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Zero capital depreciation point for Ukrainian commercial organizations

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ABSTRACT

The problem of capital shortage for Ukrainian commercial organizations has been clarified, which makes the theoretical and methodological provisions of its increase and preservation relevant. Insufficient capital for investment processes is a significant obstacle to the development of most business entities in Ukraine. The analysis of recent research and publications on the topic of the work showed that the issues of tools for estimating the point of zero depreciation of equity for Ukrainian commercial organizations still have room for improvement. The aim of the work is to substantiate the tools for estimating the point of zero depreciation of equity for Ukrainian commercial organizations. The main source of compensation for the depreciation of equity due to inflation and devaluation of the national currency is the profit of the organization. The return on equity is a relative indicator that characterizes the degree of appropriate compensation. The tools for estimating the point of zero depreciation of equity should be considered as such a value of return on equity, which compensates for its depreciation due to various factors. Due to the need to divide the factors of impairment of equity into two groups, the use of two types of zero depreciation points is justified: Cash and alternative. As a widely used alternative to the use of equity for the average investor, investing in shares of ETFs is justified, completely repeating the US stock index S and P-500 with a long-term efficiency of 9.5% per annum in US dollars. Approbation of the presented valuation tools allowed us to determine that for Ukrainian commercial organizations the alternative point of zero depreciation of equity is 26.9% and cash-17.6%. It is specified that the average enterprise in the country does not reach the level of even a cash point. There are a limited number of economic activities in the country where the cash point of zero depreciation of equity is exceeded. Reducing inflation to 6-7% per year along with the stabilization of the national currency will bring a significant number of economic activities in the country to the level of reaching the cash point of depreciation of equity.

1. Introduction

Carrying out any activity, including commercial, requires capital (Graff Zivin and Neidell, 2013). In modern conditions, capital can take various forms: Buildings, structures, equipment, bank money, bonds, and current financial investments. But, in the end, all these forms have a monetary value. In contrast to such a factor of production as a labor (especially in conditions of high unemployment)-capital is almost always a limited and scarce

resource in the activities of most commercial organizations and in the development of national economies. The corresponding shortage of capital is especially relevant in the development of modern Ukraine: The lack of capital for investment processes is a significant obstacle to the development of most businesses in the country.

Capital does not arise out of nowhere-it is the result of effective trade, production, and (or) financial activities, which leads to its growth and the possibility of further investment and increase multiplication. Otherwise, low and (or) inefficient economic activity leads to depreciation and loss of capital, which leads to the curtailment of any activity. For-profit activities can be different: Trade, production, finance-but we will combine all of these types as a commercial for simplicity because for all these types of profit is important.

The problem of depreciation and loss of capital is especially acute for countries with high inflation and devaluation of the national currency. Ukraine is no exception. In the context of high inflation and significant rates of devaluation of the national currency for commercial organizations in the country, it is important to have tools to assess the level of efficiency, which ensures or, conversely, does not ensure the preservation of equity. It is necessary to determine the value of a kind of "break-even point" (or rather the point of zero depreciation) of equity, failure to achieve this makes certain industrial, commercial, or financial activities impractical in terms of saving such capital from depreciation. Since making a profit is an important guarantee of maintaining equity in the activities of a large proportion of organizations in the country (including utilities), when considering the point of zero depreciation of equity, the concept of "commercial organization" can be extended to a significant part of the businesses.

Relevant valuation tools are especially relevant in the activities of capital-intensive entities: Industrial, commercial and agricultural enterprises with a large production and (or) financial cycle, banks, and investment companies. The gradual loss of equity for them can lead to a complete halt.

2. Analysis of recent research and publications

The concept of "zero point of depreciation of equity" is an author's proposal, so it is not contained in dictionaries, textbooks, and articles. At the same time, there is a lot of work in the field of equity management. Analysis of recent work on equity management allows highlighting the interest of scientists in industry specifics and general algorithms for managing this resource, for example, in MacCarthaigh (2011) and Bernier (2014). In a number of works, in particular in Klimek (2020) and Cheng et al. (2009) management of equity and, in general, capital, was considered in terms of a systematic approach as a "system of principles and methods of development and implementation of management decisions" (Klimek, 2020).

A separate group of works in the area are those that address the issues of financial leverage, the optimal ratio of equity and borrowed capital (Fareed et al., 2014; Ahmed et al., 2018; Rajan and Zingales, 1995; Riepina et al., 2018; Shubita and Alsawalhah, 2012). It should be noted that an important condition for the use of the relevant lever is the excess of the return on assets over the cost of borrowed capital. The presence of such a condition allows for an increase in the return on equity. Therefore, in general, these works were devoted to some problems of maximizing such profitability through the optimization of certain parameters of the model of financial leverage.

It is also necessary to highlight a group of works such as Purnamasari (2015) and Saluy (2021) which dealt with the assessment of return on equity. In particular, in Purnamasari (2015), it was noted that

the highest level of return on equity in Ukraine corresponds to agriculture. The value of the indicator never exceeded 21%. Saluy (2021) studied methods for assessing the efficiency of capital use of enterprises, which can be used to determine the cause of growth or decline in return on capital and identify the contribution of each factor in the formation of the overall return on capital in the enterprise.

Many similar works can be cited, but the issues of tools for estimating the point of zero depreciation of equity for Ukrainian commercial organizations still have room for improvement.

The aim of the work is to substantiate and test the tools for estimating the point of zero depreciation of equity for Ukrainian commercial organizations.

3. Research methods

In order to form and test the tools for estimating the point of zero depreciation of equity for Ukrainian commercial organizations, methods of quantifying inflation and devaluation of the national currency are needed. The annual rate of inflation in the country is determined by the State Statistics Service of Ukraine, as reported on its web resources.

The average annual rate of devaluation of the national currency can be determined by Eq. 1 (CAGR):

$$CAGR = \left(\left(\frac{V_N}{V_0} \right)^{\frac{1}{N}} - 1 \right) \times 100\% \qquad (1)$$

where, N is the number of years; V_N is the final value of the studied indicator; V_0 is the initial value of the studied indicator.

$$N = N_k - N_0 \qquad (2)$$

where, N_k is the year, which corresponds to the final value of the studied indicator; N_0 is a year, which corresponds to the initial value of the studied indicator.

Quantitative data on the devaluation of the national currency contain open Internet resources for investors and traders.

4. Results

A possible measure to preserve equity from depreciation due to inflation and devaluation of the national currency is the transfer of assets in a form where they are "stored" in foreign hard currency. For example, a Ukrainian investment company may buy shares or bonds of American corporations. However, not all businesses in the country will be able to convert the lion's share of assets into this form. Although Ukrainian industrial enterprises can form current financial investments and convert some assets into securities of American corporations, the lion's share of assets will still remain in the form in which they are valued in national currency, as the production process takes place in Ukraine. In

addition, even the US dollar is depreciating due to inflation.

Thus, the main source and factor in counteracting the depreciation and loss of equity due to inflation and devaluation of the national currency is the profit of the organization. However, profit is an absolute indicator. Relative indicator, which determines the level of efficiency of use of this capital-return on equity. Since the profit of the organization is the main factor in preventing the depreciation of the relevant capital, the tools for assessing the point of its zero depreciation should be formed around the formula of its profitability.

Since the capital at the disposal of the organization forms its assets, it would also be appropriate to consider the tools for assessing the point of zero depreciation of assets. However, a significant portion of such assets may be raised on various terms (including interest-free commodity credit), while equity always remains equity.

Given the above, the point of zero depreciation of equity should correspond to the amount of its profitability (RE), which corresponds to a certain value of the benchmark:

$$R_E = B_{I(DNC)} \tag{3}$$

where $B_{I(DNC)}$ is the benchmark depreciation of equity due to inflation and devaluation of the national currency, % per annum.

Return on equity is determined by Eq. 4:

$$R_E = \frac{NP}{\bar{E}} \times 100\% \tag{4}$$

where NP is the net profit, and monetary units. $\bar{E}$ is the average annual value of equity, and monetary units.

The level of profit tax or the size of profit tax varies from country to country. However, it is also a factor that promotes or does not promote activities and can be an instrument of government regulation that compensates for the depreciation of the capital of economic entities due to inflation and devaluation of the national currency. It is logical that in countries with high inflation, income tax should be minimal.

Unfortunately, in Ukraine, this instrument is not properly used to counteract the loss of equity of economic entities due to inflation. But in the methodology of determining the point of zero depreciation, the profit tax should be taken into account and using exactly net profit in this formula.

If there are no particular problems with the method of determining the return on equity, then the question arises with the value of the benchmark depreciation of equity due to inflation and devaluation of the national currency, as these are two separate factors, but closely related.

The level of inflation in the country is determined by the dynamics of prices for certain goods and services and possibly in a limited range. As almost all governments try to counteract inflation, the prices of these goods and services are targeted in terms of preventing their rapid growth. Thus, real inflation in the country may be higher than nominal. It is believed that the main factor in inflation in the country is the budget deficit and the speed of the printing press, which prints unsecured money.

In addition, the level of inflation is influenced by the dynamics of prices for the main factors of production: The growth of the minimum wage, prices for raw materials, energy, and so on. If energy is imported, the state has almost no significant tools to target relevant prices.

Data on official inflation in Ukraine are published by the State Statistics Service of Ukraine. According to the data of this service, the inflation rate in the country is given in Table 1.

Table 1: Consumer price indices for goods and services (inflation rate) in Ukraine

Year	Index value, annual	Year	Index value, annual	Year	Index value, annual
2000	128.2	2008	125.2	2016	113.9
2001	112.0	2009	115.9	2017	114.4
2002	100.8	2010	109.4	2018	110.9
2003	105.2	2011	108.0	2019	107.9
2004	109.0	2012	100.6	2020	102.7
2005	113.5	2013	99.7	2021	109.4
2006	109.1	2014	112.2		
2007	112.8	2015	148.7	Average	117.6

According to Table 1, the average annual inflation rate in Ukraine for 21 years was 17.6% per annum. This value can be taken as a benchmark for the depreciation of equity due to inflation, but should also take into account the devaluation of the national currency. The latter also affects the depreciation of equity but has additional factors compared to inflation. The national currency can depreciate both due to inflation and the "printing press" and the negative balance of payments, which can depreciate the national currency at almost zero inflation.

In turn, to assess the devaluation of the national currency should also determine the benchmark–the hard currency against which to calculate the level of devaluation. There are many hard currencies in the world, but most of the calculations take place in two of them-the US dollar and the euro, which greatly simplifies the valuation methodology.

Thus, determining the value of the benchmark depreciation of equity due to inflation and devaluation of the national currency can be limited to three indicators: The average annual inflation rate in the country, the average annual devaluation of the national currency against the US dollar, and the average annual devaluation of the national currency against the euro. These three indicators can have completely different values because the benchmark should be chosen for the indicator with the highest

value. For example, the official level of inflation in a country may be artificially low, or, conversely, maybe artificial support for the national currency at high inflation. In addition, there may be discrepancies within the normal statistical error or fluctuations in the national currency.

The dynamics of the devaluation of the hryvnia against the US dollar are shown in Fig. 1.
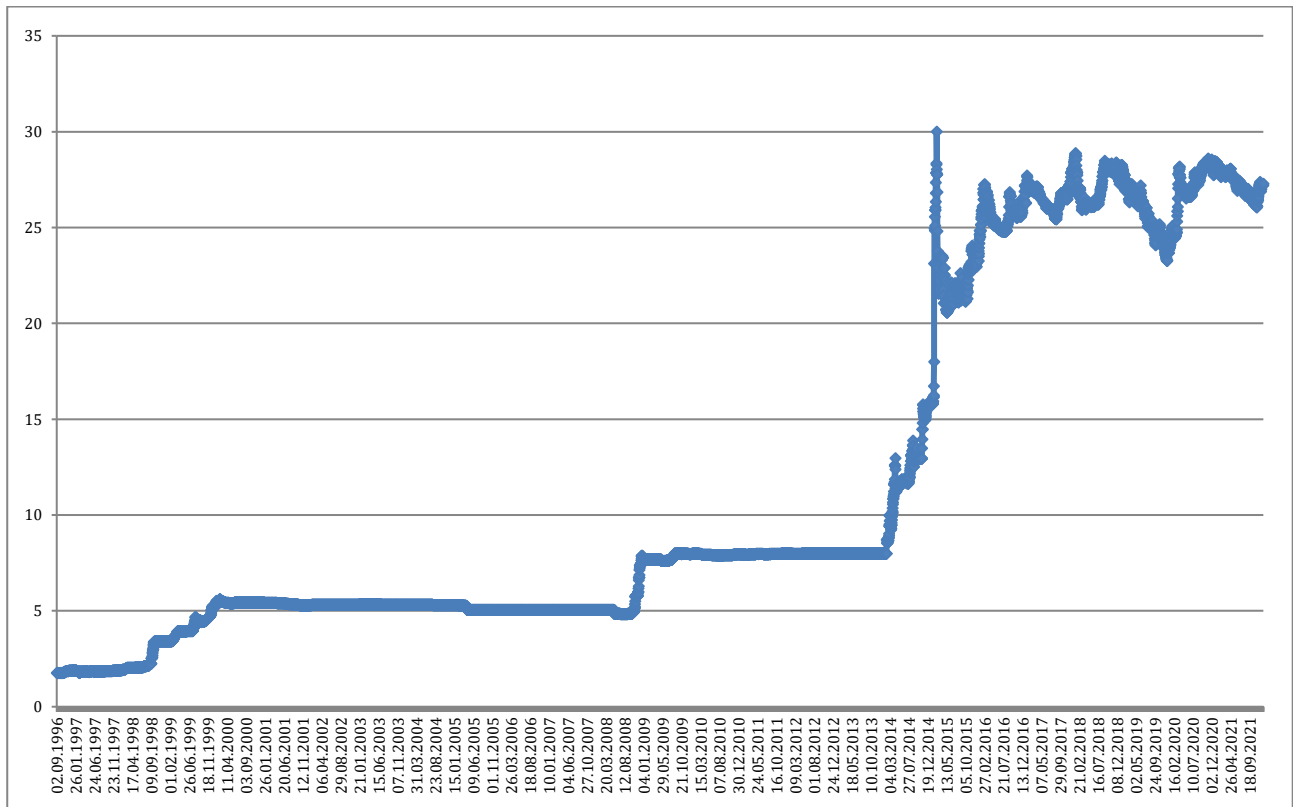

Fig. 1: Dynamics of the hryvnia exchange rate against the US dollar

Using Eq. 1, the value of the average annual devaluation of the Ukrainian national currency against the US dollar is:

$$CAGR = \left(\left(\frac{28.12}{0.32}\right)^{\frac{1}{28}} - 1 \right) \times 100\% = 17.33\%$$

where, N is the number of years; 28.12 is the final value of the studied indicator; 0.32 is the initial value of the studied indicator.

28=2022–1994

where, 2022 is the year, which corresponds to the final value of the studied indicator; 1994 is the year, which corresponds to the initial value of the studied indicator.

It is estimated that over the past 28 years, the national currency has devalued against the US dollar by an average of 17.33% per annum.

The dynamics of the devaluation of the hryvnia against the euro are shown in Fig. 2.

Using Eq. 1, the value of the average annual devaluation of the Ukrainian national currency against the euro is:

$$CAGR = \left(\left(\frac{32.2}{0.5}\right)^{\frac{1}{28}} - 1 \right) \times 100\% = 16.04\%$$

where, N is the number of years; 32.20 is the final value of the studied indicator; 0.5 is the initial value of the studied indicator.

28=2022–1994

where, 2022 is the year, which corresponds to the final value of the studied indicator; 1994 is the year, which corresponds to the initial value of the studied indicator.

According to these calculations, over the past 28 years, the national currency has devalued against the euro at an average of 16.04% per annum.

The maximum value is characterized by the average annual inflation rate in the country at 17.6% per annum, which can be used as a benchmark for determining the point of zero depreciation of equity:

$$\frac{NP}{\overline{E}} \times 100\% = 17.6$$

Thus, if the value of return on equity in terms of net profit in the organization does not exceed 17.6%, then such an entity loses equity due to inflation and devaluation of the national currency. The given value and the corresponding method of estimating the point of zero depreciation of equity take into account only the obvious factors-inflation and devaluation of the national currency, and do not take into account alternative losses.

The possibility of considering alternative losses gives grounds to consider two indicators of the point of zero depreciation of equity: Cash and alternative.
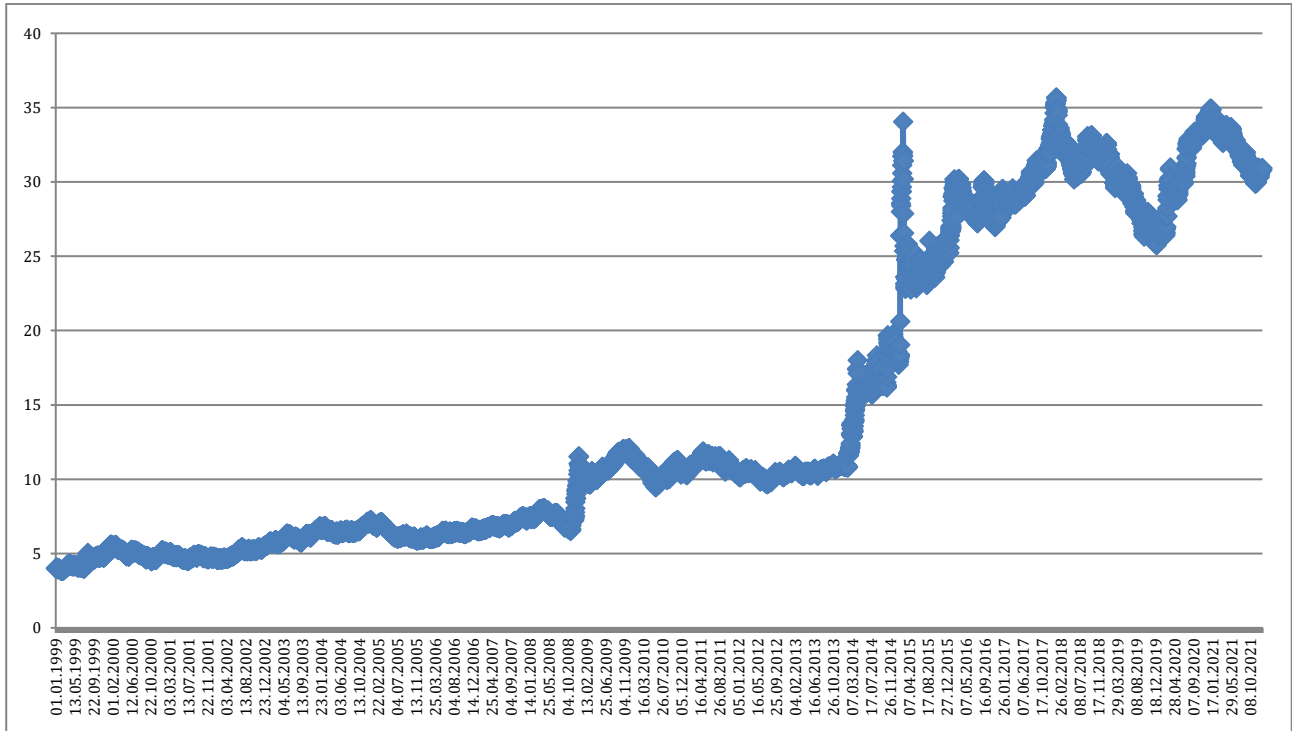

Fig. 2: Dynamics of the hryvnia exchange rate against the euro

Since previously only obvious factors of depreciation of equity were considered, accordingly, the presented methodology for determining the point of zero depreciation corresponds to its cash type:

$$R_E^C = B_{I(DNC)} \qquad (5)$$

where, R_E^C is the cash point of zero depreciation of equity, %.

This is the value of return on equity calculated on net income, which allows covering only inflation and (or) devaluation of the national currency.

The alternative point of zero depreciation of equity should also take into account opportunity costs, expressed in relative terms as annual%. Opportunity costs are, in other words, lost profits due to the choice of not the best alternative for the use of capital. In our case, opportunity costs determine part of the value of return on equity calculated on net income, which allows covering the relevant costs (lost profits).

Suppose that the country has no inflation and devaluation of the national currency, at the same time investors have the opportunity to put money in the bank on deposit at a certain%. By retaining funds in the account, the entity loses interest that it could have received from the bank deposit.

In this case, the alternative point of zero depreciation of equity (R_E^A) should also be determined taking into account the benchmark of alternative use of capital:

$$R_E^A = B_{I(DNC)} + B_A = R_E^C + B_A \qquad (6)$$

where, B_A is the benchmark of alternative use of capital, % per annum.

Objectively, there are many alternatives to using capital, so it is impossible to consider all of them. Therefore, it is advisable to use the most widely used alternatives from the point of view of the average investor with a minimum level of risk.

Almost zero level of risk corresponds, for example, to investments in US government bonds and other developed countries, but the level of yield is minimal-1-2% per annum in US dollars. At the same time, the use of this alternative under the conditions of a hypothetical 100% investment of equity in US government bonds will change the value of the point of zero depreciation of equity:

$$R_E^A = 17.6 + 1.5 = 19.1$$

where, 17.6 %is the value of the benchmark depreciation of equity due to inflation and devaluation of the national currency, % per annum 1.5% is the value of the benchmark of alternative use of capital, % per annum.

If we consider the alternative of using the equity in the short term, the government bonds of developed countries can still be identified as a certain alternative. However, this is too small for alternatives to using equity. When considering the key issues of using such capital, the following issues are usually considered: Continuation or exit from a certain business, starting a certain business, or its liquidation. Such issues involve a significant period of time-3-5 years, so the alternatives should be similar in time.

The evolution of the global stock market, especially in the emergence of index ETFs and the ability to buy securities through IT tools for many average investors has provided an almost risk-free alternative (in the long run) of invest in the US stock index S and P-500, or rather in stocks of ETFs that repeat this index.

The conditional risk-freeness of this alternative is explained by the data of previous years: For more than 80 years, the corresponding index has been growing at a rate of 7.8% per year. Thus, in 1941 the value of the index was 10, and in 2022-4400. Using Eq. 1 we obtain the average annual growth rate:

$$CAGR = \left(\left(\frac{4400}{10} \right)^{\frac{1}{81}} - 1 \right) \times 100\% = 7.8\%$$

Of course, in the 81-year history of the index, which corresponds to the economic development of the United States, there were crises, but in the long run, the crisis and subsidence of the index were offset by development and growth, which led to a long-term average of 7.8% (and about 1.5%-dividends) in US dollars. A graphic representation of the dynamics of the stock index S and P-500 is shown in Fig. 3.
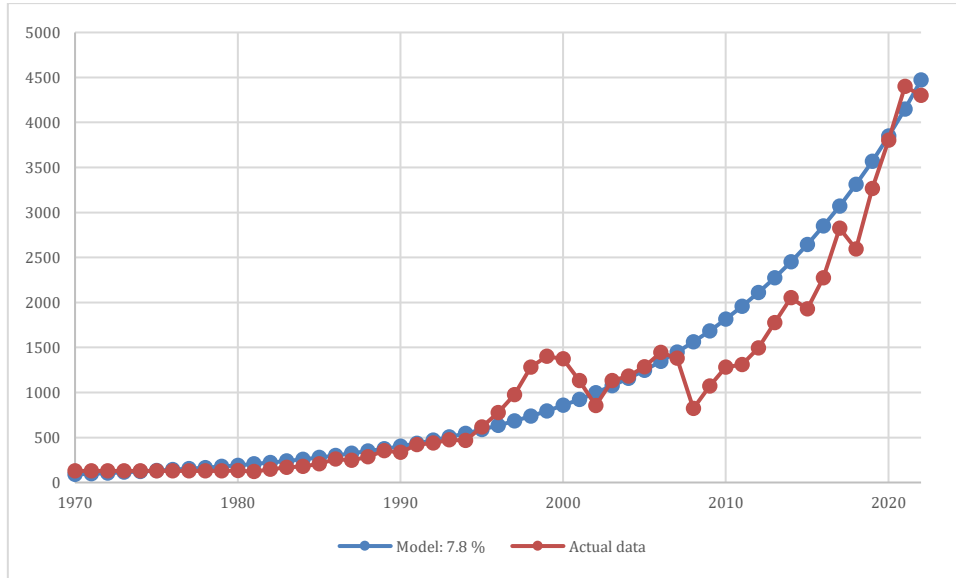

Fig. 3: Graphic representation of the dynamics of the stock index Sand P-500

Today, investments in this index and, in particular, in shares of index funds that repeat it: Vanguard S and P 500 ETF (VOO) or SPDR® Portfolio S and P 500 ETF (SPLG)-is a sustainable and widespread alternative for long-term investment for the of the average investor.

Taking into account the alternative of equity investments in the stock index S and P-500, the alternative point of zero depreciation of equity for Ukrainian commercial organizations equals:

$$R_E^A = 17.6 + 7.8 + 1.5 = 26.9\%.$$

Thus, the return on equity of Ukrainian commercial organizations should exceed 27% to prevent the depreciation of this capital both due to obvious factors and to prevent opportunity costs.

The calculation of the return on equity of Ukrainian enterprises by scale (large enterprises, medium, small and micro) according to data in Table 2.

Table 2: Return on equity of Ukrainian enterprises

Year	Total	Return on equity			
		including			
		large enterprises	medium enterprises	small enterprises	of which micro-enterprises
2013	0.58	3.38	1.31	-5.22	-9.16
2014	-38.12	-25.81	-50.16	-50.43	-43.16
2015	-15.23	-9.62	-23.25	-29.08	-22.03
2016	2.86	3.40	7.81	-10.75	-28.50
2017	9.64	9.26	18.74	-3.85	-19.74
2018	13.63	9.85	28.63	11.25	-0.53
2019	19.82	13.19	39.19	16.56	6.10
2020	4.03	3.32	10.30	-1.89	-7.57

Note: Calculated based on the pre-tax financial performance of the respective enterprises

According to the research results (Table 2), the dynamics of return on equity of the average Ukrainian enterprise were not stable. For Ukraine, 2014-2015 were crisis years (domestic political and economic crisis), and 2020 also noted a crisis that came from outside. However, even in non-crisis and prosperous years, the value of the indicator did not reach the cash point of zero depreciation of equity.

Thus, during the last 8 years, as well as during the last 30, the capital of the average Ukrainian enterprise has depreciated and decreased, which has reduced the investment opportunities of both individual entities and the national economy as a whole.

The constant impossibility of achieving many enterprises in the country to reach even the cash point of zero depreciation of equity can be seen as a chronic economic problem of the national economy, which annually and constantly leads to the gradual deindustrialization of the country. However, this situation is typical for the country as a whole, while in the new environment the most promising industries and activities for investment and development should be selected.

We calculated the return on equity with the net profit for certain types of economic activity (Table 3). There are a large number of such species in Ukraine, so they were limited to a limited list, in particular, those with unprofitable activities were not considered.

Table 3: Return on equity of enterprises in Ukraine by type of economic activity

Type of economic activity	Years								Average
	2013	2014	2015	2016	2017	2018	2019	2020	
Computer programming	14.79	34.02	-0.21	19.95	23.31	23.43	20.52	25.78	20.20
Production of dry construction mixtures	26.58	4.61	11.16	22.74	23.92	30.87	23.70	14.87	19.81
Trusts, funds, and similar financial entities	7.57	20.57	19.25	10.17	31.41	29.74	9.04	20.84	18.57
Agriculture, hunting, and related services	9.56	13.10	37.36	24.53	15.78	14.70	17.84	13.33	18.28
Production of lime and gypsum mixtures	9.33	6.44	10.42	19.95	24.26	21.53	19.77	34.13	18.23
Manufacture of basic pharmaceutical products and pharmaceuticals	13.46	5.97	14.17	18.44	19.35	19.15	22.79	19.78	16.64
Mining and quarrying	6.43	-8.09	-20.94	11.86	32.36	40.59	27.85	15.50	13.20
Textile production, production of clothing, leather, leather products, and other materials	3.92	-16.65	11.08	20.31	13.08	13.65	8.93	5.66	7.50
Provision of information services	3.78	-7.94	-8.69	0.62	15.96	9.57	24.47	11.44	6.15
Financial and insurance activities	0.11	-6.67	-6.31	-0.88	14.59	15.85	8.10	11.81	4.58
Education	7.14	3.73	4.95	4.33	4.65	7.75	20.59	1.78	6.86
Insurance, reinsurance, and private pension provision, except compulsory social insurance	12.85	1.61	-3.46	1.37	-1.52	1.49	4.05	8.67	3.13
Manufacture of food, beverage, and tobacco	8.05	-24.22	-26.26	-11.37	9.86	12.34	14.36	2.89	-1.79
Manufacturing industry	-3.78	-68.53	-88.88	-24.74	6.85	15.52	16.56	-2.99	-18.75

According to Table 3, there is a limited number of economic activities in Ukraine that exceed the cash point of zero depreciation of equity. These include Computer programming; production of dry construction mixtures; trusts, funds, and similar financial entities; agriculture, hunting, and related services; production of lime and gypsum mixtures. Among these species, only agriculture is significant in the country in terms of competitiveness (natural conditions), sales, number of employees, and the availability of exports.

Thus, the country has a long-term trend toward transformation from industrial to agricultural. The main factor in this chronic problem is the high level of inflation in the country, which averages 17.6%. Overcoming this problem inflation will change the trend in the opposite direction. Reducing inflation to 7-6% per year along with the stabilization of the national currency will bring a significant number of economic activities in the country to the level of reaching the cash point of zero depreciation of equity.

5. Conclusion

The main source of compensation for the depreciation of equity due to inflation, devaluation of the national currency, and other factors is the profit of the organization. Under such conditions, the return on equity, which is determined by net income, is a relative indicator that characterizes the degree of appropriate compensation.

The tools for estimating the point of zero depreciation of equity should be considered as such a value of return on equity, which compensates for its depreciation due to various factors. The division of these factors into explicit and alternative is substantiated. The obvious factors include inflation and the devaluation of the national currency. The alternative factor is the lost benefit (or opportunity cost) due to the choice of a worse option of capital use compared to the established and widely used practice of the average investor.

Due to the need to divide the factors of impairment of equity into two groups, the use of two types of zero depreciation points is justified: Cash and alternative. It is reasonable to consider the cash point of zero depreciation as the value of return on equity calculated on the basis of net profit, which allows covering only inflation and (or) devaluation of the national currency. The alternative point of zero depreciation of equity-in addition to the above must also compensate for opportunity costs. These costs determine part of the value of return on equity calculated on net income, which allows you to cover lost profits.

As an established and widely used alternative to the use of equity for the average investor, investments in shares of ETF funds are justified, completely repeating the US stock index S and P-500

with a long-term efficiency of 9.5% per annum in US dollars.

Approbation of the presented valuation tools allowed us to determine that for Ukrainian commercial organizations the alternative point of zero depreciation of equity is 26.9% and cash-17.6%.

It is specified that the average enterprise in the country does not reach the level of even a cash point. There are a limited number of economic activities in the country where the cash point of zero depreciation of equity is exceeded. Among such species, only agriculture can be defined as the basic branch of the national economy. The constant failure of many enterprises in the country to reach the point of zero depreciation of equity due to high inflation and devaluation of the national currency is defined as a chronic economic internal problem of the national economy, which annually leads to gradual deindustrialization. Reducing inflation to 7-6% per year along with the stabilization of the national currency will bring a significant number of economic activities in the country to the level of reaching the cash point of depreciation of equity.

Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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