



Assessment of the Efficiency of Different Forms of Financing

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Abstract: *The study analyzes various criteria and forms for assessing the effectiveness of financing the activities of enterprises. A methodological toolkit has been developed for the comprehensive assessment of the effectiveness of various forms of financing the activities of enterprises, taking into account the significance of criteria. The following criteria are considered: tax savings on income tax excluding the time factor, cost of the i-th source of attraction, economic value added, increase in return on equity, the profitability of investment capital, net present value.*

Keywords: *investment, economic value added, return on equity, return on investment capital, net present value, equity offering, bonded loan, credit, leasing.*

I. INTRODUCTION

Aviation industry enterprises require large amounts of financial resources for the implementation of investment activities. The sources of financial resources include equity and borrowed capital of the enterprise. A study of funding sources, performance criteria has been carried out. The topic of work is relevant, as a result of the study a comprehensive assessment of the effectiveness of the use of funding sources has been obtained.

The objective of the study: analysis of various criteria and forms for assessing the effectiveness of financing the activities of enterprises, developing methodological tools for a comprehensive assessment of the effectiveness of various forms of financing for enterprises, taking into account the significance of the criteria.

The enterprise uses financial resources in its current, investment and financial activities in order to generate income. At the same time, a part of financial resources is eliminated from the reproduction process in the form of taxes, insurance premiums, dividends, and the maintenance and improvement of production. That part of the financial resources, which is directed to the turnover with the purpose of making a profit, is equity.

II. REVIEW OF LITERATURE

One of the approaches to the definition of financial resources is to identify them as cash incomes and receipts. N. V. Kolchina gives the following definition: "The financial resources of an organization (enterprise) are a combination of their own cash income in cash and non-cash form and receipts from outside (raised and borrowed)

accumulated by the organization (enterprise) and intended to fulfill financial obligations, financing current costs and expenses associated with the development of production" [1]. Such an approach is incorrect since financial resources are identified with cash income, but resources are sources of cash income.

N.P. Ivashchenko addresses the definition of financial resources in terms of the part of the funds available to the enterprise: "The financial resources of the company are part of the funds in the form of income and depreciation, external revenues and deferred payments intended to fulfill financial obligations and expenses to ensure extended reproduction "[7]. Here N.P. Ivashchenko clearly indicates the means by which financial resources are formed. In practice, there are more ways of forming financial resources and it was possible not to include their specification in the definition.

One of the most common approaches to the definition of the essence of financial resources is their full or partial identification with equity. Such an approach cannot be considered consistent since the capital consumed by the enterprise has both monetary and other forms — tangible and intangible, which are not treated as financial resources.

The most important theoretical aspects of assessing the criteria for evaluating the effectiveness of various forms of financing and investing are reflected in the works of Russian and foreign authors (R. Braley, A. Damodaran, V.N. Egorov, A.N. Troshin, J.K. Horn, Ferrer R.C. Kinnunen, J. Valuing, Mabert, and others). Such researchers as Vincent A. Watts, Charles A., Mileris R., Orsag S., McClure K. consider approaches to the analysis of various forms of financing the activities of enterprises (issue of shares, bonds, credit, leasing). The analysis of various researches showed the elaboration, in methodological and procedural terms, of analyzing various criteria and forms for assessing the effectiveness of financing enterprises, analyzing the formation of a rating of the investment potential of enterprises. However, the above researches do not consider the most important issues for the aviation industry of forming an integrated assessment of the effectiveness of various forms of financing according to various criteria, which justifies the need for this work.

Manuscript published on 30 September 2019

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As **restrictions of this study**, we can single out the specifics of production, financing, and control of enterprises in the aviation industry. **The prospects of the study** are the development of a complex of economic and mathematical models of forming, building up and realizing the investment potential of enterprises of the aviation industry in the modern and forecasted socio-economic conditions of economic globalization.

III. MATERIALS AND METHODS

The most important and promising sources of financing the activities of an enterprise are the issue of shares, profit, depreciation, bank loans, bond loans and financial leasing [3,4].

Measures for the formation of financial assets and equity, investing - their use for the creation of tangible and intangible values, as well as receiving income from the use or sale in the future are considered financing of an enterprise. At the same time, the use of financial resources is not always an investment, as well as not any formation of funds is associated with the implementation of investments. Financing by issuing shares is not always associated with the receipt of funds. For example, a buyer of a stock of shares may transfer equipment or land to an enterprise instead of cash. In such a case, financing and investment occur simultaneously.

Each form of financing has its own characteristics. Therefore, to correctly assess the consequences of various investment methods is possible only when comparing alternative options.

To assess the effectiveness of forms of financing in the context of efficiency criteria, it is advisable to create a table in which all sources of financing for an enterprise and formulas determining the effectiveness of raising financial resources should be included.

According to the data in the table, it will be possible to determine both the effectiveness of a single source of funding and the effectiveness of their use in comparison with each other.

In accordance with the specifics of the aviation industry, it is proposed to focus on four sources of funding for the renewal of fixed assets [4,6]:

- 1) Shares issue;
- 2) Bonded loan issue;
- 3) Raising bank loan;
- 4) Using leasing.

And also to consider the following performance criteria that determine the effectiveness of attracting:

1. Tax savings on income tax.

Attracting financial resources associated with the following costs:

- 1) When issuing shares dividends are paid;
- 2) When issuing bonds coupon payments are paid;
- 3) When raising loans interest payments on the loan are excluded;
- 4) When using leasing, lease payments are paid.

These payments reduce the taxable base when calculating the income tax, and the amount of tax depends on the size of these payments. Thus, in paragraph No. 1 of

the assessment of the effectiveness of financial resources, we include tax savings.

2. The weighted average cost of capital and the cost of each individual source of financial resources

Since the attraction of financial resources is associated with payments, the weighted average cost of capital (WACC) is determined for each source of financing. This applies to those sources of financing, the raising of which changes the structure of the balance sheet of an enterprise.

$$WACC = \sum_{i=1}^n \alpha_i \times p_i,$$

where: WACC – weighted average cost of capital, %;

α – the proportion of the component in the equity structure;

p – price, %;

n – list of used types of equity in the company;

i – equity type.

From the formula, it follows that in order to calculate the WACC it is necessary to know the price of each of the sources of equity, which will show the cost of their raising.

- 1) Raising shares, the value of the authorized capital increases, the cost of attracting this resource is determined by the formula (2):

$$P_{shares} = \frac{Dividends\ paid}{Authorized\ capital\ value} \times 100\%,$$

where: P_{shares} – price of attracting shares, %

(dividends paid / authorized capital value)

– dividends norm, %;

- 2) The issue of bonds increases the value of long-term liabilities of the enterprise, the price of a bonded loan is calculated by the formula (3):

$$P_{bond} = (1 - T) \times i_{coupon\ payment.} \times 100\%,$$

where: P_{bond} – price of the bonded loan, %

T – income tax rate, %;

$(1-T)$ – tax adjuster;

$i_{coupon\ payment.}$ – interest under coupon payments, %;

- 3) Raising a loan, as well as a bonded loan, increases the amount of long-term liabilities of the enterprise, the price of attracting a loan is calculated by the formula (4):

$$P_{lp} = (1 - T) \times i_{lul} \times 100\%,$$

where: P_{lp} – loan price, %

T – income tax rate, %;

$(1-T)$ – tax adjuster;

i_{lul} – interest under loan, %;

4) Leasing impacts the equity structure in this way: leasing payments reduce the taxable base, which means that the amount of taxable income changes. When calculating WACC, the value of retained earnings is determined based on the deposit rates or refinancing rate and the share of retained earnings in total equity. Consequently, the share of retained earnings, although slightly, changes.

Thus, the higher the cost of attracting the i-th source, the greater the WACC.

3. Economic value added.

Economic value added is determined by the EVA parameter. This is the difference between the profit of the enterprise and the value of the equity it uses. The value of the indicator is determined by the formula (5 and 6):

$$EVA = NOPAT - WACC \times IC,$$

where NOPAT – net operating profit after taxes, rubles;

WACC – weighted average cost of capital, %;

IC – investment capital, rubles.

Thus, we see that the economic value added depends on the value of the adjusted operating profit, which is determined by the following formula (1.12):

$$NOPAT = (EBIT + K + L) \times (1 - T),$$

where: EBIT – profit before taxes and interest, rubles;

K – non-interest expenses on loan and loan servicing, rubles.;

L – leasing payments and payments on obligations similar to loans, rubles.;

T – income tax rate, %

Let us reveal the value of profit before taxes and interest in the economic value added formula (7):

$$EVA = (EBIT + K + L) \times (1 - T) - WACC \times IC,$$

1) Having considered the formula (7), it can be seen that the use of shares issue in this formula affects the WACC indicator;

2) When using a loan, the value of the WACC indicator and the adjusted operating profit also change if there are non-interest costs on loans;

3) We see a similar picture at the issue of bonds;

4) During the leasing the value of the adjusted operating profit changes.

4. The degree of financial leverage

The degree of financial leverage shows an increase in the return on equity at the expense of attracting loans and borrowings and is calculated using the formula (8):

$$DFL = (1 - T) \times (ROA - ACIR) \times \frac{ZK}{SK},$$

where: T – income tax, %;

ROA – return on assets, %;

ACIR – average calculated income rate, %;

(ZK/SK) – leverage;

From the formula (8) it can be seen that the raising of loans and borrowings leads to an increase in the return on equity.

5. Return on investment capital

$$R_{capital} = \frac{UP}{Capital} \times 100\%,$$

where UP – undistributed profit, rubles.

Thus, the use of various financial resources has a different effect on the value of the company's undistributed profit (10):

Undistributed profit =

$$= Net\ profit - Payments\ on\ dividends - Reserve\ capital\ provisions \quad (10)$$

Thus, each financial resource affects the value of change in profit:

- 1) Payments on dividends reduce undistributed profit;
- 2) Interest payments on loans and borrowings reduce profit before tax;
- 3) Lease payments reduce sales profit;

Thus, depending on the source of funding, different values of return on equity are obtained.

6. Another criterion for the effectiveness of attracting forms of financing is NPV - net present value.

The considered financial resources have a different payment scheme, both interest payments and total debt. Therefore, they have a different flow structure [3,4,5,6].

- 1) When issuing shares, the enterprise receives the total amount of necessary financial resources and within a certain period of time pays dividends on them from the net profit;
- 2) When using a bank loan, an enterprise receives the required amount of financial resources, and then within a certain period repays the amount of debt and interest thereon;
- 3) When issuing a bonded loan, the enterprise receives the required amount of financial resources, then, during a certain period, pays coupon payments and, after the end of the circulation period of the bond repays the amount of the debt;
- 4) During leasing an enterprise receives the equipment necessary for the continuation of its activity and within a certain period repays the lease payments on it.

For a visual display of the formulas for calculating the criteria for assessing the efficiency of the use of financial resources of the enterprise, a summary table 1 was compiled:

Table 1: Basic formulas for assessing the effectiveness of using various sources of financing

Effectiveness criterion	Sources of financing			
	Shares issue	Bonded loan	Loan	Leasing
1. Tax savings on income tax excluding time factor	-	$H_{EBI} = \sum_{i=1}^n cp. \text{paym.}_i \times T$	$H_{\text{ЭЕтн}} = \sum_{i=1}^n I_i \times T$	$H_{ELt} = \sum_{i=1}^n III_i \times T$

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2. Cost of i-th source of attraction	$P_{shares} = \frac{\text{Dividends paid}}{\text{Value of authorized capital} \times 100\%}$	$P_{bond} = (1 - T) \times i_{coupon\ payment} \times 100\%$	$P_{tp} = (1 - T) \times i_{int} \times 100\%$	-
3. Economic value added	$EVA_{share} = EBIT \times (1 - T) - WACC_{share} \times IC$	$EVA_{bond} = (EBIT + K_{bond}) \times (1 - T) - WACC_{bond} \times IC$	$EVA_{in} = (EBIT + K_i) \times (1 - T) - WACC_{sp} \times IC$	$EVA_l = (EBIT - L) \times (1 - T) - WACC_l \times IC$
4. Increase of return on equity	-	$\partial P_{bond} = (1 - T) \times (ROA - CPCPI_{bond}) \times \frac{3K}{CK}$	$\partial P_{in} = (1 - T) \times (ROA - CPCPI_{in}) \times \frac{ZK}{SK}$	-
5. Return on investment capital	$R_{share} = \frac{UP_{share}}{Capital_{share}}$	$R_{bond} = \frac{UP_{bond}}{Capital_{bond}}$	$R_{in} = \frac{UP_{in}}{Capital_{in}}$	$R_l = \frac{UP_l}{Capital_l}$
6. NPV	$NPV_{share} = \sum_{t=0}^n \frac{CF_{t_{share}}}{(1+i)^t}$	$NPV_{bond} = \sum_{t=0}^n \frac{CF_{t_{bond}}}{(1+i)^t}$	$NPV_{in} = \sum_{t=0}^n \frac{ln}{(1+i)^t}$	$NPV_l = \sum_{t=0}^n \frac{CF_{t_l}}{(1+i)^t}$

It is proposed to form an integrated assessment of the effectiveness of the use of various forms of business financing.

$$EF^n = \sum_{k=1}^n \left(F \frac{n}{k} \right) * b_k^n$$

EF^n -weighted cumulative effect of n funding source by criteria: tax savings on income tax excluding the time factor, cost of i-th source of raising, economic value added, increase in return on equity, return on investment capital, NPV.

n - source of financing (shares issue, bonded loan, loan, leasing).

k - criterion of effectiveness of the source of funding.

$F \frac{n}{k}$ category (1,2,3,4), corresponding to the effectiveness of the k criterion, n source of funding.

IV. RESULTS

The study has conducted a comprehensive assessment of the effectiveness of the use of financial resources at the aviation enterprise Tupolev PJSC.

Tupolev PJSC is the largest developer of aviation technology, engaged in designing, manufacturing and testing aircraft for various purposes, creating and introducing new technologies for their production, ensuring operation and after-sales service of aircraft, training crews at a training center [9].

The results of calculations, analysis of the effectiveness of the use of various forms of financing, according to the annual report of Tupolev PJSC [9, 10, 11] are presented in Table 2

Table 2 : Results of the analysis of the use of various forms of financing

	<i>Shares issue</i>	<i>Bonded loan</i>	<i>Loan</i>	<i>Leasing</i>
1. <i>Tax savings on income tax excluding time factor</i>	-	990 000.00	851 507.05	3 080 000.00
2. 2. <i>Cost of i-th source of attraction</i>	0.00%	7.20%	9.60%	-
3. 3. <i>Economic value added</i>	8 885 009.42	8 463 378.27	8 288 976.22	17 222 493.87

4. <i>Increase of return on equity</i>	-	77.12%	74.72%	-
5. <i>Return on investment capital</i>	71.67%	40.53%	43.85%	44.25%
6. <i>NPV</i>	24 807 557.77	5 219 177.12	4 177 868.94	4 315 880.48

A comprehensive assessment of the effectiveness of the use of various forms of financing is presented in Table 6.

Table 3: Comprehensive assessment of the effectiveness of the use of various forms of financing

Criteria of effectiveness	category				weighte d mark				
	<i>Share s issue</i>	<i>Bonded loan</i>	<i>Loa n</i>	<i>Le asing</i>	1-best mark	4 -worst mark			
1. <i>Tax savings on income tax excluding time factor</i>	4	2	3	1	0. 1	0. 4	0.2	0 .3	0 .1
2. <i>Cost of i-th source of attraction</i>	1	2	3		0. 1	0. 1	0.2	0 .3	0
3. <i>Economic value added</i>	2	3	4	1	0. 15	0. 3	0.45	0 .6	0 .15

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4. <i>Increase of return on equity</i>	4	2	1	4	0.2	0.8	0.4	.2	0	0
5. <i>Return on investment capital</i>	1	4	3	2	0.1	0.1	0.4	.3	0	0
6. <i>NPV</i>	1	2	4	3	0.35	0.35	0.7	.4	1	1
					1	.05	2.35	.1	3	2

Thus, the most profitable form of financing new projects for the Tupalev PJSC enterprise is the issue of shares.

V. DISCUSSION

According to the results presented in Table 3, it can be noted:

Tax savings on income tax is the largest when leasing is engaged. Bond loan has the lowest cost of attraction. EVA is the highest when leasing is involved. This means that leasing will give the greatest efficiency in the use of capital, that is, the greatest excess of profitability (return on each ruble of invested funds) of an enterprise over the weighted average cost of capital.

The degree of financial leverage gives the best value when using a bonded loan. That is, by attracting a bonded loan, the return on equity will increase more than when raising a loan.

Return on invested capital shows the highest value when issuing shares. So the funds invested in the purchase of fixed assets from the issue of shares will bring greater profit than the funds received through a bonded loan, loan, and leasing. Net present value when issuing shares is the highest, it is almost five times higher than NPV from other sources of financing. This figure shows that the investor (in this case, Tupolev PJSC) expects to receive 24 807 557 thousand rubles from the acquisition of fixed assets after cash flows recoup the initial investment costs and periodic cash outflows associated with the implementation of the project.

VI. CONCLUSION

The results obtained in the study are now being put into practice in the activities of managers and specialists of aviation industry enterprises. It is proposed to assess

the effectiveness of forms of financing from a comprehensive perspective. When considering sources separately, they all have their own advantages and disadvantages. But when calculating several criteria that differ in their economic sense, one can understand which financial resources will be most beneficial for an enterprise. An integral assessment of the efficiency of resource raising in terms of the selected criteria shows that leasing is most beneficial.

Thus, a methodological toolkit has been developed for the comprehensive assessment of the effectiveness of various forms of financing the activities of enterprises, taking into account the significance of the criteria. The criteria are tax savings on income tax excluding the time factor, cost of the *i*-th source of attraction, economic value added, increase in the return on equity, return on investment capital, net present value.

ACKNOWLEDGEMENT

The authors are grateful to colleagues for their help and financial support of the study.

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