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MONEY LAUNDERING: MACROECONOMIC ASSESSMENT METHODS AND CURRENT TREND IN UKRAINE

Abstract. The paper examines the scientists' approaches to the evaluation of money laundering. Attention is drawn to the macroeconomic results of such an analysis. The research on the scope of money laundering and its impact on the country's economy is reviewed. Relevant literature and selected techniques have been highlighted and are widely available in the world. The focus is on discussing the macroeconomic implications of money laundering and on finding methods for evaluating the various scales and conclusions reached by various scholars on the scope and flows of money laundering.

An authors' approach to the analysis of the phenomenon of money laundering is proposed based on the study of the links between the level of money laundering with the level of vulnerability of economic sectors and the spread of other negative socio-economic phenomena. Using unique empirical data obtained as a result of an expert survey in the field of money laundering, conducted a statistical analysis and test of the statistical hypothesis regarding the presence of interconnections and to determine the essential dependence of money laundering level on the selected indicators' subgroups of macroeconomic nature for analysis based on Pearson and Kendall's Tau correlation coefficients.

The conclusions on the correlation between the level of money laundering in Ukraine and macroeconomic processes in Ukraine are substantiated: shadowing of economic relations, optimization of tax burden at the initiative of business entities and «prosperity» of money laundering due to strong corruption ties in this sphere.

The grounds for determining the priorities of further state policy in the sphere of anti-money laundering have been formed, for the national financial monitoring of relevant benchmarks of increased risk of financial transactions in specific sectors of the economy and possible further

methodological use of sectoral analysis (with wider coverage of the national economic sectors) money laundering risks.

Keywords: correlation analysis, link strength, macroeconomic methods, money laundering, shadow economy, statistical linking.

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ВІДМИВАННЯ КОШТІВ: МАКРОЕКОНОМІЧНІ МЕТОДИ ОЦІНЮВАННЯ І СУЧАСНИЙ ТРЕНД В УКРАЇНІ

Анотація. Досліджуються підходи науковців щодо оцінювання відмивання коштів. Акцентовано увагу на макроекономічних результатах такого аналізу. Зроблено огляд досліджень, присвячених масштабам відмивання коштів та їхнього впливу на економіку країни. Виділено відповідну літературу та окремі методики, що мають достатнє поширення у світі. Зосереджено увагу на обговоренні макроекономічних наслідків відмивання коштів та щодо пошуку методів оцінювання різними вченими й зроблених ними висновків про масштаби і потоки відмивання коштів.

Запропоновано авторський підхід до аналізу феномену відмивання коштів на основі дослідження зв'язків рівня відмивання коштів з рівнем вразливості секторів економіки та поширення інших негативних соціально-економічних явищ. Використовуючи унікальні емпіричні дані, отримані в результаті проведеного експертного опитування фахівців у сфері протидії відмиванню коштів, проведено статистичний аналіз та перевірку статистичної гіпотези щодо наявності взаємозв'язку і з'ясування істотної залежності рівня відмивання коштів від виділених підгруп індикаторів макроекономічного характеру, проведено кореляційний аналіз на основі використання коефіцієнтів кореляції Пірсона і Кендалла.

Обґрунтовуються висновки щодо пов'язаності рівня відмивання коштів в Україні з макроекономічними процесами в Україні: тінізацією економічних відносин, оптимізацією податкового навантаження з ініціативи суб'єктів господарської діяльності та «процвітання» відмивання коштів за рахунок сильних корупційних зв'язків у цій сфері.

Сформовано підстави для визначення пріоритетів подальшої державної політики у сфері запобігання відмиванню коштів, визначення для національного фінансового моніторингу відповідних реперних точок підвищеного ризику фінансових операцій у конкретних секторах економіки і можливого подальшого методологічного використання секторального аналізу (з більш широким охопленням галузей економіки) при реалізації національної системи оцінювання ризиків відмивання коштів.

Ключові слова: відмивання коштів, тіньова економіка, макроекономічні методи, кореляційний аналіз, статистичний зв'язок, сила зв'язку.

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ОТМЫВАНИЕ ДЕНЕГ: МАКРОЭКОНОМИЧЕСКИЕ МЕТОДЫ ОЦЕНИВАНИЯ И СОВРЕМЕННЫЙ ТРЕНД В УКРАИНЕ

Аннотация. Акцентируется внимание на макроэкономических подходах оценивания отмывания денег. Выделены литература и конкретные методы, распространенные в мире.

Предложен авторский подход к анализу феномена отмывания денег на базе исследования связей уровня отмывания денег с уровнем уязвимости секторов экономики, а также распространенности иных негативных социально-экономических явлений. На основе корреляционного анализа, с использованием коэффициентов корреляции Пирсона и Кендалла, проведена проверка соответствующей статистической гипотезы.

Обоснованы приоритетные направления дальнейшей государственной политики в сфере предотвращения отмывания денег.

Ключевые слова: отмывание денег, теневая экономика, макроэкономические методы, корреляционный анализ, статистическая связь, сила связи.

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Introduction. Money laundering is a matter of global concern as it becomes a crucial link in the search for criminal funds, especially organized crime. Criminals are trying to hide their income by laundering dirty capital in financial systems, international trade. Current approaches to

combating money laundering are based primarily on understanding the problem of money laundering, the application of various methods of evaluating this phenomenon, and identifying relevant empirical evidence for calculating the effects on economies.

Research analysis. The problem of the distribution of the specified socially dangerous phenomenon, the implementation of the money laundering counteraction mechanism, the effectiveness of the legislation, in varying degrees, was the attention of the scientists and experts who have studied various aspects of overcoming of this threat to the state: Benicky A., Blum J., Busato F., Dmitrov S., Glushchenko O., Grewal B., Hendriyetty N., Korjenevsky J., Levi M., Nekrasov V., Quirk P., Schneider F., Feshchenko O., Vnukova N., Walker J. and others.

Many researches have focused on the criminalization of money laundering and the further reduction of crime rates. However, there is much less scientific literature on the analysis of the economic impact of money laundering on the country and the spread of this phenomenon, in particular at the macroeconomic level, and contains empirical evidence. In addition, most money laundering studies focus on developed countries. There is a lack of evidence-based research examining the extent of money laundering in developing countries [1]. Therefore, the search for alternative methods of measuring money laundering, especially in developing countries, is relevant and can be used to assess money laundering risks and vulnerabilities.

Research results. The economic growth of modern society is inextricably linked with the prevention of various threats that increase during the reform of the economic system. These are, first of all, such complex and dangerous for our state socio-economic phenomena as the shadow economy (especially its criminal component), organized crime, which permeates the system of economic relations, corruption at all levels of government, the «flight» of capital abroad in the presence of a shortage of investment resources, and the like. A special place among these phenomena is money laundering as a mechanism for ensuring the functioning of shadow economic relations, as well as the reproduction of the economic potential of organized crime.

For Ukraine, a key reason for the spread and a contributing factor to this is the high level of the shadow economy. It should be noted that the term «underground economy» was used by economists in the 1980s to describe illegal transactions, such as tax evasion, which is similar to money laundering [2]. In addition, Buen and Schneider [3] coined the term to distinguish it from a «shadow economy». The shadow economy provides for legal activity, but no tax is paid, while the underground economy provides for illegal money laundering activities [4].

These terms are key to the spread of money laundering. Bloom [5] and others. focus on: the more the business structure of production and distribution of non-financial goods and services is dominated by small and independent firms or self-employed individuals; the more difficult the job of separating legal from illegal transactions. Small business entities are used in money laundering schemes, in particular as a revenue-hiding mechanism. Large companies easily adapt and operate small businesses as intermediaries through a more sophisticated approach to tax evasion [5].

At the same time, money laundering contributes to the growth of the shadow economy, as it reduces the risks compared to use official channels for moving funds, especially in an effective anti-money laundering system. In addition, the use of alternative remittances and cash is more efficient under shadow schemes [6]. Even clandestine or barter stolen goods, drug trafficking, prostitution, gambling, smuggling and fraud are well-developed in the informal economy [7].

A number of researchers are focusing on the impact of the shadow economy on economic growth [3, 8]. Although the shadow economy reduces tax revenues, empirical studies show that at least two-thirds of income in the shadow economy of 120 countries (including developing countries), Eastern Europe, Central Asia, and OECD high-income countries (1999—2006) is spent on formal sectors which means an increase in expenditures and, consequently, government revenues from indirect taxes [3]. The shadow economy complements the legal economy and is estimated at about 10—20 percent of annual gross domestic product (GDP) in developed economies (for example, Australia — 15.3%, Germany — 16.3%, Japan — 11.3% and the USA: — 8.8%) and up to 60% in developing countries (e.g. Brazil — 39.8%, Russia: — 46.1%, India: — 23.1% and Nigeria: — 57.9%) [9]. This list is also appropriate to supplement Ukraine, although at the time of

publication of this data (2002), there has been some improvement in socio-economic status in Ukraine, comparative stability, reduction of the shadow economy and economic growth

In our opinion, the anti-money-laundering study in Colombia [10] on the shadow economy, which also distorts the effectiveness of any anti-money laundering system, offsetting damages and attracting more dirty funds to finance more crime, is extremely relevant. Although in Colombia, formally, the anti-money laundering system was rated as being in a high standard to meet international standards, only one of the 40 + 9 FATF recommendations was rated as being inappropriate [11]; crime through low levels of administration and corrupt environment in government [10]. The large size of the shadow economy in Colombia allows criminals to make large-scale cash transactions. Although Ukraine is different in nature, structure and content of the shadow economy, the origin of dirty money from Colombia, where it is not necessary to hide criminal money outside the country, since the financial sector is not the main place for money laundering through closed oligopoly and restricted penetration of banking services [10], the situation with regard to the low effectiveness of counteraction to money laundering crimes is extremely similar, with a generally respectable background of formal compliance with international standards [12].

Thus, money laundering has a significant and negative impact on the economies of both developed and developing countries, and in order to minimize the negative effects, it is necessary to assess the level of money laundering.

Several studies have shown that due to the global scale of money laundering, serious criminal activity with profound economic consequences should be recognized. As noted above, the most widely cited data on the scale of money laundering is the International Monetary Fund (IMF) estimate of 2—5% of world GDP [13]. This figure is still used by many researchers. In its report, AUSTRAC estimated the cost of organized crime in Australia at between \$ 10—15 billion a year [14] or about 1.2 to 1.8 percent of Australia's GDP. In addition, using an empirical model to measure global money laundering worldwide, Walker's estimate [15] is \$ 2.8 trillion per year, concentrated in Europe and North America. This amount is approximately 6.5% of world GDP, which is above the initial range of IMF estimates. In a further study [16], using a multiplicative model of the link between proceeds of crime and money laundering, the value of money laundering was estimated at 2.7% of world GDP.

In general, two main approaches are used to evaluate money laundering: macroeconomic and microeconomic [17; 18]. The macroeconomic approach is based on tax evasion. In turn, the microeconomic approach uses the estimation of proceeds from criminal activity, which is not limited to tax evasion [21].

Among other things, the following three approaches to assessing the level of money laundering are of interest: Dynamic Multiple-Indicators Multiple Causes (DYMIMIC) [19]; dynamic two-sector equilibrium model [20]; The Walker Gravity Model [15].

At the same time, determining the amount of revenue lost by states through the use of money laundering schemes is an extremely complex process that requires multidimensionality and a large body of data, both macroeconomic and microeconomic, as well as the specific nature of criminal activity [22]. However, there is no one-size-fits-all or universal model to describe the exact situation in any country [23]. There are some drawbacks to each model. It is therefore appropriate to use the widest range of assessment methods, taking into account different views [24]. Regardless of the shortcomings and lack of accuracy of these estimates, the literature review provides strong evidence of the importance of money laundering at the national and international levels, and the results still show significant amounts that cannot be ignored in the country's development [25].

In our opinion, little attention is paid to the studies of the evaluation of money laundering on probabilistic approaches, the analysis of internal relations between phenomena [26]. In Ukraine, it is quite controversial to use an empirical basis based on official statistics, in particular on the spread of crime [12].

In these circumstances, more efficient are the techniques that use expert judgment data based on an array of indicators and are based on correlation analysis [27]. In many cases, to gain an

objective understanding of the causes and factors behind the spread of money laundering, it is sufficient to use an array of expert assessments that are combined by the professional environment and the element of chance is more or less dependent on the nature of the phenomenon being investigated — money laundering [28, 29]. Thus, the special stochastic form of the relation between the obtained variables in mathematical statistics is transformed into a statistical dependence, without changing its essence, which in its turn justifies the grounds for characterizing trends, interrelations, further substantive content of strategies and so on [30].

In order to analyze the level of money laundering in Ukraine and a set of related socio-economic factors, an expert survey was conducted among law enforcement professionals with a targeted professional focus on anti-money laundering. Three groups of experts, identified by law enforcement agencies, are professionally engaged in the detection and investigation of money laundering and have more knowledge than most non-specialists in the field of money laundering: operatives (547 persons), investigators (245 persons) prosecutor's office (213 persons). A total of 1005 respondents were interviewed and all the data was structured and systematized, enabling them to more thoroughly investigate and evaluate the specific substantive characteristics of money laundering.

The questionnaire was developed in a single form for all experts. Respondents were measured on each of the indicators on a four-point ordinal scale, with the lowest score characterizing the zero level and the highest scoring high (*Table 1*).

Table 1

The expert survey results on indicators characterizing Money Laundering in Ukraine

N	Indicator	Level of evaluation			
		High (%)	Medium (%)	Low (%)	Null (%)
1.	<i>The level of Money Laundering (ML) in Ukraine</i>	63,6	28,1	8,3	***
2.	<i>Vulnerability level of economic sectors for ML:</i>	X	X	X	X
2.1	<i>Credit and Finance</i>	45,8	40,5	13,0	0,7
2.2	<i>Agro-Industrial complex (AIC)</i>	33,5	47,7	17,8	1,1
2.3	<i>Construction</i>	46,7	38,2	12,8	2,3
2.4	<i>Transport</i>	34,8	44,3	18,4	2,5
2.5	<i>Fuel and Energy Complex (FEC)</i>	40,4	41,7	16,0	1,9
2.6	<i>Real estate</i>	39,6	39,7	18,2	2,5
3.	<i>ML connection level with:</i>	X	X	X	X
3.1	Corruption (demand of corrupt officials to launder corruption assets)	56,6	33,8	8,8	0,8
3.2	Corruption (corruption links are an important element in securing ML mechanisms)	54,7	35,4	9,0	0,8
3.3	Organized crime (the demand of OCs to launder criminal proceeds)	48,9	37,0	13,3	0,8
3.4	"Thieves-in-law"	33,2	39,9	24,0	3,0
3.5	Capital flight abroad	51,2	33,6	13,6	1,5
3.6	Providing shadow activity in one's own business	48,0	37,5	12,8	1,7
3.7	Need to legalize part of the shadow income of the legal business	48,6	38,4	11,6	1,4
3.8	Need to launder "dirty" assets and hide previous criminal activity	49,6	35,6	12,9	1,9

Note: The data in Table 1 are slightly different from similar data [12]. Table 1, unlike the previous one, uses filter-based data on the reliability of expert sampling and based on a valid percentage. This does not negate, but rather justifies, the made in conclusions [12].

We have made general conclusions based on descriptive frequency distribution statistics in a previous article [12], but given the interest in analyzing the internal relationships of the studied money laundering characteristics, it is appropriate to continue it based on correlation analysis [30].

First of all, from the total array of survey data, particular groups of macroeconomic data are drawn, which are appropriate to subdivide, taking into account the specific nature and content of the survey. Specifically, these are indicators that characterize the vulnerability of certain sectors of the economy to money laundering and the extent to which money laundering is related to other socially hazardous phenomena (*Table 1*).

For further statistical analysis, to test the statistical hypothesis of the relationship and to determine the significant dependence of the «level of money laundering» on the selected subgroups of macroeconomic indicators, correlation analysis was performed based on the use of Pearson and Tau-Kendall correlation coefficients (*Table 2*). All further calculations were made using the IBM SPSS Statistics 25.

Table 2

Results of correlation analysis

Name of the group	The variable title	The level of money laundering (ML) in Ukraine	
		Pearson correlation	Kendall's Tau correlation
The level of vulnerability of the economic sectors to the ML	<i>Credit and Finance</i>	0,231**	0,204**
	<i>Agro-Industrial Complex (AIC)</i>	0,194**	0,165**
	<i>Construction</i>	0,277**	0,237**
	<i>Transport</i>	0,248**	0,211**
	<i>Fuel and Energy Complex (FEC)</i>	0,305**	0,261**
	<i>Real estate</i>	0,270**	0,237**
ML connection level with:	Corruption (demand of corrupt officials to launder corruption assets)	0,302**	0,266**
	Corruption (corruption links are an important element in securing ML mechanisms)	0,322**	0,278**
	Organized crime (the demand of OCs to launder criminal proceeds)	0,310**	0,270**
	"Thieves-in-law"	0,176**	0,166**
	Capital flight abroad	0,302**	0,274**
	Providing shadow activity in one's own business	0,283**	0,255**
	Need to legalize part of the shadow income of the legal business	0,336**	0,282**
	Need to launder "dirty" assets and hide previous criminal activity	0,318**	0,272**

**Correlation significant at 0.01 (two-tailed).

Thus, on the basis of the correlation analysis we can confirm that there is a statistically significant correlation (at the level $\alpha = 0.001$) of the average power (within 0.2—0.3) of the «money laundering level in Ukraine» with the variables we choose in both subgroups, which confirms our hypothesis and is the basis for formulating the following conclusions.

The Pearson and Kendall's tau correlation coefficients we used primarily focus on the statistical relationships of the variables studied. However, based on their meaningful understanding, we can talk about some cause and effect patterns. That is, increasing the level of vulnerability of the economic sectors directly affects the spread of money laundering as a phenomenon throughout the country. In our view, it is also appropriate to focus on the inverse relationship: the consequence of the strengthening and spread of money laundering in the country as a powerful socio-economic phenomenon is an increase in the vulnerability of the economic sectors to money laundering.

In addition, we used the Kendall Tau-correlation coefficient as a supplementary measure to the Pearson correlation coefficient because it shows the link strength for ordinal categorical variables. It is also important to take into account the greatest importance of such a link between the level of money laundering and the vulnerability, above all, of the fuel and energy complex ($\tau_c = 0.261$, $p < 0.001$), the real estate market ($\tau_c = 0.231$, $p < 0.001$) and the construction sector ($\tau_c = 0.231$, $p < 0.001$).

The aforementioned conclusion forms the grounds for determining the priorities of further state policy in the field of anti-money laundering, determining for the national financial monitoring of the relevant benchmarks of increased risk of financial transactions in specific sectors of the economy and possible further methodological use of sectoral analysis (with a wider scope of the scope of the sector in the wider scope) money laundering risk assessment systems.

In addition, the unidirectionality of the level of money laundering also occurs with the level of other related negative socio-economic phenomena, among which the strongest link is characterized by: the need to legalize part of the shadow income of the legal business ($\tau_c = 0,282$, $p < 0,001$); corruption, which is an important element of money laundering ($\tau_c = 0,278$, $p < 0,001$); capital flight abroad ($\tau_c = 0,274$, $p < 0,001$). In its turn, the aforementioned focuses on the adequacy of macroeconomic processes in Ukraine to shade economic relations, optimize the tax burden at the initiative of business entities and «prosperity» of money laundering at the expense of strong corruption ties in this area.

Conclusions. Most money laundering estimates around the world are still within the IMF's 2—5% of world GDP. However, such a divergence of absolute definition is not always an effective characteristic and basis for making adequate decisions in the field of anti-money laundering.

Our analysis has focused on the importance of exploring strategic levels at the expense of the empirical base formed by the relevant expert environment, as well as identifying on this basis the internal links between the level of money laundering and other factors, phenomena, processes and more. In particular, the authors have used two sets of indicators to characterize the vulnerability of individual sectors of the economy to money laundering and the extent to which money laundering is related to other socially hazardous phenomena.

Based on the correlation analysis, an important quantitative result has been achieved in further interpreting the link between the level of money laundering in Ukraine and other macroeconomic factors and the formation of appropriate state policy, with emphasis on specific key areas and areas for counteracting money laundering in countries.

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