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Does Intergovernmental Equalization Create Disincentives for Regional Infrastructural Development?

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ABSTRACT

The subject of the research is the relationship between the amount of fiscal equalization grants and the length of transport routes in the regions. The study **aims** to test the hypothesis that the current formula for intergovernmental equalization creates disincentives for developing the road network in the regions. **The relevance** of the study is due to the fact that equalizing interterritorial inequality and regional infrastructural development are the most important goals of regional policy, whose instruments should not contradict. The current formula for distributing fiscal equalization grants contains a negative relationship between the length of transport routes in the regions and the amount of the transfer. That is, with an increase in the length of roads, the amount of grants to regions with initially low transport accessibility decreases. The author used **the method** of simulation modeling to quantify the reduction in grants to regions with low transport accessibility in the case of an increase in the length of roads in 2020 and to assess the potential impact of this decrease on the policy of regional authorities. As a **result**, the author revealed that while maintaining the current dynamics of road construction, an increase in the length of transport routes will lead to a decrease in the volume of grants to regions within 1%, which is insignificant regarding incentives. However, with an increase in the road network of hard-to-reach regions by one and a half times or more, this decrease may become critical. The work provides the estimate of the minimum additional fiscal revenue required to compensate for the lost income of the region with an increase in the length of transport routes. A **further** study may provide more details on the impact of the road industry development on the own revenues of regional budgets.

Keywords: intergovernmental equalization; grants; regional development; transport accessibility; road construction; disincentives

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INTRODUCTION

Grants for intergovernmental equalization in the regions are the most significant element of the system of intergovernmental grants in the Russian Federation. The method of distributing equalizing grants considers many factors that objectively affect the differences in income opportunities and expenditure needs of territories. The aim of providing this transfer is to smooth out inter-territorial differences in the intergovernmental equalization of regions and in the availability of budgetary services for their population. In domestic and foreign scientific studies, they often ask if intergovernmental equalization does not conflict with stimulating the economic development of regions [1–3]. The answer is ambiguous, since the proportion between the volumes of equalizing and stimulating financial assistance is a matter of political choice and, as a rule, is established by means of "manual adjustment" based on both long-term national priorities and current challenges [1]. Most of the Russian studies show that, within the framework of the current method of distributing equalizing subsidies, the regions retain incentives to develop their own income base [4, 5]; the mechanism of intergovernmental equalization as a whole does not create dependency in the regions. The available works downplay individual parameters of the formula for distributing the equalizing transfer, which can potentially play the role of disincentives. This refers to indicators, whose value change leads to an increase in the amount of grants, but adversely affects the socio-economic development of the region as a whole. If the value of this indicator depends on the actions of the territorial authorities, then the latter may have incentives for ineffective behavior. This is called the "gaming effect" in the scientific literature [6]. In this context, the indicator that is used for distributing equalizing grants to compare the transport accessibility of territories, the length of roads and railways, should be analyzed in detail.

Considering the Spatial Development Strategy of the Russian Federation,[1] Decrees of the President of the Russian Federation No. 13 "On approval of the Fundamentals of the State Policy of Regional Development of the Russian Federation for the Period up to 2025" dated January 16, 2017 and No. 204 "On National Goals and Strategic Development Objectives Of the Russian Federation for the period up to 2024" dated May 7, 2018, infrastructural development of territories is especially urgent. In particular, the strategic documents pay great attention to road facilities, reconstruction and construction of the transport network. To solve the set tasks, a system of national projects and activities has been developed and appropriate financial support is provided. According to the current formula for distributing grants for intergovernmental equalization in the constituent entities of the Russian Federation, the development of the transport system in a number of regions and an increase in the length of roads and railways can lead to a decrease in assessing the cost of budgetary services and, as a consequence, to a reduction of these grants. Thus, a conflict may arise between the goals of national policy — intergovernmental equalization and stimulation of territories with low transport accessibility, as a result, the regional authorities will lack motivation to develop the road sector. On the other hand, disincentives may be insignificant and may not affect political decisions at the sub-federal level. Assessing this problem requires appropriate calculations. The results will allow to conclude if there are any disincentives for infrastructure development in the current methodology for intergovernmental equalization of regions.

THE DETAILS OF TRANSPORT ROUTES IN THE CURRENT FORMULA OF INTERGOVERNMENTAL EQUALIZATION

Transport accessibility is an important factor that determines the differences in the cost

[1] Spatial development strategy of the Russian Federation for the period up to 2025. Approved by the order of the Government of the Russian Federation dated 13.02.2019 No. 207-r.

of budget services in different regions. The absence or poor quality of the road network and transport infrastructure creates additional costs and increases expenditure obligations of the budget sector. Indicators of transport accessibility are used when assessing the expenditures of territories for the purpose of intergovernmental regulation in the USA and Canada [7], Australia, Switzerland, Spain, India [8].

We will now look at how the coefficient of transport accessibility is considered in the current Russian method of distributing grants to equalize the budgetary provision of regions.[2]

The volume of equalizing grants of a constituent entity of the Russian Federation depends on the ratio of the tax potential index (an indicator that measures differences in the income opportunities of territories per capita) and the budget expenditures index (an indicator that measures intergovernmental differences in specific expenditure requirements). The budget expenditure index is calculated as the weighted average sum of the indices of wages, the cost of housing and communal services and prices, with the last two components additionally indexed by the indicator (1 + TAC), where TAC is the transport accessibility coefficient. The transport accessibility coefficient for the *i*-th region is calculated by formula (1):

$$T_i^{AC} = \left(3 - 2 * \frac{D_i}{D_{ave}}\right) * \left(1 + \frac{R_i}{R_{ave}}\right) * N_i^{REM}, \quad (1)$$

where D_i and D_{ave} are the density of permanent transport routes (railways and paved roads) in the *i*-th constituent entity of the Russian Federation and on average throughout the country, respectively, at the end of the last reporting year;

N_i^{REM} is the proportion of the population in the *i*-th constituent entity of the Russian Federation that lives in areas with limited periods of delivery of goods and in mountainous areas, in the resident population of this constituent entity at the end of the last reporting year; at the same time, an additional cost weighting factor of 0.5 is applied to the population of the region living in mountainous regions, and a weighting factor of 1.2 is applied to the population living in areas with limited delivery times;

R_i and R_{ave} is the share of rural settlements that have no connections on hard-surface roads and which are not provided with a connection with the nearest railway station, sea or river port, airport, in the *i*-th constituent entity of the Russian Federation and in the total number of rural settlements in national average, respectively, at the end of the last reporting year.

The ratio $\frac{R_i}{R_{ave}}$ is considered zero for all constituent entities of the Federation, except the regions where more than half of the population lives in areas with limited periods for the delivery of goods and in mountainous areas, and the share of rural settlements that have no connection by hard-surface roads and do not provided with communication with the nearest railway station, sea or river port, airport, in the total number of rural settlements is more than twice the national average.

The density of transport routes (D_i and D_{ave}) is calculated as the total length of permanent transport routes (railways and paved roads), referred to the area of the corresponding constituent entity of the Russian Federation. The maximum value of ratio $\frac{D_i}{D_{ave}}$ is limited to 1, i.e. in relation to

[2] The methodology was approved by the Decree of the Government of the Russian Federation of November 22, 2004 No. 670 "On the distribution of grants for equalizing the budgetary provision of the constituent entities of the Russian Federation".

regions with a density of permanent transport routes higher than the national average, this parameter in the formula for calculating the transport accessibility coefficient is considered to be 1.

To calculate the distribution of grants for equalizing budgetary provision to the constituent entities of the Russian Federation in 2020, the transport accessibility coefficient TAC is equal to 0 for 49 of 85 Russian regions.[3] TAC maximum value is in the Chukotka Autonomous District (9.640). *Table 1* shows the nonzero values of TAC in Russian regions in 2020.

EFFECT OF THE LENGTH OF THE ROAD NETWORK ON THE VOLUME OF EQUALIZING GRANTS TO REGIONS

We will now see how changes in the length of transport routes affect the amount of grants to regions.

Further analysis applies only to the part of the grants, which is determined based on the estimated level of budgetary provision, i.e. the ratio of the tax potential index and the budget expenditure index. We do not consider the compensatory part of the subsidy, which is distributed considering the previously approved volumes and established restrictions on the maximum reduction or increase in the size of the transfer. Also, the part of the grant that depends on the "model budget" is not considered. The estimate of expenditure obligations of the constituent entities, since the initial data for reproducing this calculation (registers of expenditure obligations of the constituent entities of the Russia and municipalities) are not available. In 2020, the amount distributed among the Russian regions based on the estimated budgetary provision amounted to 502,506,441 thousand roubles, which corresponds to 70% of the approved equalizing grant.

Our further calculations are based on a simulation model built in Microsoft Excel, which reproduces the distribution of grants for equalizing the budgetary provision of the constituent entities of the Russian Federation for 2020 in accordance with the initial data and distribution results posted on the official website of the Ministry of Finance of Russia.[4] We considered the effect of the increase in the length of railways and paved roads on the value of the equalizing grant of the constituent entities of the Russian Federation. The mechanism is as follows: an increase in the length of transport routes leads, in accordance with formula (1), to a decrease in TAC, which, in turn, leads to a decrease in the budget expenditures index. In other words, the methodology assumes that improving transport accessibility leads to a relative reduction in the cost of budget services, and as a result, to a decrease in the region's need for grants.

Note that the grant is sensitive to changes in the length of roads not for all regions with a nonzero transport accessibility coefficient. First, we can exclude donor regions that do not receive grants for equalizing budgetary provision. These are the Komi Republic, the Murmansk region, the Nenets Autonomous District, the Tyumen region, the Khanty-Mansi Autonomous District — Yugra, the Yamalo-Nenets Autonomous District, the Krasnoyarsk region, and the Sakhalin region. Second, an increase in the length of the road network will in no way affect the size of the transfer to regions where the density of transport routes is equal to or exceeds the average Russian one. According to *Table 1*, these subjects include the Republic of Karelia, all regions of the Southern and North Caucasian Federal Districts, the Perm region, the Chelyabinsk region, the Republic of Khakassia, the Altai region, the Kemerovo region — Kuzbass, the Primorsky Krai and the Jewish Autonomous District. For these regions, the transport accessibility coefficient is determined by other

[3] Ministry of Finance of Russia. URL: https://minfin.gov.ru/ru/perfomance/regions/mb/mb2020_2022/ (accessed on 08.10.2020).

[4] Ministry of Finance of Russia. URL: https://minfin.gov.ru/ru/perfomance/regions/mb/mb2020_2022/ (accessed on 08.10.2020).

Table 1

Values of the coefficient of transport accessibility and indicators of the length of transport routes of the constituent entities of the Russian Federation in 2020 (for regions with TAC > 0)

Constituent entity of the Russian Federation	Transport accessibility coefficient (TAC)	Length of railways and paved roads, km	Density of transport routes in average for Russia
Republic of Karelia	0.0138	14083	1.000
Republic of Komi	0.3862	9354	0.302
Arhangelsk region	0.2048	16490	0.537
Murmansk region	0.0680	4775	0.443
Nenets Autonomous District	3.5500	274	0.021
Republic of Adygea	0.0388	4916	1.000
Krasnodar region	0.0311	42839	1.000
Republic of Dagestan	0.1788	21695	1.000
Republic of Ingushetia	0.2166	3154	1.000
Kabardino-Balkar Republic	0.1264	8015	1.000
Karachay-Cherkess Republic	0.3290	5323	1.000
Republic of North Ossetia — Alania	0.1920	6539	1.000
Chechen Republic	0.0751	14566	1.000
Stavropol region	0.0495	22145	1.000
Perm region	0.0128	27029	1.000
Tyumen region	0.0476	15482	1.000
Chelyabinsk region	0.0006	24189	1.000
Khanty-Mansi Autonomous District — Yugra	0.2576	18533	0.466
Yamalo-Nenets Autonomous District	1.5806	7369	0.129
Altai Republic	0.8237	4590	0.664
Tyva Republic	0.3943	3598	0.287
Republic of Khakassia	0.0351	6706	1.000
Altai region	0.0067	38466	1.000
Krasnoyarsk region	0.4014	31138	0.177
Irkutsk region	0.0647	30320	0.526
Kemerovo region — Kuzbass	0.0011	20778	1.000
Tomsk region	0.4490	10331	0.442
Republic of Buryatia	0.4109	10765	0.412
Republic of Sakha (Yakutia)	3.1349	14046	0.061
Transbaikal region	0.2110	17536	0.664
Kamchatka Krai	3.7385	2144	0.287
Primorsky Krai	0.0764	17930	1.000
Khabarovsk region	0.3571	14850	0.253
Amur region	0.1885	15843	0.589
Magadan region	3.4062	2778	0.081
Sakhalin region	0.3417	3359	0.519
Jewish Autonomous District	0.3368	3010	1.000
Chukotka Autonomous District	9.6405	922	0.017

Source: Ministry of Finance of the Russian Federation. URL: https://minfin.gov.ru/ru/perfomance/regions/mb/mb2020_2022/ (accessed on 08.10.2020).

Table 2

Impact of changes in the road length of the constituent entities of the Russian Federation on the volume of equalizing grants in 2020 (for granted regions with the density of transport routes below the average in Russia)

Constituent entity of the Russian Federation	Grant amount, thousand roubles	Changes in grants with an increase in the length of roads by 1%, thousand roubles	Changes in grants with an increase in the length of roads by 100 km, thousand roubles
Arhangelsk region	4471062	–4971	–3015
Altai Republic	7370334	–27778	–60517
Tyva Republic	16303284	–4665	–12966
Irkutsk region	841950	–2543	–839
Tomsk region	3377051	–6472	–6265
Republic of Buryatia	17887968	–23093	–21452
Republic of Sakha (Yakutia)	44977512	–29877	–21271
Transbaikal region	6674538	–19832	–11310
Kamchatka Krai	33424354	–13557	–63224
Khabarovsk region	4184607	–3627	–2443
Amur region	2125712	–3580	–2260
Magadan region	1962071	–1451	–5224
Chukotka Autonomous District	8372845	–1906	–20658

Source: author's calculations based on a simulation model.

factors — first of all, the size of the population living in areas with a limited time for the delivery of goods and mountainous areas.

Table 2 shows the results of simulation calculations assessing the impact of an increase in the length of roads on the volume of equalizing transfer of the regions where this factor is significant.

The calculations show that the volume of the equalizing transfer is most sensitive to changes in the length of transport routes in such constituent entities of the Russian Federation as the Altai Republic, the Tyva Republic, the Republic of Buryatia, the Republic of Sakha (Yakutia), the Transbaikal region and the Kamchatka Krai.

The *Fig.* shows the visual results of the simulation calculations of the impact of the length of roads on the transfer volume. The example of individual regions demonstrates how the value of the equalizing grant changes due to the increase in the length of transport routes, all other things being equal. The horizontal segment marked with a solid line corresponds to the real length of paved roads in the constituent entity of the Russian Federation at the end of 2019. The dotted line shows the dependence of the equalizing transfer volume on the length of roads based on simulation calculations.

The graph shows that the nature of the dependence of the transfer volume on the

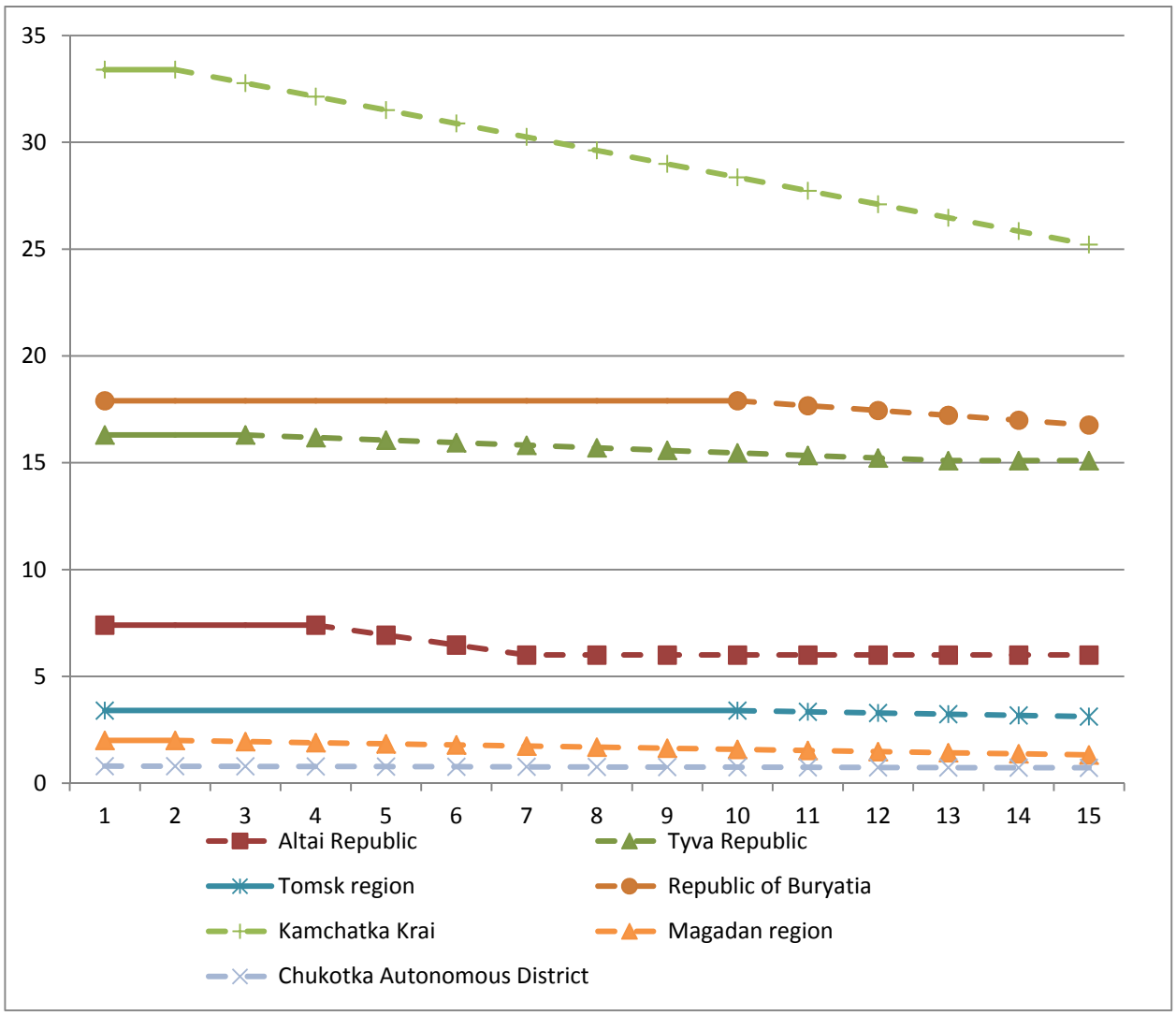

Fig. **Dependence of equalization grant (million roubles) on the length of the roads (thousand km) in 2020 in certain regions**

Source: author's calculations based on a simulation model.

length of transport routes is not uniform. On the example of the Altai Republic and the Tyva Republic, one can see how the decreasing function becomes a constant (in *Fig. 1*, the corresponding segments of the graph are shown by the dotted line). This switch in the function behavior takes place when the density of transport routes in the region reaches the average Russian level. According to formula (1), after that the length of roads do not affect the TAC value, and, as a consequence, the grant value.

By means of a simulation model, we will estimate how long the length of paved roads in each region should be, so that the density of transport routes becomes equal to the average Russian level. We will calculate the amount of grants for equalizing budgetary provision, corresponding to this indicator of the length of roads. Thus, we will find the maximum possible level of transfer reduction for each region, due to the increase in the length of transport routes. *Table 3* presents the calculation results.

Based on the calculation results in *Table 3*, we can divide the constituent entities of Russia into three conditional groups.

The first group includes the Arkhangelsk region, the Altai Republic, the Irkutsk region, the Transbaikal region and the Amur region.

Table 3

Maximum possible impact of the increase in the length of roads on the volume of equalization grant in the regions in 2020

Constituent entity of the Russian Federation	How long should the roads be for the density of transport routes to be equal to the average Russian?	How many kilometers should the length of the roads be increased?	How many % should the length of roads be increased?	What will the transfer be like?	Change in transfer, thousand roubles	Transfer change, %
Arhangelsk region	28 957	12 468	76%	4 033 826	–437 236	–9%
Altai Republic	6910	2319	51%	5 960 176	–1 410 158	–18%
Tyva Republic	12 540	8942	249%	15 138 826	–1 164 458	–6%
Irkutsk region	55 134	24 814	82%	612 118	–229 832	–27%
Tomsk region	23 039	12 707	123%	2 551 071	–825 980	–24%
Republic of Buryatia	24 903	14 138	131%	14 563 527	–3 324 441	–18%
Republic of Sakha (Yakutia)	228 808	214 762	1529%	9 139 101	–35 838 412	–79%
Transbaikal region	29 724	12 188	70%	5 007 522	–1 667 016	–24%
Kamchatka Krai	34 530	32 386	1510%	12 606 398	–20 817 956	–62%
Khabarovsk region	56 436	41 586	280%	3 106 707	–1 077 900	–25%
Amur region	23 997	8154	51%	1 871 427	–254 285	–11%
Magadan region	34 395	31 618	1138%	308 380	–1 653 690	–84%
Chukotka Autonomous District	53 659	52 737	5717%	550 391	–7 822 454	–93%

Source: author's calculations based on a simulation model.

For these regions, the density of transport routes will reach the average Russian level with an increase in the length of paved roads by 1–1.5 times. The reduction in grants ranges from 9% (Arkhangelsk region) to 27% (Irkutsk region).

The second group is the Tyva Republic, the Republic of Buryatia, the Tomsk region, the Khabarovsk region. To achieve the average Russian density of transport routes in these regions, one should increase the existing road network by 2–4 times, while the reduction in the transfer will be from 6% (Tyva Republic) to 25% (Khabarovsk region).

Finally, the third group includes the Republic of Sakha (Yakutia), Magadan region, Kamchatka Krai and Chukotka Autonomous District — the regions experiencing the greatest deficit in transport infrastructure. For these entities, the length of transport routes has the most significant effect on the volume of the equalizing transfer. *Table 3* shows that with a hypothetical increase in the coverage of the road network to the average Russian level, they will lose from 62% to 93% of equalizing grants. However, this requires an increase in the length of transport routes by 10–15 times, which seems unreal in the medium term.

CURRENT ROAD NETWORK DEVELOPMENT IN THE REGIONS AND THE FINANCIAL SIGNIFICANCE OF DISINCENTIVES

We will now consider the real dynamics of road construction in the regions over the past 5 years (2015–2019).

According to Rosstat,[5] the length of hard-surface roads over the past five years in Russia has grown by 6%, with an average annual growth rate of 1.2%. For the considered group of regions, the maximum average annual increase in the length of transport routes is in the Chukotka Autonomous District (6%). In the Republic of Buryatia, the Kamchatka Krai and the Amur Region, this indicator was 2%. It was 1% on average per year in the Republic of Sakha (Yakutia), the Altai Republic, the Tyva Republic, Irkutsk and Magadan regions, and less than 1% in the Arkhangelsk, Tomsk and Transbaikal regions. Comparing these data with the simulation calculations from *Table 2* shows that in all the regions, the average annual increase in the length of roads as those for the past 5 years, can lead to a decrease in the transfer by no more than 1%. Such losses are clearly insufficient to affect the priorities of regional policy. There is no empirical relationship between the activity of road construction and the elasticity of the amount of grants along the length of the roads. Thus, the Republic of Buryatia and the Kamchatka Krai show the pace of road construction above the national average, despite the relatively high sensitivity of grants to the length of transport routes.

The analysis of indicators of national and regional projects, as well as state programs of the constituent entities of the Russian Federation, shows that in the near future, the planned road constructions in the constituent entities under consideration is significantly lower than required to reduce the financial assistance from the federal budget by at least 1% per year. National projects do not focus on building new transport routes, but on the overhaul and reconstruction of the existing road network, which, of course, is a priority task today: the share of roads that meet regulatory requirements in the Far Eastern Federal District is only 37%, in the Siberian Federal District — 43%, in the Northwestern Federal District — 38%.[6]

In 2020, the investment activity of the regions decreased to a minimum due to the crisis caused by the coronavirus pandemic. Therefore, we have reason to assume that in the near future, the effect of reducing

[5] Federal Service of State Statistics. Transport. Length of communication lines and road infrastructure facilities. URL: https://rosstat.gov.ru/folder/23455 (accessed on 07.10.2020).

[6] Rosstat data, end of 2019, the Federal State Statistics Service. Transport. Length of communication lines and road infrastructure facilities. URL: https://rosstat.gov.ru/folder/23455 (accessed on 07.10.2020).

Table 4

Changes in the volume of equalization grant if to exclude the road length indicator in 2020

Constituent entity of the Russian Federation	Amount of grant excluding the road length indicator, thousand roubles	Change in the amount of grants, thousand roubles	Change in the amount of grants,%
Arhangelsk region	5 028 365	561 506	13
Altai Republic	6 542 236	–827 978	–11
Tyva Republic	15 846 073	–455 584	–3
Irkutsk region	1 224 604	380 331	45
Tomsk region	3 259 347	–114 490	–3
Republic of Buryatia	16 266 162	–1 626 026	–9
Republic of Sakha (Yakutia)	10 239 934	–34 741 514	–77
Transbaikal region	6 824 666	145 964	2
Kamchatka Krai	14 137 226	–19 297 048	–58
Khabarovsk region	4 013 774	–167 593	–4
Amur region	2 409 838	285 763	14
Magadan region	480 564	–1 480 313	–76
Chukotka Autonomous District	742 873	–7 637 510	–91

Source: author's calculations based on a simulation model.

grants from road construction will not have a significant impact on the behavior of regional authorities. However, disincentives become actual during large-scale road construction, associated with an increase in the length of transport routes in hard-to-reach regions by 1.5 times or more relative to the current level.

WHAT HAPPENS IF WE EXCLUDE ROAD LENGTH FROM INTERGOVERNMENTAL EQUALIZATION?

Imagine, that the length of transport routes will no longer be considered when calculating grants for equalizing budgetary provision. To do this, we must eliminate the first multiplier from formula (1). This change will automatically remove the problem of disincentives. However, what are the consequences for the volume of the transfer? *Table 4* presents the corresponding calculations.

The calculations show that excluding the road length from the methodology for calculating grants will lead to large-scale losses in the transfer of most of these regions. Especially critical losses may experience the Republic of Sakha (Yakutia), Kamchatka Krai, Chukotka Autonomous District, and Magadan region, which are disproportionately higher than the expected reduction in the transfer due to road construction on a realistic scale. To compensate for these losses, the federal center will have to provide the regions with additional financial assistance in the amount of 66.3 billion roubles, which is 13% of the total amount of grants. Thus, applying of

Table 5

Minimum additional fiscal revenues required to compensate the decrease in grants and costs for road maintenance in case of increase in the length of roads by 1 km in 2020

Constituent entity of the Russian Federation	Compensatory growth of fiscal revenues from 1 km of constructed roads, thousand roubles	For reference: income of regional road funds * per 1 km of the road
Arhangelsk region	446.2	385.5
Altai Republic	998.7	199.7
Tyva Republic	470.9	313.1
Irkutsk region	399.1	442.8
Tomsk region	437.6	478.0
Republic of Buryatia	581.2	458.9
Republic of Sakha (Yakutia)	692.8	474.6
Transbaikal region	476.4	226.2
Kamchatka Krai	1249.8	942.2
Khabarovsk region	479.9	450.6
Amur region	416.2	488.6
Magadan Region	586.5	336.8
Chukotka Autonomous District	856.2	3250.8

Source: author's calculations based on a simulation model, Ministry of Finance of the Russian Federation.

Note: * — Initial data regarding the execution of regional road funds of the constituent entities of the Russian Federation. URL: https://minfin.gov.ru/ru/perfomance/regions/mb/mb2019_2021/?id_39=123591-iskhodnye_dannye_v_chasti_ispolneniya_regionalnykh_dorozhnykh_fondov_subektov_rossiiskoi_federatsii_po_itogam_2017_goda (accessed on 08.10.2020).

equalization formula without the indicator of transport routes length is more crusial for public finance than maintaining the current formula.

TRANSPORTATION NETWORK DEVELOPMENT AS A FACTOR OF GROWTH IN REGIONAL INCOME

Increasing the transport accessibility of the northern territories, Siberia and the Far East is not only a regional issue, but also a promising strategic task at the national level. For a more objective assessment of the consequences of an increase in the length of roads, one should consider the positive effect of improving transport accessibility on the income potential of the territories. Developing transport infrastructure in the long term leads to new industries and jobs, lower costs, increased turnover, and, as a consequence, an inflow of additional revenues to the budget [9]. Based on the above simulation model, we can calculate the minimum return in the form of additional tax and non-tax revenues to the regional budget from 1 km of the constructed road necessary to compensate grant reduction. *Table 5* provides the calculation results. We calculated the amount of compensation

income considering the additional burden arising from the regional budget due to the construction of roads, namely the cost of their maintenance. The average annual cost of maintaining 1 km of paved road is determined by the data of the Ministry of Transport of Russia.[7] This calculation include the cost of road construction, since these costs are one-off, while the falling grant amount due to improved transport accessibility and road maintenance costs will occur annually.

Table 5 also provides an estimate of the income of regional road funds of the constituent entities of the Russian Federation per 1 km of a paved road. Strictly speaking, this indicator is not an estimate of the increase in budget revenues as a result of road construction, since the length of transport routes is not the only indicator determining the volume of the road fund. However, these numbers can give a rough idea of the expected growth in regional road construction revenues. In fact, the growth of regional tax revenues in the case of the transport infrastructure development will be greater, since in the future, new roads will provide not only an inflow of funds to road funds, but also additional taxes on personal income tax (due to emerging new jobs), as well as on income tax (due to expanding production and reducing costs). *Table 5* leads to the conclusion that the values from the first and second columns are quantities of the same order. Consequently, compensating for losses from a decrease in grants due to an increase in own budget revenues with the transport infrastructure development seems to be a real achievable result.

CONCLUSIONS

According to the current formula for distributing grants on equalizing budgetary provision, financial assistance for regions with a low density of the road network decreases with an increase in the length of transport routes. To test the hypothesis that the equalization formula creates disincentives for the transport infrastructure development in the regions, we did the simulation calculations based on a model reproducing grant distribution by the current methodology. The calculation results showed that an increase in the length of transport routes on a realistic scale leads to an insignificant decrease in the amount of grants for these regions (within 1%). Therefore, the current method of distributing equalization transfers in the short term does not create obstacles for the infrastructural development of the constituent entities of the Russian Federation. Today, we can consider disincentives as financially insignificant regarding their effect on the policy of regional authorities in the field of road construction. However, with an increase in the road network of hard-to-reach regions by 1.5 times or more, this decrease may become critical for such regions as the Republic of Buryatia, the Altai Republic, the Republic of Sakha (Yakutia), the Transbaikal region, the Kamchatka Krai, the Khabarovsk region, the Magadan region and the Chukotka Autonomous District. Excluding the road length from the intergovernmental equalization formula is an ineffective measure of combating disincentives, since it will cause a collapse of the transfer to the highly granted regions of the Far East and will require significant compensation from the federal budget.

The positive counter effect from road construction invites attention. By preliminary estimates, reducing grants because of an increase in the length of transport routes can be offset by an additional inflow of tax and non-tax revenues into the regional budget system due to economic growth caused by the road network development. A promising further research can be a more detailed study of the impact of the transport infrastructure development on the own revenues of sub-federal budgets.

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