

Behavioral Aspects of Financial Anomalies in Ukraine

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Abstract. This article is devoted to the problems of financial anomalies in Ukraine. Groups of main financial anomalies, and the key reasons for the development of such financial anomalies will be herein defined, and the behavior of the economic agents which frame financial anomalies in Ukraine will be explained. Possibilities for overcoming such financial anomalies will also be examined.

Keywords. Financial anomalies, economic behavior, revenue loss, shadow economy

Key terms. Model, Research

1. Introduction

The current state of the Ukrainian economy is most difficult. Government reforms which were decelerated have had a decisive impact on the further development of Ukraine as an independent nation. However, questions arise as to what the mechanism for implementing such reforms should be, and to the usefulness of implementing policies on the basis of foreign experience. The past few years show that most of the changes in the economy of Ukraine were as a result of taking into account foreign experience. However, applying such experience does not always result in the intended manner. One reason is that foreign policy examples were implemented quite imperfectly in the Ukrainian economy. Another reason is the underestimation of the time needed to properly implement reforms. Thirdly, one of the most significant reasons is the unexpected behavioral response of Ukrainian economic agents, which was quite different to reactions in other countries.

2. Theoretical and Methodological Background

Groundbreaking research work on understanding the fundamentals of the behavior of economic agents has been published by the leading scientists of institutional theory. In particular, D. North was one of the first who proved the existence of anomalies in an economy and finance that cannot be explained solely on the basis of economic laws (D. North, 1990).

J. Buchanan was one of the first who explained the role of social choice in the development of an economy and the reaction of economic agents on political decisions (J. Buchanan and G. Tullock, 1962). J. Stiglitz deeply investigated the causes of the global economic crisis of 2008, revealing the behavioral aspects and further consequences for a society (J. Stiglitz, 2011).

Research by Ukrainian scientists on the behavioral aspects of financial anomalies has been essentially unstructured. O. Pruts'ka explains how differences in the development of various societies are marked by reactions by members of the society to different types of externalities (O. Pruts'ka, 2003). A. Gritsenko has described aspects of economic anomalies in the economy of Ukraine and developed a classification of them (A. Gritsenko, 2003). V. Vishnevsky has researched the causes of financial anomalies (V. Vishnevsky, 2006). R. Pustovijt has investigated the nature of transaction costs in the economy of Ukraine (R. Pustovijt, 2004). Y. Ivanov and O. Jeskov maintain that one of the reasons for the failures of many reforms are attempts by the government to remedy the mistakes of the past without considering possible reactions by economic agents in the present (Y. Ivanov and O. Jeskov, 2007).

The causes and nature of financial anomalies in the economy of Ukraine have been studied using various methodological principles. Firstly, work was done on the basis of theoretical judgments and generalizations (O. Pruts'ka, 2003, A. Gritsenko, 2003), and secondly, using the tools of economics and mathematical modeling. Here arises another problem, because not all tools can be applied. For example, the use of correlation-regression analysis provides opportunity to describe the behavior of a group of agents (rather than the reaction of one agent) in specific terms for a specified period of time. This means that the use of predictive models based on data correlation for past periods could be incorrect. This explains the miscalculations in the development of state budgets, the failure of the planned indicators of budget, etc.

In this case, more accurate the results would be reached by fuzzy logic simulation modeling (V. Vishnevsky, 2006; O. Rajevnieva, 2007). However, in my opinion, such research should be complemented by the results of the application of game theory. It is a toolkit game theory and can explain the reasons for the behavior of each economic entity in a relevant situation.

3. Efficiency Estimation Procedure

The recent stage of development of the Ukrainian economy is characterized by a number of financial anomalies, which have been described in the publications of A. Grytsenko (2003), T. Paientko (2013), etc. Among the major financial anomalies are the following:

1. Deformed structure of economy of Ukraine, in which the dynamic development of the financial sector has not contributed to an increase in the volume of funding to the non-financial corporation sector. This issue is explored in detail in the article by T. Paientko and Y. Syrotiuk (2014).

The problem lies in the fact that the growth of the assets of financial institutions does not ensure the necessary growth of investments in the non-financial corporation sector of the economy. The crisis in Ukraine has further worsened the situation

regarding financing in that sector of the economy. First, bank lending has been actually paralyzed. The increases of the NBU discount rate initially to 19.5%, and then to 30%, have actually robbed banks of real opportunities to inject funds into the economy.

Secondly, in 2014-2015, 39 banks declared insolvency, and most banks have problems with liquidity and the ability to return deposits to customers. This was one of the causes of the bank panic and the outflow of deposits. The situation involving savers has worsened the steep inflation and devaluation.

Thirdly, problems with solvency have affected many insurance companies. This happened because they were placing their reserves mainly as deposits in banks, including those who have since become insolvent. Fourthly, mass poverty is developing within Ukraine, and that part of the population which forms the bulk of the depositors now appears on the brink of poverty.

Thus, the financial sector now finds itself on the brink of survival. The situation exists where the greater part of the population believes there is nowhere to invest. Furthermore, that part of the population that has savings in foreign currency will soon not be willing to inject funds into the financial sector. The behavior of economic agents in such situations can be described by using a toolkit of game theory. These are the possible strategies of a depositor and a bank:

1. The depositor puts money into a deposit account and the interest rate exceeds the rate of inflation (payout 1).

2. The depositor invests in a deposit account and the interest rate is lower than the level of inflation (payout 0).

3. The depositor puts money on deposit and the interest rate is lower than the inflation rate and the rate of devaluation (payout – 1).

4. The bank is ready to return the deposit by the end of the term together with interest (payout 1).

5. Temporary administration will be introduced in the bank during the term of the deposit. The depositor will receive compensation from the fund of guaranteeing deposits of individuals (payout 0).

6. Temporary administration will be introduced in the Bank during the term of the deposit. The depositor will not receive compensation (payout – 1).

Then the payout matrix will look this way (table 1):

Table 1. The matrix of payouts of the depositor and the bank

	Bank (4)	Bank (5)	Bank (6)
Depositor (1)	(1; 1)	(1;0)	(1; –1)
Depositor (2)	(0;1)	(0;0)	(0; –1)
Depositor (3)	(-1;1)	(-1;0)	(-1; –1)

N.B. – 1, 2, 3, 4, 5, 6 are strategies

As can be seen from the table, there is only one equilibrium strategy which provides a payout for both sides – (1; 1), which is possible with a probability of 1/9. Two strategies (0; 1) and (0; 0) do not provide payout for the depositor, with probability 2/9. The other strategies are without payout for the depositor with the

probability of 6/9. Potential depositors are unlikely to trust their savings to a bank because of this combination of circumstances.

There is a dilemma in such situations: the non-financial corporation sector of the economy requires an increase in funding, and the financial sector cannot provide it as a result of the outflow of funds. To overcome the described abnormalities, the government should take measures to stimulate the growth of personal savings. Reducing real income leads to a lower limit in the propensity to save. The drop in the propensity to save is now faster than the fall in real income.

2. Lack of correlation between the decrease in the tax burden and the dynamics of foreign investment in Ukraine's economy. This situation is also a financial anomaly caused by several institutional factors. Over the past twenty years, the Ukrainian government instituted significant tax benefits and other preferences for foreign investors. However, within the post-socialist space Ukraine remains an outsider in the attraction of foreign investments per capita. In addition, most foreign investment is coming into Ukraine from regions where there exists a more favorable investment climate, offshore entities, and Russia (table 2).

Table 2. Foreign direct investment (equity) in Ukraine's economy,%

Indicators	2010	2011	2012	2013	2014
Total	100,0	100,0	100,0	100	100,0
Which includes					
Cyprus	22,2	25,6	31,7	32,7	29,9
Germany	15,8	15,0	11,6	10,8	12,5
Netherlands	10,5	9,8	9,5	9,6	11,1
Russia	7,6	7,3	7,0	7,4	5,9
Austria	5,9	6,9	6,2	5,6	5,5
United Kingdom	5,3	5,1	4,7	4,7	4,7
Virginia Islands (Brit.)	5,1	4,5	3,5	4,3	4,4
France	3,9	3,5	3,2	3,1	3,5
Switzerland	3,3	3,3	2,9	2,3	3,0
Italy	2,7	2,1	2,0	2,2	2,2
USA	2,2	2,0	1,9	1,8	1,9
Poland	2,1	1,9	1,7	1,7	1,8
Belize	1,9	1,8	1,7	1,5	1,4
Other	11,5	11,2	12,4	12,3	12,2

As is evident from the data presented in table 2, the largest volume of foreign investment in Ukraine's economy is coming from Cyprus. In its essence it is not an investment, but the return of capital removed previously from Ukraine. In most developed economies, providing tax incentives to foreign investors provides an increase in foreign investment. In Ukraine, this tool does not work. According to the World Investment Report and Ranking, the reduction of business taxation is not a determining factor when deciding on investing in Ukraine. Even before the beginning

of the armed conflict, key analysts and potential investors indicated greater concern over the issues of the low level of protection of property rights and the high level of corruption. Domestic investors are also not actively investing in the domestic economy. On the contrary, much of the internal capital has been removed from Ukraine. This is an extra negative indicator for foreign investors.

Investors (domestic or foreign) make investment decisions taking into account the following probabilities:

1. The government will change the rules of the game and preferences for foreign investors will be eliminated – p (A).
2. The prevalence of bribing – q (B).
3. The infringement of ownership rights of the investor – $1-(p+q)$ (C).

Probable scenarios of the government can be described as follows:

1. An investor makes a decision about investing in the Ukrainian economy in spite of the existing risks. Investments are long-term. This is an absolute win for the economy, which denotes 2 (if we assume that 0 is the loss to the state in the absence of investment).

2. The investor does not assume all of the risk, but decides to invest in the economy. However, such investment is generally directed into short term projects intended for a fast return. Under such circumstances the economy would win, but it is smaller than the previous version – 1 (B).

3. The investor takes no risks and decides not to invest in these conditions (C).

The described version is a game that will repeat. There is the possibility that a future investor will change his course of action. However, the probability of investor choices changing depends on how the government shapes the business environment. The payoff matrix is presented in table 3.

Table 3. Game Matrix: Investor and the Government

		The choice of the Government		
		A	B	C
The choice of the investor	A	(1;2)	(1; 2)	(-2; 2)
	B	(1; 1)	(1;1)	(0; -1)
	C	(0; 0)	(0; -1)	(0; -2)

Source: compiled by author

In this case the probability of investor payout can be described as:

The probability in a change of rules of the game initiated by the government:

$$p+q+0(1-(p+q))=p+q$$

The probability of a bribe being requested:

$$p+2q-1(1-(p+q))=2p+3q-1$$

The probability of infringement on ownership rights:

$$2p-q+0(1-(p+q))=2p-q$$

All three options can be equally acceptable for domestic investors. As in the case of limited foreign investment the cost of domestic investment increases. However, this must be true:

$$p+q=2p+3q-1=2p-q$$

Having solved the equation, we obtain: $q = \frac{1}{4}$, $p = \frac{1}{2}$, $(1 - p - q) = \frac{1}{4}$

So, the most decisive factor for investors is a change of the rules of the game by the government. They believe that this risk is the largest. However, you can see that the risk of bribing or infringement of rights is smaller. The risks do not stand alone. Their real impact is expressed only with the risk of changes to the rules of the game. It means that $q = (1 - p - q) = \frac{3}{4}$. Under such conditions the likelihood of foreign investment is preserved. However, it would likely be short-term investments in projects with a fast turn-around period. Therefore, an improvement in the investment climate in Ukraine provides for a stabilization of the rules of the game for the investor. The investor should be guaranteed that the rules of the game would not change within a fixed period of time.

3. Lack of correlation between the size of the tax burden and the dynamics of the informal sector of the economy. One of the greatest problems for the Ukrainian economy is the degree of its shadow economy. According to various experts the volume of the shadow economy in Ukraine constitutes 40% (according to the Ministry of Economic Development and Trade of Ukraine) to 80% (estimated by the Schneider Institute). There is a misconception that the shadow sector of the economy in Ukraine was formed after the breakup of the Soviet Union. However, shadow economic activity existed in the times of the USSR.

The policy of "war communism" (1918-1921), from the outset, carried within elements of shady dealings. It meant that the government resorted to violent methods and centralized administrative pressures to accomplish their own goals. In those times speculation, gangsterism, and robbery developed rapidly (R. Viseberg, 1925, p. 43). In the time of Stalin about 30% of production was embezzled from socialist enterprises, and about a quarter of the resources redistributed centrally was not by intention.

A sharp reduction in the non-government sector in the late 1950s – early 1960s, contributed to the further development of the informal sector of the economy. Commercial cooperatives were eliminated in that period, the final transition from state farms to collective farms happened, prohibitions of individual trade restrictions on keeping personal subsidiary plots were decelerated, as was the ban on the holding of cattle, etc. A trend towards further consolidation of production, an increasing phenomena of monopolies in economics, ideological mandates proclaiming a further transition to communism - all these factors shaped an economy with dual sectors – official and shadow, which interacted with one another. Thus began the emergence of speculative markets, clandestine workshops, black marketeers and speculators in foreign currency. According to modern estimates, the 1960s saw that unofficial production supplied 20% of industrial products, 40% of food products, and about 35-45% of all scarce consumer goods was made available through speculative markets.

During the era of Brezhnev, the shadow economy flourished and took almost an official color. By the beginning of the 1980s, all regions of the country began to encounter clandestine workshops, using the state's equipment, material, and energy resources, and funds. Production surpassed mandated limits which were set by the State Supply and State Planning Commission, and the income was widely distributed (T. Koriagina, 1990).

This shadow economy, tolerated by Leonid Brezhnev, yielded by the most generous estimates 10-15% of GDP, and then rose to 50% of GDP in the period before “Perestroika”. The level of corruption between 1980-1985 in the Soviet Union put it in the middle of a ranking of 54 countries, having a larger bureaucracy than Italy, Greece, Portugal, South Korea and virtually all developing countries.

In the USSR at the beginning of the 1990s, the volume of the shadow sector was assessed to be in the amount of 100 billion rubles by average valuation, 20-25 billion rubles from the most conservative, and some pegged it at 150 billion rubles. In comparison with the beginning of the 1960s, the growth of the scale of the shadow economy across the whole range of ratings was from 4 to 30 times (T. Koriagina, 1990).

With the collapse of the USSR the Soviet shadow economy ended. However, shadow economies began to resurface in the individual independent republics, and the specific conditions and trends within each new country determined the dynamics and scope of illegal operations. According to various estimates the volume of the Ukrainian shadow economy at the beginning of its existence as an independent state (1991) was estimated at 18% of GDP. Thus, the Government had from the outset made an error in believing the tax burden was the main factor in the development of the shadow economy in Ukraine. It ignored other contributing factors for the development of a reducing shadow economy. Therefore, the reaction of the economic agents was not as expected by the government.

After the collapse of the USSR the shadow sector continued to grow. A decisive role in this was played not only by irrational tax policy. The development of shadow economic activity contributed to hyperinflation, an increase in bartering, and the opportunistic behavior of civil servants, etc. The growth of the tax burden in the period 1991-1996 also played a negative role. However, we are not merely noting the direct interdependence between the sum of money required to pay for the benefit of the government, and the amount of shadow activities. A principle motive of shadow economic relations and tax evasion was that taxpayers did not trust the government to responsibly use tax revenues to the benefit of the greater society. This type of economic agent truly believed that they could better use the savings than had the government had the funds.

For an explanation of the behavior of economic agents, it is advisable to use a model of expected utility, which was developed by Von Neumann and Morgenstern (Von Neumann and Morgenstern, 1970). According to the standard model of choice in conditions of uncertainty for taxpayers, it is also a game. They estimate the payment of taxes in accordance with the expected utility. In conditions of uncertainty, such behavior is described by the prospects theory. In general this theory is as follows: Assume, the taxpayer has to play a lottery (x, p, q; y). This means that the lottery has a result x with probability p and the result y with a probability of q. The taxpayer assesses this lottery this way (1):

$$\pi(p) v(x) + \pi(q) v(y) \quad (1)$$

$v(x)$ – function values that the individual gives the winning or losing and $\pi(p)$ – weight, which the individual provides objective probabilities when making decisions. Hypothetical functions v and π are presented on fig. 1.

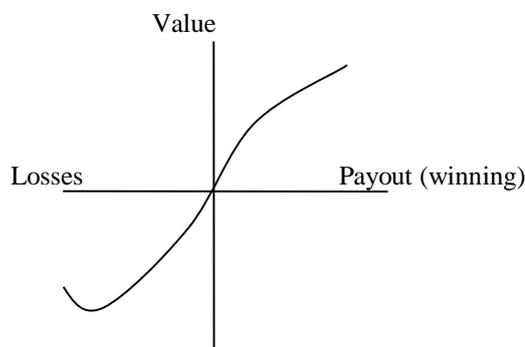


Fig. 1. Hypothetical function values

This theory has three important features. First, the value of winnings and losses are defined separately. This is consistent with the analysis of games and the choice of people in conditions of risk. Second, it is a form of function values. Function is concave in the interval of winnings and convex in the range of losses. This means that taxpayers are shunning risk in the winning area and attaching risk to the losses area. The function values must be 0 at the point of starting. It means there is more extreme sensitivity to losses than to gains. This trait is called avoidance of losses. The third feature is the nonlinear transformation of probability $\pi(p)$. Unlike probability p , $\pi(p)$ is a weight that provides an objective probability when making decisions. As a rule $\pi(p) = p$, but $\pi(p) < p$ for large p . Small probability receives a relatively large weight, with $\pi(p) > p$ (A. Lukashov, 2004, pp. 40-41).

Function definition of weight is also characterized by subcertainty property: for all $0 < p < 1$, $\pi(p) + \pi(1-p) < 1$. The principle of incomplete probability describes the attitude of people to probable events. The weight of the two probabilities of complementary events is less than the weight of the one event that must occur with a probability of 100%.

Taxpayers are more sensitive to the difference in probability at its higher levels. According to experimental data, taxpayers would surely want to hide 10,000 UAH in taxes at 100% certainty than receive social benefits from the state totaling 12,000 UAH with a probability of 80% that they would appear, while taxpayers believe that it is better to have 12,000 UAH with a 20% probability, than 10,000 UAH with a probability of 25%. According to prospects theory:

$$\frac{\pi(0,25)}{\pi(0,2)} = \frac{\pi(1)}{\pi(0,8)} \quad (2)$$

So, a 20 point increase in the probability of 0.8 to 1.0 has a greater effect than an increase from 0.2 to 0.25. Therefore, lowering the tax rate on corporate income in 2004 (from 30 to 25%) did not cause a reduction of the shadow economy since the probability of the growth of volumes of goods from the government was less than the amount of unpaid taxes. Lowering the tax rate on corporate income between 2010 to 2014 (from 25% to 18%) also did not contribute to a reduction of the shadow economy. Since the weight of probability of winning from the non-payment of taxes

exceeds the probability of a return of government benefits. Based on the foregoing, the key factor in the reduction of the informal sector of the economy is changing the behavior of the government, not the reduction of the tax burden.

Taking into account the results of research of previous financial anomalies, one can expect businesses to exit from the shadows if the following conditions can be fulfilled:

1. A change in the behavior of the government. Taxpayers must trust how taxes are being utilized.

2. Preservation of property rights should be guaranteed and not merely proclaimed.

The next financial anomaly is closely associated with the above-described situation. It is possible to explain how to use game theory (a zero sum game) by using the model of expected utility and prospects approach. However, the best model in this case would be the principal-agent theory.

4. Lack of meaningful communication between established punitive sanctions for violations of tax legislation and the level of taxes.

Low taxes are the problem, which every Government in Ukraine is trying to overcome. To improve the level of payments of taxes administrative methods were mainly applied. In particular, there was an increase in the number of grounds for carrying out unscheduled inspections and increasing the size of penalties. However, this failed to achieve the desired level of tax payments. Also, the activities of tax officials is characterized by low efficiency (tabl. 4).

Table 4. The results of the activity of tax police in Ukraine for 2007-2013, million UAH

Indicators	2007	2008	2009	2010	2011	2012	2013
Extra revenue for budget, discovered by tax police	259.94	382.1	502.68	4370.59	1052.2	2082.76	2014.5
Charge involving tax police	130.39	173.53	3461.81	451.67	568.67	978.6	1023.2
The amount stipulated damages in criminal cases of tax evasion	2429.78	2662.84	2406.57	2008.86	2173.89	1997.6	2117.4
Refunded the sum of damages in criminal cases of tax evasion	878.30	1155.97	829.52	816.78	869.71	888.2	902.3

As can be seen from table 4, even in those years when there was a growth in the shadow economy (2012-2013), large increases of revenues to the budget from punitive penalties did not occur. The tax police did not execute one of their main functions – to provide reimbursement of losses by the government.

Throughout 1997-2015, the government tried to increase the size of penalties for violations of tax legislation several times. However, the discipline of taxpayers has not changed. The approach used by regulatory agencies prior to the imposition of penalties has not changed. Each year, the regulatory agencies set a planned amount of punitive penalties. This means that the same amount of fines would have to be

recovered from taxpayers by the regulators. If the amount was less, then the head of the relevant local authority would have to explain why the targets had not been reached. If the amount collected was greater, then the following year the planned penalty targets would be increased.

Such an approach was borrowed from Soviet times. It is false from the very beginning. It thwarted an opportunity to build partnerships between the government and the taxpayer. It violates clause 4.1.4 Article 4 of the tax code of Ukraine about a presumption of legality. Also, the actions of regulatory authorities often violate clause 4.1.2 c. 4 of the tax code of Ukraine on the equality of all taxpayers. In practice, it has not been uncommon to have cases of selective application of penalties. Such cases discredit the image of the government and are not conducive to an increase in the level of trust.

The question arises as to why these facts have a place. Indeed, at first glance, this behavior is aberrant. This anomaly can be explained in terms of the theory of agency relations. In this situation, the government is the principle. It sets the rules of the game, based on existing information. However, the information is incomplete. Regulators and taxpayers are agents who in real life have more information on a specific situation.

It is a situation where both agents, if they want to be profitable, must behave opportunistically. The taxpayer knows that in any case he will have to pay a penalty (a plan of fines). The tax inspector must collect a minimum amount of fines. They are not interested in overfulfillment of the plan. It is easier for taxpayers and a tax inspector to engage in conspiracy and agree on the amount of the penalty. As a result, the taxpayer may violate tax law and not expect a higher responsibility than that agreed. Instead, the inspector receives a bribe and there is a loss of appropriate fines and charges. There is a fairly simple way out of this situation. The government should cancel the plan for punitive sanctions and reduce the number of cases of direct communication of the taxpayer and the controller.

4. Conclusions

The described financial anomalies have a serious negative impact on the potential for economic development. In terms of the theory of behavioral finance, the situation is described as abnormal. They are the behavior reactions of economic agents to the challenges of the environment. The economic policy of the government should consider not only the potential economic effects, but also the expected behavioral response of economic agents. During the development of the economic policy of the government must pay attention primarily to such behavioral aspects:

1. Economic agents make decisions based on available information. Therefore, information about the real economic situation should be fully disclosed. This will reduce the information asymmetry in the relationship of the government to the economic agent.
2. Economic agents make decisions based on the maximization of value, utility, and the expected probability of receiving benefits. Therefore, the government should ensure the provision of quality public benefits on the basis of tax revenues.

3. Economic agents invest in the economy if there is a guarantee of preservation of property rights. For the investor, the decisive factor is that the rules of the game remain constant from the government during the term of the investment. Therefore, the government must ensure the stability of conditions for investment over long-term periods.

In essence, consider behavioral aspects when developing economic policies to overcome existing financial anomalies and to avoid the emergence of new ones.

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