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The Impact of Financial Literacy on the Scale of Fraud

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ABSTRACT

The topic of financial fraud is often raised in various publications due to its significance. Increasing the level of financial literacy among the population is frequently suggested as a way to reduce the prevalence of financial fraud. However, there is a lack of research on the impact of financial literacy on financial fraud, and the studies that do exist are based only on logical arguments derived from economic theory. The purpose of this article is to examine the impact of financial literacy on financial fraud in Russia. We used data from the Ministry of Internal Affairs on crime rates in the country, as well as estimates of financial literacy levels among Russians published by the NAFI (National Agency for Financial Research) between 2008 and 2023. Given the ongoing link between financial fraud and the use of cash in money laundering the database of analyzed parameters includes data from the Central Bank of Russia on the dynamics of cash inflows. The study used correlation analyses. The article suggests that financial literacy has limited usefulness in protecting the population from financial fraud. The strong positive correlation between the number of fraud cases and the average level of financial literacy suggests that, as people acquire certain financial knowledge, they become more interested in various financial products and are more likely to fall victim to financial fraud. While financial knowledge alone may not be enough to deter fraudsters who exploit the trust of citizens, increased efforts to develop behavioral skills among the public, such as through the “Hang Up the Phone” campaign, seem to be a promising approach to strengthening the population’s ability to protect themselves against financial fraud. However, a more effective approach would be to strengthen the financial system’s protective measures, particularly for banks, in order to identify and halt suspicious transactions of customers who may have fallen victim to fraud.

Keywords: financial literacy; financial fraud; correlation matrix; cash; Crime latency; modular theory of society; financial literacy index; “Hang Up the Phone”

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INTRODUCTION

Many publications are devoted to the state of crime in the field of financial fraud and its growing number. Most of them provide various pieces of information about the situation with financial fraud, arguments about the reasons for its explosive growth, as well as ideas on how to combat it. The reason for this increase is the development of financial technologies [1] and the involvement of organized criminal groups in financial fraud, which show an increased interest in any large turnover of money [2]. It is proposed to counteract this by using machine learning technologies embedded in computer programs that carry out transactions [3, 4], and by increasing the level of financial literacy [5, 6].

Both areas of counteraction are being investigated separately, but in reality they are working towards the same goal. It is believed that financial literacy has a deterrent effect on citizens' decision to comply with the conditions of fraudsters, but in cases where the influence of fraudsters turned out to be stronger than financial literacy; machine learning technologies should stand in the way of questionable transactions. However, the question of the degree of importance of different forms of deterrence remains unexplored.

Here it is necessary to define the conceptual framework. Among the various interpretations of "financial fraud," the definition proposed by V.A. Galanov and A.V. Galanova appears both comprehensive and concise. They suggest understanding financial fraud as "a way of organizing financial relations aimed at appropriating the monetary incomes of other citizens, in which a voluntary and outwardly beneficial form of giving money by a citizen hides a deal that is obviously unprofitable for him" [6, p. 162].

As a definition of the category "financial literacy", the point of view of representatives of the Bank of Russia deserves attention, according to which financial literacy is "the basic knowledge, skills and abilities necessary for making financial decisions in order to

achieve financial well-being and financial risk management" [7, p. 5]. Financial literacy as a broad program, covering large groups of the population, up to a national and international scale, it was developed in the mid-1980s, and in Russia in the 2010s [8]. It first emerged in the corporate sector and soon became part of national programs and an international movement. Back then, their main and only goal was to increase consumption and the subsequent economic growth. The inclusion of the issue of countering the growth of financial fraud in such programs was the response of the authorities to the explosive growth of financial fraud [9].

In the vast majority of publications on financial fraud and financial literacy, financial literacy is considered as a deterrent to financial fraud. The authors are unequivocally convinced that this is the format of the relationship between these categories. Attempts to objectively look at such a relationship, undertaken by Moscow economists, were based solely on logic and economic theory [5, 6]. However, when it comes to costs, especially large-scale costs such as the cost of promoting financial literacy on a national scale, profitability becomes an issue. The lack of research in this area can be explained by the relative novelty of the expansion of the financial literacy movement into the field of countering financial fraud.

At the same time, against the background of mass belief in the anti-fraud role of financial literacy, sometimes there are hints of doubt. For example, the Galanovs write: "Increasing the financial literacy of the population is considered a positive phenomenon, which, unfortunately, is inevitably accompanied by an increase in financial fraud, since they have a common market basis — trust in financial knowledge and in financial professionals" [6, p. 164]. This phrase concludes their article and reflects the economists' thoughts on the limits of the anti-fraud usefulness of financial literacy. It also suggests that a prerequisite for the implementation of financial fraud is "the availability of certain financial knowledge

from a citizen (market participant) and his obvious lack of professionalism” [6, p. 162]. In other words, a citizen may be financially educated enough to understand the benefits of investment, while also recognizing a lack of professional knowledge needed to maximize returns in the financial market. As a result, the citizen becomes open to advice from professionals, among whom scammers increasingly appear.

Agreeing with the arguments of Moscow researchers, this article aims to define the limits of the protective role of financial literacy in relation to financial fraud. The formation of national financial literacy programs took place at a time when the financial market in Russia was emerging, and financial knowledge was lacking among the population and many employees of financial organizations. For some time, financial pyramids and the deception of depositors were widespread. Russian legislation and law enforcement were adapting to market realities, and instruments for regulating the financial market were being formed.

In the early 2000s, crime statistics in Russia became publicly available, and the country joined the global effort to protect the financial system from illegal activities, primarily in the area of money laundering. Russian financial scientists have joined the study of the impact of financial literacy programs on reducing household losses due to erroneous financial decisions.

ANALYSIS OF THE STATE OF FINANCIAL FRAUD-RELATED CRIME IN RUSSIA

The dynamics of registered crimes in Russia from 2003 to 2023 indicates the presence of persistent trends in the state of Russian crime (the coefficient of approximation of the polynomial trend line of this dynamics is $R^2 = 0.7941$). One of these trends is a gradual but steady decrease in the number of illegal acts, which is associated with an increase in the effectiveness of law enforcement agencies. However, every time it comes to the effectiveness of law enforcement agencies, the issue of crime latency and, consequently, the

reliability of official statistics is immediately raised. Legal scholars and criminologists agree that latency is an unavoidable side of crime. Among the most high-latency crimes, fraud, especially financial fraud, is most often indicated. Well-known approaches to quantifying crime latency are based on the modular theory of society [10]. In the context of crime, the theory is concretized by D.A. Lee explains this theory as follows: “All people in a particular society can be divided into those who commit crimes and those who do not commit them. The combination of the first and second forms an integral unified social system. The number of those who commit crimes will be a certain constant that performs the function of disharmony in the system itself” [11, p. 38]. Regarding the quantitative assessment, it was suggested that “the number of criminals in a particular society should be 5.6% of the total population, thus fulfilling the function of preserving its integrity as a system and maintaining the necessary diversity, which serves as a prerequisite for the self-organization of the system” (Ibid.). This self-organization may mean that criminals who remain at large will continue illegal activity within limits shaped, on one side, by the work of law enforcement agencies and, on the other, by the vacant niches created after competitors are detained. In other words, latency may be considered as a function of the number of criminals who escaped punishment. This issue was seriously studied by O.A. Olkova and S.G. Olkov [12]. They showed that the number of crimes committed during a given period in a given territory is determined by the number of criminals remaining at large within the same time and territorial boundaries.

In modern criminology, criminal psychology, and sociology, there is an opinion regarding differences in individuals’ propensity to break the law. It is believed that the mechanisms of criminal behavior of persons involved in violent crimes and persons involved in mercenary legal relations differ [13, 14]. Further, quantitative assessments of the relationship between

financial fraud and financial literacy are carried out in comparison with data on non-violent crimes.

Based on the Poisson probability distribution, O.A. Olkova and S.G. Olkov suggested that, all else being equal, every criminal who remains at large during a relatively short period of time accounts for new crime. They considered the calendar year as a relatively short period. The actual crime consists of the number of registered (R) and latent (L) crimes:

$$C = R + L = R \cdot \beta,$$

where $\beta = \frac{R}{W}$ — latency multiplier that de-

scribes the rate of change in latent crime as the number of people who have lost the ability to commit crimes because they have been held accountable for past offenses changes; W — the number of individuals convicted of crimes.

Table 1 shows that in the last 20 years, the latency of non-violent crimes has been decreasing, while latency of fraud has been increasing rapidly.

Other important trends appear in a correlation matrix based on: 1) the data calculated above on the actual number of non-violent crimes and the actual number of frauds; 2) information published by the Ministry of Internal Affairs of Russia on the number of solved non-violent crimes and the number of solved frauds; 3) information from the Bank of Russia on the amount of cash in circulation, the value of 5,000 ruble banknotes in the total amount of cash and the specific weight of 5,000 ruble banknotes in the total amount of banknotes; 4) assessment of the level of financial literacy of Russians by the NAFI Analytical Center. Cash, especially large denomination banknotes [15], is used at various stages of laundering fraudulent income. The list of designations of the studied parameters is given in *Table 2*, the initial data are summarized in *Table 3*, and the correlation matrix is presented in *Table 4*.

Based on the data presented in *Table 4*, several conclusions can be drawn:

- A strong positive correlation between general non-violent crime rates and their detection rates may support the modular theory of society, which includes the idea of a stable level of criminality in the population;
 - The strong relationship between the number of non-violent crimes committed, the number solved, and the number of fraud cases uncovered suggests that over the past 20 years, crime in Russia has been largely influenced by the level of fraud;
 - A negative correlation between the number of non-violent crimes, solved crimes, and frauds on the one hand, and cash turnover indicators on the other hand, indicates that proceeds from these crimes, including unsolved fraud cases, are generated and laundered primarily without the use of cash.
- Since 2019, the Ministry of Internal Affairs of Russia has published data on the number of fraudulent crimes committed using information and telecommunication technologies (ITT). Although the number of these frauds has increased, the detection rate remains at an average of 10.2% per year, not exceeding 11.7%. This suggests that the proportion of actual frauds committed using ITT is constantly growing compared to the total number of actual frauds (from 53% in 2019 to 82% in 2023). Considering the high correlation between these two types of fraud (Pearson coefficient of 0.9966), we can assume that in the future, the actual number of all fraudulent activities will be determined by financial fraud. This information can be used to assess the effectiveness of financial literacy programs.
- The strong negative correlation between the detection rate of ITT-related crimes and the number of solved non-violent crimes, as well as the overall number of frauds, suggests that as the number of non-violent crime solutions and fraud increases, the detection rate for financial fraud decreases. This increased pressure on law enforcement weakens the protection of Russians against financial fraud.
 - The high correlation between ITT crime data and indicators related to cash circulation

Table 1

The Calculation of the Current State of Non-violent Crimes and IT-related Fraud in Russia between 2003 and 2023

Year	Non-violent Crimes				Fraud				IT-related Frauds				
	R	W	L	C	R ¹	W ¹	L ¹	C ¹	R ²	W ²	L ²	C ²	S ²
2003	2 659 596	649 784	8 226 254	10 885 850	87 471	11 452	580 637	668 108					
2004	2 796 110	655 764	9 126 214	11 922 324	126 047	16 701	825 264	951 311					
2005	3 456 804	727 268	12 973 857	16 430 661	179 553	26 411	1 041 123	1 220 676					
2006	3 767 611	754 165	15 054 388	18 821 999	225 326	33 689	1 281 748	1 507 074					
2007	3 505 928	763 187	12 599 602	16 105 530	211 277	36 801	1 001 678	1 212 955					
2008	3 138 162	765 262	9 730 713	12 868 875	192 490	35 921	839 007	1 031 497					
2009	2 928 640	735 702	8 729 521	11 658 161	188 723	32 229	916 380	1 105 103					
2010	2 568 584	699 919	6 857 684	9 426 268	160 081	29 056	721 869	881 950					
2011	2 347 189	648 127	6 153 145	8 500 334	147 468	25 559	703 379	850 847					
2012	1 905 435	612 703	4 020 246	5 925 681	161 969	23 649	947 336	1 109 305					
2013	1 813 490	606 399	3 609 913	5 423 403	164 629	25 155	912 799	1 077 428					
2014	1 797 569	594 305	3 639 461	5 437 030	160 214	24 622	882 290	1 042 504					
2015	1 978 917	612 776	4 411 856	6 390 773	200 598	22 206	1 611 505	1 812 103					
2016	1 812 741	621 677	3 473 010	5 285 751	208 926	22 091	1 766 995	1 975 921					
2017	1 763 264	600 944	3 410 429	5 173 693	222 772	23 058	1 929 512	2 152 284					
2018	1 707 937	570 698	3 403 433	5 111 370	215 036	22 638	1 827 569	2 042 605					
2019	1 754 045	519 653	4 166 586	5 920 631	257 187	25 254	2 362 008	2 619 195	136 709	7 414	2 384 110	2 520 819	146 78
2020	1 787 718	461 625	5 135 511	6 923 229	335 631	21 876	4 813 764	5 149 395	237 074	8 216	6 603 734	6 840 808	216 25
2021	1 750 276	495 449	4 432 936	6 183 212	339 606	20 607	5 257 144	5 596 750	249 249	8 224	7 304 869	7 554 118	216 10
2022	1 726 688	510 346	4 115 332	5 842 020	343 085	21 236	5 199 735	5 542 820	257 606	11 340	5 594 321	5 851 927	303 32
2023	1 719 846	486 751	4 356 917	6 076 763	433 708	24 579	7 219 273	7 652 981	356 079	14 736	8 248 173	8 604 252	376 34

Sources: Compiled by the author based on The state of crime. Ministry of Internal Affairs of Russia; Summary of statistical information on the status of criminal records in Russia. Judicial Department of the Supreme Court of the Russian Federation. URL: <http://www.cdep.ru/index.php?id=79&item=5669> (accessed on 06.02.2025).

Table 2

Notations of the Studied Indicators

Notation	Description
Cu	The actual number of non-violent crimes
Su	Number of solved crimes (without crimes against the person)
Cf	Actual number of frauds
Sf	Number of fraud cases uncovered
M	The value of cash in circulation, billion rubles
B	The value of 5.000 rubles notes in the total amount of cash, billion rubles
P	The specific weight of 5 thousand rubles of banknotes in the total amount of banknotes, %
Ci	The actual number of frauds committed using ITT
Si	The number of uncovered frauds committed using ITT
$Fmin$	Percentage of the population with below-average financial literacy (less than 47 points), %
Fav	Percentage of the population with an average level of financial literacy (from 47 to 57 points), %
$Fmax$	Percentage of the population with above-average financial literacy (over 57 points), %

Sources: Compiled by the author.

suggests that cash, particularly large-denomination banknotes, is used in these fraudulent schemes.

FINANCIAL LITERACY AND FINANCIAL FRAUD

The assessment of the financial literacy level of the Russian population has been conducted since 2008 using international survey-based methods. This assessment is carried out by the NAFI Analytical Center, the Bank of Russia, and the Ministry of Finance. The most widely used method is the one developed by the Organization for Economic Cooperation and Development (OECD).¹

¹ Indicators of financial literacy of the population: approaches to measurement and interpretation. Institute of National Projects. URL: <https://inp.ru/fingramota/> (accessed on 17.01.2025); The Group of twenty. OECD IFRS "The Concept of basic knowledge and skills in financial literacy for the adult

To analyze changes in financial literacy over time and compare it with other countries, survey results are combined into a single indicator — the Russian Financial Literacy Index. This index shows the proportion of respondents with different levels of financial literacy:

- The first group includes respondents whose financial literacy is below the average (less than 47 points on a 100-point scale);
- The second group includes respondents with an average level (between 47 and 57 points);
- The third group includes respondents with an above-average (more than 57 points).²

Since 2008, the NAFI Analytical Center has been publishing annual data on the ratio of

population", 2016. URL: <https://fingramota.econ.msu.ru/sys/raw.php?o=1519&p=attachment> (accessed on 17.01.2025).

² Socio-economic development. NAFI, 2017.

Table 3
Data on the Current State and Detection of Non-violent Crimes and Fraud in Russia, as well as on Cash-inflows and the Level of Financial Literacy

Year	Cu	Su	Cf	Sf	M*	B*	P*	Ci	Si	Fmin	Fav	Fmax
2003	10885 850	2659 596	2661 599	87471								
2004	11922 324	2796 110	2798 114	126047								
2005	16430 661	3456 804	3458 809	179553								
2006	18821 999	3767 611	3769 617	225326	2379.7	119.0	5					
2007	16105 530	3505 928	3507 935	211277	3287.7	690.4	21					
2008	12868 875	3138 162	3140 170	192490	4128.1	1488.6	34			38	38	17
2009	11658 161	2928 640	2930 649	188723	3956.9	1622.3	41			35	50	15
2010	9426 268	2568 584	2570 594	160081	4844.4	2942.0	50.0			31	44	25
2011	8500 334	2347 189	2349 200	147468	5884.0	3907.0	57.0			36	44	20
2012	5925 681	1905 435	1907 447	161969	6798.3	4282.9	63.0			43	41	17
2013	5423 403	1813 490	1815 503	164629	7453.3	4993.7	67.0			49	38	13
2014	5437 030	1797 569	1799 583	160214	7953.4	5487.8	69.0			49	38	13
2015	6390 773	1978 917	1980 932	200598	7848.6	5494.0	70.0			34	46	20
2016	5285 751	1812 741	1814 757	208926	8261.0	6030.5	73.0			25	51	24
2017	5173 693	1763 264	1765 281	222772	8768.9	6576.7	75.0			34	32	34
2018	5111 370	1707 937	1709 955	215036	9671.4	7253.6	75.0			44	46	10
2019	5920 631	1754 045	1756 064	257187	10078.2	7760.2	77.0	136709	14678	44	46	10
2020	6923 229	1787 718	1789 738	335631	12025.6	9620.5	80.0	237074	21625	41	47	12
2021	6183 212	1750 276	1752 297	339606	13634.8	11180.5	82.0	249249	21610	41	47	12
2022	5842 020	1726 688	1728 710	343085	14798.1	12430.4	84.0	257606	30232	28	57	15
2023	6076 763	1719 846	1721 869	433708	17566.3	15107.0	86.0	356079	37634	28	57	15

Sources: Compiled by the author based on: The state of crime. Ministry of Internal Affairs of Russia; The structure of the cash in money supply. Bank of Russia; Korkonosova E.I., Imaeva G.R., Sharova P.A. Socio-economic development: Sociology. Statistics. Publications. Industry reviews. Issue 3. Moscow: NAFI Publishing House; 2017; Financial literacy of Russians – 2024. Moscow: NAFI; 2024. URL: https://cbr.ru/Bank-notes_coins/sndmvo/str_nal1_dm_070101/ (accessed on 07.02.2025). URL: <https://nafi.ru/projects/finansy/finansovaya-gramotnost-rossiyan-2024/> (accessed on 17.01.2025).

Note: * Calculated by the author as an arithmetic average for the year based on monthly data.

Table 4

**A Matrix of Correlations Between Data on Non-violent Crimes, as well as Data
on Financial Literacy and Cash-inflows in Russia**

Notation	<i>Cu</i>	<i>Su</i>	<i>Cf</i>	<i>Sf</i>	<i>M</i>	<i>B</i>	<i>P</i>	<i>Ci</i>	<i>Si</i>	<i>Fmin</i>	<i>Fav</i>	<i>Fmax</i>
<i>Cu</i>	1.000											
<i>Su</i>	0.987	1.000										
<i>Cf</i>	0.987	1.000	1.000									
<i>Sf</i>	-0.287	-0.390	-0.390	1.000								
<i>M</i>	-0.676	-0.767	-0.767	0.836	1.000							
<i>B</i>	-0.683	-0.773	-0.773	0.830	0.999	1.000						
<i>P</i>	-0.951	-0.978	-0.978	0.464	0.854	0.860	1.000					
<i>Ci</i>	0.047	-0.522	-0.522	0.997	0.963	0.960	0.946	1.000				
<i>Si</i>	-0.190	-0.705	-0.705	0.930	0.972	0.975	0.962	0.937	1.000			
<i>Fmin</i>	-0.158	-0.149	-0.149	-0.325	-0.196	-0.219	-0.039	-0.776	-0.940	1.000		
<i>Fav</i>	-0.051	-0.157	-0.157	0.647	0.581	0.589	0.366	0.736	0.922	-0.565	1.000	
<i>Fmax</i>	0.051	0.161	0.161	-0.287	-0.307	-0.282	-0.187	0.856	0.955	-0.550	-0.342	1.000

Source: Author's calculations.

groups with different levels of financial literacy of Russians. *Table 4* shows a strong positive correlation between the number and disclosure of ITT-related frauds and average or high levels of financial literacy. That is, the greater the proportion of people with average and high levels of financial literacy in the population, the more financial fraud is committed and the more they are disclosed by law enforcement agencies.

Recognizing the relatively short period used in the study, as well as the low level of detail

in financial literacy indicators, the result can be considered a technical correlation. Further observations and repeated analysis are certainly required. However, even at this stage, it is reasonable to consider possible cause-and-effect relationships behind the identified correlations. Moreover, the results correspond to the opinion of the Galanovs, who believe that the basis of fraud is trust and that the degree of trust does not depend on the level of financial literacy [6]. Immunity to financial fraud is formed differently among different

people/ It may depend on socio-economic characteristics (age, gender, and income [16]), negative experience of deception by financial fraudsters, either personal or observed in one's environment [17], and personality type, but not on the level of education [18].

The results of the study show that financial literacy has little effect on the population's self-protection against the financial fraud. Technological progress has created new forms of financial fraud, that constantly seek to scale. The activities of financial pyramids and schemes to defraud bank depositors in the 1990s were significantly reduced only by legislative, supervisory, and law enforcement measures. In a situation where citizens remotely manage their financial assets, the population should develop cognitive skills to recognize fraudsters through such campaigns initiated by the Bank of Russia, the Ministry of Internal Affairs, and the Prosecutor General's Office as "Hang Up the Phone". From a technological point of view, the most effective protective measures appear to be banking-sector tools that use machine learning embedded in software to detect and suspend transactions carried out as part of fraud. At the same time, financial literacy is and remains an important element of the socialization of Russians in an era of rapid development of financial technology development.

CONCLUSIONS

The present study is based on the work of Moscow economists [5, 6], who have logically justified the limits of the usefulness of financial literacy programs. The study uses statistical data on crime in Russia over the past 20 years, including fraud, as well as indicators of cash circulation and assessments of financial literacy levels among Russians. To get a more accurate picture, data published by the Russian Ministry of Internal Affairs has been adjusted to account for underreporting. The results of the correlation analysis show that in the new century in Russia fraud largely

determines the state of crime. However, the fight against non-violent crime and fraud in general leads to the fact that criminals transfer their activity to the sphere of financial fraud. Cash, which has already been excluded from many non-violent crimes involving the laundering criminal proceeds, still remains in the arsenal of financial fraud schemes.

Data on actual crime, including fraud, and on the financial literacy level of the population were also analyzed using correlation analysis. The study used financial literacy estimates obtained by the NAFI Analytical Center for 2008–2023. These estimates show the proportion of citizens with different levels of financial literacy (low, average, high) in the total population surveyed.

Empirical evidence shows a strong positive correlation between the number of financial fraud cases and the proportion of people with medium and high financial literacy levels, as well as a strong negative correlation between financial fraud data and the proportion of low-literate citizens in the population. In other words, the higher the level of financial literacy among citizens, the greater the risk of becoming a victim of financial fraud.

The results obtained confirm the assumptions made by Moscow economists regarding the existence of limits to the usefulness of financial literacy in protecting the population from financial fraud. On this basis, it seems promising to develop socio-psychological programs aimed at developing behavioral skills among the population to recognize and resist fraudulent forms of influence seems promising. For example, the "Hang Up the Phone" program is a promising initiative. However, the most effective solution to the problem appears to lie in external interventions. These could include software packages developed by financial organizations that use machine learning to detect and block fraudulent transactions. Law enforcement agencies can also play a significant role in addressing this issue.

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