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EFFICIENCY OF ANTI-MONEY LAUNDERING: THE CASE OF NORTHERN EUROPEAN COUNTRIES

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Abstract. As money laundering is a highly threatening and dangerous activity, its damage is only discussed when the consequences of these illegal activities become public, thus such kinds of investigations are particularly relevant. By following public anti-money laundering (AML) directives and internal financial legislation of specific countries, it is possible to improve any money laundering situation, anticipate potential risks and avoid various financial downturns. This paper examines the evolution of money laundering, the motives behind them, the potential economic consequences and highlights the need to suppress these activities to promote higher standards of AML, which could have a positive impact on the countries' economies. In the empirical part, according to the main macroeconomic indicators, 10 Northern European countries are analysed and the effectiveness of anti-money laundering processes, are identified. The analysis is made using several research steps, obtained results are compared and discussed. Methods used: scientific literature analysis, comparative analysis, data systematization, statistical data analysis, COPRAS, and cluster analysis. Conclusions and future research areas are mentioned.

Keywords: anti-money laundering (AML), financial institutions, GDP, macroeconomic indicators, money laundering, Northern Europe.

JEL Classification: G210.

Introduction

Money laundering is not a new concept in finance. Although the origins of the process are not precisely identified, it is an extremely dangerous process in modern society, with the potential to damage economically a wide range of global financial institutions, individuals, or even countries through its illegal nature (Florea, 2020). According to the International Monetary Fund, it is estimated that globally around 2~5% of annual Gross Domestic Product (GDP), or around $1.5 trillion, is being concealed by money laundering techniques (Singh & Best, 2019; See & Miru, 2019, International Monetary Fund, 2018. Even in well-known groups such as FIFA (Fédération Internationale de Football Association), more than $150 million in criminal proceeds have been concealed for money laundering and bribery purposes (Naheem, 2018; The United States Department of Justice, 2015).

The three money-laundering techniques of placement, layering and integration allow criminals to target and conceal their profits, preventing the traceability of the sources of illicit money and the proof of the criminal activities of its recipients (Singh & Best, 2019; Salehi et al., 2017; Campbell-Verduyn, 2018; Matevičius, 2020).

Due to the criminal activities related to money laundering, these frequent occurrences may have a negative impact on profits in larger financial firms, as well as contributing to the concealment of capital and assets in order to evade taxes or to the pursuit of other illicit financial activities, which could progressively depress the profits in financial firms (Korystin et al., 2020).

According to the increasing number of criminal activities each year, it is imperative to ensure that all countries have highly targeted procedures in place to identify money laundering cases. Furthermore, it is important to fully categorize the related money laundering procedures, and seek to demonstrate the correlation of money laundering activities with macro-economic indicators and their impact on the national economies (Gibney, 2019; Matevičius, 2020; Mojsoska & Dujovski, 2017).

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Although many researchers have proved, that reduction of money laundering activities may provide a positive impact on the economic indicators of any country (Agca et al., 2020; Berglund & Mäkinen, 2019; Chen et al., 2018; Stankevičiūtė, 2018), it has not been clearly stated how and what should be done in order to possibly improve the situation, meaning that the newest investigations on related issues about money laundering are very important.

In this research an attempt was made to analyse the main features of the money laundering process and what effect it has globally on countries' economies, how this process could be prevented, and to identify, which Northern European countries are the most efficient in managing anti-money laundering activities. According to the United Nations (2021) categorization of North Europe, 10 different countries in this research are analyzed. This region was chosen as Lithuania and other neighboring Baltic countries belong to the countries of Northern Europe.

The object of the study is the effectiveness of the anti-money laundering (AML) process.

The research purpose is to investigate, which of the Northern European countries are the most efficient in the money laundering prevention actions, according to the main macroeconomic indicators.

Research methods: scientific literature and statistical data analysis, comparative analysis, data systematization, COPRAS method, cluster analysis.

Results of the study could be important on theoretical and practical levels – for deeper future research in this area and for financial institutions as well in order to minimize the money-laundering processes' negative impact and possible risks to financial performance.

1. Features of the money laundering process

Money laundering is more commonly known as a form of resistance to society by criminals or illegal groups whose aim is to hide cash from illegal or criminal sources in order to profit from them. This process may be identified as a series of actions in which money from illegal sources (e.g. drug trafficking, black market, etc.) is laundered and integrated into society as if it were legitimate funds (Florea, 2020; Singh & Best, 2019; Matevičius, 2020). Money laundering is made up of several separate activities: 1) placement – the process by which an individual or a company engaged in criminal activity inserts illegally obtained funds into the financial system in the form of individual cash deposits, cashier's checks, credit cards or other means in an attempt to layer the illegally obtained money on the market; 2) layering – the purposeful concealment and disguise of money through the purchase of assets, the exchange of assets for other goods, and the movement of funds between different countries or locations. The intention of this process is to conceal the origin of the money obtained through criminal activity and, for these reasons, demonstrate that the funds are not in fact illicitly derived;

3) integration – the aim is to fully integrate the already laundered funds into society, through investments, the formal purchases of real estate or even the financial firms themselves. This process aims to fully integrate the funds into the market (Singh & Best, 2019; Salehi et al., 2017; Campbell-Verduyn, 2018; Matevičius, 2020).

Often, money laundering or similar illegal activities could be linked to an increase in the circulation of cash within a country, which is strongly emphasized by many of the European Union's anti-money laundering units (Riccardi & Levi, 2018). Investigating the use of cash in the country, it is possible to mention the sector of criminal activity in which the use of cash is more frequent, which may underline the correlation between the use of cash, the level of criminal activity and the amounts of money laundering within society (Ardizzi et al., 2018). Underlining this, it may be seen that, as a consequence, the less frequent use of cash in society has a positive impact on the safer development of a country's financial market and on the growth of Gross Domestic Product (GDP) as it encourages the market to move towards an environment with less cash in circulation and in everyday consumption (Stankevičiūtė, 2018).

Cashless society and increased use of electronic payments could make it easier to trace how and which payments could be dangerous. This might allow expediently ease of the possible identification of payments within financial institutions, while at the same time promoting an anti-money laundering approach (Le Nguyen, 2018). Given the money laundering methodology, these illegal activities have a negative impact on the country's internal economic growth, might increase unemployment, and lead to untargeted and unpredictable changes in local prices.

Moreover, these motives may have a strong impact on a country's internal or external financial activities, inhibiting or even stopping it, and strict, effective and targeted anti-money laundering methods and measures are imperative to avoid such variations (Mojsoska & Dujovski, 2017; Turki et al., 2020).

In addition to the possible impact of money laundering on macroeconomic indicators, it is important to mention the potential impact of money laundering on the overall employability of a country's citizens, whereby an increase in money laundering raises the crime rate in the country, which may inversely increase the unemployment rate (Hetemi et al., 2018).

Legal regulation is also very important. The most recent, Fourth Anti-Money Laundering Directive (or 4AMLD) adopted by the European Union states that the identification of illegal money laundering in a country exposes companies to very severe fines and sanctions, or even to certain restrictions on companies' financial activities, which in the long run could have a negative impact on the countries' macroeconomic indicators (Koster, 2020; Raweh et al., 2017; Premti et al., 2021).

Historically, when the European Union started fighting money laundering, the first directive, which came into force in 1991, highlights the first steps in the fight

against money laundering (Van Den Broek, 2011). Subsequent directives consider the risks of money laundering, identifying precise preventive measures, such as continuous surveillance of financial instruments, the identification, and confirmation of customers, and the targeted reporting of unusual, risky, and suspicious activities to the higher authorities. All of this may help to highlight and raise the profile of anti-money laundering within global financial institutions and international organizations with a view to reducing the scale of money laundering and preventing its consequences (Benson, 2021; European Court of Auditors, 2021).

2. The impact of the money laundering process on global economies

Money laundering as well can affect the macroeconomic performance of countries. When analysing the consequences of money laundering, it must be stressed that it is only by identifying targeted cases of money laundering that one may attempt to determine their impact on countries' macroeconomic indicators.

Money laundering could be associated with terrorist activities and may pose a very serious threat to individuals, companies or even international banks. One such example is the money laundering-funded terrorist attack of 11th of September 2001 in the United States of America (Balani, 2019).

According to the United Nations, in 2009, the world's total proceeds of crime accounted for approximately 3.6% of global GDP.

Considering this amount, money laundering accounted for approximately 2.7% of the world's total GDP, or about $1.6 trillion per year (Denovagis, 2015). Thus, terrorism might be directly linked to money laundering, as in a number of cases the proceeds of money laundering are transferred to foreign terrorist fighters (FTFs), who may encourage or even direct specific terrorist incidents (Mekpor, 2019).

When analysing money laundering, the expected 8% correlation between the volume of GDP and the amount of money laundering in a country could be observed, which shows that when a country adopts an anti-money laundering model, there is an increase in the volume of GDP (Šikman & Grujić, 2021). This may be seen in the gradually rising GDP of the Nordic countries of Denmark, Norway, Sweden and Iceland. These rising figures underline the applicability and acceptability of the anti-money laundering methodology in most of the Nordic countries, which is potentially more protective against possible fluctuations in the market (Comolli et al., 2021).

Economic instability could be indirectly linked to the extent of money laundering amounts within a country, which may have negative consequences for a country's GDP and market development in the long run. For the same reasons, strengthening anti-money laundering techniques and regulatory or law enforcement rules to suppress this criminal activity will help the country's economic market to be less constrained and to grow more easily (Sasongko & Huruta, 2018).

It should be noted that any negative public reaction to various cases of money laundering may not only damage the public financial reputation of the parties involved but could lead to a temporary decrease in the bank's share price, which may affect the competitiveness of financial institutions in the market. It is therefore imperative for all companies to increase the extent to which they are working toward developing anti-money laundering in the future. One of the ways would be through a wider and faster application of anti-money laundering precautions (Noroaho, 2020).

Northern European financial institutions, such as Danske and Nordea Banks, are investing significantly more money in targeted and more effective anti-money laundering techniques in the aftermath of the past money laundering incidents, thus increasing their ability to fight money laundering cases more easily and quickly in the future (Noroaho, 2020).

It is imperative that any financial institution or country would take appropriate actions to prevent future cases of money laundering. The countries' ability to adapt to current turmoil or other political or financial difficulties makes it possible to alter and improve the financial market, which results in better and more targeted anti-money laundering techniques being applied in countries, which in part could also boost a country's overall consumption and GDP (Šikman & Grujić, 2021).

3. Prevention of money-laundering process

Concerning the prevention of money laundering, it must be first of all noted that this process is the opposite of money laundering activities, i.e., the aim is to suppress, discourage and punish individuals or companies involved in criminal money laundering activities (Weber et al., 2018). A clear definition of money laundering scenarios could make it easier to identify their links to banks or other financial institutions and take preventive measures, such as Know Your Customer (KYC) or Suspicious Activity Report (SAR) identification, much easier and simpler (Swedbank, 2020). The continuous Customer Due Diligence (CDD) carried out by the relevant financial institutions in the countries concerned aims to ensure the safe and risk-free operation of any financial firm, protecting both the firms and the clients themselves from money laundering risks (Xu et al., 2021).

In the event of any more risky, dangerous, or suspicious payments, lack of information or links to criminal activities, individuals or organizations, Enhanced Due Diligence (EDD) may be introduced. This special action may be known as increased and enhanced investigation of all the riskier customers. If EDD is enabled by any of the customers, they are subjected to a significantly higher level of investigation and screening for a higher possibility of links to criminal activity and money laundering motives (Esoimeme, 2019).

Therefore, it could be useful to analyse the Anti-Money Laundering Index (AMLI). It is calculated according to the countries' money laundering preventative measures and other factors and it can show what is the current ranking of the country worldwide relating to the anti-money laundering measures taken. Besides, financial market development indicators in a country may rise as the AMLI decreases (Šikman & Grujić, 2021).

A comparison of the global Financial Development Index (FDI) and Anti-Money Laundering Index reveals that the countries with the best FDI maybe those with a lower AMLI, while a lower Financial Development Index number indicates a higher Anti-Money Laundering Index (Basel Institute on Governance, 2021; International Monetary Fund, 2018). It should be noted that application of more targeted and effective anti-money laundering techniques in the country could positively contribute to the development of any financial market in the country in the long run.

Emphasizing the knowledge of procedures for customers of any financial institution, any existing or potential financial customer must be properly and efficiently screened, stressing the importance and significance of proper documentation, prompt payments and the need to keep the information up to date. Encouraging the use of customer awareness procedures may help to anticipate, prevent and identify money laundering risks before they appear (See & Miru, 2019).

The recent emphasis on anti-money laundering has increasingly highlighted the lack of application of anti-money laundering procedures or the weaknesses within these procedures in financial institutions, which could affect the reputation of companies or even lead to their liquidation (Gutauskas, 2019).

Some of the largest banks in Northern Europe, such as Sweden's Swedbank and Denmark's Danske Bank, have come under wider public scrutiny for money laundering cases, due to the discovery of targeted money laundering cases linked to long-standing criminal activity in these financial institutions (Noroaho, 2020).

The money laundering cases of Northern European financial companies such as Danske Bank should be highlighted, where, according to the data of 2010, around USD 7 billion was laundered through Danske Bank as a result of criminal money laundering activities (Gibney, 2019). These money laundering cases resulted in a fine of USD 1.92 billion for HSBC in 2012 for money laundering through this financial institution, using the bank as an intermediary for money laundering purposes (Agca et al., 2020).

Failure to take appropriate anti-money laundering measures might result in very heavy financial penalties for financial institutions. For example, such major banks as the Swiss financial institution Credit Suisse Group, which was fined USD 536 million, and the UK's Lloyds Banking Group PLC, which was fined USD 350 million for the lack of anti-money laundering measures applicable within their own organization (Table 1) (Chen et al., 2018; Buchanan & Zabala, 2017).

Considering the amounts of money laundering cases situations worldwide, it is important to state that the higher-risk cases are identified, the more security checks are being made, thus increased amounts of security control used may also result in higher amounts of identified money laundering cases (Chen et al., 2018).

Unfortunately, while there are many more anti -money laundering methods, the exact methods of money laundering prevention are not identified or disclosed due to the safeguards in place and the non-disclosure of information to criminals (Chen et al., 2018).

Table 1. Maximum fines for anti-money laundering offences in 2010–2012 (source: created by authors, according to Buchanan & Zabala, 2017; Chen et al., 2018; Agca et al., 2020)

Company	Fine imposed (millions USD)
ABN AMBRO	500
Barclays	298
BNP Paribas	8.970
Credit Suisse Group	536
HSBC	1.920
ING	619
Lloyds Banking Groups	350
MoneyGram	100
Standard Chartered	967
Total	14.260

Northern European institutions such as DNB Bank emphasise the importance of checking all suspicious money laundering cases, their risks, and avoidance. To achieve this, continuous and targeted analysis of the bank's customers and their payments, linked to manual or automated verification of transactions according to specific methodologies (Figure 1), is mandatory (Jullum et al., 2020). This analysis could help to correctly identify the sources of money laundering, its promoters and tools, and to prevent such and similar activities.

If existing clients are misusing the privileges offered by financial institutions, violating rules or otherwise concealing their activities, targeted suspicious activity reports highlighting the money laundering circumstances might be filed, with the aim of fully reporting the cases, discovering the existing client activity and helping to prevent the real consequences of money laundering (Gupta et al., 2021). Once their weaknesses and challenges have been corrected, it is imperative that anti-money laundering models are developed at the right balance between the cost of system integration and the quality of anti-money laundering measures, even though they often do not pay for themselves (Pilpola, 2021).

Highlighting the benefits of the anti-money laundering approach, the strengthening of the anti-money laundering methodology and its implementation leads to an increase in financial market development or other macroeconomic indicators (Ofoeda et al., 2020).

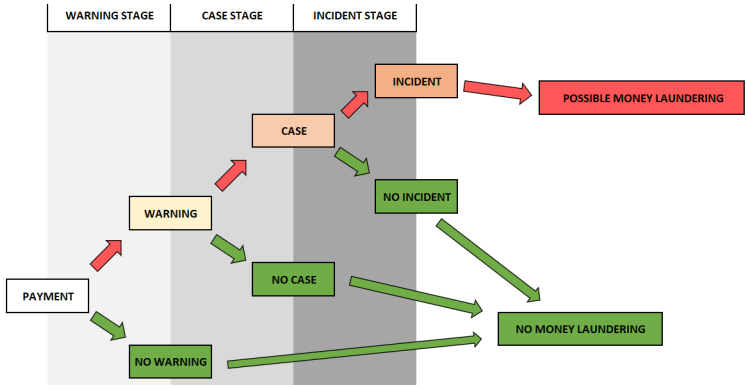

Figure 1. Standard model for the examination of international payments by financial firms (source: created by authors, according to Jullum et al., 2020)

The theoretical financial benefits of combating various money laundering techniques in countries around the world could amount to around 0.6% of global GDP (Barone & Masciandaro, 2008). It should be noted that money laundering offenses themselves are often not public and visible, and the scale and scope of these offenses are often attempted to be concealed meaning that the specific numbers and amounts are not precisely identifiable. Given the magnitude of the problem, the anti-money laundering methods used unfortunately do not cover the vast majority of criminal activity and only about 0.2% of the total number of anti-money laundering countermeasures may be justified (Pol, 2020).

The Financial Action Task Force (FATF) furthermore highlights the potential money laundering threats and their impact on any financial organization or its products (Kuznecova, 2021). With targeted existing and future FATF directives and focused anti-money laundering approaches by financial organizations within the European Union, it could be possible to make it easier for any financial institution to identify money laundering cases, and by following focused and already defined rules and precautions, ensure that money laundering cases are not missed or if they have occurred in the past, are presented in the future (Premti et al., 2021; Moneyval, 2018).

4. Methodology of the research and data used

In order to achieve the set goal – to analyse which of the Northern European countries are the most efficient in the money laundering prevention actions according to the main macroeconomic indicators, it is imperative to ensure that the data used in this research are as up-to-date and correct as possible and that they are available for all the selected indicators. Moreover, if the data are not converted or are from different time periods, it is mandatory to convert them into the same units for all indicators. In order to get more specific results, the research was divided into several steps and the main two research methods are used: COPRAS and clustering analysis. The structure of the research is provided in Figure 2.

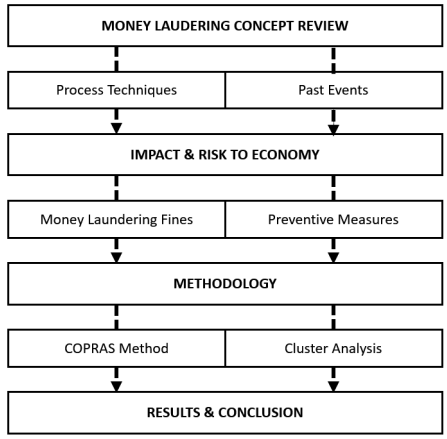

Figure 2. Structure of research (source: created by authors)

According to the United Nations (2021) categorization of North Europe, in this research 10 countries will be analysed: Lithuania, Latvia, Estonia, Finland, Sweden, Norway, Denmark, Iceland, United Kingdom and Ireland. The countries of Northern Europe have been distinguished specifically for this study according to several reasons: 1) Lithuania and other neighboring Baltic countries belong to the countries of Northern Europe 2) the majority of financial institutions operating in Baltic countries, belong to Sweden, Denmark, Norway or etc. 3) as many of these financial institutions are participating in preventive money laundering measures, these countries provide a stable ground for the research.

The selected main macroeconomic indicators for the analysis are: GDP (billion), inflation rate (%), anti-money laundering index, average monthly wage (EUR), unemployment rate (%), terrorism index, corruption index, competitiveness index and consumer price index.

For the first research step in order to find out, which countries are the most effective in AML management process, the COPRAS (Complex Proportional Assessment) method will be used. The usage of COPRAS method will allow to recalculate and compare the macroeconomic indicators which are used in the research and provide insights about the results. It allows showing the relative significance of the benchmarks used in this

research to be shown in terms the degree of efficiency U_i and ranking of these results. According to (Šilgalis, 2017), looking at the value of U_i, the higher the value, the more acceptable the indicator is.

Furthermore, it should be noted that the formulas below use specific weights for all the indicators, which state how important those indicators are within the calculations. However, the weights have been distributed evenly across each indicator. It may be also noted that different indicators are measured according to specific sources, it may be difficult to express which indicators should be of higher weight (for example values considered while measuring GDP may not be the same as those used while considering unemployment percentage or vice versa). As 9 indicators are used in this research, the weights of the indicators have been distributed evenly across all indicators, with a ratio of 1:9, which is 0.11.

COPRAS method consists of 5 calculation stages:

1. The indicator data from the Table 2 are normalized:

$$\hat{x} = \frac{x_{ij}}{\sum_{i=1}^{m} x_{ij}}, \quad (1)$$

where m – the number of indicators; x_{ij} – the j-th value of the i-th indicator.

2. Creation of the weighted matrix:

$$\tilde{x}_{ij} = \hat{x}_{ij} \times \omega_j, \quad (2)$$

ω – the weight of the indicator.

3. Composition of the maximized and minimized indicators:

$$S_{+i} = \sum_{j=1}^{m} \tilde{x}_{ij}; \quad (3)$$

$$S_{-i} = \sum_{j=1}^{m} \tilde{x}_{-ij}. \quad (4)$$

4. Calculation of the relative significance of the indicators (Q_i):

$$Q_i = S_{+i} + \frac{S_{-\min} \times \sum_{i=1}^{m} S_{-i}}{S_{-i} \times \sum_{i=1}^{m} \frac{S_{-\min}}{S_{-i}}}. \quad (5)$$

5. Calculation of the degree of efficiency (U_i):

$$U_i = \frac{Q_i}{Q_{\max}} \times 100\%. \quad (6)$$

The second research step is Cluster analysis with Ward linkage. It will allow the data from 10 countries to be categorized into three different clusters according to the data from Table 2. These clusters will give a clearer understanding of how the countries may be grouped according to the similarity of the data, which allows it to be visualized and analysed. Using SPSS software, cluster analysis, and Ward linkage, the dendrogram displays the grouped data of different countries into three clusters visualized in Figure 3.

Table 2. Selected countries and indicators used in the analysis (source: created by authors, according to Trading Economics, 2020)

Indicators / Countries		#1	#2	#3	#4	#5	#6	#7	#8	#9
		GDP, billions EUR***	Inflation rate, %	Anti-Money Laundering Index	Average Net monthly salary, EUR[2]	Unemployment rate, %	Terrorism Index	Corruption Index	Competitiveness index	Consumer price index
#1	Lithuania	62,05	0.2	3,51	1368.83	14,0	0.23	60	68,35	111.5
#2	Latvia	37,203	–0.5	4,62	1076.08	7,9	0.12	57	66,98	109.2
#3	Estonia	34,45	–0.8	2,36	1386.42	7,4	0.06	75	70,91	213.4
#4	Finland	301,122	0.2	2,97	3809.92	7,8	1.72	85	80.25	103,3
#5	Sweden	636.827	0,5	3.32	3624,86**[1]	8.2	2,89	85	81.25	332,82
#6	Norway	401.907	1,4	3.19	5299,04[1]	4.8	1,3	84	78.05	111,3
#7	Denmark	394.324	0,5	3.46	4897,41[1]	4.4	1,48	88	81.17	103
#8	Iceland	24,103	3.6	4,25	5418.50[1]	7,3	0	75	74.72	469,8
#9	United Kingdom	3006.157	0,6	4.02	4179,36*[1]	5.2	5,16	77	81.2	108,2
#10	Ireland	464.756	–1	4,46	3890.42*	6,3	2.85	72	75,12	101.7
Weight of indicator		0,11	0.11	0,11	0.11	0,11	0.11	0,11	0.11	0.11
MIN/MAX		MAX	MIN	MIN	MAX	MIN	MIN	MIN	MIN	MAX

Notes: * United Kingdom – 578 GBP/week * 4, Ireland – 847,21 EUR/week * 4 (number of weeks per month); ** Sweden – 184; SEK/hr * 160 (number of working hours per month); *** GDP, billions USD has been converted to GDP, billions EUR with a ratio of 1 USD = 1.110209 EUR (X-Rates, 2022); [1] Salaries for these countries have been converted to EUR using data from Table 3; [2] Salaries for this column have been converted from annual salaries (numbers have been divided by 12) (Country Economy, 2021).

Looking into the types of indicators, it is important to mention that there are two types of indicators: minimizing and maximizing.

Minimizing indicators are these types of figures, which, if increased, could provide a negative effect for the economy of the country.

These types of indicators include inflation rate, anti-money laundering index, unemployment rate terrorism index, corruption index as well as the competitiveness index. The other type – maximizing – indicators, if increased, provide a more positive view of the economy of the country, which are GDP, average net monthly rate as well as the consumer price index. All of the data regarding the indicators has been analyzed from Trading Economics (2020).

Limitations of the research: only one region is analysed, limited availability of up-to-date data, only main macroeconomic indicators are used, importance to convert some indicators and accuracy of converted values. While not all the data was available for the year 2021, in order to compare the results, all the indicators from the year 2020 were used (Table 2).

Table 3 was used in order to calculate salary from national currency to EUR. Due to individual countries' salary payment frequency and different currencies, the salaries of Sweden, Norway, Denmark, Iceland and the United Kingdom (UK) have been converted into EUR values based on the exchange rates on the 1st of March 2022 (Table 3).

Table 3. Conversion rates for currencies used in the research (source: created by authors, using the data from X-Rates, 2022)

1st of March 2022 Exchange Rates			
1 EUR =	Local Currency	Monthly Salary	Monthly Salary (EUR)
10,7077	SEK (Swedish Krone)	38813,92 SEK	3624,86
9,8661	NOK (Norwegian Krone)	52280,83 NOK	5299,04
7,4375	DKK (Danish Krone)	36424,50 DKK	4897,41
142,2149	ISK (Icelandic Krona)	770591,75 ISK	5418,50
0,8336	GBP (British Pound)	3483,92 GBP	4179,36

In countries such as the UK and Ireland, publicly available wage data are given in weekly values, so the source data were multiplied by 4 weeks, and in Sweden the available hourly wage data were multiplied by the number of regular monthly working hours (multiplied by 160).

All calculations were made using the data from Northern European countries, divided into 9 indicators and 10 countries and two different methods in order to provide a more defined look into how data may correlate from all the countries (Table 2). Using SPSS program, the linking of data from the Table 2 may be possible with the Ward linkage, which allows showing the possible clustered view via a computer-generated dendrogram, which shows the hierarchical clustering of the countries in the predefined number of clusters (Morkūnaitė, 2020; Lemenkova, 2019).

5. Results of the research

Using the calculation steps of the COPRAS method, the results may be ranked according to the degrees of the efficiency of the calculated indicators.

Table 4. Degrees of efficiency and ranks of calculated indicators (source: created by authors, using the data from Table 2)

	Degree of efficiency (U_i)	Rank
Estonia	1	1
United Kingdom	0,66160	2
Latvia	0,63579	3
Ireland	0,62276	4
Sweden	0,49582	5
Denmark	0,46578	6
Finland	0,44718	7
Norway	0,40941	8
Iceland	0,40881	9
Lithuania	0,40553	10

Calculated results (Table 4) show, which Northern European countries are the most efficient in anti-money laundering actions by comparing all of the indicators available within the calculations. The best performers are Estonia, the United Kingdom, and Latvia, while the worst performers are Norway, Iceland, and Lithuania.

The second step is clustering. The results may seem to correlate with the data visualized within the dendrogram, except for Lithuania, as it showed slightly worse results.

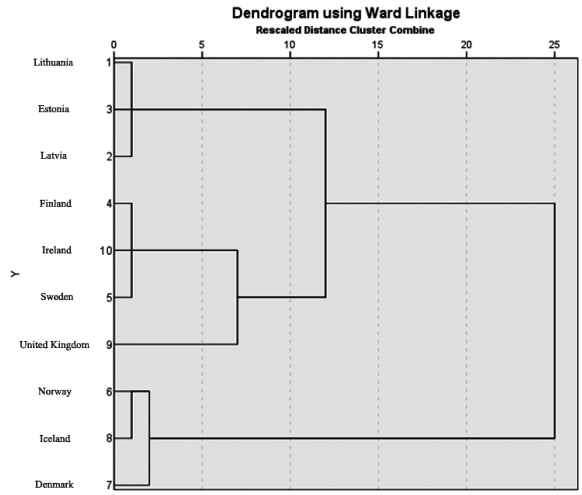

Figure 3. Dendrogram showing three different clusters (source: created by authors, using the data from Table 2 and SPSS program)

The dendrogram shows three different clusters:
– Lithuania, Latvia, and Estonia
– Finland, Ireland, Sweden, and the UK
– Norway, Iceland, and Denmark

It is important to state that the visualised clusters are formed using the data from Table 2 and the SPSS program. The results show the following clusters:

The first cluster – Lithuania, Latvia, and Estonia – shows very similar links to each of these countries, which could explain that these countries may share similar results of moderately high degrees of efficiency and are significantly proactive within the anti-money laundering regimes.

Comparing the cluster results of between both Estonia & Latvia, it is important to state that despite weaker economic situation in Baltic countries, these countries are greatly focusing on investment in preventive measures of money laundering as well as creating important regulatory acts.

As this illegal activity is fought, these countries are able to correctly distinguish cases and causes of money laundering and are able to take correct preventive measures accordingly (Bowen & Galeotti, 2014; Sepp, 2017)

The second cluster – Finland, Ireland, Sweden and the UK – may show comparable results to the first cluster, although the degrees of efficiency are not as high as compared to the first cluster. Although Ireland and United Kingdom are within the same group, their results are slightly separated from the same cluster as their compared results are slightly higher than the results of Finland and Sweden;

The third cluster – Norway, Iceland, and Denmark – shows moderately lower results compared to the other two clusters, meaning that their results in degrees of efficiency are the lowest. Calculated results may show a higher correlation between the weakest anti-money laundering actions taken and the lowest recalculated data within these three countries.

Conclusions

Money laundering is an extremely dangerous criminal activity, which focuses on illegal financial gain while using the proceeds from the crimes to launder money and integrate it into society. When analysing the damage caused by money laundering activities, it must be emphasized that it is only through the minimising of the use of cash, the shadow economy, and criminal activities, with the appropriate preventive measures, that a reduction in money laundering may be observed.

A review of the scientific literature in this context showed that the most analysed macroeconomic indicators are GDP and inflation, that most accurately reflect the economic performance of a country. Over a longer period, it is possible to observe a small negative impact of money laundering on the value of GDP, the unemployment rate as well as inflation.

On the other hand, it could be argued that, if the GDP and the overall financial performance of a country is rising, money laundering may decrease as a result of adequate preventive measures taken by the financial institutions, although this correlation is poorly described within the literature.

The analysis made by using the COPRAS method has shown that the highest degree of anti-money laundering efficiency was found within Estonia, the United Kingdom, Latvia, and Ireland.

According to cluster analysis, the results partially differ and show that the Baltic countries are the most efficient in managing anti-money laundering. The results are controversial, but it could be explained by the fact that Scandinavian countries invest heavily in money laundering "traps", that is why many money laundering activities are detected. On the contrary, the Baltic countries still are not paying so much attention and investment to anti-money laundering, thus more money laundering cases might not be detected. So it is possible that the results could show that these countries are doing their best in the prevention of money laundering. But this aspect could be analysed in more detail in the future.

Furthermore, the study shows the computer-generated country clusters, which may be used to compare them on the basis of similar economic situations in terms of geographical scope, as well as similar governance structures, financial literacy, and economic leadership.

Visual representation of the cluster analysis provides a clearer look at which countries are the most proactive in money laundering prevention practices. The precision of the results could have been affected by the time as well as the inaccuracy of the data. This could be seen regarding Lithuanian values which did not correspond well to the specifics of the clusters when compared with the ranks obtained by the COPRAS method.

The results show that regardless of which country handles anti-money laundering processes the most effectively, it is still worthwhile for all countries to invest even more and pay attention to how such negative activities can be minimized in the future. The special legislation and its permanent development for this purpose are also very important and even could have visible results for the country's economy.

Discussion

According to the scientific literature and the results of this research, in order to prevent money laundering, it is imperative to know who, where, and how may be involved in this illegal activity. Only after a thorough identification and analysis, specific and targeted actions must be taken to stop money laundering approaches.

Additional specialized legislation, staff, precise global security standards, and analysis of the past, present, and potential future money laundering cases are crucial tools to curb money laundering.

Failure to consider international global security norms and requirements in the fight against money

laundering could potentially expose the country or financial institutions to very high financial risk, fines, bad reputation or even much worse scenarios.

Directions for further research

In the future, it might be possible to refresh the study with the newest data to fully ascertain whether the results obtained from this study are in line with the actual values.

Additionally, the study could be extended and broken down into separate regions to compare the results in Scandinavia only, the Baltic States only or etc., in order to get more specific and detailed results. Also, more specific indicators and financial data could be involved.

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