FINANCIAL CONDITION AND BANKRUPTCY LIKELIHOOD IN AVIATION ON THE EXAMPLE OF THE AEROFLOT COMPANY

Nargis Faizuloyeva[1], Karolina Olechowska[2]

Abstract

This study analyses theoretical aspects of bankruptcy and financial analysis. Analysis of bankruptcy diagnostics is the most important condition for successful company management since the results of economic activity depend on the availability and efficiency of the use of financial resources. The study of the institution of bankruptcy is essential for high-quality business conduct. Thus, as a practical part this study implemented analyses of financial condition and bankruptcy likelihood in aviation on the example of one of the biggest airlines – PJSC Aeroflot. Research resulted in findings confirming the instability of the company's financial condition and downward trend on the Z index related to decrease in demand, mostly due to the pandemic of COVID-19.

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[1] Student at the University of Information Technology and Management in Rzeszów, Faculty of Management, e-mail: nfaizuloeva@list.ru, ORCID: 0000-0002-8197-7870.
[2] Student at the University of Information Technology and Management in Rzeszów, Faculty of Management, e-mail: karolina1olechowska@gmail.com, ORCID: 0000-0003-2018-9755.

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Introduction

Modern economic reality pressures business leaders to continuously make decisions in the face of uncertainty. In conditions of financial and political instability, commercial activity is fraught with various crisis situations, the result of which can be insolvency or bankruptcy.

Financial stability is one of the most important economic indicators of an enterprise, which characterizes the efficiency of its work. It is largely determined by the structure of capital and provides competitiveness, potential in business cooperation, and a guarantee of compliance with the economic interests of both the enterprise itself and its partners.

In market conditions, the financial and economic activity of the enterprise is carried out at the expense of self-financing, and in the absence of its own financial resources, at the expense of borrowed funds. That is why it is necessary to be aware of not only the financial situation of the enterprise, but also of its financial stability. Studies performed so far in the topic of airline insolvency include research made on the basis of multiple discriminant analysis and artificial neural network methods (Chow et al., 1991, Gritta et al., 2002, Gritta et al,. 2003).

Presently, the independence of enterprises in the adoption and implementation of management decisions and their economic and legal responsibility for the results of economic activities is increasing. The importance of the financial stability of business entities is objectively growing. All this increases the role of financial analysis in assessing their production and commercial activities and, above all, the availability, placement and use of capital and income. The results of such an analysis are necessary primarily for shareholders, creditors, investors, suppliers, tax authorities, managers, and heads of enterprises. Gritta (1982) presented a model for air transportation in order to appraise airlines' financial strength and to predict candidate companies filing for bankruptcy. The author's analysis was designed to distinguish causes of the airlines' financial struggles and aims to be a template for decision-making employees.

Thus, in market conditions, the guarantee of survival and the basis for the stable position of an enterprise is its financial stability. If an enterprise is financially stable, solvent, then it has a variety of advantages over other enterprises of the same profile for obtaining loans, attracting investments, in choosing suppliers, and in the selection of qualified personnel. The higher the stability of an enterprise, the more it is independent of unexpected changes in market conditions and, consequently, the less the risk of being on the verge of bankruptcy.

This study aims to analyze the current state of the chosen airline's financial situation in the middle of the global pandemic of COVID-19 and check whether the classical methods of predicting bankruptcy are still valid during this volatile situation on the aviation market. The paper includes theoretical and practical parts. The first chapter contains a review of scientific literature on the financial condition theory and financial analysis of a company, as well as the concept of bankruptcy and description of the company acting as the object of analysis – Aeroflot. The second chapter presents direct and indirect methods used in the determination of the likelihood of bankruptcy. The third, empirical chapter focuses on the presentation of calculated results and analysis of research carried out based on data relating to the selected airline.

The theoretical objective of this thesis is to present the specificity of financial analysis for an aviation company, with special attention paid to bankruptcy likelihood and assessment. The empirical objective is to assess the financial condition and bankruptcy likelihood of the Russian aviation company Aeroflot.

Literature review

Financial condition and financial analysis theory

Financial condition determines the competitiveness of an enterprise and its potential in business cooperation, and it assesses the extent to which the economic interests of the enterprise itself and its partners in financial and other relations are guaranteed. A stable financial condition is formed during all production and economic activities. Determining it for a particular date answers the question of how accurately the company has managed its financial resources over a certain period. Any business during their activities can pursue a diverse set of goals. This could be profit maximization, augmentation of the company's property, an increase in the market value of shares, the expansion of sales markets for products, and more. Many people, in one way or another are connected to a particular enterprise and expect from it the

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realization of specific goals. However, to achieve all of these goals, it is important to note whether the enterprise will continue its functioning on a certain scale for a long time or whether it will not be liquidated or reorganized in the upcoming future. According to Du Jardin (2009), variables which the best reflect the possibility of company's financial problems in the future fall into three categories. The first category of variables describes those factors which reflect the state of the company (balance sheet, income statement). The second represents environment (growth, interest rate, employment rate). The last is linked directly to the financial market and its ability to evaluate the risk of insolvency.

Analysis of the financial condition of an enterprise begins with the study of its property, assessment of the composition, structure, placement and use of funds (assets) and sources of their formation (liabilities) according to the balance sheet. For this, a comparative analytical balance is drawn up, in which the assets are grouped according to the degree of liquidity growth, and the sources - according to the urgency of the onset of obligations. The comparative analytical balance allows us to conclude through which sources there was an inflow of new funds and in which assets these funds were invested. After a general assessment of the property status of the economy and its changes during the analyzed period, its financial stability is studied. It is the main criterion for the reliability of the entity as a commercial partner, as it allows us to assess the ability to ensure an uninterrupted process of financial and economic activities and the degree of coverage of funds invested in assets by own sources.

The structure of assets and liabilities can be represented as follows:

$$F + M + A_R + C = S + L + SL + A_P$$

where F - fixed assets and investments,

M - material circulating assets (stocks and costs),

A_R - accounts receivable,

C - cash and short-term financial investments,

S - sources of own funds (capital and reserves),

L - long-term loans and credits,

SL - short-term loans and credits,

A_p - accounts payable.

According to Sheremet (2013), components of a comprehensive financial analysis are solvency, financial independence, sustainability, stability, structure of assets and liabilities, business activity, turnover, capital efficiency and liquidity. On the other hand, Stone & Hitching (2014) distinguish the following factors of the analysis: solvency, structure of assets and liabilities, business activity, turnover, capital efficiency and investments. These are noticeably disparate in relation to what has been presented by Aksenov (2014), who highlighted the importance of financial dependence, liquidity, profitability, and market activity in the analysis. Finally, research presented by Van Horne and Wachowicz (2009) include the following components of the analysis: the structure and dynamics of the property of the enterprise, liquidity, the ratio of cash flow and debt, the ratio of equity capital and debt, and the degree of coverage of interest payments by profit. All methods of a comprehensive analysis of the financial condition of an enterprise are subordinated to one goal - obtaining, in a short time, reliable, expansive information about the financial condition of the enterprise.

According to Honadle et al. (2003), financial condition may generally be defined as the solvency of the enterprise. However, in business practice, there is a more pragmatic definition of the term, specifically as the ability for a company to create money or similar equivalents, which, in turn, are a guarantee of repayment of financial obligations. Based on the above statement, it can be summarized that financial condition is a quantitatively expressed degree of the enterprise's financial resources at a certain time or within a certain period of time, which ensures the stability and prosperity of the company.

All enterprises for the implementation of business operations must have sources of funds. In a market economy, they face competition from other economic entities for attracting financial resources into their turnover. The owners of funds will agree to participate in company's operations with their capital only as long as it provides them with a higher return on investment compared to other firms with a sufficient level of financial independence. Otherwise, the members of the company will lose part of their income, either due to low profitability, or as a result of the financial dependence of the enterprise, when most of the dis-

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distributed profits are due to external creditors. Thus, when deciding to invest in a particular company, one of the main criteria is the level of its financial condition.

Financial condition indicators reflect the availability, placement and use of financial resources. The position of an enterprise in the field of finance largely determines its competitiveness and potential in business cooperation and assesses to what extent the financial interests of the enterprise and its partners are guaranteed. The financial condition of enterprises is formed in the process of their relationship with suppliers, buyers, tax authorities, banks, and other partners. Their economic prospects depend on the possibility of its improvement. The financial stability of an enterprise becomes a matter of its survival since the bankruptcy of an enterprise in a market environment is a likely result of economic activity along with other opportunities. In this regard, the role and importance of financial analysis both for the enterprise itself and for its various partners increases significantly. It is crucial to find the reasons for abrupt changes in order to maintain the ability to predict further developments and to prevent or mitigate adverse trends in a timely manner.

An extensive manifestation of the financial condition of an enterprise is its solvency, which means the ability to timely meet the payment requirements of suppliers in accordance with contracts, to repay loans, pay wages, and make payments to the budget. As a result of the implementation of any business transaction, the financial condition may remain unchanged or worsen or improve. Knowing the limits of change in the volume of certain types of sources of funds to cover capital investments in fixed assets or production stocks allows you to generate such business transactions that lead to an increase in the financial stability of the enterprise.

The financial condition of an enterprise reflects the results of its production, commercial and financial activities. If the production and financial plans are successfully fulfilled, this has a positive effect on the financial position of the company. And vice versa, because of the failure to fulfill the plan for the production and sale of products, there is an increase in its cost, a decrease in revenue, as well as in the amount of profit and, as a result, a deterioration in the financial condition of the enterprise and its solvency.

Analysis of the financial condition of an enterprise has several goals:

1) determination of financial position,

2) identification of changes in the financial condition in the spatio-temporal context,

3) identification of the main factors causing changes in the financial condition,

4) forecast of the main trends in the financial condition.

Thus, the main task of the analysis of the financial condition is the timely identification and elimination of shortcomings in financial activities and finding reserves for improving the financial condition of the enterprise and its solvency.

Bankruptcy and crisis measures

The problem of insolvency and bankruptcy of a debtor who does not fulfill his obligations is one of the most pressing problems of a market economy. Bankruptcy of legal entities, or rather, the essence of the procedure is as follows: if a company is not able to pay off its debts, it either provides its property to creditors for its sale as debt, or special measures are introduced in relation to it, aimed at restoring solvency. Any company should be aware of its financial position, because even during a period of growth, it cannot be completely sure of its future. That is why diagnostics, assessment and forecasting of bankruptcy are an integral part of the further functioning of the organization. It is important to mention that bankruptcy analysis is one of the tools of the company's investment policy, due to the exposure to the risks of this activity. Also, in the case of bankruptcy, the effectiveness of the company is assessed, its past, present, and future income and development prospects, which as a result reflects the real business value. Due to the above-mentioned aspects, it is necessary to diagnose the company for the likelihood of bankruptcy in a timely manner. It is of high importance to note that there is no universal way to predict it, although it is necessary to track the dynamics of certain indicators in order to respond in time to their deviations. The presence of a high level in these indicators does not mean that there is no threat, because it is in comparison with previous years that a negative trend can be identified.

According to Monden (2014), crisis is an extreme business risk of failing to respond to rapid and signifi-

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significant external and internal environmental chang-es. Bankruptcy of an enterprise is far more than mere debt collection, which provides the framework for im-plementing fundamental decisions about how to man-age the social and economic consequences of business failure. As it has been stated by Lewis (2018), bankrupt-cy is a very straightforward process. It typically consists of six steps:

1) liquidation proceedings,

2) reorganization proceedings,

3) the adjustment of debts of an individual with regular income,

4) the adjustment of debts of a family farmer or fisherman with regular annual income,

5) the adjustment of debts of a municipality,

6) ancillary and cross-border cases.

Theproblemoffinancialinsolvencyoftheenterpriseha sbecomequiterelevant in many countries. Huge mutual non-payments, wage arrears - all this is happening nowadays, especially during the pandemic. They originate in an ill-conceived economic strategy for the development of an enterprise in the conditions of market relations and in the absence of managerial abil-ities at the management level (Kuznetsov et al., 2015).

Models most commonly used in the literature to assess financial stress and predict bankruptcy well in advance of the event in case of airlines (Gritta et al., 2008):

1) The Altman Model

$$Z = 0.012X_1 + 0.014X_2 + 0.033X_3 + 0.006X_4 + 0.999X_5$$

where X1 - net working capital to total assets (a liquidi-ty ratio),

X2 - retained earnings to total assets (a profitability ratio),

X3 - operating profit to total assets (a profitability ra-tio),

X4 - market value of equity to book value of debt (a leverage ratio),

X5 - operating revenues to total assets (a turnover ra-tio).

This ratio is a stepwise multiple discriminant re-gression and was used e.g. by Gritta (1982) in fore-casting the insolvency of Braniff International Airways and Continental Airlines, several years before they filed for bankruptcy. Critical values of Altman Model are 1.81 and 2.99 – when the ratio is lower than 1.81, the company may be on the path of bankruptcy, while scor-ing more than 2.99 translates into a solvency profile.

2) The Altman ZETA Model

$$Zeta = a_1X_1 + a_2X_2 + a_3X_3 + a_4X_4 + a_5X_5 + a_6X_6 + a_7X_7$$

where

X1 - return on assets,

X2 - earnings stability (the deviation around a 10-year trend line of (X1),

X3 - debt service,

X4 - cumulative profitability (the same as X2 in Z Score)

X5 - liquidity (measured by the current ratio)

X6 - the ratio of equity to debt (using market values and a 5-year trend),

X7 - firm size (measured by the log of the firm's total assets).

This ratio is connected to the previously described method. The author developed its Altman Model by adding variables to the original method in order to in-crease the predictability. Every result lower than 0 may be considered as a stress situation of the company.

3) The AIRSCORE Model

AIRSCORE Model is a specific industrial (aviation) model based on three ratios, as in the formula:

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$$AIRSCORE = -.34140X_1 = .00003X_2 + .36134X_3$$

where

X1 – interest/total liabilities,

X2 – operating revenue per air mile,

X3 – shareholders' equity/total liabilities.

The conception of both economic growth and crisis are two complementary sides of the same coin. They are part of a broader theory of the reproduction in time of society. From the type of explanation of economic growth, it logically follows an explanatory theory of the reasons why the crisis occurs. Or expressed alternatively, an analysis of the crisis has implicitly not only a conception of economic growth, but of systemic reproduction, and thus, of the capitalist regime itself. The relevance of the concept of economic crisis is revealed by the fact that the theory of crisis establishes a division of the various schools of economic thought. And by extension, it supports the corresponding economic policy recommendations. According to Tome (2019), the crisis expresses the contradiction between the development of the productive forces and the social relations of production. In other words, it is the contradiction between use value and exchange value. This abstract tendency toward the crisis is theorized within the framework of ideal conditions: assuming that there is full physical availability of all kinds of goods and services, considering that any element susceptible to correction or improvement by the institutional framework has already been incorporated, the existence of a certain degree of human rationality, and that changes in prices respond to changes in production conditions. On the other hand, the explanation of the crisis requires integrating both levels: content and form, the essential and its way of manifesting the abstract and the concrete.

Data and Methods

Methods of financial analysis

The financial analysis consists of several stages. First, it estimates the dynamics of the balance sheet currency. At this stage, the state is assessed based on accounting reports. In this case, the totals will be called the balance sheet currency. After making calculations,

the balance sheet currency. After making calculations, the balance sheet is recommended to be verified with real forecasts. In addition, it is advisable to compare the change in the total volume of property for the reporting periods (year, quarter) with the data of the results of economic activity.

Following, the financial stability analysis is performed. Such a check provides understanding of whether the company has financial independence, whether it can maneuver its own capital and provide support for the production process without attracting borrowed funds. Sustainability analysis enables external investors to assess the company's prospects and its reliability. If the result is positive, it allows the company to get the necessary infusions faster.

Respectively, the solvency analysis consists in checking the company's ability to fulfill its obligations. Such an analysis is often called a liquidity test, that is, an assessment of the company's ability to convert its assets into real capital to meet its liabilities. The main reasons for low liquidity include errors in financial and economic activities, the presence of accounts receivable, problems with capital turnover, and so on.

Finally, the business activity analysis is conducted as an opportunity to be convinced of the rational use of personal funds by the company. The main indicators include the main parameters of turnover. The higher the rate of turnover of funds in monetary form, the greater the potential of the company. The main result of the calculations is the calculation of the turnover ratio (Morozova & Tikhonova, 2002).

The analysis of profitability ratios is carried out by studying the historical dynamics of change, direction, and rate. Profitability ratios are the main indicators characterizing the profitability of an enterprise and the effectiveness of its various elements. Profitability indicators are relative indicators, that is, they represent the ratio of income items to types of activities, sales volumes, property size, etc. In the process of analyzing the financial and economic activities of the enterprise, it is necessary to study the composition, structure, and dynamics of several indicators (assets and liabilities of the balance sheet, income, expenses, profit, etc.). The absolute change in indicators is calculated by the formula:

$$\Delta P_i = P_2 - P_1$$

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where

ΔP_i - the absolute change in the indicator,

P_2 - value at the end of the year,

P_1 - value at the beginning of the year.

Analyzing the dynamic range of absolute changes in indicators, we determine the direction of development (growth, decline). Relative change:

$$T_nP_i = (P_2)/P_1 * 100$$

where

T_pP_i - the rate of growth of the indicator.

The growth rate shows the percentage change of the compared level to the base or previous level of a few dynamics and allows us to determine the direction and nature of the relative change in the indicator.

To analyze the liquidity of the balance sheet depending on the degree of liquidity, i.e., the speed of transformation into cash, the assets of the enterprise can be divided into the following groups:

A1. Enterprise cash and short-term financial investments.

A2. Receivables.

A3. Inventories, value added tax and other current assets.

A4. Long-term assets.

Balance sheet liabilities are grouped according to the urgency of their payment:

P1. Accounts payable.

P2. Short-term borrowed funds and other short-term obligations.

P3. Long-term loans and borrowed funds, arrears of income to participants, deferred income and reserves for future expenses.

P4. Equity capital.

To determine the liquidity of the balance sheet, it is necessary to compare the results of the given groups by asset and liability.

The balance is considered absolutely liquid if the following ratios take place:

$$A1 > P1; A2 > P2; A3 \geq P3; A4 \leq P4$$

The fulfillment of the first three inequalities necessarily entails the fulfillment of the fourth inequality, therefore, it is practically essential to compare the results of the first three groups in terms of assets and liabilities. In the case where one or several inequalities have a sign opposite to that fixed in the optimal version, the liquidity of the balance to a greater or lesser extent differs from the absolute one. There are four main types of financial strength: absolute financial stability, normal financial stability, unstable financial position, and crisis financial situation. Absolute financial stability arises when an enterprise fully covers the need for commodity and production values from the account of own resources. In this case, the company covers its costs with its own funds and does not depend on creditors.

It is worth noting that this type of financial stability is rarely found, and mainly in small firms in terms of production and turnover.

This financial stability can be described by the formula:

$$M1 = (1, 1, 1): \Delta OCA > 0, ALS > 0, \Delta ACR > 0$$

where

ΔOCA - decrease (increase) of own circulating assets,

ΔALS - increase (decrease) in the number of long-term sources of financing and own funds,

ΔSCR - an increase (decrease) in the total value of the main source of coverage of reserves.

Normal (sufficient) financial stability arises when a firm finances its costs through long-term loans and its own funds. With this type of financial stability, the maximum efficiency of production activities is achieved. Normal financial stability is expressed by the formula:

$$M2 = (0, 1, 1): \Delta OCA < 0, ALS > 0, \Delta SCR > 0$$

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An unstable financial position occurs when an enterprise cannot cover its costs with its own funds and long-term loans and is forced to resort to short-term loans for production activities. For example, if a firm cannot acquire materials, for the continuity of the production cycle, and is forced to turn to borrowed funds (short-term loans, accounts payable) for their purchase, then such a company is in an unstable position. This situation may arise if the rate of conversion of the invested assets into real money (operating cycle) has slowed down.

It is worth noting that such a financial situation quite often occurs in firms and does not always lead to the collapse of the firm. At this stage, competent financial management, mobilization of assets and reserves should be a priority for the management. The precarious financial situation is expressed by the formula:

$$M3 = (0, 0, 1): \Delta OCA < 0, ALS < 0, \Delta SCR > 0$$

A financial crisis occurs when a firm has exhausted all possible sources of funding and is unable to pay for its obligations. In this case, the company expects bankruptcy or reorganization.

A crisis state is described by the following formula:

$$M4 = (0, 0, 0): \Delta OCA < 0, ALS < 0, \Delta SCR < 0$$

Further, the ratio analysis of liquidity and solvency is carried out. The solvency of the organization is characterized by liquidity ratios, which are calculated as the ratio of various types of working capital to the amount of urgent liabilities. Each type of working capital has its own liquidity, and liquidity ratios show what part of short-term liabilities the organization can repay if specific types of working capital are converted into money. There are the following liquidity ratios that characterize solvency, which are of interest not only to the management of the enterprise, but also to external subjects of analysis: the absolute liquidity ratio is of interest to suppliers of raw materials and materials, the quick liquidity ratio is for banks, and the current liquidity ratio is for investors.

The absolute liquidity ratio is determined by the ratio of cash and short-term financial investments to the total amount of short-term debts of the enterprise.

It shows what part of short-term liabilities can be repaid at the expense of available cash, the higher its value, the greater the guarantee of debt repayment. The overall picture of the company's solvency is supplemented by the presence or absence of overdue obligations, their frequency and duration.

Quick ratio is the ratio of cash, short-term financial investments and short-term receivables, payments for which are expected within 12 months after reporting date, to the amount of short-term financial liabilities. Usually the ratio of 0.7 - 1 is satisfied. However, it may turn out to be insufficient if a large share of liquid funds is accounts receivable, some of which are difficult to collect in a timely manner. In such cases, a larger ratio is required.

Overall liquidity ratio:

$$L1 = (A1 + 0.5 * A2 + 0.3 * A3)/(P1 + 0.5 * P2 + 0.3)$$

where

L1 - the absolute liquidity ratio.

It quantifies the ability of an enterprise to pay short-term liabilities on time using available current assets. The level of this coefficient should be > 1.

Absolute liquidity ratio:

$$L2 = (LF + SFI)/SL$$

where

L2 - the absolute liquidity ratio,

LF - long-term funds,

SFI-short-term financial investments,

SL - short-term liabilities.

This shows what part of short-term debt the organization can pay off in the near future at the expense of cash. The level of this coefficient should be > 0.2- 0.7.

Current liquidity ratio (total debt coverage ratio) - the ratio of the total amount of current assets, including inventories and work in progress, to the total amount of short-term liabilities. It shows the extent to which current assets cover current liabilities:

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$$L3 = (CA - DE)/(SL - DI - RFPE)$$

where

L3 - the current liquidity ratio,

CA - current assets,

DE- deferred expenses,

DI – deferred income,

RFPE - reserves for future payments and expenses.

This indicator shows what part of current loan and settlement liabilities can be repaid by mobilizing all working capital. The optimum is not less than 2.0.

The excess of current assets over short-term financial liabilities provides a safety margin to compensate for losses that an enterprise may incur when placing and liquidating all current assets other than cash. The greater the value of this reserve, the higher the confidence of creditors that the debts will be repaid. The value of the indicator can vary by industry and type of activity, and its reasonable growth over time is usually viewed as a favorable trend.

Thus, the main sources of a comprehensive analysis of the financial condition are the Balance Sheet and the Statement of Financial Results. The main methods of financial analysis are: time (horizontal) analysis, structural (vertical) analysis, trend analysis, analysis of relative coefficients, spatial (comparative) analysis, and factor analysis. The analysis consists of several main stages: assessment of the dynamics of the balance sheet currency, analysis of financial stability, analysis of solvency, analysis of business activity, analysis of profitability ratios.

Liquidity and solvency are certainly manageable variables. That is why accounting and forecasting of possible factors of restoring solvency are more reasonable. There are extraordinary measures to improve solvency, but their implementation takes a long time.

The main ones are:

1) increase in the authorized capital,

2) obtaining state financial support on a non-refundable or repayable basis from budgets of various levels. This source is associated with the fulfillment of a few conditions, in particular, with the availability of a financial recovery plan and other documents.

What are the factors of restoring solvency, at least in formal terms? From the algorithm for calculating the current liquidity ratio, it is easy to see that its growth in dynamics can be achieved either by reducing accounts payable, or by accelerating the growth of working capital (current assets). It is clear from the balance ratios that a reduction in accounts payable is not possible in itself - it is always accompanied by an equivalent reduction in current assets. Therefore, the only acceptable means of restoring solvency is to build up current assets at the expense of the results of economic activities with a simultaneous increase in the passive item 'profit'. The profit of an enterprise depends not only on the volume of production, but also on the volume of its sales. The financial results of the enterprise, its financial position, and solvency depend on the volume of sales. The point is not only to produce products, but also to sell them profitably, and in return to acquire the necessary means of production and material resources.

The aviation sector can as well be characterized by slightly more specific factors. According to research conducted by Tolkin (2010), there are four main ratios when considering a state of financial stability of an airline. The first one is current ratio – airlines should be able to cover their current debts with current assets. The next one is passenger revenue which should be of priority concern for managers and should be constantly optimized. There is no such issue with freight revenue, as that concept has been proven to be positive in the majority of cases. If an airline is able to earn even 1 cent more than its competition per passenger, this significantly improves their competitive advantage and increases passenger revenue. The third factor is labor efficiency – costs per employee should be decreased, which later may result in increase of revenue per employee and improved work satisfaction. Finally, probably the most important ratio of all the above-mentioned is breakeven load factor (BLF).

Methods and assessments of the likelihood of bankruptcy

Distinctive features of modern enterprises are the lack of working capital, low solvent discipline, an increase in the volume of barter transactions, and the high cost of credit resources. As a result of the actions of these and other factors, the enterprise does not have the means to fulfill its solvent obligations, including the payment of wages, and also the debts to the

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budget are growing. A significant number of enterprises are approaching bankruptcy or are already doing so.

Thus, today, more and more enterprises are faced with crises in their development, which leads to bankruptcy of many of them.

An important direction in the analysis of the financial condition of an organization is the assessment of the likelihood of its bankruptcy. In modern economic conditions, any enterprise needs to regularly assess its own solvency and determine the degree of threat of bankruptcy or the risk of losing existing financial stability. Timely notice of any imbalance and deviations from the norm in the structure of the balance sheet and the main indicators of economic activity can help the company avoid an unstable financial situation and possible bankruptcy. Kroeze et al. (2018) tested two bankruptcy prediction models aimed at corporations. They have chosen the Altman Z″-Score model, as well as a new model which was created was based on the first method mentioned. The new model has been improved by three additional variables – liquidity, cumulative profitability and solvency. Their findings highlighted that the Altman method was not specifically accurate, although the newly developed method could predict the bankruptcy up to four years before the filing.

Restoring the company's solvency is a priority goal of the bankruptcy procedure in relation to an enterprise that has signs of insolvency. Signs of high probability bankruptcy can be: non-fulfillment of obligations, suspension of payments, late payment of taxes, suspension of production, decrease in sales, dismissal of employees, delay in payment wages, or a high proportion of overdue accounts payable, etc. (Khitskov et al., 2006).

To diagnose the likelihood of bankruptcy, several approaches are used based on the application:

1) analysis of an extensive system of criteria and features,

2) a limited range of indicators,

3) integral indicators calculated using scoring models; multivariate rating analysis; multiplicative discriminant analysis.

In the practice of Western experts, a list of critical indicators is used to assess bankruptcy, which can be combined into two groups. The first group includes criteria and indicators, the current value of which or

dynamics indicate significant financial difficulties in the future, including bankruptcy:

1) recurring significant losses in the main,

2) production activities,

3) exceeding a certain critical level of overdue accounts payable,

4) excessive use of short-term borrowed funds as a source of long-term investments,

5) low values of liquidity ratios,

6) lack of working capital,

7) presence of overdue accounts payable,

8) potential losses of long-term contracts.

The second group includes criteria and indicators, the values of which do not give grounds to consider the current financial condition as critical, but under certain conditions and circumstances, if no action is taken, the situation may take an unfavorable development:

1) loss of key management staff,

2) forced stops and disturbances in the rhythm of the main production,

3) overdependence of the enterprise on one specific contract,

4) type of equipment, type of asset,

5) participation in court proceedings with unpredictable outcome,

6) underestimation of the need to constantly update the main funds,

7) as a result, the 'consumption' of the depreciation fund, etc. (Zimin, 2004).

The advantages of this system of indicators of possible bankruptcy include a systemic and integrated approach, and the disadvantages are a higher degree of complexity of decision-making in a multi-criteria task, with the subjectivity of a predictive decision.

The main obligations and responsibility of the organization, from the point of view of the bankruptcy procedure, is to fulfill its obligations in a timely manner and in full in the form of full repayment of all types of debts, as well as responsibility for late payment of

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mandatory payments and fulfillment of obligations to creditors (Slabinskaya & Kravchenko, 2017).

However, if the enterprise really faces bankruptcy, there are both negative and positive aspects in this situation. Sometimes this can lead to a better managed enterprise. Table 1 presents some of the positive and negative aspects of declaring an enterprise bankrupt.

Table 1: Positive and negative consequences of bankruptcy for enterprises

Positive consequences	Negative consequences
opportunity to start a new business	lenders lose some of their capital
ineffective managers and specialists will be replaced with more highly professional personnel, the business will be transferred to more reliable and competent management	the financial situation of the company's employees is deteriorating due to the long delay in the payment of wages, benefits, etc.
restoration of the financial stability of the company and its restructuring in order to create a more efficient and stable enterprise	jobs are reduced, social tension appears, as a result of which the ability to pay, and, consequently, the purchasing power of the population decreases
the closure of unprofitable industries, which leads to a decrease in costs and an increase in the efficiency of social production	a series of subsequent bankruptcies may occur, the so-called "domino effect"
release of resources involved in uncompetitive production	the likelihood of theft

Source: Zimin (2004).

The use of methods and models for forecasting and assessing the likelihood of bankruptcy can help in diagnosing the current financial condition of an enterprise and in a timely manner to prevent the onset of adverse consequences (Risin et al., 2004).Table 2 shows the models for assessing the likelihood of bankruptcy of enterprises with a detailed description of the indicators.

Table 2: Models for assessing the likelihood of bankruptcy

Models and its calculation formula	Used indicators
Altman's two-factor model $X = -0.3877 - 1.0736 * K1 + 0.0579 * K2$	K1– current liquidity ratio; K2 - the share of borrowed funds in liabilities
Altman's five-factor model $Z = 0.717K1 + 0.841k2 + 3.107K3 + 0.42K4 + 0.995K5$	K1 - equity / total assets; K2 - retained earnings / amount assets; K3 - profit before interest and taxes / amount of assets; K4 - equity / borrowed capital; K5 - sales proceeds / amount of assets.

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Spring gate model $Z = 1.03K1 + 3.07K2 + 0.66K3 + 0.4K4$	K1 - equity / total assets; K2 - profit before tax / assets; K3 - profit up to taxation / short-term obligations; K4 - revenue / total amount of all assets.
Fox model $Z = 0.063K1 + 0.092K2 + 0.057K3 + 0.001K4$	K1 - working capital / sum of all assets; K2 - profit from sales / the sum of all assets; K3 - retained earnings / the sum of all assets; K4 - equity / debt Capital
Davydova-Belikov model $Z = 8.38K1 + 1K2 + 0.054K3 + 0.63K4$	K1 - own circulating capital / sum of all assets; K2 - net profit / equity capital; K3 - revenue divided by the total amount all assets; K4 - net profit divided by Cost price
Zaitseva's model $Kfact = 0.25K1 + 0.1K2 + 0.2K3 + 0.25K4 + 0.1K5 + 0.1K6$	K1 - profit before tax, divided by equity; K2 - accounts payable divided for accounts receivable; K3 - short-term liabilities, divided by the most liquid assets; K4 - profit before tax, divided by revenue; K5 - debt capital divided by equity; K6 - assets divided by revenue

Source: Zimin (2004).

At the moment, there is no such model for forecasting bankruptcy that would be perfect. Each technique has its own advantages and disadvantages. Throughout many years of practical application of each of the above models, a number of shortcomings have been identified. Comparative analysis of these models is presented in Table 3.

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Table 3: Comparative characteristics of models for diagnosing the probability of bankruptcy

Model	Advantages	Disadvantages
Altman's two-factor model	Ease of calculation, the ability to use when conducting external analysis based on the balance sheet.	No consideration of industry and regional specifics of the functioning of economic entities.
Altman's five-factor model	The variables in the model reflect various aspects of the enterprise's activities, it is possible to dynamically predict changes in financial stability.	The model is applicable only to large companies that have placed their shares on stock market.
Springgate model	The model shows a sufficient level of forecast reliability.	There is no sectoral and regional differentiation of the Z-score. There is a fairly high correlation between the variables.
Fox model	All financial performance indicators depend on the value of assets, regardless of whether this item is income or expense. The model is based on the assumption that the more assets, the higher their liquidity.	When trying to apply the Fox model to the Russian in reality, the indicators may be incorrect and unnecessarily overestimated. This is due to the fact that in the Fox model, a high value belongs to the profit from sales excluding tax.
Model Davydova Belikova	The development mechanism and all the main stages of calculations are described in detail, which facilitates the practical application of the method. Developed on the basis of Russian statistics and determines the percentage of Bankruptcy probability.	Suitable for commercial enterprises. Methodology is suitable for predicting a crisis situation when its obvious signs are already noticeable, not in advance.
Zaitseva's model	Uses 6 financial variables as variables, indicators with certain standard values. Possibility of use in Russian conditions. Ease of interpretation of results.	The technique is not well described. There is a need to attract data load factors for previous periods, which limits the possibilities of using the model on external analysis.

Source: Rodionova (2001).

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Currently, in practice, there are no such methods of assessing company bankruptcy that would be flawless from a theoretical point of view. If we use these methods as a whole, taking into account all the pros and cons of each of these models, then it is absolutely realistic to give an accurate estimate of the probability of an enterprise bankruptcy.

Pjsc aeroflot: an overview

Before the research results will be presented, it is crucial to indicate the characteristics of the entity chosen for the study. Founded on March 17, 1923, Aeroflot is one of the oldest airlines in the world and one of the most recognizable Russian brands. It won in two nominations of the rating of the independent consulting company Brand Finance: it received the status of the strongest brand in Russia in 2020 among the leading Russian corporations and was also recognized as the strongest aviation brand in the world. The authors of the rating emphasize that the leading Russian carrier is one of the few in the global industry, which in crisis conditions managed to strengthen its position.

Aeroflot is one of the elite carriers in the global air transportation industry and it is the national carrier of one of the most influential countries in the world. Therefore, their financial stability and general position on the market, as well as the forecast for future expansion should be of great concern for researchers interested in the field. In 1989, they joined the International Air Transport Association (IATA). According to the rating of the reputable analytical agency Cirium (Great Britain), in 2020 Aeroflot entered the top three largest carriers in Europe in terms of the number of flights, ahead of such companies as Lufthansa and Air France. According to the report of the Center for Aviation Analytics CAPA, compiled in February 2021, Aeroflot Group has become the absolute leader in the restoration of traffic among European airlines against the backdrop of the novel coronavirus COVID-19 pandemic. As an indicator, the percentage of restored carrying capacities from the level of the corresponding period of the "dock" 2019 was used. In the first three months of 2021, Aeroflot carried 3.3 million passengers (52.8% less than in the same period in 2020). Passenger traffic amounted to 7.6 billion passenger-kilometers. The occupancy rate of passenger seats of Aeroflot airline amounted to 73.8% (+7.1 pp compared to the same period in 2020).In general, Aeroflot Group carried 7.4 million passengers in the first quarter of 2021 (32.5% less compared to the same period last year, excluding the results of Aurora Airlines in 2020). The operating results for three months and March 2021 were influenced by the dynamics of demand and significant restrictions on flights associated with the spread of coronavirus infection globally.

Data used in the research has been gathered from the official airline's website where the company publishes its financial data and commercial news, mainly for stakeholders and passengers. The period covered by the study is three corresponding years (2018-2020). Variables chosen for the research purposes will be presented graphically and finally implemented into the Altman's five-factor model to assess the solvency of Aeroflot.

Research results analysis

Analysis of the financial condition of a company includes the analysis of balance sheets and statements of financial results for the past periods to determine the main financial indicators. Financial analysis also serves as a basis for understanding the true position of the enterprise and the degree of financial risks. The results of financial analysis directly affect the determination of the goals of planning the activities of the enterprise for the following time periods (Kamenskaya & Zhdanova, 2015).

The horizontal analysis of the balance sheet is carried out by comparing the data at the end of the reporting period with the data at the beginning of the reporting period for each item in the report. The difference in absolute values is calculated and the relative change (rate of change) is calculated as the ratio of the calculated difference in readings at the end and beginning of the period to the value of the indicator at the beginning of the reporting period.
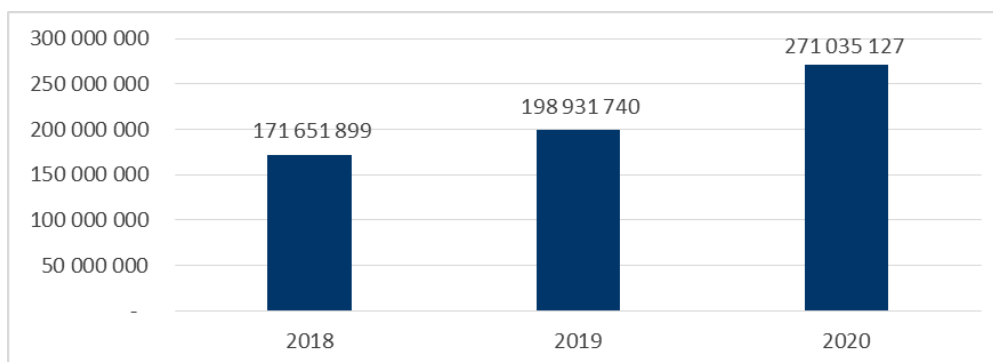
Vertical (structural) analysis of the balance sheet of an enterprise is a calculation of the ratio of each position of the report to the total value (balance sheet currency). Balance sheet structure data are calculated at the beginning and end of the reporting period.

The balance sheet of the enterprise characterizes the financial position of the enterprise; on its basis, the development potential of the enterprise inherent in the assets and the risk of insolvency are assessed, both in the short and long term.

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The statement of financial results provides an assessment of the efficiency of the enterprise and is necessary for the analysis of profitability and business activity. The share of the cost of goods sold amounted to 98.41%.In 2019, selling and administrative expenses in the revenue structure amounted to 5.89% and 2.37%. Compared to the previous period, the share of production costs decreased by 0.6%, and the share of selling expenses decreased by 0.02%, and the share of admin-istrative expenses decreased by 0.37%.The share of gross profit increased from 0.99% to 1.59%, due to an increase in the share of prime cost. The share of profit from sales decreased from 7.65% to 6.67%, due to an increase in the share of selling costs. The share of profit before tax decreased from 0.81% to 0.42%. Net profit in 2019 amounted to 5,286,800 thousand rubles (Figure 1 and 2).

Figure 1: Assets of Aeroflot airlines in years 2018-2020 (in thousand rubles)

Source: Aeroflot – Auditor's report https://ir.aeroflot.ru/fileadmin/user_upload/files/rus/reports/rsbu/2020/ras_12m2020.pdf(Access: 28.06.2021).

In the three consecutive years Aeroflot's assets have been increasing and the much more significant increase can be observed between 2019 and 2020. Generally, increase in assets may be interpreted as a company's growth, which is of no surprise in the aviation sector – the tendencies have highlighted constant expansion of the market up until March 2020.

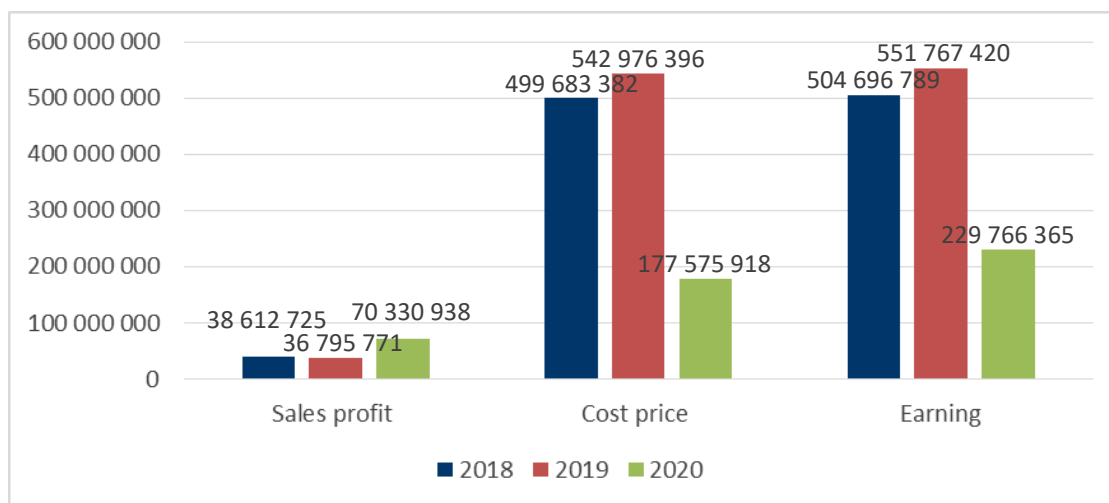**Figure 2: Sales revenue, cost price and sales profit of Aeroflot in years 2018-2020 (in thousand rubles)**
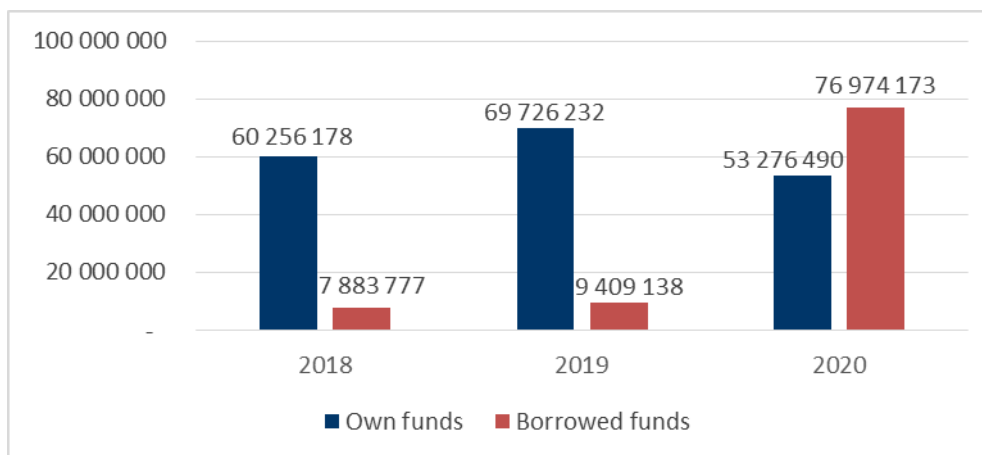

Source: Aeroflot – Auditor's report https://ir.aeroflot.ru/fileadmin/user_upload/files/rus/reports/rsbu/2020/ras_12m2020.pdf(Access: 28.06.2021).

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The main criterion for assessing financial stability is the ratio of own funds to borrowed funds. And here a certain balance should be maintained, in which the enterprise can work as efficiently as possible, but at the same time does not depend on borrowed funds. A visual representation of this relationship is shown in Figure 3.

Figure 3: Equity to debt ratio in years 2018-2020

Source: Aeroflot – Auditor's report https://ir.aeroflot.ru/fileadmin/user_upload/files/rus/reports/rsbu/2020/ras_12m2020.pdf (Access: 26.08.2021).

As can be seen from Figure 3, the company in 2021 saw a colossal increase in its borrowed funds.

In Table 4 included in the appendix, it can be seen that as of Dec 31, 2020, the organization's assets for the entire period under consideration increased slightly (by 39.73%). Noting this growth in assets, it is necessary to consider that equity capital increased even more - 2.20 times. This low increase in equity capital should be considered a positive factor.

In a market environment, any company can go bankrupt, but a skillful economic strategy, rational policy in the field of finance, investments, prices and marketing allow the company to avoid this and maintain business activity, profitability and a high reputation for many years as a reliable partner and manufacturer of quality products or quality services.

PJSC Aeroflot is the leader in civil aviation in Russia. The main activity of Aeroflot Group is passenger air transportation. At the end of 2017, the corporation occupied more than 40% of the Russian air transportation market in terms of passenger traffic. At present, PJSC Aeroflot places a special emphasis on new information technologies as a powerful means of improving the quality of customer service. The founder of PJSC Aeroflot is the Government of the Russian Federation, it owns 51.17% of the shares of PJSC Aeroflot, and about 41% belong to legal entities and individuals, including the company's employees.

To predict the possible bankruptcy of PJSC Aeroflot, the foreign five-factor model of E. Altman will be used. The initial data required for diagnosing the probability of bankruptcy using the five-factor model for PJSC Aeroflot are presented in Table 5.

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Table 5: Data for calculating the five-factor model

Indicator	2018	2019	2020
Current assets, thousand rubles	105 434 016.00	124 624 352.00	173 492 749.00
Amount of assets, thousand rubles	171 651 899.00	198 931 740.00	271 035 127.00
Retained earnings, thousand rubles	65 848 670.00	68 284 001.00	28 200 730.00
Operating profit (profit before tax), thousand rubles	4 082 708.00	2 317 013.00	123 149 777.00
Debt	82 150 336.00	104 635 508.00	81 570 945.00
Market value of shares (share capital), thousand rubles	60 256 178.00	69 726 232.00	53 276 490.00
Revenue, thousand rubles	504 696 789.00	551 767 420.00	121 703 971.00
X1 (ratio of working capital to assets)	0.61	0.63	0.64
X2 (ratio of retained earnings and assets)	0.38	0.34	0.10
X3 (ratio of operating profit and total assets)	0.02	0.01	0.45
X4 (ratio of market value of shares to debt)	0.73	0.67	0.65
X5 (revenue to assets ratio)	2.94	2.77	0.45

Source: Official website of PJSC Aeroflot, https://ir.aeroflot.ru/ru/reporting/annual-reports/(Access: 28.06.2021).

Aeroflot using a five-factor model:

$$Z_{2018} = 1.2 * 0.61 + 1.2 * 0.38 + 3.3 * 0.02 + 0.6 * 0.73 + 2.94 = 4.63$$

$$Z_{2019} = 1.2 * 0.63 + 1.2 * 0.34 + 3.3 * 0.01 + 0.6 * 0.67 + 2.77 = 4.37$$

$$Z_{2020} = 1.2 * 0.64 + 1.2 * 0.10 + 3.3 * 0.45 + 0.6 * 0.65 + 0.45 = 0.38$$

Based on a five-factor E. Altman model, it might be concluded that the company PJSC Aeroflot as of 31.12.2020 was financially not stable, as there is a downward trend in the Z index, which cannot but alert us to the condition.

Conclusions

As a result of the thesis, it was revealed that the financial condition is the most important characteristic of the economic activity of the enterprise. It determines the competitiveness of an enterprise, its potential in business cooperation, and assesses the extent to which the economic interests of the enterprise itself and its partners in financial and other relations are guaranteed.

The study showed that solvency and financial stability are the most important characteristics of the financial and economic activity of an enterprise in a market economy. If an enterprise is financially stable, solvent, it has an advantage over other enterprises of the same profile in attracting investments, in obtaining loans, in choosing suppliers and in the selection of qualified personnel. Finally, it does not come into conflict with the state and society, since it pays taxes to the budget, contributes to social funds, pays wages to workers and employees, pays dividends to shareholders on time, and guarantees the return of loans and payment of interest on them to banks. The higher the

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stability of an enterprise, regardless of an unexpected change in market conditions, the less the risk of being on the verge of bankruptcy.

For Aeroflot, as of December 31, 2020, the residual value of fixed assets amounted to 7,140,577 thousand rubles. Decrease in the indicator in "Fixed assets" in 2020 was in the amount of 1 310 979 thousand rubles or 15.51%.

As of December 31, 2020, the residual value of profitable investments in tangible assets amounted to 721,487 thousand rubles (as of 31.12.2019 - 756 791 thousand rubles, as of 31.12.2018 - 522 530 thousand rubles). Decrease in the indicator "Profitable investments in material assets" in 2020 was in the amount of 35 304 thousand rubles or by 4.66%.

As of December 31, 2020, capital investments in fixed assets amounted to 4,371,978 thousand rubles (as of 31.12.2019 - 3,894,521 thousand rubles, as of 31.12.2018 - 3,799,813 thousand rubles). Increase in capital investments in fixed assets in 2020 was in the amount of 477,457 thousand rubles. or 12.26%. Increase in the value of fixed assets in 2020 was by 80,982 thousand rubles.

The cost of inventories, taking into account the created reserves for the decline in the cost of tangible assets, as of December 31, 2020 amounted to 13,226,345 thousand rubles (as of 31.12.2019 - 10,204,178 thousand rubles, as of 31.12.2018 - 9,363,819 thousand rubles). The authorized capital of PJSC Aeroflot as of December 31, 2020 is 2,444,535,448 rubles. As of 31.12.2019 and 31.12.2018, the authorized capital was 1,110,616,299 rubles.

This financial analysis of PJSC Aeroflot based on a five-factor model of E. Altman, may conclude that the company as of 31.12.2020 is financially not stable, and was on a downward trend in the Z index. Such an outcome can be explained by the strongest decline in demand which affected the load and efficiency of the aircraft fleet because of COVID-19. Aircraft which have been in use during the highest demand times had to be leased or grounded for an unspecified amount of time. For the 12 months of 2020, the Group transported 30.2 million passengers, which is 50.3% fewer than the result of the same period in 2019.The percentage of occupancy of passenger seats in the Group decreased by 8.3 p.p. compared to the same period last year and amounted to 73.6%.The Group's passenger turnover decreased by 56.5% compared to the same period last year. The Altman Model results calculated in the study confirmed that Aeroflot is not in a stable position, which could have been observed on the market. The correlation between calculation and observative reality can be considered as a demonstration of the continuous applicability of the Altman Model to assess financial situation and predict future trends.

Taking into account that aviation is one of the first sectors which was affected by COVID-19, it is a main reason of why the company is facing such financial issues as of 31.12.2020. It could be considered a temporary challenge. Moreover, not only Aeroflot company, but diverse businesses are struggling and continuing to fight the pandemic in order to survive today.

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Appendix 1

Table 4: Property structure and sources of its formation

Index	Indicator value			In % to the balance currency		Change for the analyzed period	
Active							
	2018	2019	2020	31.12.18	31.12.20	thousand roubles	± %
1. Non-current as-sets		74 307 388	97 542 378	-	26.46	97 542 378	
fixed assets	13 031 367	12 346 077	11 512 514	7.59	3.12	(1 518 853)	0.88
intangible assets	40 946	543 413	486 263	0.02	0.13	445 317	11.88
2. Negotia-ble, total	171 651 899	198 931 740	271 035 127	100.00	73.54	99 383 228	1.58
reserves	9 363 819	10 204 179	13 226 345	5.46	3.59	3 862 526	1.41
accounts receivable	82 150 336	104 635 508	81 570 945	47.86	22.13	(579 391)	0.99
cash and short-term financial in-vestments	9 871 604	7 481 583	76 249 435	5.75	20.69	66 377 831	7.72
Passive							
1. Equity capital	1 110 616	1 110 616	2 444 535	0.65	0.66	1 333 919	2.20
2. Long-term liabilities, total	7 883 777	9 409 138	76 974 173	4.59	20.88	69 090 396	9.76
borrowed funds	6 918 282	7 570 486	22 826 243	4.03	6.19	15 907 961	3.30
3. Current liabilities, total	103 511 944	119 796 370	271 035 127	60.30	73.54	167 523 183	
borrowed funds		12 524 022	25 536 113	-	6.93	25 536 113	
Balancecurrency	171 651 899	273 239 128	368 577 505	100.00	100.00	447 362 230	39.73

Source: Aeroflot – Auditor's report https://ir.aeroflot.ru/fileadmin/user_upload/files/rus/reports/rsbu/2020/
ras_12m2020.pdf(Access: 26.08.2021).