

Assessment and Minimization of Risks to the Budgets of Russia's Regions

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Abstract

This article examines the concept of budgetary risk, lays out specific approaches towards assessing risks to the fulfillment of regions' budgets and minimizing (managing) risks to the budget's revenue part, provides an assessment of risks to the budgetary system of an RF constituent, and summarizes the reasons behind them and possible ways of minimizing them. Based on data on an RF constituent's budget fulfillment, the author calculates the level of risk across groups of revenues and expenditures, conducts an analysis of the budgetary entropy of expenditure, and provides a rationale for the need to use budgetary risk indicators in planning out the regional budget reserve fund.

Keywords: sub-federal budget, budgetary process, budgetary risk, deficit, budget fulfillment, risk assessment methods, reserve fund

1. Introduction

Processes related to reforming Russia's budgetary system set for administrative authorities objectives aimed at boosting the efficacy of decisions made. The broadening of planning horizons, the crisis phenomena of recent years, as well as a number of other factors, provide a rationale for the emergence of budgetary risks as facts of the deviation of target indicators for the region's revenue and expenditure from the actual ones. This being the case, the determination of specific approaches towards identifying, assessing, and minimizing budgetary risks is considered a topical issue today.

Questions to the management of public revenue and expenditure in terms of risk and uncertainty are studied by many Russian and foreign scientists (Aart, 2014; Cortuka, 2013; Gaizatullin et al., 2014; Jeffrey & Miran, 2012; Lysandrou, 2013; Ferrari & Manzi, 2014; Bank & Suglobov, 2014).

At present, there is a lack of theoretical, methodological, and regulatory work on these crucial issues. Virtually all publications have pointed out that the very concept of budgetary risk remains open for discussion and debate. Besides, the introduction of various criteria for classifying these risks can be deemed excessive, while traditional methods for assessing them are not always applicable in the practice of planning out and fulfilling budgets.

2. Method

Science-based management measures fiscal risks with a view to practical applications suggest holding their numerical estimates. The choice of methods to assess fiscal risks is affected by the likelihood of quantitative assessments, the possibility of a qualitative assessment, the adequacy of the initial information.

The magnitude of the risk is measured, on the one hand, the average expectation, on the other hand the variability of possible results (revenues, expenses). Average expectation - a value of income and expenditure of the budget, which is due to the uncertain economic situation. Variability is a possible result of the degree of deviation of the expected value of income and expenditure budget from their mean value. Qualitative analysis allows to identify the causes of fiscal risks. Methods proposed by the authors estimate fiscal risks based on the use of statistical methods and includes three stages. In the first phase held approximation (smoothing of the curve) of the time series of statistical data on deviations of actual values of income and expenditures from their planned values. In order to smooth the time series used polynomials of second and third order.

In the second stage, using the coefficient of determination is calculated relative mean square error of approximation, expressed in percentage, largest of which assessed the risk budget.

At the third stage the entropy as a measure of the cost of uncertainty state spending budget system. One of the methods of optimal control of fiscal risks is to adjust the parameters so that the entropy costs remained constant or decreased.

3. Results

An essential characteristic of budgetary risk, in our view, is the unpredictability of whether the budget will be fulfilled in terms of revenue and expenditure - and whether there is going to be over fulfilling or underfinancing, at that. Risks themselves arise both in the process of formation and fulfillment of the budget. Having said that, the RF regulatory framework regulating budgetary legal matters does contain information on the legal foundations and structure of the budgetary process, but it does not set out the methodology of assessing budgetary risks. The organization of the budgetary process based on the system of mid-term (three-year) budget planning in regions is a confirmation to that.

A comparison of the results of the actual fulfillment of revenue (expenditure) with the those in the first edition of the Law on the Budget of Krasnoyarsk Krai as at the 2011-2013 period-end leads us to infer that the region's financial management's weakness is not only mid-term but expeditious budget planning. That being the case, the presence of the risk of failure to fulfill the destinations of the budget calls for its quantitative assessment and minimization.

For reduce budgetary risks to the revenue part of Krasnoyarsk Krai's budget, the region needs a set of activities aimed at altering the mechanism of operation of participants in the budgetary process with a view to creating efficacious stimuli for more efficient work, as well as implementing measures for increasing tax receipts into the budget.

The budgetary entropy of expenditure in the budget of Krasnoyarsk Krai has revealed an unstable trend for this indicator. Thus, for instance, the high uncertainty around the policy related to Krasnoyarsk Krai budget expenditure corresponds to the maximum value of entropy in 2014. Over the next two years, the situation is expected to stabilize. However, in such areas of expenditure as servicing the state and municipal debt, education, and general state issues, we observe an increase in entropy.

The logical to take account of budget risk indicators in forming the minimum size of the reserve fund. In this case, the reserve fund will be just a method for accepting budgetary risk, i.e. a way to finance budget losses. There is no doubt that managing such risks should include minimizing budget losses.

4. Discussion

4.1 *The Definition of Fiscal Risk*

The most commonly employed in economics literature approach towards interpreting budgetary risk is to define it as the probability of actually fulfilled budget revenues and expenditures deviating from initially planned ones (Gamukin, 2012; Kayuchkina, 2010; Yanov, 2011).

Broadly interpreted, budgetary risks are viewed as the probability of one failing to fulfill activities related to budget planning and budgetary policy due to failures in the movement of budgetary resources and their proportions (Korobko, 2012; Makarova, 2012; Cherkasova, 2012).

In foreign sources, issues in assessing budgetary risks are examined not often (Michael & Douglas, 2013; Sprinkle et al., 2008, Lamartina & Zaghini, 2011; Foremny, 2014). Mostly, those are works dedicated to assessing risks to budgetary expenditure related to paying the population compensation due to natural disasters, which lately has been a topical issue for many countries. Ukrainian researchers are also evincing an interest in the issue, looking into risks to regional budgets and the characteristics of optimizing them (Kalambet, 2012). Note that compared with Russia the Ukrainian regulatory framework contains provisions that regulate substantive methodological aspects of the issue under study. Thus, for instance, a Resolution of the Cabinet of Ministers of Ukraine construes budgetary risk as the risk of substantial under-fulfillment of the state (local) budget's revenue part, which can result in an increase in state (local) borrowing and failure to fulfill obligations related to servicing the debt.

The term "budgetary risk" is yet to be captured in the Budgetary Code of the Russian Federation. However, an RF Ministry of Finance order does provide a definition of it: the possibility of failing to fulfill (in full or in part) certain parameters (characteristics) of the federal budget, effectively perform the management of account liquidity in terms of federal budget funds accounting, as well as make an effective use of federal budget funds during the current fiscal year under the condition that during the current fiscal year the quality of financial management

achieved during the reporting period will be preserved. One may agree with authors who find this concept “convoluted” and “tangled” (Yanov, 2011; Korobko, 2012).

4.2 The Analysis

The parameters of the centralized cash fund of Krasnoyarsk Krai have been subject to corrections every year. The regional budget was fine-tuned 5 times in 2011, 3 times in 2012, and 2 times in 2013. However, changing budget parameters failed to ensure a match between the actual and target indicators.

Broadening the horizon of forecasting the key parameters of the regional budget did not lead to a substantial increase in the accuracy of planning. The deviations of the actual results of fulfilling revenue and expenditure volumes for the next three-year period (2011-2013) reached 38.9 billion rubles compared with those initially envisaged in projects for Krasnoyarsk Krai’s budget. Relatively, in 2011 the deviation of budget parameters was beyond 37% (Table 1).

Table 1. The dynamics of indicators of fulfilling Krasnoyarsk Krai’s budget as at the 2011-2013 period-end, billion rubles

Indicator	First edition	Fine-tuned plan	Fact	Fulfillment percentage, %	
				of first edition	of fine-tuned plan
2011					
Revenue	104.8	133.5	143.7	137.1	107.7
Expenditure	122.8	162.6	146.6	119.4	90.2
Deficit	-18.0	-29.1	-2.9	-	
2012					
Revenue	120.0	129.1	140.4	117.0	108.7
Expenditure	145.5	171.2	164.5	117.7	96.1
Deficit	-45.5	-42.1	-24.1	-	
2013					
Revenue	133.5	138.0	136.9	103.3	99
Expenditure	157.2	182.8	168.1	116.2	92
Deficit	-23.7	-44.7	-31.2	-	

4.3 Calculation of the Risk

In the view of V. V. Yanov, in forecasting budgetary risks it is optimal to use fundamental quantitative methods (Yanov, 2011). We agree with the above researcher and suggest conducting the assessment of risks to regions’ budget fulfillment in two stages, using statistical methods.

Thus, in the first stage one should conduct an approximation (curve smoothing) of a time series of statistical data on the deviation of the size of the actual revenue and expenditure from the target. To smooth the time series, we shall use second- and third-order polynomials.

The second stage involves calculating the approximation error, based on the size whereof a risk estimate will be provided.

The relative root-mean-square approximation error is calculated in percentage using the determination coefficient (R^2) via the following formula:

$$\varepsilon = 100 \times \sqrt{1 - R^2} \quad (1)$$

Where ε is the root-mean-square approximation error, %

Errors calculated using the formula (1) should be interpreted as an indicator of the size of budgetary risk.

Bearing in mind that the fulfillment of the budget on revenue and expenditure takes place amid a high degree of variability in the movement of financial resources, it is hard to guarantee the target taxation base volume on each specific tax, since it is formed during the budgetary year under the influence of a whole range of factors. Note that scientific research in the area of budgetary risks deals mainly with failure to fulfill the budget on revenue.

For instance, the 2008-2013 Krasnoyarsk Krai budget revenue was fulfilled at a risk of 24.9%. Based on the budget practice of economically developed EU countries, the US, and Canada, a low risk level is one up to 10%, moderate - 10-25%, and high - over 25% (Uskov, 2011). Thus, as at the end of the period under study the risk to the revenue part of the region's budget corresponded to the medium level (Table 2).

Table 2. A grouping of Krasnoyarsk Krai budget revenues by level of the risk of failure to attain receipts of them as at the 2008-2013 period-end

Level of risk	Group of revenues
Low (up to 10%)	The tax on the income of organizations (5.5%) Taxes on goods (works, services) produced in the territory of the Russian Federation (11.8%); Revenue from the use of property in state or municipal ownership (13.8%); Other non-tax revenue (14.1%);
Medium (10-25%)	Taxes, levies, and regular disbursements for the use of natural resources (16.1%); Non-repayable receipts (16.1%); Disbursements in using natural resources (17%); Administrative disbursements and levies (17%); Debt and resettlements on discontinued taxes and levies (20.7%) The tax on the income of natural persons (35.8%); Taxes on consolidated income (38.9%); Revenue from providing paid services and state expenditure reimbursement (39%);
High (over 25%)	Revenue from the sale of material and non-material assets (45.5%); Taxes on property (48.5%); State duty (67.9%); Fines, sanctions, damage reparations (68.4%)

Risks to the revenue part of Krasnoyarsk Krai's budget are in large measure associated with a number of factors.

Firstly, it is higher forecast prices on certain metals (nickel, copper, and aluminum), which are the staples of the region's metallurgy, an increase in their current cost as a consequence of the 2008 economic downturn.

Secondly, it is the redistribution of revenue from implementing investment projects in the region starting in 2011 in favor of the federal budget due to changes in federal, taxation, budgetary, and customs legislation. For instance, a substantial impact came from the discontinuation of concessions on duties and the tax on the extraction of mineral resources, namely oil from the Vankor Field, which resulted in an increase in federal revenue, having, at the same time, reduced in the region the taxation base on the tax on the income of organizations.

Thirdly, it is the substitution of differentiated standards for the single standard of Natural Person's Income Tax 10% withholdings, which was behind the high risk of failure to attain receipts of revenue from the natural person's income tax.

Fourthly, it is the decline in the level of business investment activity within particular sectors of the region's economy.

4.4 Expenditure Level of Risk

Consequently, to reduce budgetary risks to the revenue part of Krasnoyarsk Krai's budget, the region needs a set of activities aimed at altering the mechanism of operation of participants in the budgetary process with a view to creating efficacious stimuli for more efficient work, as well as implementing measures for increasing tax receipts into the budget.

However, risks to fulfilling the entire revenue part of Krasnoyarsk Krai's budget over the same period corresponds to the low level, namely 8.9%, which is due to an increase in the pace of the region's social-economic development (Table 3).

Table 3. A grouping of Krasnoyarsk Krai budget expenditure by level of the risk of their being underfinanced as at the 2008-2013 period-end

Level of risk	Group of expenditures
Low (up to 10%)	National security and law-enforcement activity (3.2%);
	The national economy (3.2%);
	National defense (7.7%).
Medium (10-25%)	Social policy (14.1%);
	Culture, cinematography, mass media (17.3%);
	Inter-budget transfers (25.9%).
High (over 25%)	Housing and municipal services (78.9%);
	Environmental protection (64%);
	General state issues (60.5%);
	Healthcare, physical fitness and sports (58.8%);
	Education (52.9%)

A high level of risk to the region’s budget expenditure has been identified across the socially significant areas, such as healthcare and housing and municipal services, which is associated, primarily, with objectives set by the federal government, which are an additional load on constituents’ budget expenditure on account of lack of additional financial support. Thus, for instance, in Krasnoyarsk Krai the indexation of salaries for employees of budget-funded institutions, modernization of education, and creation of regional road funds have provided a rationale for an additional load on the region’s budget expenditure.

Besides, the redistribution of powers between the federal and regional levels has also had a substantial impact on risks to the budget’s revenue part.

4.5 Adjustment Costs

One of the methods for the optimum management of budgetary risks is the correction of expenditure parameters in such a way as to keep entropy constant or make it go down (Shalanov, 2008).

We suggest assessing the entropy of the regional budget of Krasnoyarsk Krai using the following formula:

$$H = -\sum_{i=1}^n e_i \ln(e_i) \tag{2}$$

where H is the level of the entropy of expenditure in the budget of an RF constituent, units;

e_i is the share of the i^{th} expenditure in the overall amount of expenditure in the budget of an RF constituent, units.

An analysis of the budgetary entropy of expenditure in the budget of Krasnoyarsk Krai has revealed an unstable trend for this indicator (Figure 1).

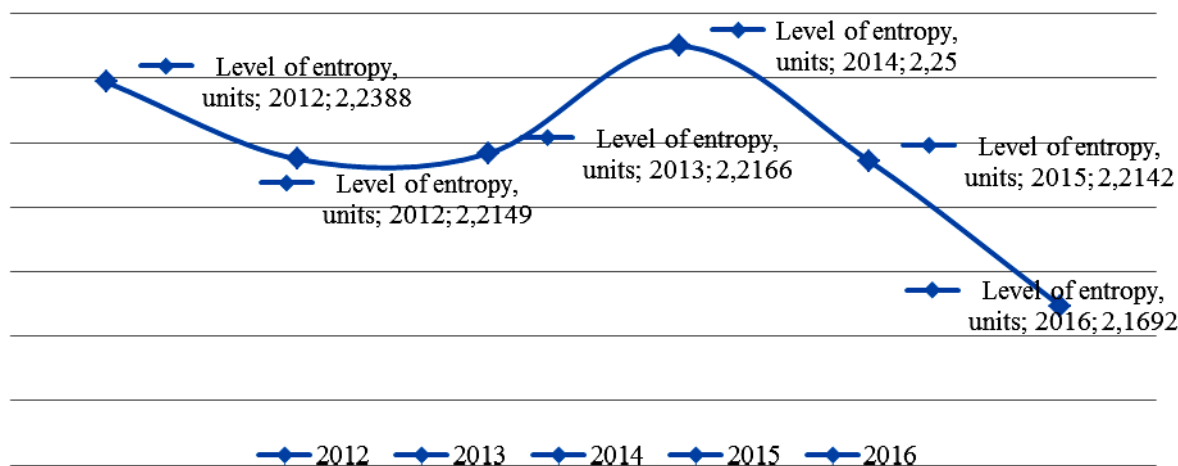


Figure 1. The level of the budgetary entropy of expenditure in the budget of Krasnoyarsk Krai as at the 2011-2016 period-end, units

Despite the fact that the budgetary mechanism operates based on sizable regulatory support oriented towards the inviolability of collecting funds into the budget and guaranteed financing of obligations in front of society, in practice there is always a possibility of breaching this inviolability or giving up on guaranteedness. What is more, there arises an independent risk of changes to the legal field due to predictable mismatches between codes, laws, decrees, resolutions, directives, orders, and letters by authorized bodies of authority and administration.

4.6 Smoothing of the Risk

To smooth over the consequences of budgetary risks in budgets of different levels, reserve funds are created. At present, RF constituents determine the size and procedure for the formation of this kind of fund on their own. An analysis of the regulatory framework of the regional budgets of Siberia Federal Okrug has revealed that regions determine this size both as a percentage of expenditure or the remainder of funds in the single account of the budget for the next fiscal year and an absolute quantity. For instance, in Krasnoyarsk Krai it is 500 million rubles for the year 2014 (Table 4).

Table 4. A procedure for the formation of the reserve fund across the constituents of Siberia Federal Okrug

RF constituent	Standard	Sources of formation
Established in absolute amount (based on 2014 data)		
Altai Republic	98 million rub.	Budget revenue
Republic of Khakassia	240173 thousand rub.	
Altai Krai	100 million rub.	
Krasnoyarsk Krai	500 million rub.	
Tuva Republic	50 million rub.	Parts of the remainder of funds in the single account of the republican budget as at the beginning of the next fiscal year, which do not have an intended end-use
Tomsk Oblast	1 billion rub.	Tax and non-tax revenue obtained in excess of amounts established by the law on the budget
Kemerovo Oblast	200 million rub.	Parts of the remainder of funds in the single account of the oblast budget, which do not have an intended end-use, as well as of additional revenue obtained from placing funds into bank deposits
Established in relative quantity		
Republic of Buryatia	No more than 3% of expenditure	Budget revenue
Zabaykalsky Krai	53.1 million rub. (no more than 10% of budget expenditure)	Budget expenditure and sources of financing the deficit
Irkutsk Oblast	100 million rub. (no more than 10% of budget expenditure)	The remainder of funds in the single account of the oblast budget as at the beginning of the next fiscal year, which do not have an intended end-use, and parts of tax revenue in the oblast budget from the tax on the income of organizations, the tax on the income of natural persons, and the tax on the property of organizations
Novosibirsk Oblast	7%	The remainder of budget funds as at the beginning of the fiscal year, which do not have an intended end-use
Omsk Oblast	2%	

Source: Compiled based on an analysis of the regulatory framework of RF constituents on issues related to the formation of the reserve fund

Funds formation sources also differ substantially across RF constituents from the size of one's own budget revenue to the remainder of funds in budget accounts.

The purpose of the reserve fund is financing unforeseen expenditure and activities of public and social-economic significance to the region, which are not envisaged in the budget. Quite often the purpose of creating a reserve fund is construed in the regulatory framework as the fulfillment of expenditure obligations in case of the insufficiency

of the region's budget revenue for their financial support. This being the case, we find it logical to take account of budget risk indicators in forming the minimum size of the reserve fund.

In this case, the reserve fund will be just a method for accepting budgetary risk, i.e. a way to finance budget losses. There is no doubt that managing such risks should include minimizing budget losses. To reduce budgetary risk to the expenditure part of Krasnoyarsk Krai's budget, the region should implement programs aimed at boosting the efficacy of budget expenditure, the quality of the budgetary process, the caliber of fulfillment of powers conferred by the state and strive to increase the tax potential of local budgets.

5. Conclusion

In our view, the proposed approaches towards assessing risks to the fulfillment of budget revenue and expenditure and minimizing them should become a necessary element of budget planning, as it will help forecast budgetary indicators inclusive of risk factors, analyze them over time, and foresee them in the future with a view to making timely managerial decisions. Yet, a shift to long-term budget planning requires further work on issues related to risk management, issues aimed at the formation of budgetary policy as a stabilizing factor in the social-economic development of regions.

The broadening of planning horizons and the crisis phenomena of recent years are facilitating a boost in the risk of failure to fulfill state and municipal budgets. An essential characteristic of budgetary risk is the unpredictability of whether the budget will be fulfilled in terms of revenue and expenditure - and whether there is going to be overfulfilling or underfinancing, at that. We can conduct the assessment of budget fulfillment risk in two stages, using statistical methods. The correction of budget spending parameters must be performed in such a way as to keep entropy constant or make it go down. The practical application of calculating budgetary risks should get in the picture in planning the minimum size of the budget reserve fund.

References

- Aart, K. (2014). Government Spending Multipliers in Developing Countries: Evidence from Lending by Official Creditors. *American Economic Journal: Macroeconomics*, 6(4), 170-208.
- Bank, S., & Suglobov, A. (2014). Tactical and strategic modelling of the corporate financial performance indexes. *World Applied Sciences Journal*, 5, 683-686.
- Cherkasova, Yu. I. (2012). *Incentives to Increase the Tax Capacity of the Region* (pp. 646-651). In the Proceedings of the "Issues and Trends in the Development of the Economy and Management in the Modern World" International Conference (Bulgaria, Sofia).
- Cortuka, O. (2013). A disaggregated approach to the determination of government spending multipliers. *Journal of Economic Policy Reform*, 16(1), 31-45. <http://dx.doi.org/10.1080/17487870.2012.755812>
- Ferrari, P., & Manzi, G. (2014). Citizens evaluate public services: A critical overview of statistical methods for analysing user satisfaction. *Journal of Economic Policy Reform*, 17(3), 236-252. <http://dx.doi.org/10.1080/17487870.2014.909313>
- Foremny, D. (2014). Sub-National Deficits in European Countries: The Impact of Fiscal Rules and Tax Autonomy. *European Journal of Political Economy*, 34, 86-110. <http://dx.doi.org/10.1016/j.ejpoleco.2014.01.003>
- Gaizatullin, R., Vafin, I., & Zagladina, E. (2014). Modelling of regional system of budget resources management. *Asian Social Science*, 10(20).
- Gamukin, V. V. (2012). Risk-Boundaries of the Regional Budget Imbalance. *Federalism*, 3, 101-108.
- Jeffrey, C., & Miran, S. (2012). Fiscal policy multipliers on subnational government spending. *American Economic Journal: Economic Policy*, 4(2), 46-68.
- Kalambet, S. V. (2013). Budgetary Risks and Characteristics of Optimizing Them at the Level of Ukraine's Regions. *Biznesinform*, 4, 90-96.
- Kayuchkina, M. A. (2010). Risks of a Decrease in Receipts from the Natural Person's Income Tax in Forming the Municipal Budget. *Finansy*, 4.
- Korobko, S. A. (2012). A System of Managing Risks to the Budgetary Process of an RF Constituent. *Terra Economicus*, 3(3), 54-58.
- Lamartina, S., & Zaghini, A. (2011). Increasing Public Expenditure: Wagner's Law in OECD countries. *German Economic Review*, 12, 149-164. <http://dx.doi.org/10.1111/j.1468-0475.2010.00517.x>
- Lysandrou, P. (2013). Debt intolerance and the 90 per cent debt threshold: Two impossibility theorems. *Economy*

- and Society*, 42(4), 521-542. <http://dx.doi.org/10.1080/03085147.2012.760346>
- Makarova, S. N. (2012). The Development of the Methodological Principles of Program Budgeting for the Effective Management of Public Finances. Krasnoyarsk: Journal of Siberian Federal University. *Humanities & Social Sciences*, 10(5), 1409-1418.
- Michael, K., & Douglas, L. (2013). Fiscal Deficits and Current Account Deficits. *Journal of Economic Dynamics and Control*, 37(10), 2062-2082. <http://dx.doi.org/10.1016/j.jedc.2013.05.001>
- Shalanov, N. V. (2008). *Systems Analysis* (p. 288). Cybernetics. Synergetics: Mathematical Methods and Models. Novosibirsk: Izd-vo NGTU.
- Sprinkle, G., Williamson, M., & Upton, D. (2008). The Effort and Risk-Taking Effects of Budget-Based Contracts. *Accounting, Organizations and Society*, 33(4). <http://dx.doi.org/10.1016/j.aos.2007.11.001>
- Uskov, I. V. (2011). Methodological Approaches towards Assessing Threats and Risks to Local Budgets. *Ekonomika i Organizatsiya Upravleniya*, 1, 44-54.
- Yanov, V. V. (2011). Budgetary Risks of Municipal Formations: The Content of Methods for Assessing Them. *Ekonomika i Upravleniye: Novyye Vyzovy i Perspektivy*, 2, 324-327.

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