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**ANALYSIS OF THE CALCULATION OF DEPRECIATION IN  
MODERN CONDITIONS**

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*Abstract*

The use of taxes is one of the economic methods of managing and ensuring the interconnection of national interests with the commercial interests of entrepreneurs and enterprises, regardless of departmental subordination, ownership, and legal form of the enterprise. With the help of taxes, the relationships between entrepreneurs, enterprises of all forms of ownership with state and local budgets, with banks, as well as with higher organizations are determined. With the help of taxes, foreign economic activity is regulated, including attracting foreign investment, self-supporting income and profit of the enterprise are formed. With the help of taxes, the state receives at its disposal the resources necessary to fulfill its public functions. Issues and problems of basic depreciation funds are also not new for domestic theory and practice of accounting, so and all accounting globally. The issues of choosing methods for calculating depreciation of fixed assets continue to be problematic in the formation of accounting policies in order the most effective use of them and the greatest economic security of the business entity.

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## 1. Introduction

Fixed assets include: buildings, constructions, working and power machines and equipment, measuring and regulating instruments and devices, computers, vehicles, tools, production and household equipment and accessories, working, livestock and pedigree cattle, perennial plantations, on-farm roads and other related facilities.

The composition of fixed assets also takes into account: capital investments for radical land improvement (drainage, irrigation and other land reclamation works); capital investments in leased fixed assets; land plots, natural resources (water, subsoil and other natural resources).

Fixed assets intended solely for the organization to provide for payment for temporary possession and use or for temporary use for the purpose of generating income are reflected in accounting and financial statements as part of income-bearing investments in tangible assets (Nechaev, Zakharov, & Troshina, 2017).

Many scientific publications are devoted to the depreciation tools, which combine both financial and tax accounting (Nechaev, Ognev, & Antipina, 2017). These tools are important as an element of depreciation mechanism due to particular serious problems of accounting area caused by the use of financial and tax accounting systems. Another reason is the objection to the modern accounting standards approved in Europe and North America. Due to this reason, many scientists focus on these problems and study them.

## 2. Problem Statement

Accounting for fixed assets and their depreciation is one of the most important and responsible areas of work of an accountant. Proper organization of accounting in this area will allow the company to receive complete and reliable information on fixed assets and their depreciation in a timely manner, make informed management decisions and positively affects the results of the enterprise (Tyapkina, Ilina, & Mongush, 2016). The main idea of optimization is to increase depreciation charges to the maximum amount during the periods of asset usage, which allow a company to increase the number of funds in order to renew fixed assets with future growth of profit and property taxes.

## 3. Research Questions

Fixed assets of an economic entity are the most important economic category. In the process of production activities, fixed assets perform the most important function, ensuring uninterrupted production. To implement this function, it is necessary to ensure the reproduction of fixed assets through the calculation of depreciation charges (Campello, 2015). Fixed production assets wear out during operation, transferring their value to manufactured products. In this research we use the following methods: synthesis method, analysis method, analysis of data, as well as the synthesis of statistical data (Akhtyamov & Gonchar, 2017). These methods allowed us to analyze the collected facts, draw conclusions and generalize theoretical aspects. In the process of studying the problems, the principles of depreciation management were considered.

#### 4. Purpose of the Study

In order to solve the research problems we consider some mathematical methods. Calculation of the income tax variation rate (Romano, Tanewski, & Smyrnios, 2014).

This article presents calculations for the usefulness of the optimization method. For this purpose, a mathematical model was made and calculations were performed. The process included the following order of stages<sup>^</sup>

- to depreciate the operating fixed assets in linear method;
- to make amortization of fixed assets using the sum-of-the-years-digits technique (a decreasing depreciation option);
- to calculate the difference between profit and property taxes presented as a result of the application of different depreciation methods;
- to calculate fixed assets that we can obtain by the value of the released taxes;
- to calculate the possible value of depreciated new fixed assets in a linear order;
- to calculate the potential cost of depreciated new fixed assets using the sum-of-the-years-digits method (increasing amortization option);
- to calculate the potential profit and property taxes released as a result of the use of additional fixed assets;
- to distinguish an optimal way and amortization ratio (Delano, 1995).

Property tax is calculated according to p. 2 of Tax code of the Russian Federation, ch. 30 "Property Tax for organizations" instituted by Federal law № 139-FZ of 11.11.2003. This law defines the property tax base as the average annual value of property called a taxation object. However its residual value is taken into account according to the established accounting procedure approved in the accounting policy of the organization (Ilina & Tyapkina, 2016).

#### 5. Research Methods

In a market economy, only that enterprise survives that most competently and competently determines the requirements of the market, creates and organizes the production of goods, the provision of services or the performance of work that is in demand, provides high income for its employees, effectively uses all factors of production, and first of all fixed assets . It is fixed assets that together form the production and technical base of the enterprise, determine its ability to produce products, the level of technical equipment of labor. As a result of participation in the production process, fixed assets wear out, which necessitates their timely updating (Savin, 2016).

Calculation of the income tax variation rate. The procedure for calculating income and property taxes will be done according to the following criteria:

- annual property tax calculation using the straight-line depreciation method;
- annual property tax calculation using the straight-line depreciation method for new assets obtained through deferred taxes;
- annual property tax calculation which uses depreciation reduction option;

- annual property tax calculation using the option with increasing depreciation for new assets obtained through deferred taxation.

Let us introduce the following notation:

$\gamma$  – property tax rate;

$O_t$  – (initial) residual value of fixed assets in the t-th year (the residual value at the beginning of the 1<sup>st</sup> year of operation is equal to initial meaning);

$O_t^*$  – (initial) residual cost of fixed assets obtained at the charges of deferred taxation during the t-th year;

$V_1$  – rate of depreciation in the use of the linear way of amortization during the i-th quarter of the t-th year;

$V_2$  – norm of depreciation in the use of the sum-of-the-years-digits way decreasing depreciation option) during the i-th quarter of the t-th year;

$V_3$  – norm of depreciation in the use of the sum-of-the-years-digits way (rising depreciation option) during the i-th quarter of the t-th year;

$V$  – revenue;

$S$  – production cost;

$Z$  – the amount of costs, excluding depreciation;

$A$  – the depreciation amount for fixed assets of the company;

$D$  – pretax profit;

$\alpha$  – profit tax rate;

$t$  – year digit;

$k$  – the length of the deferred tax period (in years).

The average asset value is considered a taxation object for the reporting period and calculated as the ratio of dividing the sum obtained through the sum of the cost of net book of the assets on the 1<sup>st</sup> day of every month of the reporting period and the 1<sup>st</sup> day of the month next the reporting period by the number of months in the reporting period and plus one (par. 4 of item 376 of p. 2 of Tax code of the Russian Federation).

Calculation the sum of income and property tax:

The profit tax:

$$G_t = D_t \cdot \alpha \quad (1)$$

The pretax profit:

$$D_t = W_t - S_t$$

(2)

The production cost:

$$S_t = F_t + A_t$$

(3)

The depreciation amount getting with the help of depreciation linear method:

$$A_t = O_t \cdot \gamma \quad (4)$$

Using the above-mentioned comments and formulas (1)–(4), profit taxes can be calculated with the help of various methods of depreciation

**The formula for the calculation of profit tax  $G_1$**  includes the linear method:

$$G_1 = [W_t - (F_t + (O_t \gamma_t)) - P_1] \cdot \alpha \quad (5)$$

**The formula for the calculation of profit tax  $G_1^*$**  includes the linear method in order to account new assets:

$$G_1^* = [W_t - (F_t + (O_t \gamma_t)) - P_1^*] \cdot \alpha \quad (6)$$

**The formula for the calculation of profit tax  $G_2^*$**  includes the method of sum-of-the-years-digits (decreasing depreciation option):

$$G_2^* = [W_t - (F_t + (O_t \gamma_2)) - P_2^*] \cdot \alpha \quad (7)$$

**The formula for the calculation of profit tax  $G_3^*$**  includes the method of the sum-of-the-years-digits (increasing depreciation option) accounting for new assets:

$$G_3^* = [W_t - (F_t + (O_t \gamma_3)) - P_3^*] \cdot \alpha \quad (8)$$

If the difference between profit taxes should be calculated, then it is necessary to calculate:

$d_1$  – the difference of the sum of profit tax at amortization,  $V_1$  and  $V_2$  rates:

$$d_1 = (G_1 - G_2) \quad (9)$$

Combining formulas (2.5) and (2.7) and then inserting them into formula (2.9), we get

$$d_1 = [W_t - (F_t + (O_t \gamma_t)) - P_1] \cdot \alpha - [W_t - (F_t + (O_t \gamma_2)) - P_2] \cdot \alpha \quad (10)$$

There are no doubts that the amount of depreciation caused by the difference in the rates of depreciation during the use of the methods of sum-of-the-years-digits (decreasing depreciation option) ( $V_2$ ) and linear ( $V_1$ ) has a great impact on the final amount of profit tax.

The sum of income tax is affected by property tax, the sum of which is equal to property taxes odds  $P_1$  and  $P_2$ .

We calculate  $d_2$  – the difference between property tax at the rates of depreciation  $V_1$  and  $V_3$ :

$$d_2 = (G_1^* - G_3^*) \quad (11)$$

By inserting the formulas (2.6) and (2.8) into the formula (2.11), we get

$$d_2 = [W_t - (F_t + (O_t \gamma_1)) - P_1] \cdot \alpha - [W_t - (F_t + (O_t \gamma_3)) - P_3^*] \cdot \alpha$$

(12)

In the formula (12), we have the same consistent pattern as in the formula (10).

**The sum of taxes of property and profit of deferred taxation can be calculated by formula**

$$d_3 = d_1 + d_2 \quad (13)$$

Combining formulas (9) and (11) and then inserting them into formula (2.13), we get

$$d_{3_i} = (G_{1_i} - G_{2_i}) + (G_{1_i}^* - G_{3_i}^*) \quad (14)$$

Inserting expressions (5), (7) and (6), (8) we can transform formula (2.14). As the result we have

$$d_{3_i} = [W_i - (F_i + (O_i \gamma_i)) - P_{1_i}] \cdot \alpha - [W_i - (F_i - (O_i \gamma_i)) - P_{2_i}] \cdot \alpha + [W_i - (F_i + (O_i \gamma_i)) - P_{1_i}^*] \cdot \alpha - [W_i - (F_i - (O_i \gamma_i)) - P_{3_i}^*] \cdot \alpha \quad (15)$$

Let us oversimplify formula (2.15):

$$d_{3_i} = \alpha [(Y_{2_i} - Y_{1_i}) C_i + (Y_{3_i} - Y_{1_i}) O_i^* - (P_{1_i} - P_{2_i}) - (P_{1_i}^* - P_{3_i}^*)] \quad (16)$$

Thus, we can use this formula to calculate profit and property taxes not only for deferred taxation period, but also for the period of entire taxation, until we fully depreciate the value of fixed assets. Moreover, we can use it for the calculation of the amount of tax deductions on the taxes of profit and property for newly obtained fixed assets.

During the analysis of the formulas (5), (7) and (6), (8) and formula (16) we noticed that with the increase in the rates of depreciation  $\gamma_2$  and  $\gamma_3$ , the taxable base for profit tax decreases along with the difference in profit tax amounts caused by the difference in the amounts of the rates of depreciation (Huyghebaert, 2017).

During the deferred taxation using  $\gamma_2$ , vice of  $\gamma_1$ , the decrease in the difference in property tax amounts occurred and as a result it increased the taxable income amount. While the use of  $\gamma_3$  instead of  $\gamma_1$  reduced the taxable profit as the difference in the property tax increased.

## 6. Findings

The author's mathematical model allows calculating the money allocated to update the main assets and the sum of paid revenue and the taxes of property. The mathematical model allows to conclude that the greatest economic effect is earned only by the method of the year's digits summing (option to reduce depreciation) and the sum of the year's digits (option to increase depreciation). In other words, it allows to increase budget revenues from income and property taxes (Tyapkina, Ilina, & Mongush, 2016).

It should be noted that using the straight-line depreciation method reduces budget revenues.

## 7. Conclusion

For the successful functioning of the company in a rapidly developing market economy and constantly increasing competition, it is necessary to optimally and most effectively use all factors of production. The production and technical base of the company in aggregate is formed by fixed assets that wear out as a result of participation in the production process. The source of compensation for depreciation of fixed assets is their depreciation. In its economic essence, depreciation is a monetary reimbursement of a part of the cost of fixed assets move to a newly created product. In conclusion, we can confirm that this method will help to increase depreciation charges creating the opportunity to renew assets and confirm the need for the direction of priority industry to update fixed assets taking into account the specification and production capital intensity.

According to the results of the research, we can distinguish two main groups of problems, which prevent the fixed assets from renewal:

- 1) Internal problems such as unwillingness of managers to spend big money and the lack of new equipment, technologies, production space;
- 2) External problems such as high prices, intense competition, taxes etc.

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