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ERRONEOUS PREDICTIONS RISK IN CORPORATE BUDGETING SYSTEMS OF RUSSIAN COMPANIES

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Abstract

The article presents the rationale for updating the risk management tools of Russian corporations in the context of the trade wars' expansion, increased protectionism and sanction pressure. Today diminishing financial risks and threats as well as prevention their possible consequences are the factors allowing smooth adaptation of the Russian industrial-transport corporations to new restrictions. The authors show the nature of managerial information misrepresentation and associated risks when using the traditional methodology for factor analysis of JSC "Russian Railways" income in the context of inflation. Based on the results of income factor analysis, it was concluded that the use of various methodological tools, in particular the traditional methodology and the methodology using inflation correctors, leads to significant differences in professional judgments about the reasons of change in income. This situation complicates managerial decision making when choosing an effective dividend policy in corporations, including those with state share. The authors present the evidence base of the need to improve the methodological tools for factor analysis of cash flows, traditional in Russian practice, and their adaptation to new macroeconomic environment to minimize the risk of generating inferior managerial information. The practical application of inflation analysis techniques to key indicators of corporation's financial statements minimizes the risks of forecast distortion, creates an evidence base to assess the expected income and profit taking into account the impairment of cash flows and optimizes dividend policy. Such information becomes the most valuable in current and medium-term budgeting and in strategic corporative planning.

Keywords: Misrepresentation risks, factor analysis methods, financial statements, inflation, freight transportation, passenger transportation

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1. Introduction

Against the backdrop of the trade wars expansion, protectionism rise and sanction pressure, solving actual problems of the Russian companies' risk management becomes one of the factors providing their smooth adaptation to new restrictions. Such tasks are significantly complicated due to inflation which reduces reliability of the corporations' key financial indicators analysis, and causes errors and failures in forecasts at the stages of budgeting and long-term financial planning.

The main purpose of budgeting as a financial management tool is to provide benchmarks and to coordinate the company's management amid transforming relations of the business unit and its environment. As a result of such changes, objectively occurring and fundamentally unrecoverable uncertainties are identified as integral or native risk factors (Karlina et al., 2009). The integral factors of macroeconomic level include the exchange rate of the rouble against world currencies; inflation rate; change of the discount rate of the Central Bank of Russia, LIBOR, MIBOR; tax burden; climate conditions. Underestimation of macroeconomic risk factors increases the microeconomic risk factors' negative impact probability, which, according to (Karlina et al., 2009), include professional errors of the executive staff and errors in business processes, for example, unreasonable targeting and erroneous forecasts in the budgeting process. It is known that such forecasts are based of the factor analysis results of general budget, including the company's forecast annual financial statements.

The ways of taking into account the risks of price dynamics particularly due to inflation in the financial forecasts became the subject of scientific interest long enough. This interest is supported by multiple works, for example (Ilter & Cenap, 2012; Paquet, 1986; Richard, 1993; Shim & Siegel, 2007), suggesting the approaches for adjustment.

Despite the fact that, currently, traditional methods of the factor analysis of key financial indicators are used widely, their use in conditions of significant inflation can lead to unreliable results and erroneous strategic decisions (Dedyukhina, 1998). Some possible distortion in accounting caused by inflation and the ways for reflecting inflation in statements were earlier described in (Flynn, 1977; Vancil, 1976). It should be mentioned that Flynn (1977) wrote that though public and corporative decisions are bound to be better when they are based on more factual, realistic, and straightforward information about business results business community is unenthusiastic about methods of inflation accounting.

The objective of the paper is to demonstrate discrepancies of financial forecasts resulted from not taking into account the inflation and substantiation this way the need for improvement methodical approach popular in the Russian practice of financial analysis.

2. Methods

To show the roots of distortions, the results of the traditional forecast method taking into account only the price index popular in Russian practice of financial analysis, described in (Voitolovsky et al., 2014), are compared with the results of the method which alongside the price index supposes the inflation adjustment. The methods were applied for operating revenue factor analysis, which is represented by the sales revenue in the official annual financial statements.

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To determine the reasons of changes in revenue and to show discrepancies in professional judgments dependent on inflation adjustment the methods were applied to the reporting figures of JSC "Russian Railways" by business segments of freight, and long-distance passenger transportation. The data from Ernst & Young, (2019) and Rosstat (2018) and official website of Russian State statistic *www.gks.ru* were used.

3. Results

The method of factor analysis described in Voitolovsky et al. (2014) allows estimating impacts of changes in the physical volume of goods transported and changes in the average cost of transportation of one ton of freight on total revenue in the certain business segment (table 1).

Table 1. Results of revenue factor analysis for the "freight" business segment of JSC "Russian Railways" using traditional method

Indicator	Reference year 2017, R_0, billion rubles	Reported sales volume in reference year prices, R^*, billion rubles.	Reporting year 2018, R_1, billion rubles.
1. Revenue for the 'freight' segment.	1367.3	1454.5 : 1.05 = 1385.2	1454.5
2. Revenue growth due to changes in the physical volume of goods transported	$R^* - R_0$ =1385.2 - 1367.3 = 17.9		-
3. Revenue growth due to changes in the average cost of transportation of one ton of freight	-	$R_1 - R^*$ = 1454.5- 1385.2 = 69.3	
4. Total revenue growth due to changes in two factors	$R_1 - R_0$ = 1454.5 - 1367.3 = 17.9 + 69.3 = 87.2		
5. Rate of changes in sales revenue (%)	$R_1 : R_0$ x 100 – 100 = 1454.5 : 1367.3 x 100 = 106.4%.		

Source: compiled by the authors based on (Voitolovsky et al., 2014) and data from (Ernst &Young, 2019)

In our case, we use the data from the annual financial statements of JSC "Russian Railways" for 2017-2018, when inflation in Russia was moderate, which nevertheless makes the significant discrepancies in the results of the analysis. The results of calculating the impact of two factors, which are changes in the physical volume of goods transported and changes in the average cost of transportation of one physical unit of freight (Rosstat, 2018), on the change in revenue for the 'freight' segment of JSC "Russian Railways", taking into account the index of changes in rates for freight transportation in 2018 in the amount of 1.05, are presented in table 1. Updated results of calculations of the impact of the same factors on the change in revenues of JSC "Russian Railways", taking into account the influence of the inflation factor, are presented in table 2. In this case, we used indicators of annual inflation rates in Russia in 2017-2018, calculated on the basis of consumer price indices, as inflation adjusters: 2.52 % in 2017; 4.3% in 2018.

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Table 2. Updated results of factor analysis for revenues in the 'freight' segment of JSC "Russian Railways", taking into account inflation adjusters

Indicator	Reference year 2017 R_0, billion rubles	Reported sales volume in reference year prices, R^*, billion rubles	Reporting year 2018, R_1, billion rubles
Revenue for 'freight' business segment	1367.3 : 1.0126 x 1.043 = 1408.3	1454.5 : 1.05 : 1.0215 = 1356.1	1454.5: 1.0215 = 1423.9
2. Revenue growth due to changes in the physical volume of goods transported	$R^* - R_0$ =1356.1- 1408.3 = - 52.2		-
3. Revenue growth due to changes in the average cost of transportation of one ton of freight	-	$R_1 - R^*$ = 1423.9 - 1356.1 = 67.8	
4. Total revenue growth due to changes in two factors	$R_1 - R_0$ = 1423.9 - 1408.3 = - 52.2 + 67.8 = 15.6		
5. Rate of changes in sales revenue (%)	$R_1 : R_0$ x 100 = 1423.9 : 1408.3 x 100 = 101.1 %.		

Source: compiled by the authors based on (Dedyukhina, 1998; Dedyukhina, 2016; Richard, 1993) and data from (Ernst &Young, 2019)

An inflation adjuster is a multiplier that provides a reduction of the indicator characterizing the cash flow for the analyzed period to the purchasing power of the monetary unit established at a certain point of time (reporting date), taking into account the spike in inflation. Given that performance indicators of the company's annual financial statements, characterizing the inflows and outflows of funds, are not generated instantly, but on a cumulative total and relatively smoothly over the year, the level of the spike in inflation, as well as the value of the inflation adjuster for these cash flows, should "be moved" to the middle of the year in order to obtain correct results of comparisons of these indicators (Dedyukhina, 2016).

Table 3. Results of revenue factor analysis for the 'long-distance passenger transportation' business segment of JSC "Russian Railways" using traditional method

Indicator	Reference year 2017, R_0, million rubles	Reported sales volume in reference year prices, R^*, million rubles.	Reporting year 2018, R_1, million rubles
1. Revenue for the 'passenger transportation' segment	17.2	19.8 : 1.017 = 19.5	19.8
2. Revenue growth due to changes in the number of passengers transported	$R^* - R_0$ = 19.5 – 17.2 = 2.3		-
3. Revenue growth due to changes in the average cost of transportation per passenger	-	$R_1 - R^*$ = 19.8 - 19,5 = 0,3	
4. Total revenue growth due to changes in two factors	$R_1 - R_0$ = 19.8 – 17.2= 2.3 + 0.3 = 2.6		
5. Rate of changes in sales revenue (%)	$R_1 : R_0$ x 100 = 19.8 : 17.2 x 100 = 115.1%		

Source: compiled by the authors based on (Voitolovsky et al., 2014) and data from (Ernst &Young, 2019)

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Thus, depending on whether the cash flow indicator of the analyzed period is influenced completely by the spike in inflation or partially, as it is formed, the inflation adjuster we use will take one of the following two modifications:

$$A_{infl.} = 1 + iorA^*_{infl} = (1 + 0.5\,i),$$

where i is the inflation change index for the period.

In our example, the inflation adjuster A_{infl} equal to 1.0252 is used to provide a comparable form at the reporting date of the cash flow of the reference year, formed before the period of the spike in inflation in 2018, and inflation adjusters A^*_{infl} of 1.0126 and 1.0215 are used to provide a comparable form of cash flows of the reference and reporting periods evenly formed in the process of growing inflation, and thus taking into account their "movement" to the middle of the year (Dedyukhina, 2016).

Similar analytical procedures also provide data on the reasons of changes in revenue for the 'passenger transportation' segment (table 3, table 4).

Table 4. Updated results of factor analysis of revenues for the long-distance passenger transportation segment of JSC "Russian Railways", taking into account inflation adjusters (Karlina et al., 2009; Paquet, 1986)

Indicator	Reference year 2017, R_0, million rubles	Reported sales volume in reference year prices, R^*, million rubles	Reporting year 2018, R_1, million rubles
1. Revenue for the 'passenger transportation' segment	17.2 : 1.0126 x 1.043 = 17.7	19.8 : 1.017 : 1.0215 = 19.1	19.8 : 1.0215 = 19.4
2. Revenue growth due to changes in the number of passengers transported	$R^* - R_0 = 19.1 – 17.7 = 1.4$		-
3. Revenue growth due to changes in the average cost of transportation per passenger	-	$R_1 - R^* = 19,4 – 19.1 = 0.3$	
4. Total revenue growth due to changes in two factors	$R_1 - R_0 = 19.4 – 17.7 = 1.4 + 0.3 = 1.7$		
5. Rate of change in sales revenue (%)	$R_1 : R_0$ x 100 = 194 : 17.7 x 100 = 109.6%		

Source: compiled by the authors based on (Dedyukhina, 1998; Dedyukhina, 2016; Richard, 1993) and data from (Ernst &Young, 2019)

The results of application both methods are summarized in the table 5, where the discrepancies are evident and significant.

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Table 5. Summary table of the factor analysis results on the revenue of JSC "Russian Railways" in 'freight' segment

Factor influencing the change in revenues	Amount of the influence of the factor according to table 1		Amount of the influence of the factor according to table 2	
	billion rubles	%% against R_0	billion rubles	%% against R_0
1. Change in the physical volume of transported goods	17.9	1.3	- 52.2	- 3.7
2. Change in the average cost of transportation of one ton of freight	69.3	5.1	67.8	4.8
3. Total impact of two factors on the change in revenues of the 'freight' segment	87.2	6.4	15.6	1.1
4. Assessment of the risk of erroneous forecasts when developing current and medium-term operational budgets for the 'freight' segment	The initial data are not updated taking into account the risk factor. Maximum risk of erroneous forecasts.		The initial data are updated taking into account the risk factor. Minimum risk of erroneous forecasts	

Source: compiled by the authors based on the data from tables 1, 2.

The results of calculating the amount of the impact of two factors which are changes in the number of passengers transported and changes in the average cost of transportation per passenger on the change in the revenue for this segment in relation to the reporting figures of JSC "Russian Railways", taking into account the index of changes in long-distance passenger fares in 2018 in the amount of 1,017 are presented in table 3. The updated results of calculations for the amount of the impact of the same factors on the change in the revenue of JSC "Russian Railways" taking into account the influence of the inflation factor are presented in table 4.

Table 6. Summary table of the factor analysis results for the revenue of JSC "Russian Railways" in the segment of 'long-distance passenger transportation'

Factor influencing the change in revenues	Amount of the factor influence according to table 3		Amount of the factor influence according to table 4	
	million rubles	%% against R_0	million rubles	%% against R_0
1. Change in the number of passengers transported	2.3	13.4	1.4	7.9
2. Change in the average cost of transportation per passenger	0.3	1.7	0.3	1.7
3. Total impact of two factors on the change in revenues of the 'passenger transportation' segment	2.6	15.1	1.7	9.6
4. Assessment of the risk of erroneous forecasts when developing current and medium-term operational budgets for the 'passenger transportation' segment	The initial data are not updated taking into account the risk factor. Maximum risk of erroneous forecasts.		The initial data are updated taking into account the risk factor. Minimum risk of erroneous forecasts	

Source: compiled by the authors based on the data from tables 3, 4.

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The values of the indicators in summary tables 5 and 6 show that the results of factor analysis of JSC "Russian Railways" revenue by business segments differ significantly depending on the methodology used, which leads to confusing professional judgments and discrepancies in the estimates of possible consequences that will be taken into account to develop operational and investment budgets for each segment (table 7).

High risks of incorrect forecasts in the development of current and medium-term budgets for the 'freight' sector are due to the fact that corrective action of the analyst, when traditional method of analysis of revenue changes is used, is based on the overvalued positive impact of higher turnover upon profitability of the segment in the amount of 1.3% while in comparable estimation this factor decreased the value of the revenues from transportation for the amount of 3.7%. The real estimate overvalued the favorable effect of the increase in total revenue from transportation in the amount of 6.4%, while in a comparable estimate this increase was only 1.1% compared to the level of the previous year.

High risks of erroneous forecasts in current and medium-term budgets for the 'long-distance passenger transportation' segment are explained by the fact that the analyst's corrective actions in case of using of the traditional method of analyzing the reasons for changes in revenues will be based on an overestimated positive impact of the growth in the number of passengers transported on the segment's profitability of 13.4% and an overestimated favorable increase in the total revenue from transportation of 15.1%.

To eliminate the impact of the risk-generating inflation factor, it is necessary to use the updated values of the number of passengers transported on the segment's profitability of 7.9%, taking into account the factor of money supply depreciation and the growth of the effective revenue in the passenger transportation segment by 9.6% compared to last year.

The data systematized in table 5 provide the basis for the following reasoning. Assessment of the dynamics of revenues from freight traffic of JSC "Russian Railways" using traditional methods of factor analysis is unreasonably high, does not reflect the real position of the company on the transport services market, since "seeming" revenue growth of 6.4% arises simply because comparable financial statements are expressed in monetary units of different purchasing power due to high inflation.

Table 7. Discrepancies in professional judgments based on the results of the factor analysis of the revenues of JSC "Russian Railways" by 'freight' and 'long-distance passenger transportation' business segments

Adherence to a certain analysis method	Interpretation of management information based on the results of factor analysis of the "revenue" indicator (professional judgment)
1. Conclusion based on the results of factor analysis of revenues for the 'freight' segment according to the traditional method of Russian authors (taking into account the index of changes in freight tariffs, without inflation adjusters) (Voitolovsky et al., 2014)	The revenues of JSC "Russian Railways" for the 'freight' segment in the reporting year increased by RUB 87.2 billion, or 6.4%, compared to the reference year. At the same time, the increase in the physical volume of transported cargo contributed to the increase in the segment revenues by RUB 17.9 billion, or 1.3%, while the increase in the average cost of 1 ton of transported cargo contributed to the increase in revenues by RUB 69.3 billion, or 5.1%.

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2. Conclusion based on the results of the factor analysis of the revenues for the 'freight' segment according to the updated methodology (taking into account the index of changes in tariffs for cargo transportation and inflation adjusters) (Dedyukhina, 1998; Dedyukhina, 2016; Richard, 1993)	The revenues of JSC "Russian Railways" for the 'freight' segment in the reporting year increased by RUB 15.6 billion, or 1.1%, compared to the reference year. At the same time, the decrease in the physical volume of transported goods contributed to the decrease in the segment revenues by RUB 52.2 billion, or 3.7%, and the increase in the average cost of 1 ton of transported cargo contributed to the increase in revenues by RUB 67.8 billion, or 4.8%.
3. Conclusion based on the results of factor analysis of the revenues for the 'long-distance passenger transportation' segment according to the traditional method of Russian authors (taking into account the index of changes in passenger transportation fares, without inflation adjusters) (Voitolovsky et al., 2014)	The revenues of JSC "Russian Railways" for the 'passenger transportation' segment in the reporting year increased by RUB 2.6 billion, or 15.1%, compared to the reference year. At the same time, the growth in the number of passengers contributed to the increase in the segment revenues by RUB 2.3 billion, or 13.4%, and the increase in the average cost of transportation per passenger contributed to the increase in revenue of RUB 0.3 billion, or 1.7%.
4. Conclusion based on the results of the factor analysis of the revenues for the 'long-distance passenger transportation' segment according to the updated methodology (taking into account the index of changes in passenger transportation fares and inflation adjusters) (Dedyukhina, 1998; Dedyukhina, 2016; Richard, 1993)	The revenues of JSC "Russian Railways" for the 'passenger transportation' segment in the reporting year increased by RUB 1.7 billion, or 9.65%, compared to the reference year. At the same time, the decrease in the number of passengers transported contributed to the decrease in the segment revenues by RUB 1.4 billion, or 7.9%, while the increase in the average cost of transportation per passenger contributed to the increase in revenues by RUB 1.7 billion, or 9.6%.

Source: compiled by the authors based on the data from tables 5, 6.

Therefore, their comparison, even if the index of growth of tariffs for freight is used, does not make sense, and cannot be used as an evidence base for solving professional problems both in the system of short-term budgeting and at the level of long-term strategic planning (Dedyukhina, 2016). These tasks include assessing of the transport company's yield curve risk and the downside risk, reputation risks of JSC "Russian Railways", justification for its dividend policy, and evaluating of the business value. Similar professional judgments are formed based on the analytical information presented in table 7.

4. Discussion

In our opinion, the results obtained according to the methodology using inflation adjusters most accurately reflect the real accomplishments of JSC "Russian Railways" in the field of managing revenues from its core business. The reasonableness and relevance of using this approach for solving professional tasks is confirmed by the comparability of the analysed indicators. Thus, discrepancies in professional judgments based on the results of the analysis of the financial statements of the joint-stock company that arise when using different methods create prerequisites for improving traditional methodological approaches and adapting them to new conditions of the macroeconomic environment, minimizing the risks of generating incomplete analytical information for various groups of its users.

Using the results of inflation analysis in current, medium-term budgeting and strategic planning systems will allow the management of corporate structures to minimize the risks of distortion of forecast

management information, to form an evidence base for justifying the expected financial indicators and their integration with the process of building of a risk-resistant organizational structure to manage investment and operating flows of transport complex corporations.

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