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Red Flags of Cash Inflows: Tracing Money Laundering in European Union

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I hereby declare that the work submitted is mine and that where I have made use of another's work, I have attributed the source(s) according to the Regulations set in the Student's Handbook.

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Abstract

Money laundering entails a highly rapid scheme of multiple transactions running within seconds the course of the world. Due to the clandestine origin of money laundering, its estimation becomes highly complex and extremely time consuming, thus the existence of an accurate model is highly impossible. Moreover, factors such as technological advances, rapid development in financial information systems and the existence non-cooperative multinational banking entities that ensures anonymity and full disclosure to the customer makes such estimations even more impossible. Thus, in this working paper, a spherical model including macroeconomic, sociocultural, governance and corruption components has been implemented in order to capture every essence related to money laundering. By utilizing and modifying Jones's model of earnings management and quality, we end up in a new set of approaches portraying the inclinations and red flags towards the presence of money laundering. An application in the European Union will be considered as to test and export crucial conclusions regarding the presence of money laundering in European Union.

Keywords: money laundering, European union, corruption, jones's model

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Preface

This dissertation was written as part of the MSc in International Accounting, Auditing and Financial Management program at the International Hellenic University. It is the original and independent work of the post-graduate student and author Vasileios Papoutsis.

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Introduction

Financial crimes, also referred as white collar crimes, are defined as nonviolent crimes with the sole purpose of achieving financial gains through fraud or embezzlement. Financial crimes seem to be considered as less important due to the absence of violence, however they can potentially have huge impact on personal finance or even to entire financial markets. Money laundering is defined as the process carried out in order to disguise or cancel out the true origin or source of entitlement to money or property through criminal activities. The aforementioned process is the consequence of almost any illegal activity, with its sole purpose to generate profits. Money laundering takes place secretly hence, it cannot be accurately measured, however it is estimated that, every year, almost 600bil. \$ are laundered through the financial institutions. By the time illicit money has been placed, layered and integrated into a financial system, the identification and separation between licit and illicit money becomes extremely complex. Consequently, the adequacy of every model proposed in the available literature is difficult to be assessed.

To fully understand the struggle of revealing such crimes we, first, have to look at their common characteristics

- The first major characteristic is the *limited visibility* due to the offenders being in the area of the crime and as a result, skillfully covering their tracks.
- Another issue is the *complexity*. Forensic accountants are deceived by the originators of financial crimes that use their existing general knowledge and exploit the technical knowledge of the systems, used by the company, along with the vagueness of the law, as to achieve their personal gains.
- The third issue is the *diffusion of victimization*. A common example is the rolling scams where apart from the offenders, it involves individuals, "victims", who out of necessity, become part in criminal schemes, with or without their knowledge that they are committing a financial crime.

- Considering all the above, the most important hindrance to reveal such crimes is the *difficulty of investigation* due to the large volume and complexity of transactions, a key feature that appears mainly on financial exchange markets, the rare leak of inside information and the limited availability of Anti-Money Laundering (AML) resources.
- Anti-Money Laundering procedures are not sufficient in developed countries. For example, the 2005 bombings of London's Public Transportations were financed through legal channels by incorporating and issuing transactions that amounted in less than 4.500 pounds each. On the other hand, developing countries where the transportations of large sum of money are quite unusual, such transactions could be "caught" if the proper protocol was followed.

Taking into account the Wien and Palermo Conventions, money laundering, may encompass three areas:

- (i) the *conversion or transfer*, knowing that such property is the proceeds of crime
- (ii) the *concealment or disguise* of the true nature, source, location, disposition, movement or ownership of rights with respect to property, knowing that such property is the proceeds of crime
- (iii) The *acquisition, possession or use of property*, knowing, at the time of the receipt, that such property is the proceeds of crime.

The *FATF (Financial Action Task Force)*, established in 1989 by the G7 members, is the policy-initiating body, that has the purpose of setting the standards, facing the problem of money laundering and finance of terrorism (AML/CTF) and supporting their implementation. The cornerstone of the initiatives of FATF is called "*The Forty Recommendations*" *. Among them, are included some of the most crucial to the process, approaches known as Know Your Client ("KYC") and Customer Due Diligence ("CDD") approach.

- Effects of money laundering and high scale of global terrorism have shaken the foundation of business environment. The *Know Your Client* approach, a critical area for any institution, underlines the need of transparency between the involving parties of a transaction. Every transaction in the financial system must

be able to be traced back to an identifiable individual. As obvious is the need for this kind of approach, as perpetrating is its limitation. For instance, both Hines (2010) and Sharman (2010) point out that offenders could set up anonymous shell companies in a noncooperative area or territory (NCCT), resulting in setting up, in banking secrecy, anonymous bank accounts.

- A further step forward as to ensure the trustworthiness of the client is the *Customer Due Diligence* (“CDD”) approach. In connection to KYC approach where, through the local Customer Identification Program (“CIP”), basic personal details such as the name, identification and date of birth are obtained, in CDD a more strenuous control is in place. The turning point of CDD is to cross-check the received information, verify it and determine the credibility of the client. In case the previous steps are not efficient enough, *Enhanced Due Diligence* (“EDD”) takes place, where sources from intelligence offices are gathered in order to eliminate the risk of the institution being used as a mean of money laundering.

In contrast to the popular trend in legitimate commercial activities where the use of cash is constantly marginalized, the largest proportion of revenue generated by illegal activities continues to be channeled in the form of cash in bank accounts at various financial institutions in order to convert them to legal values and to integrate into “legal” economies. This “anomaly” is accustomed to one thing and only: The anonymity that transactions in the form of cash guarantees. Banknotes exchanged from hand to hand, without any trace, reduces the degree of transparency.

Thus, in this working paper, we are going to formulate an econometric model based on Jones’s Earnings Quality model (1991), but alternated and adapted so as to depict a less biased and more accurate estimation, in order to provide an answer regarding the inclinations and components in reducing or enlarging Money Laundering. Later, we will apply this model to the 28 E.U. countries and expect to find the proclivity of certain nations towards criminal activities and more specifically money laundering.

The structure of the paper is the following. At first stage, Chapter 1 will be based on the telltale signs of money laundering. The general concept of how placing,

layering and integrating are taking place, would be fully explained accompanied with additional information and examples. Chapter 2 will entail the explanation of the new approach to measure money laundering. We would define the hypothesis as to structure a solid and adaptive model that tries to consider not only economic and macroeconomic components but also social and cultural inclinations based on the diverseness that European Union provides. As a result, we will face the challenge to capture the general concept of money laundering from every possible angle. Cultural and social components, will cross out any arbitrary biased hypotheses and will ensure more accurate results. Undeniably, the most difficult part would be to distinguish “dirty” money components within the cash inflows. As a result, the model would also include control independent variables linked to activities coming from either official or shadow economy activities. Besides these, factors such as unemployment rate, anti-money laundering legislation, corruption and expenditure on education that is highly related with the scale of electronic payments will be considered. Chapter 3 will present the construction of the model along with the process followed and the econometric analysis. Multiple geographical, economic and cultural sets will be considered as to extrapolate on the inclinations of every European Union Economy towards Money Laundering. As a sample, we will utilize data generated from each of the 28 E.U. countries for the period from 2005 to 2014. Datasets will entail information based on excessive search in online search engines, World’s Bank/IMF/Eurostat/European Data Warehouse databases, Governmental and other reports or assessments. The dataset will be processed and interpreted by utilizing the STATA Software. Chapter 4 will include the summary and the conclusion concerning the work undertaken and its respective results.

Telltale Signs of Money Laundering

Financial institutions around the world are constantly facing the issue of illicit money entering their circulation systems. Implemented measures seem to slow down but not eliminate the phenomenon. The next chapter focuses on the processes that illicit proceeds go through as to be laundered and become legal.

Money Laundering Phases

The primary objective of money laundering sourced from criminal activities, is to prevent their disclosure and consequently the conversion of assets, mainly those of criminal origin. However, this is not the sole objective. Simply hiding the cash does not offer something beneficial to the perpetrator, because in order to exploit, use for personal gain or invest the money, these proceeds should be laundered and pumped, as “legitimate”, in the economy. The systematization which is widely accepted by both American and European theory is the one which resulted from the report of the US customs service and is based on the separation, in three stages, of money laundering process by criminal activities. What is more, considering Schneider and Windischbauer (2008), the following processes are the most commonly in place.

Step 1: Placement

This is the stage where cash is pumped and mixed with legitimate funds or is simply deposited in financial institutions. According to Andelman D. (1994) this is a high-risk phase due to the fact that the detection of off-balance sheet cash can be tracked more easily by the supervisory bodies. Upon completion of this stage, the proceeds of crime are no longer in form of cash.

The placement of the proceeds can be executed in multiple ways and means. Some of the most commonly known approaches are the following

- “*Smurfing*” is the act of breaking down illicit funds into smaller, below the threshold (somewhere around 9.000\$ depending on the regulations) transactions, as to avoid the obligatory declaration of the transaction, to the reporting

authorities, or a probable investigation regarding the source of funds. The items used for these transactions have to be highly liquid (bank drafts, cheques or depositions in saving accounts) due to the high risk of detection.

- A further commonly known technique is the use of “*straw-man*”. The role of the straw-man is to lend his identity for multiple purposes (obtain loan or buy real estate) in order to keep the anonymity and conceal the real owner and origin of the funds.
- This stage also includes the "physical" border transport of banknotes.
- Other major red-flag areas that are highly affected by money-laundering schemes are, *the repayment of loans, the betting on sport events or the blend of illicit with legitimate funds through daily routine events(receipts) mostly on cash-based and service-providing business (also known as front business) such as restaurants, bars and casinos.*

Step 2: Layering

Layering is defined as the separation of illicit proceeds from their source by creating a network of financial transactions designed to cover the original trace and ensure anonymity (Bank Of England, 1990). In this stage, criminals try to conceal the true origin of cash. By utilizing a complex matrix of transactions based on increased intensity and speed (e.g. multiple electronic transactions and transfers) criminals try to decouple cash from their origin. For example, cash could be transferred, by utilizing accounting, to an international financial center (e.g. tax heaven, off-shore bank), which, above all, ensures anonymity and discretion.

Step 3: Integration

The final stage regarding the process of money laundering is the integration. In this stage, the proceeds of illegal activities are integrated in the financial system after having acquired legitimacy. By simply hiding cash, offenders will only be protected by law enforcement authorities for a short term. It is obvious that this single and simple concealment of illicit proceeds would serve the principle goal of protecting themselves from prosecution. However, the risk of physical loss, and the imperative need of investing these revenues, lead the offenders to channel and integrate them into legitimate financial and economic systems. The desirable outcome, in addition, is the illegal

income to acquire a “lawful-like” status, in order to be exploited or invested in future activities without a trace of shade. As a result, the ultimate aim of concealing the criminal origin of the funds and their legalization is served only by constantly pumping them in financial markets.

A new approach

Exploring the impact of money laundering in a country’s economy is a rather difficult and newly-researched field of economics. Academics point out that pioneering generated data was mostly based on tacit knowledge or feelings rather than actual observations thus, making the results scientifically doubtful. (e.g. Walker 1999, Barone and Masciandaro 2011). Further limitations are related to the available literature and resources available. First of all, the assessment of money laundering through criminal activities is almost exclusively limited to drug trafficking, even though criminal organizations engage in more, than this, activities. Moreover, recent studies are based on data generated from the calibration of theoretical models rather than actual data, which means that money laundering is often confused and mixed with shadow economy, two concepts related but not identical.

Money laundering is not an observable content, thus it is quite hard to estimate. However, the one component that is always observable and closely related to money laundering is the flows of cash and more specifically cash deposited in regulated financial institutions. As financial institutions are not tracing the source of money at the moment of deposition, cash could be sourced from numerous legal or illegal activities.. Taking every aspect into consideration, this working paper is proposing a new approach that will capture money laundering from every angle. For this purpose, we will borrow the model based on the discretionary accruals, also referred as the Jones Model of earnings quality. The model portrays a linear estimate of the earnings of a firm (a nation’s in the current working paper) given several covariates and uses the errors from the model (the unexplained component) as the level of earnings management and quality. So, the first step would be a demonstration of the cash balances the

way they were expected to be and then, a comparison with the actual reports. The difference between the expected and the actual amounts will be an indication of Money Laundering component.

Hypothesis Statement

As described above, money laundering is an extremely complex procedure and consequently several multidimensional factors should be taken into consideration. Besides the obvious macroeconomic factors that affects the yearly inflows of every nation, factors such as the political stability and corruption, the tendency for criminal acts and the social and cultural conditions of every nation could affect and pressure the offender to engage in such activities. Finally, certain adjustments should be made in order to include a wider range covering the whole European Union. Some of the hypotheses stated below might seem too simplistic. However, as obvious are the hypotheses as important is their outcome as to ensure the stability of the baseline of the model.

Criminal activities vary in form, outcome, means of action and benefits. Furthermore, as the model involves the members of the European Union, we assume that the basis of the Anti-Money Laundering regulations would be if not the same, closely similar.

Macroeconomic Components

The first series of hypotheses involve the most crucial macroeconomic factors that affect and could potentially put the balance of a nation in jeopardy. Those factors cannot be ignored due to their importance and significance on the financial system

Besides money laundering components our model estimates components that are sourced from the legal motivations of offenders to commit such crimes. Deploying socioeconomic habits varying between nations we could derive to some very interesting results regarding money laundering. Considering socioeconomics turmoil throughout Europe especially during the latter years, we expect countries facing a financially uncertain period to have lower scores in macroeconomic statistics and additionally

higher penetration of corruption to their system. Initiating the first set of variables, one such component is the gross domestic product. The GDP is the standard measure as to gauge a country's economic health. By achieving a positive growth, nations, can enjoy prosper and financial stability, thus making the need to engage in criminal activities (in particular, money laundering) less appealing. As a result, we can state the first hypothesis of the model:

H1: The higher the GDP, the less population is engaging in criminal activities thus, the less money is laundered.

Another substantial component is the level of unemployment rate at each nation. The unemployment rate can reveal the level of economic development nationwide. Higher levels of unemployment rate mean that generated income is concentrated and distributed to higher income classes in contrast to lower income classes. Classes where people still rely, mainly, on the use of cash for their transactions.

H2: The higher the unemployment rate in a nation, the higher the use of cash, the higher the presence of money laundering in the financial system.

The next crucial macroeconomic factor that could hint an extensive existence of money laundered in a national financial system is the inflation rates. Since we are considering the gains of making illicit proceeds, legal, we should also consider the onward gains or benefits from investing actions. More specifically, nations and especially developing ones, can become attractive financial heavens to offenders, leading them to a short-term financial growth. However, major consequences can occur from such actions. The lack of stable long-term investments and growth can destabilize the financial system. The economic system can potentially erode (an underlying "bubble" would be created), for a short term, leading to a higher demand for cash, making the interest rates extremely volatile and causing a high inflation on the domestic products. Thus, we can state that the existence of high inflation rate, especially in counter-fashion to GDP's growth can point to inflows of illegally sourced money in the financial system. As a result:

H3: The higher and more unexplained the inflation rate, the higher the chance of “dirty money” in the system.

An additional macroeconomic component that is highly related to dominant markets is the ratio of imports to exports of goods and services as a GDP's percentage. The hypothesis behind this assumption is that dominant markets tend to import investment goods, thus the deficit created in the accounts, is expected to be positively correlated to high exports as well. On the other hand, weaker markets tend to import consumption goods, creating an issue of hard currency volatility and being unable to fulfill their obligations towards their creditors.

H4: The lower or closer to balance the ration of imports to exports is, the less is the presence of money laundering in the system.

The last macroeconomic component that will be added as to complete the baseline model is the Foreign Direct Investments. It is obvious to state that Money Laundering is a global issue. Cross-national transactions and investments are fast and easily succeeded these days. As a result cash inflows sourced from foreign investments could reveal a certain volume of illicit money pumped into the system. The current global assumptions are parted in two approaches. The first approach is that countries under the influence of criminal groups tend not to be trusted by foreign creditors and as a result the volume of the foreign direct investments would be much lower. The second approach is that countries, and especially the ones in non-cooperative territories or with lax regulatory environment, tend to attract “shady” investments due to their clandestine and non-transparent nature thus having an increased volume of foreign direct investments. As a result, a combination of indexes should be displayed as to structure a solid hypothesis.

H5: The higher the regulatory effectiveness of a nation, the higher the transparency of the investments in a nation, thus the less illicit money will be pumped into the financial system.

World Governance Indicator Components

Where delinquency and corruption flourishes, the Rules of Law fail, said the Executive Director of the United Nations' Office on Drugs and Crime, Mr. Yury Fedotov, in 2012. Worldwide Governance Indicators are a prime example of the deep penetration of corruption, or incompetence, of the government to implement basic principles, used as a safeguard against arbitrary governance of the officials (LexisNexis). The model proposed in this working paper, wants to capture every aspect related to money laundering and consequently we will borrow the aforementioned indicators as to make a more spherical model. Constitutional economics can suggest that, weak Worldwide Governance Indicator figures can depict the proclivity of certain individuals to engage in criminal actions, in comparison to strong figures where no one is considered above the law (Leff 1964, Huntington 1968).

In terms of the indexes used, the World Bank has established the World Governance Indicators encompassing six dimensions that measures the level of adherence of a nation to these Rules. The estimated values vary somewhere between -2.5, been the worst outcome and +2.5 been the best outcome. In particular, these factors are presented with their respective hypothesis, as follows:

Control of Corruption

Control of Corruption is described as the abuse of public office for personal gain (United Nations). It entails a range of criminal offering from petty to grand gains. High levels of corruption can hinder the growth of a nation. In relation to Rules of Law, corruption is considered as a serious impediment to national development. As a result it is fair to state that:

H6: The lower the indicator of Control for Corruption, the higher the presence of money laundered in the financial system.

Government Effectiveness

Using the Government Effectiveness Index, we want to investigate and compare the effectiveness of not only the quality of public and civil services, but also the credibility of the government to such commitments. More specifically, focusing on the

given variations between nations and we can draw upon conclusions regarding not only the effectiveness of the government but also the impact the financial crisis had, on the formulation and implementation of such policies. As a result,

H7: Nations under memorandums or IMF's supervision tend to score lower on GE Index, thus the presence of money laundering will be higher.

Political Stability and Absence of Violence/Terrorism

One of the most unfamiliar, within the European Borders, indicator. Besides sporadic unfortunate events, EU is almost sterilized by terrorist or extremely politically violent actions. As an indicator related to money laundering, it captures the penetration of criminal groups that could ultimately destabilize or overthrow the government.

H8: The lower the indicator of Political Stability and Absence of Violence/Terrorism, the higher the presence of criminal groups in cornerstone positions, thus the higher the presence of money laundering in nation.

Regulatory Quality

Regulatory Quality is a crucial indicator that generally lowers or even disappears the presence of money laundered. It captures the ability of the government to implement and formulate sound and effective policies. It also reveals the respect of the public towards socioeconomic institutions that governs the nation. As a result, we expect to see a tendency where people that trust the local policies and institutions will not engage, or fear to engage, in criminal actions, thus:

H9: The higher the respect towards the public policies and institutions, the lower the presence of money laundering in the nation.

Rule of Law

In connection to the previous indicator, Rule of Law encompass the confidence that persons, institutions and public or private entities, including the State itself have in the established laws. Moreover, it shows the level of abide towards them. It also includes the quality of the enforcement and police bodies. As a result, high indicators

would probably lead to small percentage of criminal activities and even smaller in the area of money laundering thus:

H10: The higher the Rule of Law indicator the lower the presence of civilians engaging in money laundering activities.

Voice and Accountability

Criminal organizations can invest and control various aspect of the social life of a nation. Voice and Accountability measures the level of freedom of expression and speech, as well as, the extent to which the citizens are able to participate in activities such as voting for a candidate party. Furthermore, such factor accounted from a risk-analysis perspective, have been proved to be closely connected with risk of corruption leading to money laundering (FATF 2011), as “elites” could potentially “influence” the effective functioning of Anti-Money Laundering Reporting or other supervisory authorities. The index, among further hypothesis, can result in some very interesting outcomes due to the connection of control of the media to criminal activities and proceeds. As a result:

H11: The higher the indicator of Voice and Accountability the less the presence of money laundering in the nation.

Sociocultural Components

The sociocultural perspective of the model tries to eliminate any biased results occurring only by including the previous indexes. Every country across the European Union faces its peculiar problems and challenges. By considering the cultural effects on nations, one could explain why some, in paper, similar countries are doing better than the other. Subsequently, the third dataset will entail cultural components closely related to the finance of education, the inequality and such factors that, in the absence of, can push an individual to engage in criminal activities.

Expenditure on Education

The first cultural component is the expenditure on education concentrated by the % of GDP. Studies (World Bank 2005) have revealed that higher educated, or finan-

cially literate, individuals tend to enjoy higher income and, subsequently, tend to trust alternative ways of payment that eliminates the use of cash, thus lowering money laundering. Moreover, financially literate individuals tend to lack the characteristic of narrow self-interest. To support the claim, recent studies (Gregory Clark 2009) document that on a downturn, modern technology or even sufficient capital, alone, will not be able to revive and boost an economy. As a result:

H12: The higher the expenditure on Education, the higher the public literacy thus, the lower the presence of money laundering in a nation.

GINI Coefficient

Corrado Gini, an Italian statistician, was the first to research and implement a coefficient that measures the inequality of income/wealth distribution. The main idea behind this component is that, the more equal the distribution of income in every social class is, the lower the index will be. Inequality is one of the major factors that affects and increases the tendency of an individual to engage in criminal activities. Becker (1968) has created a model trying to explain the created socioeconomic gap and resulted in that the wider the distribution gap is, the more proceeds from criminal activities are perceived. However, recent studies have claimed that crime rates and wealth distribution is less of a matter of inequality and more of the level of how much individuals flaunt their riches (Daniel Hicks and Joan Harmony Hicks, 2014). Considering our model, by adding the current index, we expect to find a positive correlation between low GINI index and absence of money laundering. As a result:

H13: The lower the GINI index, the lower the presence of money laundering in a nation.

People at risk of poverty or social exclusion

In addition to popular belief, poverty is the major factor that drives individual to criminal acts. The presented component does not measure the inequality of wealth distribution like the above factor, but the low income and low working intensity in comparison to the rest residents of a nation. Taking into consideration all the above we can conclude that in order to avoid the risk of poverty, low income classes, will be

easier inclined to pursuit proceeds from criminal activities and as a result we can state the next hypothesis.

H14: The higher the rate of people at risk of poverty or social exclusion, the higher the crime rates thus, the higher the presence of money laundering.

Detection Components

Regulatory Efficiency

Since the basic actions as to gain illegal proceeds have been set, now, we must consider the probability of the actions being detected by the supervisory authorities. Taking into account, the Basel Accord, the forty Regulations of the FATF, European Commissions Regulations on Anti-Money Laundering Reporting and the proposals from Bank of Greece, every transaction that is known or even suspected, regardless if it is currently in place or has already occurred, that has the probability of laundering money, should be reported for further investigation to the local authorities. As a result, strict and efficient regulatory controls would refrain individuals from engaging in criminal activities, thus:

H15: The higher the efficiency of regulatory bodies in a country, the less money are attempted to be laundered through financial institutions, the less money are effectively laundered, thus the presence of laundered money in an institution will be lower.

Corruption Perception Index

The current index, first launched in 1995, have been created in order to measure the level of public corruption of a nation or as the Transparency International defines it “the misuse of public power for private benefit”. Corruption can become a critical barrier towards the economical and general growth of a nation. High levels of corruption could reveal the ease of individuals to engage in criminal activities without hesitation resulting in the following hypothesis:

H16: The lower the Corruption Perception Index, the higher the presence of money laundering in a nation.

Econometric Analysis

A thorough explanation of the structure of the model and the datasets, along with the estimation techniques and its limitations, will be given in the following chapter.

Model, Data and Technique

The econometric model is completed in two stages. The tested data is structured as a panel of the 28 European Union countries observed over the period 2005-2014. For every country included in the final data, we have acquired all the necessary indexes and information required for the proper testing and functioning of the model.

Structure of the Model

The main inspiration towards the construction of the model is derived from Jones(1991) discretionary accruals model and the modified Jones's model(1995). Jennifer Jones, the creator of the model, developed it during her doctoral thesis in early 1990. The purpose of the model is to study the quality of a firm's (nation's in the particular situation) earnings. The main hypothesis is that the accrual part of earnings should be connected and explain growth in revenues and tangible assets. Higher level of accruals if not accompanied with corresponding earnings are proved to offer lower quality earnings. Managers, using their discretion, could influence and manipulate fundamental accounting methods used to recognise earnings, as to show an increased performance of the firm. As a result, Jones, focused on dividing the accruals in two components. The first component would include the accruals which are sourced using the fundamental accounting methods in the recognition of earnings (non-discretionary accruals). The second component would include accruals sourced from managerial errors, either intentional or unintentional (discretionary accruals). In 1995, after extended research, Dechow, Sloan and Sweeney noted that Jones's Model did not consider changes in receivables as a part to estimate earnings quality. However, as accurately proved, growth in receivables is closely associated with growth in revenues,

thus receivables should be accounted when the non-discretionary earnings component is considered.

The idea behind the construction of our model is born from Jones's approach and is considering the abnormal earnings. More precisely, we will structure a baseline econometric model, making the estimation of how much the Gross Domestic Product of a country should be and then compare it with the actual number. The difference of those two results would be an indication of something unexplained happening in the local accounts. Unluckily, limited information and resources available on specifically money laundering components for all the European Union countries for all the tested period have limited the scope of the research. However, we hope that this working paper would set a new base towards the fight against money laundering and finance of terrorism.

Datasets

Datasets have been separated in three parts. The macroeconomic components, the World Governance Indicator components and the Sociocultural and Corruption components. In total 280 observations connected with each of the sixteen components will be tested and presented in this working paper.

Estimation Technique

In order to get accustomed with the dataset and its variables, the first part of the model analysis will present some basic trends as to understand the economic position of each nation under the period of scrutiny. All the hypotheses stated above will be tested. However further explanation will be focused on the most crucial to money laundering outcomes. The rest of the variables and their respective hypotheses will be treated as controls. After the implemented tests are completed we will examine each of the components significance as to figure out which ones should be added in the final model, in order to have make it as accurate as possible.

National Trends

Based on the gathered macroeconomic components, STATA, provide us with some first indications towards the economic situation of the European Union countries under the tested periods. Values depicted in amounts (GDP and FDI) were logged as to reflect and portrait more clearly the volume of their fluctuations during the years. By utilizing the log function, from a statistical perspective, we can make the model appear linear or at least transform any curves as to appear more linear. Moreover, when variables are positively skewed (long tail at the end), components of the data situated on the end, could have a major impact and influence the outcome of the test. Thus, by logging the values we eliminate that phenomenon. Lastly, the mean function when accompanied with the rest of the test will provide with a wider view as to arrive in more accurate results. The next table depicts the mean value of the 28 nations under scrutiny.

Table 1: Macroeconomic Mean Values

| Country | mean (gdp) | mean (unem~t) | mean (infl~n) | mean (impo~s) | mean (fdi) |
|----------------|------------|---------------|---------------|---------------|------------|
| Austria | 26.959 | 5.030 | 2.083 | 0.937 | 18.480 |
| Belgium | 27.160 | 7.880 | 1.720 | 1.068 | 15.315 |
| Bulgaria | 24.855 | 9.650 | 4.488 | 0.904 | 22.260 |
| Croatia | 25.043 | 12.710 | 2.658 | 1.079 | 21.835 |
| Cyprus | 24.166 | 8.080 | 1.878 | 0.947 | 8.996 |
| Czech Republic | 26.261 | 6.550 | 2.312 | 1.176 | 23.029 |
| Denmark | 26.753 | 5.810 | 1.895 | 0.975 | 9.369 |
| Estonia | 24.032 | 9.250 | 3.995 | 1.012 | 21.651 |
| Finland | 26.514 | 7.840 | 1.897 | 1.059 | 9.529 |
| France | 28.869 | 9.030 | 1.479 | 0.868 | 20.260 |
| Germany | 29.136 | 7.390 | 1.597 | 1.347 | 24.941 |
| Greece | 26.622 | 15.370 | 2.232 | 0.961 | 21.664 |
| Hungary | 25.868 | 9.100 | 4.162 | 0.858 | 9.938 |
| Ireland | 26.465 | 9.930 | 1.484 | 1.003 | 24.691 |
| Italy | 28.648 | 8.730 | 1.880 | 1.198 | 18.705 |
| Latvia | 24.271 | 12.170 | 4.841 | 1.082 | 17.271 |
| Lithuania | 24.655 | 10.700 | 3.720 | 0.833 | 20.657 |
| Luxembourg | 24.939 | 4.960 | 2.194 | 0.878 | 19.080 |
| Malta | 23.136 | 6.490 | 2.172 | 1.037 | 18.691 |
| Netherlands | 27.708 | 4.570 | 1.770 | 1.240 | 26.401 |
| Poland | 27.107 | 10.500 | 2.546 | 1.179 | 23.444 |
| Portugal | 26.423 | 10.930 | 1.740 | 1.009 | 23.197 |
| Romania | 26.091 | 6.850 | 5.412 | 1.076 | 22.643 |
| Slovakia | 25.462 | 13.170 | 2.598 | 0.975 | 17.860 |
| Slovenia | 24.834 | 7.160 | 2.327 | 0.876 | 16.234 |
| Spain | 28.228 | 17.160 | 2.218 | 1.087 | 24.583 |
| Sweden | 27.188 | 7.590 | 1.176 | 0.992 | 18.488 |
| United Kingdom | 28.879 | 6.590 | 2.708 | 0.964 | 25.386 |

Table 1 depicts the mean values derived from the generated data. By utilizing mean we can make some preliminary educated guesses towards the outcome of the research as well as a first comparison between the stability and proclivity towards criminal activities of the nations.

As we can see, European powerhouses such as United Kingdom, Germany, Italy and France generate the highest GDP volumes across the European Union. Considering this indication, we expect to find less presence of money laundering in those nations. However, in the current estimation, we should not ignore the role of the population and the working force available to these nations. As a result, it would be extremely bi-ased to concluded in any results considering only the mentioned variable.

Regarding unemployment rates, we focus on two trends. Eastern European countries (Baltic and Balkan Countries) have higher level of unemployment in comparison to the Western ones. A possible explanation here is that Baltic nations, still need time to eliminate any remnants left from their communist past (in strict connections to financial principles enforced in communist countries), while Balkan countries have suffered wars and totalitarian regimes that negatively affected their growth. The second trend pertain the so called “PIIGS” countries (Portugal, Italy, Ireland, Greece and Spain). These countries scored higher in unemployment level in comparison to the unaffected from the financial crisis, rest of Europe. That could be accounted as an indication towards the effectiveness of the memorandum programs and the austerity measures imposed on these nations and, as well as, deliver a first indication of probable higher levels of money laundering in these nations.

The first component that we should focus our attention is the inflation. To begin with nations outside of the Eurozone [Hungary (Forint), Romania (Leu) and Bulgaria (Lev)] score the highest inflation rates through the years. The paradox here is that the mentioned nations have not enjoyed a major economic growth through the tested years in order to explain such large and constant raises. Taking into consideration the tested hypothesis stated in the “Hypotheses Statement” section we should note that a red flag, regarding illicit money pumped into the financial system of the mentioned nations, could be raised here. On the other hand, nations that joined the Eurozone the last few years [Estonia(2011), Latvia(2014), Lithuania(2015)] are expected to have a constant growth in prices due to the increase in economic power and benefits (mostly through bilateral agreements) that the participation in the European Union, brings with.

Considering the imports to exports ration, we can see an almost equal distribution among the European Union. The mentioned index did not offer a clear indication in connection to criminal activities or money laundering and as a result it should not and will not be considered in the formulation of the final model.

Last but not least is the Foreign Direct Investment. The variable as a standalone index cannot be interpreted. Prosperous nations such as Cyprus, Denmark and Finland

have been affected by the negative foreign direct investments (outflows of investments). Especially Cyprus, having suffered the bail in of 2013, saw limited investments inflows due to the created uncertainty and additionally, saw large volume of investments leave the country as investors wanted to protect and invest in some more financially stable environments. The provided outcomes cannot indicate an underlying financial anomaly thus, the variable will either be ignored, like the imports to exports variable, or tested with further assumptions.

Macroeconomic Model

As already stated, in order to formulate the final model, we will initiate, first, a two-stages model. The first model that we want to produce will be a baseline macroeconomic model in connection to the GDP. Moreover, having provide an introductory picture of the first results, the interpretation of the model would become more accurate and logical. We begin our tests with one of the most popular statistical techniques used by researchers, the linear regression.

Table 2: Linear Regression

| | | |
|-------------------|-----------------|--------|
| Linear regression | Number of obs = | 280 |
| | F(5, 27) = | 6.87 |
| | Prob > F = | 0.0003 |
| | R-squared = | 0.1863 |
| | Root MSE = | 1.4538 |

(Std. Err. adjusted for 28 clusters in Country)

| gdp | Coef. | Robust Std. Err. | t | P> t | [95% Conf. Interval] | |
|----------------|-----------|---------------------|-------|-------|----------------------|-----------|
| unemployment | -.032052 | .0495639 | -0.65 | 0.523 | -.1337486 | .0696447 |
| inflation | -.1747081 | .051032 | -3.42 | 0.002 | -.2794171 | -.0699999 |
| importsexports | 3.710306 | 1.387459 | 2.67 | 0.013 | .8634752 | 6.557137 |
| fdi | .0138824 | .0079155 | 1.75 | 0.091 | -.0023588 | .0301236 |
| year | .0668741 | .0341682 | 1.96 | 0.061 | -.0032332 | .1369815 |
| _cons | -111.4188 | 69.5439 | -1.60 | 0.121 | -254.1111 | 31.27345 |

The coefficients of the linear regression reveal that an increase in GDP correlates with an increase in imports and a slight increase in Foreign Direct Investments. As a result, from a cash based perspective, such increases that include the usage of cash could include funds sourced from money laundering activities. Consequently, we reject the first hypothesis stated due to the mentioned example. When tested for significance, most of the values result in higher than 0.05 p-values. As a result, they are insignificant to the dependent variable of the model and their hypotheses should be rejected. However, the one thing worth noticing is the low p-value of the inflation index that makes it significant. In connection with the assumption established before, inflation seems to play a critical role towards the formulation of the GDP. Arbitrary and unexplained inflation could hint the existence of underlying illicit proceeds pumped into the financial system. What is more by examining the values of the coefficients, inflation has a negative relation with an increase in the GDP. Thus, it is the first indication of money laundering in nations influenced from such anomaly. Last but not least, we are noticing a low R^2 . Considering the theory, low R^2 indicates that the model does not fit well the observations. However, we should not jump to conclusions. As we want to predict the human inclination towards money laundering, the unpredictability sourced from the human behavior can impact R^2 without necessarily proving an unbalanced

fitness of the model. So, we have to run extra tests and evaluate R^2 in connection with its residuals.

This is the stage where Jones's model and theory are taken into consideration. When Arellano-Bond dynamic estimation model was implemented, after running the regression we predict and define the residuals in order to ascertain the difference between the actual and the expected data. Moreover, by running the Arellano-Bond dynamic panel data estimation model, we include lags as regressors in order to eliminate any endogenous regressors and achieve a higher efficiency of the estimator. Static data (Fixed or Random effect) would not allow us to interpret data observed in previous period. On the other hand, dynamic data can give us current and past information. The main reason we chose Arellano-Bond model is that financial inflows such as Foreign Direct Investments are assumed to be endogenous thus having a correlation with the error term. Moreover, time and geographical components may be correlated with the explanatory variables. Last but not least, the Arellano-bond model was designed for panel data that is constructed with a limited timeline(t) dimension (10 years) and wide country(N) dimension (28 countries). As a result:

Table 3: Arellano-Bond dynamic panel data

```

Arellano-Bond dynamic panel-data estimation   Number of obs   =   224
Group variable: Country                       Number of groups =   28
Time variable: year

Obs per group:   min =   8
                  avg =   8
                  max =   8

Number of instruments =   41                   Wald chi2(5)    =   212.35
                                                Prob > chi2     =   0.0000
  
```

One-step results

| gdp | Coef. | Std. Err. | z | P> z | [95% Conf. Interval] | |
|----------------|-----------|-----------|-------|-------|----------------------|-----------|
| gdp | | | | | | |
| L1. | .5074231 | .0415951 | 12.20 | 0.000 | .4258983 | .588948 |
| unemployment | -.0100552 | .0023413 | -4.29 | 0.000 | -.0146441 | -.0054662 |
| inflation | .0108312 | .0028301 | 3.83 | 0.000 | .0052843 | .0163781 |
| importsexports | -.1454625 | .0966292 | -1.51 | 0.132 | -.3348523 | .0439273 |
| fdi | -.0003241 | .000446 | -0.73 | 0.467 | -.0011982 | .00055 |
| _cons | 13.20508 | 1.139129 | 11.59 | 0.000 | 10.97242 | 15.43773 |

Instruments for differenced equation

GMM-type: L(2/.)gdp

Standard: D.unemployment D.inflation D.importsexports D.fdi

Instruments for level equation

Standard: _cons

The differences from the standard regression model portrayed above depict a first estimation towards shadow economy and money laundering. The residual of the GDP reveal that there is, on average, 0.5 points of unexplained amount inside the GDP component. Due to the restricted information available, the model cannot disentangle the amount to criminal components as to accurately state that a certain value is accustomed to money laundering. However, it can be used as a good proxy for future studies in order to end up in more accurate results.

Second Stage Model

After completing the bases of our model, we will start considering factors closely related to corruption, shadow economy and most of all, money laundering. At first, a correlation matrix will be implemented as to examine the possibility of existence of collinear variables, which should not be parted together in the final model, as they measure the same trends. As a result:

Table 4: Correlation Matrix

| | resid | riskof~n | gini | eduexp~d | corrup~n | contro~n | govern~s | politi~i | regula~y | ruleof~w | voicea~y |
|--------------|---------|----------|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| resid | 1.0000 | | | | | | | | | | |
| riskofsoci~n | -0.2601 | 1.0000 | | | | | | | | | |
| gini | -0.0565 | 0.7202 | 1.0000 | | | | | | | | |
| eduexpend | -0.0030 | -0.4364 | -0.4059 | 1.0000 | | | | | | | |
| corruption | 0.3268 | -0.7037 | -0.5019 | 0.6174 | 1.0000 | | | | | | |
| controlofc~n | 0.3173 | -0.7116 | -0.5076 | 0.6388 | 0.9791 | 1.0000 | | | | | |
| government~s | 0.2423 | -0.7869 | -0.5789 | 0.6760 | 0.9276 | 0.9411 | 1.0000 | | | | |
| politicals~i | -0.1604 | -0.6057 | -0.6453 | 0.3785 | 0.5575 | 0.5703 | 0.6103 | 1.0000 | | | |
| regulatory~y | 0.2433 | -0.6646 | -0.4503 | 0.5691 | 0.8772 | 0.8879 | 0.8712 | 0.5614 | 1.0000 | | |
| ruleoflaw | 0.2830 | -0.7698 | -0.5132 | 0.6266 | 0.9295 | 0.9471 | 0.9450 | 0.5864 | 0.9103 | 1.0000 | |
| voiceandac~y | 0.3508 | -0.7943 | -0.5468 | 0.6033 | 0.9134 | 0.9360 | 0.9124 | 0.6161 | 0.8962 | 0.9454 | 1.0000 |

The first note that we should make here is about the expected negative correlation between the World Governance Indicators and the Sociocultural components. As the inequality of wealth distribution or the risk of social inclusion rises, the World Governance Indicators drop, meaning that corruption is highly related to the social stability of the nation. What is more, expenditure in education is highly related with the Governance components. Nations investing in education tend to enjoy a more peaceful environment, thus eliminating criminal activities such as money laundering. Lastly political stability component is not following, in volume, the trend of the rest indicators. An assumption here is that due to the origins of the index, nations enjoying financial stability and prosperity are obviously scoring higher results. However, due to the exogenous factors such as terrorist attacks, the index does not correlate, in the same level, as the rest. As a result, this factor would be also important, if terrorist financing components were considered.

The next step towards the completion of the final model will be to examine the other two datasets (World Governance Indicators and Sociocultural and Corruption Components) as to conclude regarding which indexes are the most important in connection to tracing money laundering.

Table 5: World Governance Indicators and Sociocultural and Corruption Components

```

Arellano-Bond dynamic panel-data estimation   Number of obs       =       196
Group variable: Country                       Number of groups    =        28
Time variable: year

Obs per group:   min =        7
                  avg =        7
                  max =        7

Number of instruments =    39                Wald chi2(11)       =       63.45
                                                Prob > chi2         =       0.0000

One-step results
                                                (Std. Err. adjusted for clustering on Country)

```

| resid | Coef. | Robust Std. Err. | z | P> z | [95% Conf. Interval] | |
|----------------------------------|-----------|------------------|-------|-------|----------------------|-----------|
| resid | | | | | | |
| L1. | -.1282679 | .0459045 | -2.79 | 0.005 | -.218239 | -.0382968 |
| corruption | .0193846 | .0269175 | 0.72 | 0.471 | -.0333728 | .072142 |
| eduexpend | -.0762998 | .0274602 | -2.78 | 0.005 | -.1301209 | -.0224788 |
| gini | .0079581 | .0069818 | 1.14 | 0.254 | -.0057259 | .0216421 |
| riskofsocialexclusion | .001976 | .00403 | 0.49 | 0.624 | -.0059226 | .0098746 |
| controlofcorruption | .1183249 | .0711407 | 1.66 | 0.096 | -.0211083 | .2577581 |
| governmenteffectiveness | .0021645 | .0686995 | 0.03 | 0.975 | -.1324841 | .1368131 |
| politicalstabilityandabsenceofvi | .06944 | .0621572 | 1.12 | 0.264 | -.0523859 | .191266 |
| regulatoryquality | .0024651 | .0673971 | 0.04 | 0.971 | -.1296309 | .1345611 |
| ruleoflaw | .0340461 | .0915735 | 0.37 | 0.710 | -.1454347 | .2135268 |
| voiceandaccountability | -.162161 | .1622999 | -1.00 | 0.318 | -.4802629 | .1559409 |
| _cons | -.041898 | .3804617 | -0.11 | 0.912 | -.7875893 | .7037933 |

```

Instruments for differenced equation
GMM-type: L(2/.)_resid
Standard: D.corruption D.eduexpend D.gini D.riskofsocialexclusion D.controlofcorruption
D.governmenteffectiveness D.politicalstabilityandabsenceofvi
D.regulatoryquality D.ruleoflaw D.voiceandaccountability

Instruments for level equation
Standard: _cons

```

In similar fashion to the first estimation technique we include all the components and by utilizing again the Arellano-Bond estimator. Consequently, we drew upon some very interesting results. First of all, local and international regulations seem to play the most crucial part regarding the levels of money laundering in an economy. The high p-values can be interpreted as the following way. Governments that have succeed in implementing and maintaining highly functional laws (or anti-money laundering laws) tend to eliminate the presence of criminal activities or money laundering. Moreover, in connection to laws, efficient regulatory authorities and supervising bodies would prompt the public to abstain from criminal activities. As a result, both of our hypotheses stated above are significant to the estimation and could be used to formulate the final model. What is more, we should note that the residual in this situation is negative. In other words, the predicted values are higher than the actual ones. Again, this is a matter of human characteristics and unpredictability. Due to the fact that this da-

taset is comprised mainly of components related not to economic statistics, but to human proclivity, predicted values could be higher than the actual ones. Moreover, a large, positive or negative, residual would indicate that the estimation would be poorly predicted. What is more, corruption and risk of social inclusion will be added to the final model as to make it more considerate and less biased against strictly financial components. The rest of the hypotheses did not capture our interest; thus, they will be crossed out from the formulation of the model.

Model

Considering the above tests and hypotheses it is time to formulate the final model. Through a series of tests on STATA in order to define the most adequate model, we drew upon the following results:

| Source | SS | df | MS | | | |
|----------|------------|-----|------------|-----------------|--------|--|
| Model | 33.1483637 | 5 | 6.62967273 | Number of obs = | 252 | |
| Residual | 123.469866 | 246 | .501910026 | F(5, 246) = | 13.21 | |
| | | | | Prob > F = | 0.0000 | |
| | | | | R-squared = | 0.2117 | |
| | | | | Adj R-squared = | 0.1956 | |
| | | | | Root MSE = | .70846 | |
| Total | 156.61823 | 251 | .623977012 | | | |

| resid | Coef. | Std. Err. | t | P> t | [95% Conf. Interval] | |
|-------------------------|-----------|-----------|-------|-------|----------------------|-----------|
| voicelandaccountability | 1.287058 | .3865322 | 3.33 | 0.001 | .5257235 | 2.048393 |
| governmenteffectiveness | -1.125887 | .2397112 | -4.70 | 0.000 | -1.598035 | -.6537386 |
| corruption | .2298701 | .0799631 | 2.87 | 0.004 | .0723704 | .3873699 |
| riskofsocialexclusion | -.0068886 | .0093235 | -0.74 | 0.461 | -.0252527 | .0114755 |
| inflation | -.0609383 | .0212595 | -2.87 | 0.005 | -.1028121 | -.0190645 |
| _cons | -1.284122 | .4358607 | -2.95 | 0.004 | -2.142617 | -.4256272 |

In the final dataset, we can see that 2 components from the World Governance Indicators dataset and one component from each of the rest datasets have been chosen. In econometric terms the final model could be depicted as follow:

$$Y = a_0 + a_1 \text{voicelandaccountability}_x + a_2 \text{governmenteffectiveness}_x + a_3 \text{corruption}_x + a_4 \text{riskofsocialexclusion}_x + a_5 \text{inflation}_x + e_t$$

P-values seems to predict accurately the coefficients and as a result, the variables to be statistically significant. The abnormal value of the risk of the social inclusion does not prove the inadequacy of the model. On the contrary, as already mentioned, it captures the human characteristics perspective as to give a more spherical base to the model.

The next table will present the outcomes and significance of the regressors through the years. To formulate the current model, we created a simple linear regression with clustered standard errors. However, as we wanted to add the yearly estimations we needed to create a lag of the dependent value and the year effects, in order to end up with the year dummy variables. As result:

Table 6: Linear Regression of the Final Model

| | | |
|-------------------|-----------------|----------|
| Linear regression | Number of obs = | 224 |
| | F(13, 27) = | 55924.05 |
| | Prob > F = | 0.0000 |
| | R-squared = | 0.9972 |
| | Root MSE = | .04291 |

(Std. Err. adjusted for 28 clusters in Country)

| resid | Coef. | Robust Std. Err. | t | P> t | [95% Conf. Interval] | |
|-------------------------|-----------|------------------|--------|-------|----------------------|-----------|
| riskofsocialexclusion | .0014618 | .0003223 | 4.54 | 0.000 | .0008005 | .0021231 |
| inflation | -.0065812 | .0016972 | -3.88 | 0.001 | -.0100637 | -.0030988 |
| corruption | -.0018664 | .0031596 | -0.59 | 0.560 | -.0083493 | .0046164 |
| governmenteffectiveness | -.0043027 | .0112338 | -0.38 | 0.705 | -.0273527 | .0187472 |
| voiceandaccountability | .0338104 | .0155531 | 2.17 | 0.039 | .0018981 | .0657226 |
| resid | | | | | | |
| L1. | .9890883 | .0024922 | 396.88 | 0.000 | .9839748 | .9942017 |
| yr_1 | 0 | (omitted) | | | | |
| yr_2 | 0 | (omitted) | | | | |
| yr_3 | .1052953 | .0125502 | 8.39 | 0.000 | .0795443 | .1310463 |
| yr_4 | 0 | (omitted) | | | | |
| yr_5 | -.1576822 | .0197318 | -7.99 | 0.000 | -.1981685 | -.1171959 |
| yr_6 | .0329286 | .0177037 | 1.86 | 0.074 | -.0033964 | .0692536 |
| yr_7 | .0590711 | .0121175 | 4.87 | 0.000 | .0342082 | .0839341 |
| yr_8 | -.1191275 | .0144653 | -8.24 | 0.000 | -.1488078 | -.0894472 |
| yr_9 | .0619572 | .0109665 | 5.65 | 0.000 | .0394557 | .0844586 |
| yr_10 | -.031729 | .0166121 | -1.91 | 0.067 | -.0658142 | .0023563 |
| _cons | -.0187113 | .01936 | -0.97 | 0.342 | -.0584347 | .021012 |

We can see that the effects have mostly disappeared due to being absorbed by the created lags and some year dummies. As a result, we end up with such a high R². Finally, the unexplained component of the GDP (either positive or negative) represents parts of the economy outside the official fiscal figures. This is in turn is, partly, explained by institutional features and characteristics (and lags and year effects). Therefore, the shadow economy is embedded in the economy of nations and is linked with infrastructural - cultural characteristics, not necessarily related to the real economic conditions.

The final table will depict estimations based on the mean scores of the countries in connection to the accepted hypotheses. From the last table, we will conclude to the final assumptions towards the presence of money laundering in European Union.

Table 7: Means of the Final Model per Country

| Country | mean(voic~y) | mean(infl~n) | mean(gove~s) | mean(corr~n) | mean(risk~n) |
|----------------|--------------|--------------|--------------|--------------|--------------|
| Austria | 1.424 | 2.083 | 1.702 | 7.810 | 18.620 |
| Belgium | 1.371 | 1.720 | 1.589 | 7.340 | 21.210 |
| Bulgaria | 0.493 | 4.488 | 0.092 | 3.890 | 50.890 |
| Croatia | 0.460 | 2.658 | 0.600 | 4.170 | 32.080 |
| Cyprus | 1.037 | 1.878 | 1.387 | 6.140 | 25.420 |
| Czech Republic | 0.974 | 2.312 | 0.954 | 4.820 | 15.720 |
| Denmark | 1.621 | 1.895 | 2.120 | 9.300 | 17.420 |
| Estonia | 1.087 | 3.995 | 1.060 | 6.580 | 23.280 |
| Finland | 1.562 | 1.897 | 2.147 | 9.190 | 17.130 |
| France | 1.260 | 1.479 | 1.489 | 7.090 | 18.790 |
| Germany | 1.386 | 1.597 | 1.588 | 7.940 | 19.940 |
| Greece | 0.828 | 2.232 | 0.540 | 4.060 | 30.770 |
| Hungary | 0.885 | 4.162 | 0.695 | 5.130 | 31.220 |
| Ireland | 1.392 | 1.484 | 1.514 | 7.500 | 26.460 |
| Italy | 0.991 | 1.880 | 0.398 | 4.480 | 26.770 |
| Latvia | 0.779 | 4.841 | 0.709 | 4.740 | 37.800 |
| Lithuania | 0.881 | 3.720 | 0.772 | 5.060 | 32.120 |
| Luxembourg | 1.562 | 2.194 | 1.673 | 8.320 | 17.330 |
| Malta | 1.178 | 2.172 | 1.153 | 5.780 | 21.430 |
| Netherlands | 1.577 | 1.770 | 1.783 | 8.680 | 15.660 |
| Poland | 0.961 | 2.546 | 0.577 | 4.960 | 30.970 |
| Portugal | 1.158 | 1.740 | 1.036 | 6.240 | 25.700 |
| Romania | 0.422 | 5.412 | -0.240 | 3.770 | 43.780 |
| Slovakia | 0.923 | 2.598 | 0.849 | 4.600 | 22.020 |
| Slovenia | 1.027 | 2.327 | 1.026 | 6.230 | 18.630 |
| Spain | 1.084 | 2.218 | 1.068 | 6.380 | 25.660 |
| Sweden | 1.601 | 1.176 | 1.936 | 9.110 | 15.540 |
| United Kingdom | 1.335 | 2.708 | 1.603 | 7.920 | 23.520 |

First of all, we will not focus on the inflation component as thorough explanation has been delivered above. Through the interpretation of the above table and in connection with the model we can see that three countries stand among the 28 regarding the highest proclivity in Money Laundering. Bulgaria, Hungary and Romania did not only score low in most of the indexes but also matched the stated hypotheses. For example, high corruption with low government effectiveness is a clear indication of presence of money laundering activities. Moreover, the scale of people living in the risk of social exclusion confirms our assumptions. From an arbitrary statistical perspective, it is more probable that people living on the edge of poverty or social exclusion will engage in larger volume of criminal acts. What is more, by considering our final model the stated hypotheses are correct. Finally, the governmental effectiveness is one of the most crucial variables regarding money laundering. Countries that scored the lower levels has the higher perpetration of money laundering. As a result, we can

state that it is the government's responsibility to limit and set strict boundaries if it wants to lower or eliminate the phenomenon.

Conclusions

In this working paper, we attempted to calculate the amount of money laundering in European Union Countries. Limited available resources on the subject obligated us to transform our model and change the original orientation. However, as the research was in action, the results were becoming clearer and clearer that money laundering is not only an economical nature matter of deception but also a matter highly connected to human behavior. The researched components could give an indication towards the presence of money laundering in European Union. The first analysis of the macroeconomic baseline model gave an indication of 0.5 points of unexplained component in the total GDP. Further analysis confirmed that the absence of variables such as voice and accountability or government effectiveness could attract individuals in engaging in criminal activities. The macroeconomic component that crosses out any biased results is the inflation rate. Unexplained inflation rate with counter-cyclical growth in Gross Domestic Product revealed the presence of illicit inflow funds in local financial systems. Considering the European Union, we see that Bulgaria, Romania and Hungary have the highest presence of Money Laundering. At this point we would like to finish this dissertation by hoping that this working paper will be treated as a stepping stone towards the construction of an ultimate model that will assist the fight against money laundering and corruption in general.

Bibliography

Books:

- Block, Alan A. (1980): *East Side–West Side. Organizing Crime in New York 1930–1950*. Cardiff, UK: University College Cardiff Press.
- Clark Gregory (2009): *A Farewell to Alms, a Brief Economic History of the World*, Princeton University Press.
- Huntington Samuel (1968): *Political Order in Changing Societies*, republished by Yale University Press (2006), United States of America.
- Kiros Berhane and Duncan C. Thomas (2002): *A Two-stage Model for Multiple Time Series Data Count*, University of Southern California, United States of America.
- Schneider, F. (2008): *Money Laundering and Financial Means of Organized Crime: Some Preliminary Empirical Findings in Global Business and Economics Review*, Interscience Enterprises Ltd, 10 (3), 309-330.
- Tanzi, Vito. (1997): *Macroeconomic Implications of Money Laundering, International Perspectives*, edited by E.U. Savona, pp. 91–104, Amsterdam: Harwood Academic Publishers.
- Unger, B. (2007), *The Scale and Impact of Money Laundering*, Cheltenham, UK: Edward Elgar.
- Walker, J. and B. Unger (2009) *Measuring Global Money Laundering: The Walker Gravity Model*, Review of Law & Economics 5, 821-853.

Journals:

- Aminul Islam (2011): *Is modified Jones Model Effective in Detecting Earnings Management? Evidence from a Developing Country*, International Journal of Economics and Finance.

- Ardizzi Guerino, Petraglia Carmelo, Piacenza Massimiliano, Schneider Friedrich and Turati Gilberto (2014): *Money Laundering as a Financial Sector Crime - A new Approach to Measurement, with an Application to Italy*, Journal of Money, Credit and Banking, Vol. 46, No. 8.
- Barone R., Masciandaro D. (2011): *Organized Crime, Money Laundering and Legal Economy: Theory and Simulations*, European Journal of Law Economics, 32(1), 115-142.
- Becker Gary (1968): *Crime and Punishment, an Economic Approach*, University of Chicago and National Bureau of Economic Research.
- Dechow, Sloan, and Sweeney (1995): *Detecting Earnings Management*, The Accounting Review.
- Dechow, P., & Dichev, I. (2002): *The Quality of Accruals and Earnings: The Role of Accrual Estimation Errors*. The Accounting Review, 77, 35-59.
- García C., Prieto-Alaiz M. and Simón H. (2013): *The Influence of Macroeconomic Factors on Personal Income Distribution in Developing Countries: A Parametric Modelling Approach*, Journal of Applied Economics, Routledge, Taylor and Francis Group.
- Hicks Daniel and Hicks Joan Harmony (2014): *Jealous of the Joneses: Conspicuous Consumption, Inequality and Crime*, Oxford Economic Papers, Vol. 66 (4), October, pp. 1090-1120
- Jones, J.J. (1991): *Earnings Management during Import Relief Investigation*. Journal of Accounting Research, 29, 193-228.
- Joras Ferwerda, Mark Kattenberg, Han-Hsin Chang, Brigitte Unger, Loek Groot and Jacob Bikker (2011): *Gravity Models of Trade-based Money Laundering*, DNB Working Paper No. 318.
- Hines, James R. (2010): *Treasure Islands*. Journal of Economic Perspectives, 24, 103–26.

- Leff N. (1964): *Economic Development through Bureaucratic Corruption*, American Behavioral Science, Sage Publications Inc.
- Sharman, Jason C. (2010): *Shopping for Anonymous Shell Companies: An Audit Study of Anonymity and Crime in the International Financial System*, Journal of Economic Perspectives, 24, 127–40.
- Walker, J. (1999): *How Big is Global Money Laundering?*, Journal of Money Laundering Control, 3(1), 25-37.

Reports:

- Financial Action Task Force (2012): *Specific Risk Factors in the Laundering of Proceeds of Corruption*, FATF/OECD.
- Lequiller F., Blake D. (2007): *Understanding National Accounts*, OECD.
- Torres-Reyna Oscar (2007): *Panel Data Analysis Fixed and Random Effects using STATA*, Princeton University.

Databases:

- Eurostat
- European Central Bank Statistical Data Warehouse
- World Bank
- OECD
- United Nations Office on Drugs and Crime
- International Monetary Funds
- CIA Factbook
- The Egmont Group
- Financial Action Task Force
- Basel Institute of Governance
- The World Project
- Transparency International

Appendix

This model used a balanced panel data of the 28 European Union Countries across ten years from 2005 to 2014. Datasets were created through the utilization of different resources. All the information along with sources and definitions are available in the excel spreadsheets.

Linear Regression Model including all World Governance Indicators and Socio-cultural and Corruption Components:

Linear regression

Number of obs = 252
 F(10, 27) = 6.74
 Prob > F = 0.0000
 R-squared = 0.4648
 Root MSE = .58973

(Std. Err. adjusted for 28 clusters in Country)

| resid | Coef. | Robust Std. Err. | t | P> t | [95% Conf. Interval] | |
|----------------------------------|-----------|------------------|-------|-------|----------------------|-----------|
| corruption | .2029724 | .1937467 | 1.05 | 0.304 | -.194563 | .6005078 |
| eduexpend | -.2135001 | .1618026 | -1.32 | 0.198 | -.5454916 | .1184915 |
| gini | -.0186157 | .0302468 | -0.62 | 0.543 | -.080677 | .0434456 |
| riskofsocialexclusion | -.0068708 | .0227367 | -0.30 | 0.765 | -.0535227 | .0397811 |
| controlofcorruption | -.0199704 | .4678941 | -0.04 | 0.966 | -.9800098 | .940069 |
| governmenteffectiveness | -.1690605 | .4890751 | -0.35 | 0.732 | -1.17256 | .8344387 |
| politicalstabilityandabsenceofvi | -1.273931 | .3356385 | -3.80 | 0.001 | -1.962605 | -.5852578 |
| regulatoryquality | -.4607049 | .5590705 | -0.82 | 0.417 | -1.607823 | .686413 |
| ruleoflaw | -.3769795 | .5831647 | -0.65 | 0.523 | -1.573535 | .8195757 |
| voiceandaccountability | 2.435138 | .9620346 | 2.53 | 0.017 | .4612056 | 4.40907 |
| _cons | -.0195415 | 1.377304 | -0.01 | 0.989 | -2.845535 | 2.806452 |

