 200,00[1]	0,0029%[1]	MLT*†	3,078%[1]	105 546,70[5]	0,0042%[1]
CHE†	1,977%[4]	6 792 890,00[2]	0,0003%[5]	NLD*†	2,331%[2]	7 579 990,00[2]	0,0006%[4]
CYP*†	1,805%[5]	196 806,25[5]	0,0062%[1]	NOR*	3,256%[1]	3 866 630,00[3]	0,0053%[1]
CZE*	1,911%[4]	1 868 300,00[4]	0,0006%[4]	NZL	2,432%[2]	1 776 210,00[4]	0,0006%[4]
DEU*	2,108%[3]	33 756 100,00[1]	0,0001%[5]	PAN	1,923%[4]	540 917,14[5]	0,0014%[2]

[12] World Bank, 2019a

Country	ML (% of GDP)	GDP	FIU Funding (% of GDP)	Country	ML (% of GDP)	GDP	FIU Funding (% of GDP)
DNK*†	1,922%[4]	3 012 980,00[3]	0,0008%[3]	POL*†	1,456%[5]	4 769 710,00[3]	0,0003%[5]
ESP*†	1,821%[5]	11 977 900,00[2]	0,0006%[4]	PRT*†	1,523%[5]	1 994 200,00[4]	0,0010%[3]
FIN*†	1,979%[3]	2 324 650,00[3]	0,0007%[3]	ROU*	1,329%[5]	1 778 930,00[4]	0,0010%[2]
FRA*†	1,627%[5]	24 382 100,00[1]	0,0002%[5]	RUS	2,082%[3]	13 684 000,00[2]	0,0023%[2]
GBR*†	1,860%[5]	28 855 700,00[1]	0,0003%[5]	SGP†	2,013%[3]	3 040 980,00[3]	0,0012%[2]
GRC*	1,907%[4]	1 955 420,00[4]	0,0009%[3]	SVK*	2,150%[2]	875 014,24[4]	0,0009%[3]
HRV*	1,616%[5]	494 901,42[5]	0,0018%[2]	SVN*	3,193%[5]	430 724,15[5]	0,0026%[1]
HUN*	1,925%[4]	1 228 790,00[4]	0,0009%[3]	SWE*	2,583%[2]	4 979 180,00[2]	0,0006%[4]
IRL*	6,388%[1]	2 906 170,00[3]	0,0004%[4]	TUR	2,720%[2]	8 597 970,00[2]	0,0009%[3]
ITA*	2,189%[2]	18 328 700,00[1]	0,0007%[4]	USA	1,986%[3]	181 207 000[1]	0,0008%[3]

GDP figures in 100.000 USD
(*) = Member of EU or EEA.
(†) = Large banking sector.
(n) = Quintile from 1 (Highest) to 5 (Lowest).

What is perhaps most interesting about this data is that there is no obvious relationship between a money laundering as a percentage of a country's GDP and their funding of an FIU as a percentage of GDP. Belgium for example is in the 4th quintile for money laundering with an estimated rate of 1,947% of GDP, however they are among the top funders of their FIU; they rank in the 1st quintile with 0,0014% of GDP.

The opposite also holds true, Japan ranks in the 5th quintile for FIU funding with 0,0001% of its GDP devoted to its FIU. This is despite or perhaps it leads to Japan being in the 1st quintile for money laundering, with an estimated 3,051% of its GDP being money laundering.

Although not covered by the scope of this thesis, it would also be interesting to examine why governments fail to adequately fund FIUs, especially in countries with larger estimates of money laundering. In looking at Table 6.1, a possible reasoning could be that the small % of GDP going to FIU funding could simply be a result of the countries' large GDP, as 5 of the 8 countries in the 5th quintile for FIU Funding are in the 1st quintile for GDP.

6.1.2 – Regression Results

A bit more scientific than looking at a colorful chart is a regression analysis. This section will focus on the 8 linear regressions run to look for a relationship between the absolute and

relative size of a country's banking sector as measured by banking assets and banking assets/GDP, respectively, and money laundering and FIU funding rates.

6.1.2.1 – Hypothesis 1

Hypothesis 1, previously stated in Section 3.6.1, is as follows:

Countries with larger banking sectors will experience more money laundering.

There were a total of eight linear regression analyses carried out to test this hypothesis; Regressions 1.2, 1.3, 1.4, 1.6, 1.7, 1.8, 1.9, and 1.10. Referring to Table 5.12, these regressions were designed to measure the relationship between the three estimates and one average of money laundering, and the absolute and relative size of the banking sector. The most relevant values are presented below in Table 6.2.

Table 6.2: Selected regression results for Hypothesis 1

Regression (X Variable)	***Multiple R***	***T Statistic***	***P-value***
1.2 (Assets/GDP)	0,983996936	34,04187492	$4{,}45637^{-30}$
1.3 (Assets/GDP)	0,92559277	15,07377258	$1{,}28347^{-17}$
1.4 (Assets/GDP)	0,589703901	4,501103355	$6{,}22208^{-05}$
1.6 (Assets)	0,061366568	-0,379003243	0,706795002
1.7 (Assets)	0,100232326	-0,62100088	0,538306438
1.8 (Assets)	0,123930166	-0,769891993	0,446123839
1.9 (Assets/GDP)	0,116212622	-0,721269778	0,475158109
1.10 (Assets)	0,877787344	11,29535324	$1{,}04019^{-13}$

The first result observed from this table is that having a larger banking sector relative to GDP will indeed result in an increase in money laundering. That said, the relationship is stronger when measuring actual estimates of money laundering rather than using the Hot Money method to estimate capital flows. The positive and high *(>0,5)* Multiple R values indicate that there is a strong positive relationship between levels of money laundering and banking sector size relative to GDP. The only exception to this is *Regression 1.9* which measures the relationship between the *Average ML* and *Relative Bank Sector Size*. In this case the Multiple R value is quite low, indicating a positive but very slight relationship.

Next, the P-value was examined to determine the significance of these results and whether or not the null hypothesis should be rejected. Given such a small *(>0,05)* P-value for *Regressions 1.2, 1.3,* and *1.4*, it can clearly be seen that the results are significant and thus the null hypothesis should be rejected. However, when looking at *Regression 1.9* which compares the *Average ML* to *Assets/GDP* the results are not significant and thus the null hypothesis should be accepted.

Following this analysis, *Regressions 1.6, 1.7, 1.8,* and *1.10* are examined. The aim of these regressions is to determine whether there exists a relationship between *Money Laundering* and the *Absolute Banking Sector Size*. The results show a positive, near-zero Multiple R value for *Regressions 1.6, 1.7,* and *1.8*. This indicates that while there is a positive relationship, it is so small as to be insignificant. For *Regression 1.10*, the Multiple R value is near 1 which indicates that there is a strong positive relationship between the *Absolute Bank Sector Size* and *Money Laundering*.

Again, after the Multiple R values, the P-values must be scrutinized to determine whether the results found are significant. For *Regressions 1.6, 1.7,* and *1.8* the P-values are well over the significance threshold of 0,05. This means that the null hypothesis must be accepted as the results are not statistically significant. The opposite is true for *Regression 10*; it has a very low P-value indicating that the relationship found is significant and that the null hypothesis should be rejected.

In concluding the analysis of Hypothesis 1, it can clearly be stated that when using the measurements of *3,5% of GDP*, *the Walker Method*, or *the Hot Money Method*, there is a strong and significant positive relationship with the *Relative Bank Sector Size*, but a very weak and not significant relationship with the *Absolute Bank Sector Size*. When taking an *Average of Money Laundering* estimates the relationship with *Absolute Bank Sector Size* is strong and significant, but the relationship with *Relative Bank Sector Size* is weak and insignificant.

6.1.2.2 – Hypothesis 2

Hypothesis 2, previously stated in Section 3.8.2, is as follows:

> *A higher level of FIU funding does not translate into higher FIU effectiveness among the countries analyzed.*

To test this hypothesis, a series of five linear regression analyses were run, *Regressions 4.1, 4.2, 4.3, 4.4,* and *4.5*. These regressions took *Financial Intelligence Unit Funding* as the Independent variable with the Dependent variable being the ML measures of *3,5% of GDP, the Walker Method, the Hot Money Method, the Average ML,* and *the number of STRs*, respectively. Relevant statistics are presented below, in Table 6.3.

Table 6.3: Selected regression results for Hypothesis 2

Regression (X Var.)	***Multiple R***	***T Statistic***	***P-value***
4.1 (FIU Funding)	0,882271048	11,55343449	$5{,}32466^{-14}$
4.2 (FIU Funding)	0,871187928	10,93872392	$2{,}66133^{-13}$
4.3 (FIU Funding)	0,417388817	2,831383509	0,007370539
4.4 (FIU Funding)	0,777710815	7,62641111	$3{,}55095^{-09}$
4.5 (FIU Funding)	0,706472246	6,15336537	$3{,}50753^{-07}$

From the data it is plain to see that the relationship between all four measured dependent variables is positive; *3,5% of GDP, the Walker Method, the Average ML estimate,* and *the number of STRs* are all strongly positive. The *Hot Money Method* relationship is positive but less so than the others.

An explanation for this may be that while *3,5% of GDP* and the *Walker Method* are indeed estimates of money laundering, the *Hot Money* method is not. This important difference could signify that although capital flows, which are measured by *Hot Money*, increase they do not increase at the same rate as money laundering.

Moving on to the significance, all P-values are less than *0,05* indicating that all relationships found are significant. It is important to note that while all the relationships have been found to be significant, by far the largest P-value is that of *Regression 4.3* which measured *Hot*

Money. This would support the theory that it is a less positive relationship as it measures capital flows and not money laundering.

What these results imply is that as FIUs are funded at higher levels, levels of money laundering increase as well. This would fit with the research suggesting a point of diminishing returns for FIU funding, a point after which further funding will have a negligible effect on money laundering. The result of this analysis would then seem to imply that a majority of the wealthy, developed countries studied here have reached this point and no further FIU funding will help them to reduce their money laundering.

The only measure by which more FIU funding translates to higher effectiveness is in STRs. *Regression 4.5* has a Multiple R value of *0,7* and a P-value of $3{,}5^{-07}$ indicating a strong positive link between *FIU Funding* and the *Number of STR*s received. Furthermore, this result is significant.

Regardless of the reasons, it can be said that all relationships between *FIU Funding* and *Money Laundering* are positive and significant, and thus that Hypothesis 2 should be accepted.

6.1.3 – Regional Results

Presented below in Table 6.4 are selected results of the regional level regressions.

Table 6.4: Selected regression results – Regional level

Regression (X Variable)	***Multiple R***	***T Statistic***	***P-value***
RR1.2 (Assets/GDP)	0,200397125	-0,578544586	0,578815611
RR1.3 (Assets/GDP)	0,233078397	-0,677916469	0,516948213
RR1.4 (Assets/GDP)	0,103196523	0,293450582	0,776646332
RR1.6 (Assets)	0,984719618	15,99340333	$2{,}34169^{-07}$
RR1.7 (Assets)	0,96446401	10,32463659	$6{,}6836^{-06}$
RR1.8 (Assets)	0,81617044	3,995212455	0,00397626
RR1.9 (Assets/GDP)	0,148932561	-0,425995877	0,681340676
RR1.10 (Assets)	0,96138431	9,880496715	$9{,}28464^{-06}$

What these regressions show is that even at the Regional level, there exists a clear link between money laundering and bank sector size. The link at this level though is different to the link found above in the National regressions: the link exists between *Absolute Bank Sector*

Size and *Money Laundering*. A potential explanation of this is that as all country-level data is averaged, countries with significantly larger banking sectors in relative terms such as Luxembourg, Cyprus, or Singapore are 'cancelled out' so to speak by countries with smaller sectors. This is also a function of the wide variance in banking sectors within the regions delineated; for example, while Poland is seen to have an above-average bank sector size *(3,913)*, it is in a region with countries in the 4th and 5th quintiles, resulting in a much lower average.

In looking at the ranked table (Table 5.11), the results are more or less as expected. Given the link shown above between *Absolute Bank Sector Size* and *Money Laundering*, the poorer regions (Balkans, South and Central America, and Eastern Europe) are found to have lower levels of money laundering than do richer, more developed regions (Asia, North America, Western Europe).

Thus it can be said that there exists a link between *Money Laundering* and *Bank Sector Size* not only at the national level but at the regional level as well; the link simply happens to exist at between *Absolute Bank Sector Size* and not *Relative Bank Sector Size*.

6.2 – Analysis

Section 6.1 presented the results of the regression analyses and their impact on this thesis' two hypotheses. This section will present checks of the data for robustness, as well as limitations of the results, and specific issues with the methodology used.

6.2.1 – Robustness Check

Given the large number of outliers in the data, for example Luxembourg's Assets/GDP ratio of 19,539 (nearly 7 times the mean ratio), it would be prudent to remove outliers and re-run the regressions to determine whether the results are affected by outliers.

Thus, this section will present the same regressions run for each of the hypotheses, but without the outliers in *Absolute Bank Sector Size*, *Relative Bank Sector Size*, and *FIU Funding*. For the purposes of this section, the outliers will be taken as 3 Standard Deviations above the mean.

6.2.1.1 – Hypothesis 1

The following tables present the results of the linear regression analyses to determine the relationship between the methods of estimating money laundering and the size of the banking sector. Section 6.2.1.1.1 presents the results of regressions after the elimination of Asset outliers. Section 6.2.1.1.2 presents the results after the elimination of Asset/GDP outliers.

6.2.1.1.1 – Regressions without Asset Outliers

Table 6.5: Selected regression results for Hypothesis 1 without Asset Outliers

Regression (X Var.)	***Multiple R***	***T Statistic***	***P-value***
2.2 (Assets/GDP)	0,103058698	-0,630237425	0,532412589
2.3 (Assets/GDP)	0,188875591	-1,169943144	0,249505031
2.4 (Assets/GDP)	0,124429529	-0,762803441	0,450416774
2.6 (Assets)	0,893456285	12,09992314	1,99318E-14
2.7 (Assets)	0,527221338	3,774104453	0,000563522
2.8 (Assets)	0,535479597	3,856731165	0,000443471
2.9 (Assets/GDP)	0,16286523	-1,004076622	0,321863356
2.10 (Assets)	0,558175578	4,092028384	0,000222184

Removed in this set of regressions was one country with significantly higher *Absolute Bank Sector Size* compared to other countries: the United States. The mean value for Assets was $12.155.203,57 with a standard deviation of $29.223.678,60. The only country with a value three standard deviations above the mean ($99.826.239,27) was the US with an *Absolute Bank Sector Size* of $181.207.000.

Compared to the initial regression results, the same results are only observed in *Regression 2.9 (Assets/GDP* and *ML Average)*; in both cases there was a very weak relationship which was not found to be statistically significant. Thus it can be said that the relationship between *Average Money Laundering* and *Relative Bank Sector Size* is not sensitive to outliers in absolute bank sector size.

Regressions 2.2, 2.3, and *2.4* have gone from having strong positive relationships to having very weakly positive relationships. In addition to this, their P-values have increased to the point of insignificance. Thus it can be determined that the relationship between relative banking sector size and the three estimates of money laundering are sensitive to outliers.

Regressions 2.6, 2.7, and *2.8* have also shifted. Where they once returned very weak relationships, they now show stronger positive relationships. In addition, the P-values on these three regressions have decreased to the point where the relationships can be judged to be significant. As above, it can be said that the relationship between *Absolute Bank Sector Size* and *Money Laundering* is sensitive to outliers.

Regression 2.10 presents essentially the same relationship as *Regression 1.10*; a strong positive relationship which is statistically significant. The only difference between the two is that the relationship is less strong and the significance slightly lower in *Regression 2.10*. Thus it can be said that the relationship between *Average Money Laundering* and *Absolute Bank Sector Size* is not sensitive to outliers in *Absolute Bank Sector Size*.

6.2.1.1.2 – Regressions without Asset/GDP Outliers

Table 6.6: Selected regression results for Hypothesis 1 without Asset/GDP outliers

Regression (X Var.)	Multiple R	T Statistic	P-value
3.2 (Assets/GDP)	0,008193283	-0,049839467	0,960518398
3.3 (Assets/GDP)	0,101071486	-0,617958313	0,540388146
3.4 (Assets/GDP)	0,149602507	-0,920353982	0,363349752
3.6 (Assets)	0,984173527	33,78241078	$2{,}06682^{-29}$
3.7 (Assets)	0,925565966	14,87110569	$3{,}45746^{-17}$
3.8 (Assets)	0,588691369	4,429807474	$8{,}07881^{-05}$
3.9 (Assets/GDP)	0,125899911	-0,771961803	0,445039917
3.10 (Assets)	0,877705048	11,14118807	$2{,}22566^{-13}$

Again, in the *Relative Bank Sector Size* data set there was only one outlier: Luxembourg. The mean value was *2,96*, with a standard deviation of *2,99* resulting in all values above *11,92* being eliminated. Luxembourg's value of *19,539* classed it as an outlier, and as such it was eliminated.

As with the previous section, there are significant changes in the results of the regressions. *Regressions 3.2, 3.3,* and *3.4* have shifted from strongly positive relationships and statistically significant results to essentially no relationships and insignificant results. Thus it can be said that the relationships between *Money Laundering* and *Relative Bank Sector Size* is sensitive to outliers in *Relative Bank Sector Size*.

Regressions 3.6, 3.7, and *3.8* have also experienced shifts in their values. The results originally displayed weak relationships which were statistically insignificant. After elimination of the outliers, the results have shifted to strongly positive relationships which are statistically significant. Thus, the relationship between *Absolute Bank Sector Size* and *Money Laundering* is sensitive to outliers.

The values returned by *Regression 3.9* have shifted compared to *1.9* but not enough that a different conclusion must be drawn. The relationship between *Relative Bank Sector Size* and *Average Money Laundering* is not sensitive to outliers.

As with *Regression 3.9, 3.10* has shifted in results but not such that the conclusions are different. After elimination of *Asset/GDP* outliers, the relationship between *Absolute Bank Sector Size* and *Average Money Laundering* is both stronger and more significant. This relationship is not sensitive to outliers.

6.2.1.1.3 – Analysis Conclusion

After examining the results of all twenty-four regression analyses, it can be said with confidence that only the relationships between the *Money Laundering Average* and *Bank Sector Size* (*Relative* and *Absolute*) are wholly robust to outliers, as these were the only relationships which did not change with the elimination of outliers.

All other relationships are sensitive to certain outliers. The relationship between the individual *Estimates of Money Laundering* and both *Relative* and *Absolute Bank Sector Size* are sensitive to outliers in both *Assets* and *Assets/GDP*.

6.2.1.3 – Hypothesis 2

The following regressions present the relationship between *FIU Funding* and the four *Estimates of Money Laundering*, as well as the *Number of STRs* received. As with Hypothesis 1, all countries presenting values 3 standard deviations above the mean for *FIU Funding* were eliminated.

Table 6.7: Selected regression results for Hypothesis 2 without FIU funding outliers

Regression (X Var.)	Multiple R	T Statistic	P-value
5.1 (FIU Funding)	0,265929394	1,678006144	0,101774545
5.2 (FIU Funding)	0,273834142	1,731865266	0,091628395
5.3 (FIU Funding)	0,069731901	0,425197623	0,673155444
5.4 (FIU Funding)	0,175212316	1,082520778	0,286025854
5.5 (FIU Funding)	0,418127262	2,799869169	0,008077247

Again, only one country was classed as an outlier: the United States. The mean *FIU Funding* across all forty countries was $103,51, with a standard deviation of $256,35, resulting in the elimination of all countries with *FIU Funding* above $872,55. As with *Absolute Bank Sector Size*, the US was the only country with a value high enough to be eliminated.

Directly it is seen that all Multiple R values are significantly lower than in the initial regressions. While *Regressions 5.1 – 5.4* have decreased by around *0,6, Regression 5.5* has decreased by only *0,3*. Furthermore, all P-values apart from *Regression 5.5* have increased to a point that the results can no longer be considered statistically significant. *Regression 5.5*'s P-value has also increased but it remains significant.

From these results it can be determined that the relationship between *FIU Funding* and *Money Laundering* is sensitive to outliers, however the relationship between *FIU Funding* and *STRs* received is robust.

6.2.1.3 – Summary

As seen in the preceding subsections, nearly all results are sensitive to outliers. One explanation for this is that the outliers are so extreme and the total sample size so small, the outliers significantly influence the results. Another potential explanation lies in the methodology: linear regressions are known to be especially vulnerable to outliers, something which may well have affected these results.

There a number of ways to potentially cancel these effects. First of which would be to redo the entire analysis with a much larger sample size. As all the countries analyzed were wealthy, it stands to reason that this influenced both the mean and the standard deviations up. The addition of more countries could drive both of these values down. An alternate solution would

be to eliminate the US and Luxembourg where they are outliers and rerun the analyses with new lower means and standard deviations. This would obviously change the relevance of the results, as they would no longer be seen to apply to countries with outlying values. Finally, the analyses could be redone using a method which is naturally less sensitive to outliers, such as the MM-Estimation or Least Trimmed Squares.

6.2.2 – Limitations and Potential Issues

One of the most significant issues with this thesis is its subject matter: money laundering. As has been pointed out by every article researching money laundering, it is an illegal activity and thus any numbers given are mere guesses, no matter how educated they may be. The implication of this is that if the estimates used in this thesis are not correct, the conclusions reached may not be correct either. While this is a limitation, it must be said that this limitation applies to all research relating to money laundering volume and not just this thesis.

6.2.2.1 – Different Values

One of the most noticeable things about the three estimates of money laundering is how different they are. This is nowhere more apparent than in the cases of Luxembourg and Australia; these countries have values for 3,5% of GDP, the Walker Model, and Hot Money which are in three different quintiles (LUX: 4^{th}, 5^{th}, 3^{rd} respectively/AUS: 2^{nd}, 1^{st}, 3^{rd} respectively).

The most probable explanation for this variance is that the three measures measure different things using different data: 3,5% measures GDP; the Walker Model uses GNP/capita as well as policy, regulation, and country-specific factors; and Hot Money measures capital flows. As the inputs for each method are quite different, it stands to reason that the outputs would also be quite different. Regardless of the variance in values, all three methods are supported by the literature, and absent better methods for measuring money laundering their use is justified in this thesis.

6.2.2.2 – Issues with Estimation Methods

To attempt to reach a more correct estimate, three methods were used, as well as an average of the three to attempt to balance out any extreme values. Although detailed in the

methodology section, it is worth stating again here that all three methods have their own issues.

The Walker Model presents the most significant issues; Walker has been criticized for using "tacit knowledge" and "feelings" to calibrate his money laundering model (Barone and Masciandaro, 2010 p. 177). While this does call into question its reliability, its inclusion in this thesis is justified partly by its use in other research and partly by its ease of use compared to more data-intensive estimation methods.

The main issue with the Hot Money method is that it does not estimate money laundering directly but rather illicit capital flows. However as noted by (Hendriyetty and Grewal, 2017), illicit capital flows should be a sufficient stand-in for money laundering. Given this backing its use was justified in this thesis. Despite this, any estimates produced by the Hot Money method should be accepted with caution: that it measures capital flows means it will tend to produce higher values in financial centers.

The final method used is the IMF's estimate of between two and five percent of GDP, which in this thesis was taken as the average of the two values: 3,5%. This figure was reported in a speech by the Managing Director of the IMF, Michel Camdessus. At issue with this method is the total lack of justification; despite attempts by the author of this thesis as well as others to find a source for the figures "IMF sources have never explained how they reached these figures" (Barone and Masciandaro, 2010 p. 117).

There exists a second concern as well, with the exact figure used in this thesis: 3,5%. The IMF provided a range, and for ease of calculation the average of this range was used. The issue in using an average value is that it ignores country-specific factors. As stated in the literature review, crime is an important determinant of money laundering; a country like Brazil cannot be seen as comparable to one like Switzerland when it comes to crime, thus the value used is problematic as it does not account for country-level variation. Regardless, as an average, 3,5% should be close enough to the actual values to justify its use in this thesis.

The average of the three estimates is also quite problematic. At the time it was calculated, the average of all estimates was thought to be a good way to produce a more reliable estimate by finding a value somewhere in the middle of the three estimates. However, in hindsight using an average of three such different values obtained in very different ways was unwise. The average money laundering value does not add anything to the data apart from noise, which may make interpretation of the results more difficult. Despite these misgivings, the average value was included to avoid any potential accusations of hiding unfavorable results which do not confirm the hypotheses.

6.2.2.3 – Issues with Data

There exist also potential issues with the data used in this thesis. All data on Bank Sector Size, FIU Funding, and STRs was taken directly from the websites of central banks or FIUs so there is no way to ensure validity. Particularly as regards FIU funding, it is possible that values were inflated to present a better picture of the country's efforts in fighting money laundering. Given though that so many of the countries analyzed are members of the FATF and subject to mutual evaluations, this risk is not significant.

As regards Bank Sector Size, all members of the ESBC (European System of Central Banks, composed of all Central Banks of EU member states) can be assumed to use the same measurements when calculating bank assets, but the same cannot be said of central banks which are not as closely linked. This can be especially concerning for all central banks which did not provide statistics in English, as exact technical descriptions of what is included in "Assets" can be difficult to translate.

Language is also an issue as regards FIU funding. Numbers on FIU funding as well as STRs received came largely from the annual reports of respective FIUs. While some countries provided annual reports in English, the vast majority did not. This mandated the use of Google Translate on documents which were often very technical and produced translations which this author had no means of verifying. While all figures reported are believed to be accurate, any further research using the same data should be used with caution or further verified.

6.2.2.4 – Limitations

The principal limitation of this thesis is that given the countries observed, results cannot easily be generalized. As the data was obtained from developed, wealthy countries, any findings can only be assumed to apply to other countries with similar levels of wealth and development.

The conclusions must also be interpreted in this way. While the conclusions are applicable to the 40 countries studied here, they cannot be applied to other countries without more research using a larger and more representative sample.

SECTION 7 – CONCLUSIONS

7.1 – Summary of Results

This thesis presented two hypotheses. The first attempted to link banking sector size and money laundering using three estimation methods and an average of those methods. The second attempted to link funding of Financial Intelligence Units to their effectiveness as measured by money laundering estimates as well as Suspicious Transaction Reports received.

7.1.1 – Hypothesis 1

It was expected that as the size of a banking sector relative to the GDP of a country increased, money laundering would increase as well due to lower political will to regulate what would be an important industry. It was also expected that as the absolute size of a banking sector increased, money laundering would not increase, because political will to regulate should be more common in countries not reliant on banking. In both of these cases, the results supported expectations with one important caveat: using individual estimates produces these results, using an average of the three estimates produces the opposite result.

This is to say that there exists a strong and significant ($p<0.05$) relationship between banking sector size relative to GDP and money laundering as measured by the Walker Model, the Hot Money Method, or an estimate of 3,5% of GDP. There does not exist a relationship between these methods and absolute size of a banking sector. Additionally, there exists a strong and positive relationship between an average of these three methods and absolute size of a banking sector, but there exists no relationship between an average of the three estimates and relative size of a banking sector at the national level.

7.1.2 – Hypothesis 2

It was expected that as FIU funding increases, money laundering would not decrease due to the countries analyzed having reached the point of diminishing returns as regards FIU funding. This was proven to be the case. There exists a strong and statistically significant *($p<0.05$)* positive relationship between FIU funding and money laundering, thus as FIU funding increases, money laundering can be expected to increase as well. This means that Hypothesis 2 was accepted, as it stated that increased FIU funding would not lead to increased efficiency.

As there is a positive relationship, it cannot be claimed that FIU funding increasing money laundering is efficient.

The exception to this is in measuring effectiveness as STRs received. In this case there is a positive and significant relationship between FIU funding and STRs received. Despite this finding, receiving STRs is no guarantee of action and thus Hypothesis 2 was still accepted.

7.2 – Usefulness and Implications

The usefulness of this thesis lies in answering the simple but as yet unanswered question posed in this thesis' title: *Does Size* [of national banking sectors] *Really Matter?* Answering this question can help governments estimate their risk of money laundering, as well as showing supranational organizations which types of economies are most at risk of money laundering and thus where the most AML efforts are needed.

The implications of the results found in this thesis are wide-ranging. Perhaps most significant is that this thesis highlights how significant the problems of regulatory capture and systemic importance are in the banking sector. This thesis has shown that economies that have large banking sectors relative to their GDP will have more money laundering; although it is impossible to say why this occurs, a reasonable assumption is that banks are seen not as 'Too Big to Fail' but as 'Too Big to Regulate'. The importance of banks in economies dependent on financial services means that banks can act with impunity knowing their transgressions will be excused by captured regulators or kept secret by the NTR process.

In a way, this thesis has shown something disturbing: Without political will, AML regulations are not worth the paper on which they are printed. Despite the fact that all the countries analyzed have what appear to be robust financial intelligence units, they remain affected by money laundering, which has been proven to increase as relative banking sector size increases. This signifies that countries with large banking sectors relative to their GDP have no interest in effectively enforcing their regulations.

The specific implications of this thesis are:

1. While FIUs and AMLDs are good places to begin, real international accountability is needed when it comes to money laundering. Without accepted international standards and means of holding national politicians to account, there can be no real reduction in money laundering.

2. Countries with large banking sectors relative to GDP should take extra care when crafting AML regulations, as well as being particularly prudent in enforcement of AML regulations. Such measures can help these countries, which are especially prone to money laundering, reduce it as much as possible.

3. FIU funding should be maintained or increased, but with no expectation of significant gains in combating money laundering. The best regulators can hope for is to maintain or slightly increase effectiveness through higher funding.

7.3 – Impact on Literature Review

The conclusions found in this thesis mostly support the information presented in the literature review. For instance, that there is a significant and positive relationship between banking sector size relative to GDP and money laundering. This supports the idea that important industries will exploit their systemic importance to an economy to forge close relationships with politicians, capture their regulators, lobby for self-regulation and the use of NTRs, and do everything else in their power to make themselves immune from regulation.

The reverse also holds true: in countries with large banking sectors, in absolute terms, there is no strong positive link between money laundering and banking sector. This could very well be because the relatively less important banks will have a harder time lobbying for preferential treatment in law when the success of the economy is not bound to the success of banks.

Research on FIUs is also partly confirmed by the results of Hypothesis 2. As theorized in Sections 2.6.4 and 3.4, there would indeed appear to be a point at which an FIU's ability to reduce money laundering becomes unlinked from its funding levels. The specific location of

this point is one area where the results do not agree with the literature; Reganati and Olivia (2018) stated that the point of diminishing returns had not yet been reached, however the lack of a decrease in money laundering as FIU funding increased would seem to indicate that this point ***has*** been reached. Although the exact location of this point was out of scope for this thesis, the results confirm that such a point exists, but do not confirm that it is above current funding levels.

Also partly confirmed by the results was the literature on the measurement of money laundering, specifically the IMF's estimate of 2 – 5% of GDP. While an average of these two values was used in this thesis, the two other estimates (Walker Model and Hot Money) were averaged and compared to national GDPs. These percentages are presented in Table 6.1. An average of the Walker Model and the Hot Money method produced results indicating that twenty of the forty countries had money laundering percentages between 2% and 5%. This increased to thirty of forty when widening the margins by 0,1% to 1,9% and 5,1%. That the results mostly fit in within the IMF's estimate should be seen as a confirmation of its reliability, as well as providing a modicum of confidence in the other values.

7.4 – Future Research

Based on these results, there are a few avenues for future research, the first of which would be to redo the same research presented in this thesis with a more diverse and representative group of countries. This could provide a more accurate and generalizable guide to national and international regulators about where to focus in the fight against money laundering. Any future research in this direction should again divide countries by region to attempt to see if there are any identifiable regional trends.

Additional research could also be done into the specifics of measuring money laundering. The three estimates used in this thesis were selected for availability of information and ease of calculation, there are other methods which would not have been practical at this level. Further research could be done into this area to determine how different methods may produce different results, as well as if certain characteristics of a country contribute to significantly different results. The IMF estimate could also be modified to account for country-level differences in corruption or crime.

Given the results of Hypothesis 2, future research could investigate what level of FIU funding is most effective at reducing money laundering or try to determine the point after which FIU funding no longer produces worthwhile returns. Hypothesis 2's results have shown, and the research has supported, that FIU funding is effective up to a point and after that point will produce diminishing returns. It would be extremely valuable for regulators to know where this point is to avoid spending money unnecessarily.

Additionally, further research could investigate which organizational type of FIU is most effective: Administrative, Investigative, Judicial, or Law Enforcement. Research has found that banks would prefer to deal with Administrative FIUs but has also suggested that banks would prefer not to comply with regulations at all if it would increase their profits. A study on which type of FIU is most effective in reducing money laundering regardless of the feelings of firms would show legislators how best to organize FIUs to reduce money laundering.

SECTION 8 – REFERENCES

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SECTION 9 – APPENDICES

Appendix 1 – Walker and Unger's questions for use in the Walker Model

(Walker and Unger, 2009)

CRIMINAL LAW

1. Is money laundering punished in your criminal system?
2. Does your legislation provide for a list of crimes as predicate offenses?
3. Do predicate offenses cover all serious crimes?
4. Do predicate offenses cover all crimes?
5. Are there provisions allowing confiscation of assets for an ML offense?
6. Are there special investigative bodies or investigations in relation to ML offenses?

ADMINISTRATIVE REGULATIONS

1. Is there an anti-ML law in the jurisdiction?
2. Are banks covered by the anti-ML law?
3. Are other financial institutions covered by the anti-ML law?
4. Are non-financial institutions covered by the anti-ML law?
5. Are other professions carrying out financial activities covered by the anti-ML law?
6. Are there identity requirements for the institutions covered by the anti-ML law?
7. Do you have suspicious transactions reporting?
8. Is there a central authority (for instance, an FIU) for the collection of suspicious transactions reports?
9. Is there regular cooperation between banks or other financial institutions and police authorities?

BANKING LAW

1. Is it prohibited to open a bank account without ID of the beneficial owner?
2. Are there limits to bank secrecy in cases of criminal investigation and prosecution?

COMPANY LAW

1. Is there a minimum share capital required for limited liability companies?
2. Is there a prohibition on bearer shares in limited liability companies?
3. Is there a prohibition on legal entities as directors of limited liability companies?
4. Must a registered office exist for limited liability companies?
5. Is there any form of annual auditing (at least internal) for limited liability companies? 6. Is there a shareholder register for limited liability companies?

INTERNATIONAL COOPERATION PROVISIONS

1. Does extradition (at least of foreigners) exist for ML offenses?
2. Is assistance to foreign law enforcement agencies provided in ML investigations?
3. Can law enforcement respond to a request from a foreign country for financial records?
4. Is there provision allowing the sharing of confiscated assets for ML offenses?
5. Has the 1988 UN Convention been ratified?

Appendix 2 – Quintile Chart (Part 1/4)

Table Ap2.1: Quintile Chart, Part 1/4

BANK AND ECONOMY INFO				MONEY LAUNDERING ESTIMATES				
Code	GDP[13]	Bank Assets[14]	Assets/GDP	3,5% of GDP	Walker Model	Hot Money1	Hot Money3	Hot Money Average
AUS	$ 13 490 300,00	$ 31 068 859,66	2,303	$ 472 160,50	$ 275 030,54	$ 2 184,15	$ 136 299,40	$ 69 241,77
AUT	*$ 3 820 660,00*	*$ 9 153 679,99*	*2,396*	*$ 133 723,10*	*$ 60 129,55*	*$ 9 518,20*	*$ 74 763,03*	*$ 42 140,61*
BEL	*$ 4 550 400,00*	*$ 12 770 672,10*	*2,806*	*$ 159 264,00*	*$ 69 312,56*	*$ 13 615,40*	*$ 60 801,89*	*$ 37 208,64*
BGR	*$ 502 013,15*	*$ 376 423,66*	*1,154*	*$ 17 570,46*	*$ 4 295,55*	*$ 27 831,33*	*$ 20 424,00*	*$ 24 127,67*
BRA	$ 18 022 100,00	$ 16 707 147,57	0,927	$ 630 773,50	$ 291 457,87	$ 26 247,25	$ 213 729,00	$ 119 988,13
CAN	$ 15 596 200,00	$ 40 324 762,80	2,586	$ 545 867,00	$ 315 650,75	$ 4 859,09	$ 184 905,39	$ 94 882,24
CHE	**$ 6 792 890,00**	**$ 24 675 885,71**	**3,633**	**$ 237 751,15**	**$ 89 960,42**	**$ 30 376,00**	**$ 119 950,64**	**$ 75 163,32**
CYP	***$ 196 806,25***	***$ 1 141 490,70***	***5,8***	***$ 6 888,22***	***$ 886,79***	***$ 911,64***	***$ 4 847,20***	***$ 2 879,42***
CZE	*$ 1 868 300,00*	*$ 3 305 977,11*	*1,77*	*$ 65 390,50*	*$ 22 840,86*	*$ 19 527,01*	*$ 18 271,51*	*$ 18 899,26*
DEU	*$ 33 756 100,00*	*$ 90 757 318,50*	*2,689*	*$ 1 181 463,50*	*$ 556 404,21*	*$ 19 988,58*	*$ 773 908,78*	*$ 396 948,68*
DNK	***$ 3 012 980,00***	***$ 12 994 550,89***	***4,313***	***$ 105 454,30***	***$ 39 642,19***	***$ 8 927,57***	***$ 48 408,72***	***$ 28 668,14***
ESP	***$ 11 977 900,00***	***$ 36 366 930,00***	***3,036***	***$ 419 226,50***	***$ 86 968,84***	***$ 128 843,58***	***$ 167 282,14***	***$ 148 062,86***
FIN	***$ 2 324 650,00***	***$ 7 371 576,60***	***3,171***	***$ 81 362,75***	***$ 39 478,75***	***$ 10 108,92***	***$ 24 258,33***	***$ 17 183,63***
FRA	***$ 24 382 100,00***	***$ 94 798 340,10***	***3,888***	***$ 853 373,50***	***$ 244 151,19***	***$ 38 010,24***	***$ 147 640,54***	***$ 92 825,39***
GBR	***$ 28 855 700,00***	***$ 120 296 164,96***	***4,169***	***$ 1 009 949,50***	***$ 293 684,43***	***$ 63 265,63***	***$ 549 279,06***	***$ 306 272,34***
GRC	*$ 1 955 420,00*	*$ 4 445 003,70*	*2,273*	*$ 68 439,70*	*$ 19 388,04*	*$ 4 543,07*	*$ 43 536,27*	*$ 24 039,67*
HRV	*$ 494 901,42*	*$ 960 693,02*	*1,941*	*$ 17 321,55*	*$ 4 493,54*	*$ 1 963,06*	*$ 2 382,53*	*$ 2 172,79*
HUN	*$ 1 228 790,00*	*$ 2 275 362,86*	*1,852*	*$ 43 007,65*	*$ 11 019,60*	*$ 8 090,39*	*$ 25 766,76*	*$ 16 928,57*
IRL	*$ 2 906 170,00*	*$ 4 746 626,40*	*1,633*	*$ 101 715,95*	*$ 55 243,04*	*$ 36 973,79*	*$ 762 909,86*	*$ 399 941,82*
ITA	*$ 18 328 700,00*	*$ 43 983 761,10*	*2,4*	*$ 641 504,50*	*$ 50 051,77*	*$ 288 427,17*	*$ 736 110,50*	*$ 512 268,83*
JPN	$ 43 949 800,00	$ 84 861 764,40	1,931	$ 1 538 243,00	$ 1 023 873,95	$ 1 118 306,32	$ 1 804 137,49	$ 1 461 221,91
LTU	*$ 415 086,09*	*$ 552 691,20*	*1,332*	*$ 14 528,01*	*$ 7 909,08*	*$ 4 945,72*	*$ 4 451,10*	*$ 4 698,41*
LUX	***$ 577 844,95***	***$ 11 290 697,47***	***19,539***	***$ 20 224,57***	***$ 1 007,50***	***$ 74 397,65***	***$ 7 108,57***	***$ 40 753,11***

[13] World Bank (2015)

[14] Sources in Section 9.2 – Central Bank Statistics

Appendix 2 – Quintile Chart (Part 2/4)

Table Ap2.2: Quintile Chart, Part 2/4

	BANK AND ECONOMY INFO				MONEY LAUNDERING ESTIMATES				
Code	**GDP**	**Bank Assets**	**Assets/GDP**	**3,5% of GDP**	**Walker Model**	**Hot Money1**	**Hot Money3**	**Hot Money Average**	
LVA	*$ 269 728,63*	*$ 354 452,97*	*1,314*	*$ 9 440,50*	*$ 3 378,52*	*$ 5 798,55*	*$ 12 026,77*	*$ 8 912,66*	
MEX	$ 11 705 600,00	$ 5 225 585,55	0,446	$ 409 696,00	$ 972 270,58	$ 271 368,61	$ 831 834,18	$ 551 601,39	
MLT	***$ 105 546,70***	***$ 526 108,53***	***4,985***	***$ 3 694,13***	***$ 615,99***	***$ 556,93***	***$ 10 313,67***	***$ 5 435,30***	
NLD	***$ 7 579 990,00***	***$ 28 596 630,30***	***3,773***	***$ 265 299,65***	***$ 107 869,81***	***$ 112 628,60***	***$ 201 233,10***	***$ 156 930,85***	
NOR	*$ 3 866 630,00*	*$ 6 379 233,48*	*1,65*	*$ 135 332,05*	*$ 137 570,97*	*$ 127 165,33*	*$ 82 424,12*	*$ 104 794,73*	
NZL	$ 1 776 210,00	$ 3 980 160,60	2,241	$ 62 167,35	$ 46 250,91	$ 26 348,68	$ 15 964,52	$ 21 156,60	
PAN	$ 540 917,14	$ 1 184 775,20	2,19	$ 18 932,10	$ 5 107,11	$ 6 435,25	$ 7 907,85	$ 7 171,55	
POL	***$ 4 769 710,00***	***$ 18 663 521,13***	***3,913***	***$ 166 939,85***	***$ 32 376,88***	***$ 4 996,40***	***$ 13 112,93***	***$ 9 054,66***	
PRT	***$ 1 994 200,00***	***$ 6 954 549,60***	***3,487***	***$ 69 797,00***	***$ 15 783,82***	***$ 5 542,67***	***$ 5 529,75***	***$ 5 536,21***	
ROU	*$ 1 778 930,00*	*$ 4 186 777,92*	*2,354*	*$ 62 262,55*	*$ 6 412,33*	*$ 2 113,76*	*$ 2 338,95*	*$ 2 226,36*	
RUS	$ 13 684 000,00	$ 14 109 950,36	1,031	$ 478 940,00	$ 217 075,67	$ 30 432,49	$ 286 719,69	$ 158 576,09	
SGP	**$ 3 040 980,00**	**$ 17 561 110,89**	**5,775**	**$ 106 434,30**	**$ 25 887,06**	**$ 2 808,00**	**$ 99 882,25**	**$ 51 345,13**	
SVK	*$ 875 014,24*	*$ 766 027,57*	*0,875*	*$ 30 625,50*	*$ 14 164,66*	*$ 4 588,34*	*$ 18 686,68*	*$ 11 637,51*	
SVN	*$ 430 724,15*	*$ 432 555,90*	*1,004*	*$ 15 075,35*	*$ 10 057,28*	*$ 10 904,78*	*$ 21 358,50*	*$ 16 131,64*	
SWE	*$ 4 979 180,00*	*$ 11 032 372,48*	*2,216*	*$ 174 271,30*	*$ 130 528,77*	*$ 51 376,40*	*$ 110 637,55*	*$ 81 006,97*	
TUR	$ 8 597 970,00	$ 8 761 456,21	1,019	$ 300 928,95	$ 230 509,79	$ 93 159,47	$ 247 104,51	$ 170 131,99	
USA	$ 181 207 000,00	$ 444 361 000,00	2,452	$ 6 342 245,00	$ 3 537 728,48	$ 1 027 114,31	$ 808 933,24	$ 918 023,78	
Mean	$ 12 155 203,57	$ 30 707 566,23	2,956675	$ 425 432,12	$ 226 411,74	$ 93 130,01	$ 217 679,52	$ 155 404,77	
Median	$ 3 430 820,00	$ 8 957 568,10	2,3285	$ 120 078,70	$ 48 151,34	$ 16 571,20	$ 67 782,46	$ 41 446,86	
Highest	$ 181 207 000,00	$ 444 361 000,00	19,539	$ 6 342 245,00	$ 3 537 728,48	$ 1 118 306,32	$ 1 804 137,49	$ 1 461 221,91	
Lowest	$ 105 546,70	$ 354 452,97	0,446	$ 3 694,13	$ 615,99	$ 556,93	$ 2 338,95	$ 2 172,79	
Range	$ 181 101 453,30	$ 444 006 547,03	19,093	$ 6 338 550,87	$ 3 537 112,49	$ 1 117 749,39	$ 1 801 798,54	$ 1 459 049,11	
Std. Dev.	$ 29 223 678,60	$73 039 211,09	2,9891779	$1 022 828,75	$ 585 302,01	$236 982,79	$362 434,49	$284 744,58	

Appendix 2 – Quintile Chart (Part 3/4)

Table Ap2.3: Quintile Chart, Part 3/4

	ML EST.		FIU INFORMATION			ML AS % of GDP			
Code	ML Avg	# of STRs	FIUBudgetUSD	FIU as % of GDP	FIU/Assets	3.5/GDP	Walker/GDP	HMA/GDP	Avg %
AUS	$ 172 136,16	78 000	$ 511,95	0,0038 %	1,64779E-05	3,500 %	2,039 %	0,513 %	2,017 %
AUT	*$ 51 135,08*	*1 793*	*$ 11,36*	*0,0003 %*	*1,24052E-06*	*3,500 %*	*1,574 %*	*1,103 %*	*2,059 %*
BEL	*$ 53 260,60*	*9 938*	*$ 61,45*	*0,0014 %*	*4,81177E-06*	*3,500 %*	*1,523 %*	*0,818 %*	*1,947 %*
BGR	*$ 14 211,61*	*372*	*$ 88,91*	*0,0177 %*	*0,000236189*	*3,500 %*	*0,856 %*	*4,806 %*	*3,054 %*
BRA	$ 205 723,00	4 304	$ 23,10	0,0001 %	1,38254E-06	3,500 %	1,617 %	0,666 %	1,928 %
CAN	$ 205 266,50	92 531	$ 449,44	0,0029 %	1,11456E-05	3,500 %	2,024 %	0,608 %	2,044 %
CHE	**$ 82 561,87**	9 756	**$ 20,20**	**0,0003 %**	8,18613E-07	**3,500 %**	**1,324 %**	**1,106 %**	**1,977 %**
CYP	***$ 1 883,10***	209	***$ 12,21***	***0,0062 %***	1,06965E-05	***3,500 %***	***0,451 %***	***1,463 %***	***1,805 %***
CZE	*$ 20 870,06*	*3 480*	*$ 11,01*	*0,0006 %*	*3,33026E-06*	*3,500 %*	*1,223 %*	*1,012 %*	*1,911 %*
DEU	*$ 476 676,45*	*10 051*	*$ 20,79*	*0,0001 %*	*2,29073E-07*	*3,500 %*	*1,648 %*	*1,176 %*	*2,108 %*
DNK	***$ 34 155,17***	958	***$ 24,27***	***0,0008 %***	1,86778E-06	***3,500 %***	***1,316 %***	***0,951 %***	***1,922 %***
ESP	***$ 117 515,85***	2 251	***$ 65,95***	***0,0006 %***	1,81342E-06	***3,500 %***	***0,726 %***	***1,236 %***	***1,821 %***
FIN	***$ 28 331,19***	9 975	***$ 17,37***	***0,0007 %***	2,35655E-06	***3,500 %***	***1,698 %***	***0,739 %***	***1,979 %***
FRA	***$ 168 488,29***	45 266	***$ 55,30***	***0,0002 %***	5,83309E-07	***3,500 %***	***1,001 %***	***0,381 %***	***1,627 %***
GBR	***$ 299 978,39***	200 000	***$ 81,02***	***0,0003 %***	6,73512E-07	***3,500 %***	***1,018 %***	***1,061 %***	***1,860 %***
GRC	*$ 21 713,86*	*1 250*	*$ 16,65*	*0,0009 %*	*3,74578E-06*	*3,500 %*	*0,992 %*	*1,229 %*	*1,907 %*
HRV	*$ 3 333,16*	*334*	*$ 8,80*	*0,0018 %*	*9,16068E-06*	*3,500 %*	*0,908 %*	*0,439 %*	*1,616 %*
HUN	*$ 13 974,09*	*14 120*	*$ 11,10*	*0,0009 %*	*4,87834E-06*	*3,500 %*	*0,897 %*	*1,378 %*	*1,925 %*
IRL	*$ 227 592,43*	*10 402*	*$ 11,00*	*0,0004 %*	*2,31705E-06*	*3,500 %*	*1,901 %*	*13,762 %*	*6,388 %*
ITA	*$ 281 160,30*	*82 428*	*$ 122,01*	*0,0007 %*	*2,77404E-06*	*3,500 %*	*0,273 %*	*2,795 %*	*2,189 %*
JPN	$ 1 242 547,93	399 508	$ 44,17	0,0001 %	5,20443E-07	3,500 %	2,330 %	3,325 %	3,051 %
LTU	*$ 6 303,74*	*115*	*$ 1,75*	*0,0004 %*	*3,17069E-06*	*3,500 %*	*1,905 %*	*1,132 %*	*2,179 %*
LUX	***$ 20 880,30***	800	***$ 21,63***	***0,0037 %***	1,91558E-06	***3,500 %***	***0,174 %***	***7,053 %***	***3,576 %***

Appendix 2 – Quintile Chart (Part 4/4)

Table Ap2.4: Quintile Chart, Part 4/4

	ML EST.		FIU INFORMATION				ML AS % of GDP			
Code	**ML Avg**	**# of STRs**	**FIUBudgetUSD**	**FIU as % of GDP**	**FIU/Assets**	**3.5/GDP**	**Walker/GDP**	**HMA/GDP**	**Avg %**
LVA	*$ 6 145,59*	13 505	*$ 2,94*	*0,0011 %*	8,30497E-06	*3,500 %*	*1,253 %*	*3,304 %*	*2,686 %*
MEX	$ 761 935,99	51 683	$ 125,80	0,0011 %	2,40739E-05	3,500 %	8,306 %	4,712 %	5,506 %
MLT	***$ 3 025,64***	407	***$ 4,47***	***0,0042 %***	8,48943E-06	***3,500 %***	***0,584 %***	***5,150 %***	***3,078 %***
NLD	***$ 132 400,33***	40 959	***$ 46,91***	***0,0006 %***	1,64045E-06	***3,500 %***	***1,423 %***	***2,070 %***	***2,331 %***
NOR	*$ 121 182,85*	4 714	*$ 206,26*	*0,0053 %*	3,23323E-05	*3,500 %*	*3,558 %*	*2,710 %*	*3,256 %*
NZL	$ 33 703,76	596	$ 10,23	0,0006 %	2,56919E-06	3,500 %	2,604 %	1,191 %	2,432 %
PAN	$ 6 139,33	1 358	$ 7,68	0,0014 %	6,48231E-06	3,500 %	0,944 %	1,326 %	1,923 %
POL	***$ 20 715,77***	2 863	***$ 14,30***	***0,0003 %***	7,66271E-07	***3,500 %***	***0,679 %***	***0,190 %***	***1,456 %***
PRT	***$ 10 660,02***	650	***$ 20,14***	***0,0010 %***	2,89539E-06	***3,500 %***	***0,791 %***	***0,278 %***	***1,523 %***
ROU	*$ 4 319,34*	2 720	*$ 18,24*	*0,0010 %*	4,35699E-06	*3,500 %*	*0,360 %*	*0,125 %*	*1,329 %*
RUS	$ 187 825,88	700 000	$ 310,21	0,0023 %	2,1985E-05	3,500 %	1,586 %	1,159 %	2,082 %
SGP	**$ 38 616,09**	30 511	**$ 36,19**	**0,0012 %**	2,06092E-06	**3,500 %**	**0,851 %**	**1,688 %**	**2,013 %**
SVK	*$ 12 901,09*	1 573	*$ 7,71*	*0,0009 %*	1,00663E-05	*3,500 %*	*1,619 %*	*1,330 %*	*2,150 %*
SVN	*$ 13 094,46*	453	*$ 11,09*	*0,0026 %*	2,56444E-05	*3,500 %*	*2,335 %*	*3,745 %*	*3,193 %*
SWE	*$ 105 767,87*	6 000	*$ 32,00*	*0,0006 %*	2,9009E-06	*3,500 %*	*2,621 %*	*1,627 %*	*2,583 %*
TUR	$ 200 320,89	74 221	$ 73,20	0,0009 %	8,35494E-06	3,500 %	2,681 %	1,979 %	2,720 %
USA	$ 2 227 876,13	696 810	$ 1 521,61	0,0008 %	3,42427E-06	3,500 %	1,952 %	0,507 %	1,986 %
Mean	$ 190 908,25	65 172	$ 103,51	0,0018 %	1,22112E-05	3,500 %	1,589 %	2,046 %	2,378 %
Median	$ 44 875,59	5 357	$ 21,21	0,0009 %	3,25048E-06	3,500 %	1,374 %	1,210 %	2,031 %
Highest	$ 2 227 876,13	700 000	$ 1 521,61	0,0177 %	0,000236189	3,500 %	8,306 %	13,762 %	6,388 %
Lowest	$ 1 883,10	115	$ 1,75	0,0001 %	2,29073E-07	3,500 %	0,174 %	0,125 %	1,329 %
Range	$ 2 225 993,02	699 885	$ 1 519,86	0,0176 %	0,00023596	0,000 %	8,132 %	13,637 %	5,059 %
Std. Dev.	$ 404 235,89	163341,7997	$256,35	0,0030 %	3,71113E-05	0,000 %	1,318 %	2,444 %	0,985 %

Appendix 3 – Quintile Chart – Regional Level

Table Ap3.1: Regional Quintile Chart

RANKING	Code	GDP	Bank Assets	Assets/GDP	3,5% of GDP	Walker Model	Hot Money1	Hot Money3	Hot Money Average
10th	Asia Avg	$ 13 946 389,06	$ 28 081 455,55	3,631	$ 488 123,62	$ 320 289,40	$ 303 796,36	$ 538 992,87	$ 421 394,61
9th	BLK Avg	*$ 1 032 397,74*	*$ 2 080 290,84*	*1,745*	*$ 36 133,92*	*$ 8 929,35*	*$ 9 471,20*	*$ 18 008,05*	*$ 13 739,63*
8th	CE Avg	*$ 7 948 468,20*	*$ 23 324 931,06*	*5,150*	*$ 278 196,39*	*$ 124 084,53*	*$ 26 399,30*	*$ 168 781,54*	*$ 97 590,42*
7th	EE Avg	$ 4 073 462,95	$ 7 191 195,70	1,888	$ 142 571,20	$ 54 351,95	$ 10 852,71	$ 68 415,45	$ 39 634,08
6th	NAm Avg	$ 69 502 933,33	$ 163 303 782,78	1,828	$ 2 432 602,67	$ 1 608 549,94	$ 434 447,34	$ 608 557,60	$ 521 502,47
5th	NE Avg	*$ 3 545 860,00*	*$ 9 444 433,36*	*2,838*	*$ 124 105,10*	*$ 86 805,17*	*$ 49 394,56*	*$ 66 432,18*	*$ 57 913,37*
4th	Oc Avg	$ 7 633 255,00	$ 17 524 510,13	2,272	$ 267 163,93	$ 160 640,72	$ 14 266,42	$ 76 131,96	$ 45 199,19
3rd	SCAm Avg	$ 9 281 508,57	$ 8 945 961,38	1,559	$ 324 852,80	$ 148 282,49	$ 16 341,25	$ 110 818,43	$ 63 579,84
2nd	SE Avg	***$ 8 101 586,67***	***$ 21 957 837,31***	***3,477***	***$ 283 555,53***	***$ 38 355,10***	***$ 105 842,59***	***$ 229 809,01***	***$ 167 825,80***
1st	WE Avg	***$ 13 654 872,00***	***$ 52 241 686,77***	***3,254***	***$ 477 920,52***	***$ 154 052,21***	***$ 52 898,73***	***$ 344 372,89***	***$ 198 635,81***

RANKING	Code	ML Avg w/ 3.5	# of STRs	FIUBudgetUSD	FIU as % of GDP	FIU/Assets	Walker/GDP	HMA/GDP	Avg %
10th	Asia Avg	$ 409 935,88	126 112	$ 41,44	0,0021 %	5,40821E-06	1,578 %	2,114 %	2,397 %
9th	BLK Avg	*$ 19 600,96*	*1 026*	*$ 28,74*	*0,0048 %*	*5,58193E-05*	*1,090 %*	*2,069 %*	*2,220 %*
8th	CE Avg	*$ 166 623,78*	*4 576*	*$ 15,45*	*0,0010 %*	*2,93339E-06*	*1,260 %*	*2,130 %*	*2,297 %*
7th	EE Avg	$ 78 852,41	146 121	$ 68,06	0,0010 %	7,82105E-06	1,264 %	1,433 %	2,065 %
6th	NAm Avg	$ 1 520 885,02	280 341	$ 698,95	0,0016 %	1,28813E-05	4,094 %	1,942 %	3,179 %
5th	NE Avg	*$ 89 607,88*	*5 412*	*$ 69,98*	*0,0019 %*	*9,86439E-06*	*2,298 %*	*1,507 %*	*2,435 %*
4th	Oc Avg	$ 157 667,95	39 298	$ 261,09	0,0022 %	9,52353E-06	2,321 %	0,852 %	2,225 %
3rd	SCAm Avg	$ 178 905,04	2 831	$ 15,39	0,0008 %	3,93242E-06	1,281 %	0,996 %	1,925 %
2nd	SE Avg	***$ 163 245,48***	***21 434***	***$ 53,14***	***0,0016 %***	***3,99307E-06***	***0,594 %***	***2,365 %***	***2,153 %***
1st	WE Avg	***$ 276 869,51***	***61 313***	***$ 51,14***	***0,0006 %***	***2,00522E-06***	***1,373 %***	***3,618 %***	***2,831 %***

Appendix 4 – FIU Budgets and Conversion

Table Ap4.1: FIU Budgets in National Currency with Conversion to USD

Country	National Currency	Budget[15] (Nat'l currency)	Conversion Rate[16]	Budget (USD)
Australia	Australian dollar – (AUD)	$62 662 000,00	0,817	$51 194 854,00
Austria	Euro – (EUR)	€1 023 000,00	1,11	$1 135 530,00
Belgium	Euro	€5 536 000,00	1,11	$6 144 960,00
Brazil	Brazilian real – (BRL)	R$6 143 145,30	0,376	$2 309 822,63
Bulgaria	Bulgarian lev – (BGN)	lev7 363 000,00	0,619	$4 557 697,00
Canada	Canadian dollar – (CAD)	$52 200 332,00	0,861	$44 944 485,85
Croatia	Croatian kuna – (HRK)	kn5 570 000,00	0,158	$880 060,00
Cyprus	Euro	€1 100 000,00	1,11	$1 221 000,00
Czechia	Czech koruna – (CZK)	25 194 000,00 Kč	0,0437	$1 100 977,80
Denmark	Danish krone – (DKK)	14 936 000,00 kr	0,1625	$2 427 100,00
Finland	Euro	€1 565 000,00	1,11	$1 737 150,00
France	Euro	€4 981 688,00	1,11	$5 529 673,68
Germany	Euro	€1 872 975,00	1,11	$2 079 002,25
Greece	Euro	€1 500 000,00	1,11	$1 665 000,00
Hungary	Hungarian forint – (HUF)	Ft.300 000 000,00	0,0038	$1 110 000,00
Ireland	Euro	€990 825,00	1,11	$1 099 815,75
Italy	Euro	€10 992 150,00	1,11	$12 201 286,50
Japan	Japanese yen – (JPY)	¥525 782 000	0,0084	$4 416 568,80

[15] Sources in Section 9.3 – Financial Intelligence Unit and Suspicious Transaction Reports Sources
[16] XE, 2015

Country	*National Currency*	*Budget*[17] *(Nat'l currency)*	*Conversion Rate*[18]	*Budget (USD)*
Latvia	Euro	€265 200,00	1,11	$294 372,00
Lithuania	Euro	€157 875,00	1,11	$175 241,25
Luxembourg	Euro	€1 948 488,00	1,11	$2 162 821,68
Malta	Euro	€402 375,00	1,11	$446 636,25
Mexico	Mexican peso – (MXN)	$185 000 000,00	0,068	$12 580 000,00
Netherlands	Euro	€4 226 250,00	1,11	$4 691 137,50
New Zealand	New Zealand dollar – (NZD)	$1 311 000,00	0,78	$1 022 580,00
Norway	Norwegian krone – (NOK)	153 922 000,00 kr	0,134	$20 625 548,00
Panama	Panamanian balboa – (PAB)	$768 008,00	1	$768 008,00
Poland	Polish złoty – (PLN)	€1 288 406,00	1,11	$1 430 130,66
Portugal	Euro	€1 814 063,00	1,11	$2 013 609,93
Romania	Romanian leu – (RON)	€1 643 400,00	1,11	$1 824 174,00
Russian Federation	Russian ruble – (RUB)	1 824 748 000,00 ₽	0,017	$31 020 716,00
Singapore	Singapore dollar – (SGD)	$4 800 000,00	0,754	$3 619 200,00
Slovak Republic	Euro	€694 688,00	1,11	$771 103,68
Slovenia	Euro	€999 338,00	1,11	$1 109 265,18
Spain	Euro	€5 941 294,00	1,11	$6 594 836,34
Sweden	Swedish krone – (SEK)	25 003 000,00 kr	0,128	$3 200 384,00
Switzerland	Swiss franc – (CHF)	CHF2 000 000,00	1,01	$2 020 000,00
Turkey	Turkish lira – (TRY)	₺17 103 145,00	0,428	$7 320 146,06

[17] Sources in Section 9.3 – Financial Intelligence Unit and Suspicious Transaction Reports Sources
[18] XE, 2015

Country	*National Currency*	*Budget*[19] *(Nat'l currency)*	*Conversion Rate*[20]	*Budget (USD)*
United Kingdom	British pound – (GBP)	£5 207 000,00	1,556	$8 102 092,00
United States of America	US dollar – (USD)	$152 161 000,00	1	$152 161 000,00

[19] Sources in Section 9.3 – Financial Intelligence Unit and Suspicious Transaction Reports Sources
[20] XE, 2015

Appendix 5 – Calculations for Walker Model estimate

Table Ap5.1: Walker Model information

Country	GNP/Capita[21]	Bank Secrecy	Gov't Attitude	Conflict	SWIFT[22]	Corruption (CPI)[23]	Estimate
AUS	$60 484,66	5	19	0	1,00	79,00	$63 339 533 361,85
AUT	*$47 428,24*	*7*	*19*	*0*	*1,00*	*76,00*	*$14 407 039 745,35*
BEL	*$44 179,21*	*6*	*19*	*0*	*1,00*	*77,00*	*$19 449 103 256,11*
BRA	$10 090,79	5	18	3	1,00	38,00	$27 018 144 783,13
BGR	$7 481,44	5	19	0	1,00	41,00	$322 165 922,45
CAN	$47 303,71	5	19	0	1,00	83,00	$81 627 284 237,55
HRV	*$12 868,79*	*5*	*19*	*0*	*1,00*	*51,00*	*$872 195 324,55*
CYP	*$19 261,44*	*6*	*19*	*0*	*1,00*	*61,00*	*$514 338 216,31*
CZE	*$18 155,02*	*5*	*19*	*0*	*1,00*	*56,00*	*$4 042 831 962,41*
DNK	*$60 107,84*	*7*	*19*	*0*	*1,00*	*91,00*	*$17 097 676 094,96*
FIN	*$46 604,14*	*7*	*19*	*0*	*1,00*	*90,00*	*$12 518 711 737,25*
FRA	*$42 077,21*	*5*	*19*	*0*	*1,00*	*70,00*	*$94 925 984 218,23*
DEU	*$45 777,98*	*7*	*19*	*0*	*1,00*	*81,00*	*$149 617 093 407,39*
GRC	*$19 642,10*	*4*	*19*	*2*	*1,00*	*46,00*	*$4 406 901 757,38*
HUN	*$13 036,78*	*5*	*19*	*0*	*1,00*	*51,00*	*$2 040 829 895,68*
IRL	*$51 875,72*	*6*	*19*	*0*	*1,00*	*75,00*	*$9 021 188 017,71*
ITA	*$33 645,99*	*6*	*19*	*0*	*1,00*	*44,00*	*$12 012 424 578,35*
JPN	$38 622,79	5	19	0	1,00	75,00	$197 710 060 632,27
LVA	*$14 849,87*	*7*	*19*	*0*	*1,00*	*56,00*	*$443 936 892,35*
LTU	*$14 971,14*	*5*	*19*	*0*	*1,00*	*59,00*	*$1 053 488 866,52*
LUX	*$73 869,61*	*6*	*19*	*0*	*1,00*	*85,00*	*$1 968 551 214,82*
MLT	*$25 623,31*	*4*	*19*	*0*	*1,00*	*60,00*	*$307 069 691,83*
MEX	$9 841,45	4	13	10	1,00	31,00	$43 363 267 847,16
NLD	*$49 037,52*	*5*	*19*	*0*	*1,00*	*84,00*	*$40 699 279 646,32*
NZL	$40 105,36	5	19	0	1,00	91,00	$10 364 828 698,58
NOR	*$92 877,29*	*7*	*19*	*0*	*1,00*	*88,00*	*$22 699 209 353,07*
PAN	$11 741,58	2	8	0	1,00	39,00	$1 118 456 404,33
POL	*$13 243,51*	*6*	*19*	*0*	*1,00*	*63,00*	*$12 669 071 521,08*
PRT	*$20 319,19*	*6*	*19*	*0*	*1,00*	*64,00*	*$5 503 817 293,69*
ROU	*$9 492,52*	*6*	*19*	*0*	*1,00*	*46,00*	*$1 509 461 919,43*

[21] World Bank, 2019b
[22] SWIFT, 2019
[23] Transparency International, 2015

Country	GNP/Capita[24]	Bank Secrecy	Gov't Attitude	Conflict	SWIFT[25]	Corruption (CPI)[26]	Estimate
RUS	$11 964,70	5	18	6	1,00	29,00	$22 380 501 272,88
SGP	$54 019,08	5	19	0	1,00	85,00	$14 949 779 042,95
SVK	*$17 528,78*	*6*	*19*	*0*	*1,00*	*51,00*	*$1 239 407 743,58*
SVN	*$22 119,41*	*6*	*19*	*0*	*1,00*	*60,00*	*$1 009 750 850,29*
ESP	*$28 453,53*	*6*	*19*	*0*	*1,00*	*58,00*	*$26 403 741 141,80*
SWE	*$58 086,88*	*6*	*19*	*0*	*1,00*	*89,00*	*$28 925 176 205,19*
CHE	$85 395,65	7	18	0	1,00	86,00	$32 682 621 973,74
TUR	$12 003,91	6	13	5	1,00	42,00	$23 488 947 741,06
GBR	*$43 539,81*	*6*	*19*	*0*	*1,00*	*81,00*	*$122 437 037 499,91*
USA	$56 498,98	5	19	2	1,00	76,00	$867 451 022 618,02

Italic text = EU or EEA country

[24] World Bank, 2019b
[25] SWIFT, 2019
[26] Transparency International, 2015

Appendix 6 – Full Regression Analysis Results (Part 1/4)

Table Ap6.2: Full Regression Results, Part 1/4

Regression Code	Multiple R	R Square	Adjusted R Square
1.2	0,983996936	0,96824997	0,967414442
1.3	0,92559277	0,856721975	0,852951501
1.4	0,589703901	0,347750691	0,330586236
1.6	0,061366568	0,003765856	-0,022450832
1.7	0,100232326	0,010046519	-0,016004888
1.8	0,123930166	0,015358686	-0,010552927
1.9	0,116212622	0,013505373	-0,012455011
1.10	0,877787344	0,770510621	0,764471426
2.2	0,103058698	0,010621095	-0,016118875
2.3	0,188875591	0,035673989	0,009611124
2.4	0,124429529	0,015482708	-0,011125868
2.5	0,893456285	0,798264134	0,792811813
2.6	0,527221338	0,277962339	0,258447808
2.7	0,535479597	0,286738398	0,267461058
2.8	0,16286523	0,026525083	0,00021495
2.9	0,558175578	0,311559976	0,292953489
2.10	0,103058698	0,010621095	-0,016118875
3.2	0,008193283	6,71299E-05	-0,026958083
3.3	0,101071486	0,010215445	-0,016535489
3.4	0,149602507	0,02238091	-0,004041228
3.6	0,984173527	0,96859753	0,967748815
3.7	0,925565966	0,856672357	0,852798637
3.8	0,588691369	0,346557528	0,328896921
3.9	0,125899911	0,015850788	-0,01074784
3.10	0,877705048	0,770366151	0,764159831
4.1	0,882271048	0,778402202	0,772570681
4.2	0,871187928	0,758968407	0,75262547
4.3	0,417388817	0,174213425	0,152482199
4.4	0,777710815	0,604834112	0,59443501
4.5	0,706472246	0,499103034	0,485921535
5.1	0,265929394	0,070718443	0,045602725
5.2	0,273834142	0,074985137	0,049984736
5.3	0,069731901	0,004862538	-0,022033069
5.4	0,175212316	0,030699356	0,004502041
5.5	0,418127262	0,174830407	0,152528526

Appendix 6 – Full Regression Analysis Results (Part 2/4)

Table Ap6.3: Full Regression Results, Part 2/4

Regression Code	Standard Error	Significance F	*Coefficients*	*Standard Error*
1.2	184635,6268	4,45637E-30	0,013779727	0,000404788
1.3	224445,1968	1,28347E-17	0,007417267	0,000492064
1.4	232971,4978	6,22208E-05	0,002298971	0,000510757
1.6	1034246,699	0,706795002	-20998,24515	55403,86671
1.7	589967,2666	0,538306438	-19626,19293	31604,13064
1.8	286243,0858	0,446123839	-11805,40091	15333,84035
1.9	406745,4852	0,475158109	-15715,79692	21789,06895
1.10	196180,8784	1,04019E-13	0,004858119	0,000430099
2.2	361776,7042	0,532412589	-12218,65948	19387,39116
2.3	234760,1276	0,249505031	-14718,64628	12580,65091
2.4	261279,4387	0,450416774	-10680,62465	14001,80449
2.5	163361,9217	1,99318E-14	0,010954845	0,000905365
2.6	203138,5376	0,000563522	0,004248925	0,00112581
2.7	222391,3967	0,000443471	0,004753463	0,001232511
2.8	236018,2711	0,321863356	-12699,63546	12648,07405
2.9	198479,7926	0,000222184	0,004501194	0,001099991
2.10	1047904,429	0,960518398	-6406,986337	128552,4662
3.2	596668,6308	0,540388146	-45232,55513	73196,77431
3.3	288432,3272	0,363349752	-32565,4862	35383,65328
3.4	185702,6733	2,06682E-29	0,013766526	0,000407506
3.6	227053,3157	3,45746E-17	0,007409462	0,000498246
3.7	235810,3032	8,07881E-05	0,002292256	0,000517462
3.8	410756,1922	0,445039917	-38899,02067	50389,82569
3.9	198413,6733	2,22566E-13	0,004850859	0,000435399
3.10	361776,7042	0,532412589	-12218,65948	19387,39116
4.1	487782,4295	5,32466E-14	3520,272039	304,6948543
4.2	291110,2575	2,66133E-13	1989,129862	181,8429532
4.3	262137,943	0,007370539	463,6257541	163,7453043
4.4	257433,5248	3,55095E-09	1226,377808	160,8066744
4.5	117114,8703	3,50753E-07	450,1566937	73,15617823
5.1	350616,9714	0,101774545	831,8084025	495,7123701
5.2	229925,2946	0,091628395	562,9861051	325,0750022
5.3	262684,8934	0,673155444	157,9147686	371,3914662
5.4	235511,7028	0,286025854	360,4504368	332,973227
5.5	118659,8637	0,008077247	469,719301	167,7647321

Appendix 6 – Full Regression Analysis Results (Part 3/4)

Table Ap6.4: Full Regression Results, Part 3/4

Regression Code	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
1.2	34,04187492	4,45637E-30	0,012960277	0,014599176
1.3	15,07377258	1,28347E-17	0,006421134	0,008413399
1.4	4,501103355	6,22208E-05	0,001264997	0,003332944
1.6	-0,379003243	0,706795002	-133157,5096	91161,01928
1.7	-0,62100088	0,538306438	-83605,41054	44353,02469
1.8	-0,769891993	0,446123839	-42847,13783	19236,336
1.9	-0,721269778	0,475158109	-59825,46094	28393,86711
1.10	11,29535324	1,04019E-13	0,003987429	0,005728808
2.2	-0,630237425	0,532412589	-51501,24533	27063,92637
2.3	-1,169943144	0,249505031	-40209,46633	10772,17378
2.4	-0,762803441	0,450416774	-39050,97537	17689,72608
2.5	12,09992314	1,99318E-14	0,009120402	0,012789289
2.6	3,774104453	0,000563522	0,001967817	0,006530033
2.7	3,856731165	0,000443471	0,002256159	0,007250768
2.8	-1,004076622	0,321863356	-38327,06777	12927,79684
2.9	4,092028384	0,000222184	0,002272401	0,006729987
2.10	-0,049839467	0,960518398	-266879,0244	254065,0517
3.2	-0,617958313	0,540388146	-193543,3075	103078,1973
3.3	-0,920353982	0,363349752	-104259,5778	39128,6054
3.4	33,78241078	2,06682E-29	0,012940841	0,014592212
3.6	14,87110569	3,45746E-17	0,006399921	0,008419004
3.7	4,429807474	8,07881E-05	0,001243779	0,003340734
3.8	-0,771961803	0,445039917	-140998,5057	63200,46435
3.9	11,14118807	2,22566E-13	0,003968658	0,005733061
3.10	-0,630237425	0,532412589	-51501,24533	27063,92637
4.1	11,55343449	5,32466E-14	2903,449554	4137,094523
4.2	10,93872392	2,66133E-13	1621,008049	2357,251675
4.3	2,831383509	0,007370539	132,1407158	795,1107924
4.4	7,62641111	3,55095E-09	900,841715	1551,913901
4.5	6,15336537	3,50753E-07	302,0597534	598,253634
5.1	1,678006144	0,101774545	-172,6002656	1836,217071
5.2	1,731865266	0,091628395	-95,67841424	1221,650624
5.3	0,425197623	0,673155444	-594,5958211	910,4253582
5.4	1,082520778	0,286025854	-314,2174061	1035,11828
5.5	2,799869169	0,008077247	129,7956653	809,6429367

Appendix 6 – Full Regression Analysis Results (Part 4/4)

Table Ap6.5: Full Regression Results, Part 4/4

Regression Code	*Lower 95,0%*	*Upper 95,0%*
1.2	0,012960277	0,014599176
1.3	0,006421134	0,008413399
1.4	0,001264997	0,003332944
1.6	-133157,5096	91161,01928
1.7	-83605,41054	44353,02469
1.8	-42847,13783	19236,336
1.9	-59825,46094	28393,86711
1.10	0,003987429	0,005728808
2.2	-51501,24533	27063,92637
2.3	-40209,46633	10772,17378
2.4	-39050,97537	17689,72608
2.5	0,009120402	0,012789289
2.6	0,001967817	0,006530033
2.7	0,002256159	0,007250768
2.8	-38327,06777	12927,79684
2.9	0,002272401	0,006729987
2.10	-266879,0244	254065,0517
3.2	-193543,3075	103078,1973
3.3	-104259,5778	39128,6054
3.4	0,012940841	0,014592212
3.6	0,006399921	0,008419004
3.7	0,001243779	0,003340734
3.8	-140998,5057	63200,46435
3.9	0,003968658	0,005733061
3.10	-51501,24533	27063,92637
4.1	2903,449554	4137,094523
4.2	1621,008049	2357,251675
4.3	132,1407158	795,1107924
4.4	900,841715	1551,913901
4.5	302,0597534	598,253634
5.1	-172,6002656	1836,217071
5.2	-95,67841424	1221,650624
5.3	-594,5958211	910,4253582
5.4	-314,2174061	1035,11828
5.5	129,7956653	809,6429367

Appendix 7 – Regression Key for Regression Analyses

Table Ap7.1: Full Regression Key

REGRESSION KEY		
INDEPENDENT (X)	**DEPENDENT (Y)**	**SHEET**
AssetsGDP	3.5	1.2
AssetsGDP	Walker	1.3
AssetsGDP	HMA	1.4
Assets	3.5	1.6
Assets	Walker	1.7
Assets	HMA	1.8
AssetsGDP	ML Avg	1.9
Assets	ML Avg	1.10
AssetsGDP	3.5 w/o Asset Outliers	2.2
AssetsGDP	Walker w/o Asset Outliers	2.3
AssetsGDP	HMA w/o Asset Outliers	2.4
Assets	3.5 w/o Asset Outliers	2.6
Assets	Walker w/o Asset Outliers	2.7
Assets	HMA w/o Asset Outliers	2.8
AssetsGDP	ML Avg w/o Asset Outliers	2.9
Assets	ML Avg w/o Asset Outliers	2.10
AssetsGDP	3.5 w/o AssetGDP Outliers	3.2
AssetsGDP	Walker w/o AssetGDP Outliers	3.3
AssetsGDP	HMA w/o AssetGDP Outliers	3.4
Assets	3.5 w/o AssetGDP Outliers	3.6
Assets	Walker w/o AssetGDP Outliers	3.7
Assets	HMA w/o AssetGDP Outliers	3.8
AssetsGDP	ML Avg w/o AssetGDP Outliers	3.9
Assets	ML Avg w/o AssetGDP Outliers	3.10
FIU	3.5	4.1
FIU	Walker	4.2
FIU	HMA	4.3
FIU	ML Avg	4.4
FIU	STRs	4.5
FIU	3.5 w/o FIU Outliers	5.1
FIU	Walker w/o FIU Outliers	5.2
FIU	HMA w/o FIU Outliers	5.3
FIU	ML Avg w/o FIU Outliers	5.4
FIU	STRs	5.5
AssetsGDP	3.5	RR1.2
AssetsGDP	Walker	RR1.3
AssetsGDP	HMA	RR1.4

Assets	*3.5*	*RR1.6*
Assets	*Walker*	*RR1.7*
Assets	*HMA*	*RR1.8*
AssetsGDP	*ML Avg*	*RR1.9*
Assets	*ML Avg*	*RR1.10*