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Fiscal decentralization and regional economic growth: Theory, empirics, and the Russian experience ☆

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Abstract

The article addresses the theoretical and empirical relation between fiscal decentralization and economic growth. An empirical analysis of Russian regions for 2005–2012 shows that excessive expenditure decentralization within the region, which is not accompanied by the respective level of revenue decentralization, is significantly and negatively related to regional economic growth. In contrast, regional dependence on intergovernmental fiscal transfers from the federal center is positively associated with economic growth.
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1. Introduction: Fiscal decentralization — theoretical aspects

Fiscal decentralization is one of the key concepts in the public finance theory and a commonly used policy measure in public sector reforms. In federal states, fiscal decentralization means that revenue and expenditure responsibilities (the right to impose and collect tax and independently determine the focus areas of expenses) are transferred from the federal to the regional and local levels.[1]

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[1] Depending on the context, fiscal decentralization can be viewed as a process (transferring budgetary authority) or as a state or result of such a process (scope of authority delegated to lower administrative levels with respect to the total scope of authority of the public sector).

Fiscal federalism is a more general concept that represents a vertical financial structure of the public sector (Oates, 1999), with revenue and expenditure assignment among different levels of government and a system of intergovernmental transfers. Thus, fiscal decentralization is a mechanism of fiscal federalism and can be considered as a necessary condition of the latter because there is no point in a vertical financial structure of the public sector without a certain level of decentralization (in this case, all resources, authority and responsibilities are concentrated at the federal level).

The classical theory of fiscal federalism considers three key goals of the public sector: economic efficiency, macroeconomic stability, and income redistribution (Musgrave, 1959; Oates, 1972). According to Musgrave, the federal government should be responsible for macroeconomic stabilization and income redistribution, whereas subnational (regional and local) authorities, which are closer to citizens and possess more information on their preferences, should ensure the efficiency of public goods provision within their jurisdictions (Musgrave, 1959).

The key argument in favor of fiscal decentralization is the possibility to increase the allocative and productive efficiency of public goods provision (Martinez-Vacquez and McNab, 2003; Oates, 1999; Thiessen, 2003). The allocative efficiency of the decentralized provision of most public services is higher than that of the centralized provision because lower levels of government can improve the well-being of residents through a more comprehensive satisfaction of their individual needs (*preference-matching argument*). The productive efficiency can also be higher under decentralization because subnational authorities, which have better knowledge of citizens' needs and experience in providing respective public goods, can produce such goods at lower cost.[2] Another advantage of fiscal decentralization is the increased horizontal and vertical fiscal competition, which, in turn, may limit the size of the public sector and its predatory incentives (Brennan, Buchanan, 1980). Moreover, with strong democratic institutions (transparent elections, rule of law, and an effective parliamentary system) fiscal decentralization may encourage a higher accountability of subnational authorities and an improved quality of governance (Lockwood, 2005).

In contrast, fiscal decentralization can be dangerous under particular circumstances (Prud'homme, 1995). Excessive decentralization makes macroeconomic stability and income redistribution nearly unachievable. In times of crises, macroeconomic stabilization becomes problematic because the federal government does not have sufficient resources to stabilize the economy, whereas powerful regional governments may have differing, often contradictory, fiscal policy priorities. Income redistribution also does not work under full decentralization. Resources are usually unevenly distributed among territories (at least in large federal states). Therefore, a lack of a centralized equalization policy can lead to the bankruptcies of poor regions (Thiessen, 2003). Excessive horizontal fiscal competition may lead to greater inequality among regions and horizontal fiscal imbalances. Moreover, the quality of governance is questionable at the regional

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[2] This argument has been challenged in the literature (Thiessen, 2003) because centralization (and a uniform level of public goods provision) may lead to significant economies of scale. Conversely, decentralization may lead to lower production efficiency because lower level officials potentially lack the necessary competences to provide high-quality public goods.

and local levels in certain countries (low competences of officials, corruption, and weak institutions); therefore, it is questionable whether subnational authorities can achieve high efficiency in the public production. Another problem of decentralization is the inability of subnational governments to fully internalize cross-regional externalities, which raises doubt regarding the theoretical conclusions found in the classical studies of fiscal federalism (Oates, 1972).

2. Fiscal decentralization and economic growth: Theory and empirics

The classical theory of fiscal federalism does not explicitly consider the relationship between fiscal decentralization and economic growth. However, studies in this field became particularly relevant after the beginning of large-scale decentralization reforms in (former) socialist states in the late 1980s — early 1990s (Russia and former republics of the Soviet Union, Eastern Europe, and China). The advocates of these reforms needed a theoretically and empirically justified relationship between the degree of decentralization and economic growth, the most easily measured quantitative indicator of economic development. In their search for such a justification, economists have analyzed and adapted various economic growth models, using them to find a potential link between decentralization and growth and applying various econometric techniques to confirm this link empirically.

Researchers have modified popular economic growth models (Solow model, Barro's endogenous growth model, and Diamond's overlapping generations model) to incorporate a potential relationship between fiscal decentralization and economic growth (Brueckner, 2006; Davoodi and Zou, 1998; Thiessen, 2003). The most common analytical framework that links expenditure decentralization to growth is a model developed by Davoodi and Zou (1998), which is a modified version of Barro's model (Barro, 1990). A Cobb-Douglas production function has two inputs, namely private capital and public spending, by three levels of government, federal, state and local. Public expenditures are financed through taxes on output. Maximizing the utility function of a representative agent with respect to a dynamic budget constraint provides the following solution: output growth rate depends, inter alia, on the shares of different levels of government in total public expenditure. From the model, it is also possible to calculate growth-maximizing shares of public spending. Davoodi and Zou (1998) conclude that if public expenditure is excessively centralized, decentralization can be conducive to economic growth.

The augmented Solow model (Mankiw et al., 1992) also provides the basis for econometric analysis of the relationship between decentralization and growth (Thiessen, 2003; Lin and Liu, 2000). In addition to standard determinants of economic growth that are derived from the Solow model (initial output value, physical and human capital accumulation, and labor force growth), in the empirical specification, Thiessen (2003) uses additional decentralization measures and other conditioning factors as independent variables.

Brueckner (2006) uses Diamond's model to show the advantages of decentralization theoretically. A hypothetical Diamond-Brueckner world at time *t* consists of two overlapping generations, the young and the old (each agent lives for two periods, being young in the first and old in the second). Young in-

dividuals can invest part of their time in education because it raises their future income and can work the remainder of the time. In addition, a young generation can save a share of their income and invest it in physical capital. Old individuals devote all of their time to work. A consumption bundle of each generation consists of two goods: private and public. The old generation, whose disposable income is higher (because their level of human capital is higher, and they do not spend their time on schooling), can consume more, thus having higher demand for the public good. Brueckner then compares two systems: decentralized (federalism) and centralized (unitary). Under federalism, it is assumed that a perfect Tiebout-sorting mechanism allows individuals to sort themselves in two demand-homogeneous jurisdictions with different levels of the public good provision (higher for old than for young). Under the unitary system, a common level of the public good is provided for all individuals. According to the proposition presented by the author, the time spent on education and levels of physical capital is higher in the federalist equilibrium than in any unitary equilibrium. Economic growth, determined by the human capital growth rate, is, hence, higher under federalism. This model, which is excessively abstract and cannot be implemented empirically, provides insights on how federalism (in the form of decentralized public good provision) may positively influence growth.

Summing up the previous research on the theoretical relationship between fiscal decentralization and economic growth, Baskaran et al. (2014) identify four potential channels of this relationship: heterogeneity of preferences, market preservation, structural change, and political innovation. *Heterogeneity of preferences* is presented in the abovementioned Diamond-Brueckner model (Brueckner, 2006). *Market preservation* means that fiscal decentralization increases the horizontal fiscal competition, which restricts the negative incentives of subnational authorities, improves the conditions for market development, and ultimately accelerates economic growth. *Structural change* is related to potential positive effects of decentralization during structural crises (e.g., when there is a permanent negative demand shock encountered by a particular industry). Structural change is easier to implement under decentralization because in the centralized system, risk-averse officials may have a higher interest in providing excessive financial aid to inefficient industries, which precludes structural reforms (Besley and Coate, 2003). *Political innovation* means that fiscal decentralization creates conditions for using regions as laboratories for economic experiments (Oates, 1999). If a policy innovation is successful in one region, it may be further disseminated among other regions, which creates new opportunities for economic growth.

Thus, a theoretical relationship between fiscal decentralization and economic growth appears to be established and justified. Is there solid empirical evidence of such a relationship?

The results of numerous studies on the relationship between fiscal decentralization and economic growth, both from a cross-country and regional perspective, are very contradictory. Some researchers find a positive relationship (Akai and Sakata, 2002; Buser, 2011; Iimi, 2005; Thiessen, 2003), whereas others show that decentralization and growth are either negatively correlated (Baskaran and Feld, 2013; Davoodi and Zou, 1998; Rodriguez-Pose and Ezcurra, 2011) or not correlated at all (Asatryan and Feld, 2013; Thornton, 2007). In contemporary

studies, researchers refer to the multidimensional nature of decentralization and find that expenditure decentralization has a negative effect on growth, whereas revenue decentralization is positively related to the long-run growth prospects (in cases when expenditures are more decentralized than revenues). In other words, the convergence hypothesis is confirmed: achieving a balance between revenue and expenditure at regional and local levels is positively related to economic growth (Cantarero et al., 2009; Gemmel et al., 2013; Rodriguez-Pose and Kroijer, 2009) and creates positive incentives for subnational authorities to preserve market institutions (Jin et al., 2005).

The most widely used cases in the regional studies are obviously Chinese provinces and American states, because both countries offer sufficient samples (50 American states and 28 Chinese provinces), substantial heterogeneity among regions in terms of economic and fiscal performance, and reliable statistical data for a long period of time. Nevertheless, there is no consensus on the direction and significance of this relationship.

According to some researchers, regional economic growth in China is negatively correlated with expenditure decentralization (Zhang and Zou, 1998) and positively linked to the transition to a new system of revenue assignment among different levels of government in 1987, which increased the autonomy of provinces with respect to their independently collected revenues (Lin and Liu, 2000). Both papers noted above use panel data analysis over a similar period of time (1970s–early 1990s), which allows a general conclusion regarding a positive relationship between the convergence of revenues and expenditures of Chinese provinces and their economic growth. Other researchers obtain an opposite result: the convergence of subnational revenues and expenditures is negatively correlated with economic growth prospects both under the fiscal contract system (1979–1993) and under the revenue assignment system (1994–1999) (Jin and Zou, 2005).

Analyzing the relationship between fiscal decentralization and economic growth in the USA, researchers also obtain contradictory results. For instance, some use the Davoodi-Zou model and analyze 'long' time series data (1948–1994) and conclude that there is no strong link between expenditure decentralization and growth, i.e., the exiting degree of decentralization suits the purpose of maximizing economic growth (Xie et al., 1999). Other researchers use panel data analysis over relatively 'short' time periods (1997–2001) and confirm that there is a positive relationship between both expenditure and revenue decentralization and economic growth at the state level (Akai and Sakata, 2002), as well as a negative correlation between the degree of decentralization and the volatility of economic growth in 1992–1997 (Akai et al., 2009).

The analysis of the decentralization experience in Spain in 1985–2004 reveals a strong positive relationship between revenue decentralization and economic growth and no link between expenditure decentralization and growth (Cantarero and Perez Gonzalez, 2009). The authors use several robustness checks to confirm their findings, including the instrumental variables (IV) technique to account for the possible endogeneity between decentralization measures and economic growth and the dynamic panel data model to control for the inclusion of the lagged dependent variable in the set of regressors. All of these checks confirm the major results of the study.

Summing up the analysis of the empirical literature,[3] it should be noted that the relationship between fiscal decentralization and economic growth (and its significance) is contradictory in cross-country and regional studies and depends on the following factors:

- cross-section and time structure of data (number of countries or regions analyzed, time horizon, including the presence of structural shocks and crises in the time period considered);
- methods of empirical analysis (cross-section analysis, instrumental variables technique; panel analysis, including models with fixed and random effects and dynamic panel data methods; time series analysis using ARMA and GARCH models; and Bayesian methods);
- choice of fiscal decentralization measures (revenue and expenditure decentralization, fiscal autonomy variables, integral indices of decentralization);
- control variables included in the econometric model, i.e., determinants of economic growth (initial GDP or GRP levels, population or labor force growth rate, physical capital growth rate or share of investments in the physical capital in GDP, tax pressure on the economy, and openness index, etc.— see seminal papers of Barro (2003), Levine and Renelt (1992)).

The main lessons that need to be learned from the numerous empirical studies described above are that the multidimensional nature of decentralization (at least its revenue *and* expenditure dimension) should be considered, and the major determinants of economic growth should necessarily be included in the econometric model to prevent the omitted variable bias.

3. Fiscal federalism development in the Russian Federation

The development of fiscal federalism in contemporary Russia is similar to a pendulum motion. The highly centralized budget system of the late Soviet Union underwent spontaneous decentralization during a transition period of the early and mid-1990s, formation of fiscal norms and institutions in early 2000s and then gradual fiscal recentralization beginning in the mid-2000s. It should be noted that in contrast to China, where the economic decentralization of the 1990s was accompanied by the preservation of political control over provinces by the central government, fiscal decentralization in post-Soviet Russia was accompanied by political decentralization, whereas the recentralization of the budget system in the mid-2000s was accompanied by political centralization. Thus, the Chinese model proposed for Russia by certain researchers and policy-makers was not attempted in reality.

A detailed description of fiscal federalism development in Russia is beyond the scope of this paper but covered extensively in Yushkov (2014). The most relevant studies on this issue include the report *Intergovernmental Reforms in the Russian Federation* by the World Bank (Da Silva et al., 2009) and articles of leading Russian (Bukhvald, 2008; Enikolopov et al., 2002; Kadochnikov et al., 2006; Klimanov and Lavrov, 2004; Nazarov, 2007; Orekhovsky, 2011; Alexeev and Kurlyandskaya, 2003; Freinkman and Plekhanov, 2008; Zhuravskaya, 2000)

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[3] The relationship between decentralization and economic growth is also considered for the case of Turkey (Tosun and Yilmaz, 2008), Australia (Bodman et al., 2009), and India (Zhang and Zou, 2001).

and foreign researchers (Blanchard and Shleifer, 2000; Diamond, 2003; Freinkman and Yossifov, 1999; Shleifer, 2005; Solanko and Tekoniemi, 2005).

The empirical section of this article considers the relationship between fiscal decentralization and regional economic growth at the latest stage of development of fiscal federalism in Russia (from 2005 until now). This stage is characterized by the continuing recentralization of budget revenues and the increased dependence of regions on intergovernmental transfers from the federal center.

4. Fiscal decentralization and regional economic growth in the Russian Federation (2005–2012): An empirical analysis

4.1. Data description

For the purposes of the empirical analysis, we collected data on 78 Russian regions over the period from 2005 through 2012.[4] The major sources of financial and economic statistics on Russian regions are the Russian Federal State Statistics Service (Rosstat), the Ministry of Finance of the Russian Federation, and the Federal Treasury of the Russian Federation. The key goal of the empirical analysis is to identify the direction and significance of the relationship between fiscal decentralization and regional economic growth in the period of further centralization of the budget system and increasing economic volatility. The period of analysis includes both the final stage of the 'fat years' (from 2005 to early 2008) and the crisis period with a subsequent moderate recovery (from late 2008 to 2012). Therefore, to confirm the overall result of the regression analysis, separate calculations for each of those periods are performed.

The growth rate of the gross regional product (GRP) per capita (GRP_GR) is used as the dependent variable in all the specifications. The independent variables that characterize the degree of decentralization include the intraregional revenue decentralization (DEC_1), which is the share of self-generated municipal revenues (without transfers) in total revenues of the consolidated regional budget[5]; intraregional expenditure decentralization (DEC_2), which is the share of consolidated municipal expenditures (excluding 'backward' intergovernmental transfers to higher levels) in the total expenditures of the consolidated regional budget; dependence of a region on intergovernmental transfers from the federal budget (IGT), which is the share of intergovernmental transfers (unconditional grants, subsidies, subventions) in total revenues of the consolidated regional budget; and the municipal autonomy indicator (AU), which is the share of self-generated revenues of all municipalities in consolidated municipal revenues of the respective region.

The majority of regional studies use similar measures of fiscal decentralization (Akai and Sakata, 2002; Freinkman and Yossifov, 1999; Cantarero and Perez Gonzalez, 2009). Another more sophisticated approach to measuring decentralization is proposed by Rodden (2004) and Stegarescu (2004) in which not only the share of revenues and expenditures in the consolidated subnational budget

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[4] Moscow and St. Petersburg are two federal cities that are excluded from the analysis because their budget structure is incomparable with other regions; Tyumen Oblast includes two Autonomous Okrugs (Yamalo-Nenetsky and Khanty-Mansiysky), and Arkhangelsk Oblast includes Nenetsky Autonomous Okrug.

[5] The consolidated regional budget in Russia consists of the regional budget and consolidated municipal budgets (i.e., budgets of all municipalities present in the respective region).

are considered but also the real authority of regions and municipalities to impose new taxes, to change tax rates, tax bases and federal tax deductions, and to establish their own spending priorities. However, this approach cannot be successfully applied in this paper because it is tailored primarily to cross-country comparisons and will not lead to the creation of a variable with sufficient *interregional* variation in the degree of decentralization. The reason is that regions and municipalities in the existing Russian system of fiscal federalism have *extremely limited authority over revenues and expenditures* and cannot impose new taxes or change the tax base (particular tax rates may be changed but only within narrow limits), whereas spending priorities are often imposed by the federal government (in other words, such a sophisticated variable will tend to zero for most regions).

Additional independent variables include the share of investments (in fixed assets) in GRP (*INV_SHARE*); the regional share of total natural resource production (*RES_SHARE*); the tax burden or tax pressure, measured by the share of tax revenues in GRP (*TAX_IN_GRP*); the regional population growth (*POP_GROWTH*); the trade openness ratio of the regional economy, the ratio of exports and imports to GRP (*OPENNESS*); one of the possible indicators of human capital development, i.e., the share of higher educational institutions graduates in total population of the region (*ALUMNI*); the inflation index (*INFL*); and a logarithm of the lagged value of GRP per capita (*GRP_PC_LAG*) to test the conditional convergence hypothesis.

A few key conclusions should be noted regarding the descriptive statistics. First, the degree of intraregional expenditure decentralization far exceeds the degree of revenue decentralization (average level of *DEC_2* over 8 years is 50%; *DEC_1*—28%). That is, there is a significant gap: revenues are concentrated at the regional level, whereas expenditures are equally divided between regions and municipalities. In other words, *the municipal tax base does not correspond to its spending authority.*[6] Second, *the dependence of regions on transfers from the federal budget is significant* (transfers constitute approximately 27% of regional budget revenues). Third, the average annual economic growth rates over the period of interest fluctuated substantially (from 9.7% in 2007 to 4.4% in 2009), whereas the average rate of population growth was negative during the entire eight years.

Table 1 shows descriptive statistics for the most important variables presented above (average values) for the 10 best and 10 worst regions in terms of regional economic growth in 2005–2012. The share of investments (in fixed assets) in GRP is substantially higher in the leading regions (33.38%) than in the outsider regions (26.72%), which provides preliminary evidence in favor of the hypothesis regarding a positive relationship between investments in fixed assets and economic growth. The average level of GRP per capita in 2005 (in 2000 prices) in the leading regions (RUB 37,400) was significantly lower than in the outsider regions (RUB 51,300), which provides preliminary confirmation for the conditional convergence hypothesis ("poor" regions grow faster than "rich" ones). Nevertheless, there are exceptions that reject this hypothesis: Sakhalin Region

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[6] The formal allocation of revenue and expenditure powers between different levels of the budget system can be found in Ch. 8 and 9 of the Russian Budget Code and Part 2 of the Russian Tax Code (regional and local budget revenues), Ch. 11 of the Russian Budget Code (spending obligations of different levels), Federal Law No. 184-FZ (powers of regions) and Federal Law No. 131-FZ (powers of local authorities).

was No. 1 in terms of economic growth, while its GRP per capita in 2005 was RUB 121,800; and the Republic of Tuva was No. 75 in terms of economic growth, while its GRP per capita in 2005 was RUB 15,500. It is also noteworthy that the tax pressure is much lower in the leading regions (10.1% of GRP) than in the outsider regions (13.7% of GRP). The average degree of revenue and the expenditure decentralization in the leading regions was 3% lower than in the outsider regions, whereas the average dependence on transfers from the federal budget in the leading regions is 31% (5% higher than in outsider regions). Thus, based on the descriptive statistics analysis, it is possible to conclude that *decentralization was negatively related to growth in Russian regions in the selected time period*, whereas the dependence on transfers during the crisis was positively correlated with GRP growth per capita. These conclusions need to be verified as part of the panel data analysis.

Table 1 demonstrates the heterogeneity of Russian regions in terms of the degree of intraregional revenue (to a greater extent) and expenditure decentralization. The varying degrees of decentralization may be caused by the general economic heterogeneity of regions (following, inter alia, from differences in the natural resource endowments): relatively poor regions are characterized by low living standards and low value of property, which raises problems with collecting local taxes and explains their insignificant role in the consolidated regional budget revenues (e.g., in Dagestan and Tuva, *DEC_1* is 0.10, whereas the average across Russia is 0.26). Conversely, in the regions with relatively developed industries and a higher GRP per capita, local taxes and other non-tax revenues form a significant portion of the consolidated regional budget revenues (0.38 in Vologda Region; 0.34 in Samara and Irkutsk Regions). Expenditure decentralization within a region has a relatively high correlation with revenue decentralization; as a general rule, the more income a municipality generates, the greater share of expenditures in the consolidated regional budget it takes. Moreover, differences in expenditure decentralization are caused by the different approaches towards allocating authority between the region and municipalities, which vary across Russian regions.

4.2. Empirical methodology

The following empirical analysis is loosely based on the Davoodi-Zou analytical framework (Davoodi, Zou, 1998). Nevertheless, the framework has been modified considerably. The general formula for the regression equation is:

$$GRP\_GR_{it} = \alpha_i + \lambda_t + \beta_D DEC_{it} + \beta_T TAX_{it} + \gamma'X_{it} + \varepsilon_{it},$$

where GRP_GR_{it} is a GRP growth per capita in the region i in year t; α_i denotes the unobserved regional fixed effects; λ_t is the vector of time effects (dummy variables)[7]; DEC_{it} is one of the indicators of fiscal decentralization[8]; TAX_{it} indi-

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[7] Including time effects in the regression model is extremely important for the period of interest (2005–2012) because it allows to control for the impact of exogenous macroeconomic shocks and cyclical fluctuations of the economy on economic growth.

[8] Squared specifications have also been tested but showed insignificant results.

Table 1
Data for fiscal decentralization and other economic indicators for the 10 best and worst regions in terms of regional economic growth (GRP growth per capita) in 2005–2012.

Place in the ranking — average GRP growth per capita in 2005–2012	Region	GRP_GR, %	Real GRP per capita in 2005, rub., 2000 prices	INV_SHARE, % (place)	TAX in GRP	DEC_1	DEC_2	IGT
1	Sakhalin Oblast	9.01	121 851	46.91 (2)	0.0862	0.24 (59)	0.53 (30)	0.23 (38)
2	Belgorod Oblast	8.77	36 102	27.41 (35)	0.1132	0.29 (41)	0.61 (8)	0.27 (32)
3	Kaluga Oblast	8.67	31 078	32.49 (18)	0.1352	0.29 (39)	0.46 (64)	0.17 (59)
4	Republic of Adygea	8.38	15 904	29.79 (28)	0.1007	0.23 (61)	0.45 (66)	0.35 (19)
5	Republic of Dagestan	8.36	14 863	38.25 (10)	0.0533	0.10 (76)	0.54 (26)	0.19 (49)
6	Irkutsk Oblast	7.37	51 700	23.06 (59)	0.1182	0.34 (22)	0.50 (43)	0.54 (8)
7	Jewish Autonomous Oblast	7.09	30 925	45.77 (4)	0.0979	0.20 (67)	0.40 (73)	0.46 (10)
8	Voronezh Oblast	6.83	25 491	29.88 (27)	0.0919	0.33 (23)	0.61 (9)	0.35 (22)
9	Tambov Oblast	6.70	27 357	33.19 (17)	0.0970	0.29 (40)	0.47 (61)	0.16 (61)
10	Mari El Republic	6.55	19 443	27.01 (40)	0.1206	0.21 (64)	0.56 (15)	0.35 (20)
Average (1–10)		7.77	37 471	33.38	0.1014	0.25	0.51	0.31
69	Kemerovo Oblast	2.55	40 880	27.34 (37)	0.1276	0.35 (18)	0.51 (40)	0.27 (31)
70	Samara Oblast	2.53	55 963	20.54 (69)	0.1252	0.34 (20)	0.55 (21)	0.21 (42)
71	Vologda Oblast	2.51	69 802	31.66 (21)	0.1246	0.38 (11)	0.57 (14)	0.14 (65)
72	Volgograd Oblast	2.42	33 890	19.76 (72)	0.1121	0.40 (4)	0.46 (63)	0.20 (45)
73	Republic of Kalmykia	2.26	17 082	33.89 (15)	0.1373	0.24 (58)	0.52 (35)	0.79 (2)
74	Chukotka Autonomous Okrug	1.96	137 473	30.38 (23)	0.2583	0.19 (69)	0.69 (1)	0.18 (56)
75	Tuva Republic	1.90	15 565	18.56 (77)	0.1032	0.10 (77)	0.54 (23)	0.10 (73)
76	Altai Republic	1.89	19 461	39.08 (9)	0.1348	0.17 (71)	0.58 (12)	0.08 (77)
77	Tomsk Oblast	1.38	53 930	27.95 (33)	0.1017	0.29 (44)	0.47 (60)	0.30 (27)
78	Murmansk Oblast	0.99	69 550	18.00 (78)	0.1449	0.34 (21)	0.49 (53)	0.37 (15)
Average (69–78)		2.04	51 359	26.72	0.1370	0.28	0.54	0.26

cates the tax burden; and X_{it} is a set of basic and additional control variables. The basic independent variables (determinants of economic growth) include population growth, the share of investments in GRP, the logarithm of three-year lagged values of GRP per capita, and a proxy of human capital (in accordance with the approach used in (Levine and Renelt, 1992)). In addition, the trade openness ratio, inflation (regional consumer price index) and the regional share of total natural resource production are used as additional conditioning factors. Unemployment is not considered as a control variable in this study due to two reasons: first, it is highly correlated with the lagged GRP per capita; second, it may cause an endogeneity problem due to its bi-directional causality with economic growth.[9]

The panel data model is estimated in the fixed-effects framework (FE).[10] The disadvantage of the FE model is that it is impossible to analyze an impact of time-invariant independent variables (e.g., the basic level of GRP per capita or dummy variables for federal districts). Nonetheless, the advantage of this model is that the unobserved heterogeneity, i.e., the entire set of time-invariant factors, is implicitly controlled through fixed effects.

5. Results and conclusions

Table 2 contains the results of the panel data analysis. Only full specifications are shown in the table. Columns 1 through 4 contain the results of the regressions for specifications with various fiscal decentralization measures.

The intraregional expenditure decentralization (column 2) is negatively and significantly (at 5%) related to regional economic growth, whereas the region's dependence on transfers from the federal budget (column 4) is positively and significantly (at 10%) linked to growth.[11] The remaining decentralization measures are insignificant in the regressions.

These results imply that *government expenditures in Russian regions are excessively decentralized, which causes a negative relationship between expenditure decentralization and regional economic growth*. At the same time, self-generated revenues of municipalities are only 50% of their total revenues (the second half consists of intergovernmental transfers). Thus, municipalities lack sufficient resources to finance their own spending programs. The majority of their programs are financed through subsidies. Thus, local authorities have no incentives to spend budget resources more efficiently.

The results noted above contrast with the findings of researchers who, studying Russian federalism at its initial stage, find a positive relationship between the intraregional revenue decentralization and the growth of real industrial production (1992–1996) (Freinkman and Yossifov, 1999). It should be noted that

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[9] Multicollinearity is not an issue here because independent variables in the regression are not highly correlated (only two correlation coefficients exceed 0.3).

[10] The Hausman test results show that the random-effects model (RE) is inconsistent for the model of interest.

[11] To verify the results, separate regressions were run for both periods (the 'fat years' and the crisis period with subsequent recovery, see above). The direction of the relationship between decentralization measures and economic growth *remained the same*. However, the negative correlation between expenditure decentralization and growth is more significant during the 'fat years'.

Table 2
Model with fixed effects and time dummies.

	Dependent variable — GRP growth per capita			
	(*DEC_1*)	(*DEC_2*)	(*AU*)	(*IGT*)
DEC_VAR	−0.0422	**−0.0559****	−0.0169	**0.0824***
	(−1.00)	**(−2.12)**	(−0.70)	**(1.81)**
POP_GR	−0.0031	−0.0038	−0.0029	−0.0034
	(−0.91)	(−1.07)	(−0.84)	(−1.01)
INV_SHARE	0.0853**	0.0820**	0.0886**	0.0788**
	(2.42)	(2.30)	(2.58)	(2.39)
TAX_IN_GRP	−0.2739***	−0.2779***	−0.2713***	−0.2026**
	(−3.05)	(−3.18)	(−2.93)	(−2.46)
GRP_PC_LAG	−0.1156***	−0.1156***	−0.1160***	−0.1109***
	(−3.76)	(−3.86)	(−3.71)	(−3.71)
ALUMNI	4.7838*	4.8654*	4.8321*	4.4423*
	(1.76)	(1.76)	(1.79)	(1.67)
INFL_T−1	−0.3822**	−0.3900**	−0.3868**	−0.3832**
	(−2.10)	(−2.20)	(−2.15)	(−2.29)
SHARE_RES	0.5641***	0.5226***	0.5711***	0.5841***
	(3.20)	(2.64)	(3.06)	(2.82)
OPENNESS	−0.0194	−0.0192	−0.0193	−0.0238*
	(−1.51)	(−1.50)	(−1.53)	(−1.74)
Constant	1.2734***	1.2760***	1.2771***	1.2218***
	(4.02)	(4.13)	(3.95)	(3.95)
Time effects	Yes	Yes	Yes	Yes
Observations	623	623	623	623
R^2	0.6149	0.6156	0.6136	0.6178

Notes: Only full specifications are shown in the table. The *t*-statistics are given in parentheses; standard errors are cluster-robust.
The coefficients for time dummies are not shown. The coefficients are positive for 2006, 2007 and 2011 and negative for 2009 (at the peak of economic crisis). The relevant coefficients with variables representative of decentralization (DEC_2 and IGT, the two remaining variables have no relevant coefficients) are in bold.
DEC_VAR is one of the decentralization variables: DEC_1, DEC_2, AU, IGT.
Levels of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

these authors consider a shorter time period and do not include most of the necessary control variables in their analysis, which leads to the omitted variable bias. The difference between our results can also be explained by the fact that in 1996–2005, a significant institutional transformation occurred within the entire system of fiscal federalism (a strong formalization of the budget process, concentration of resources and authority at the federal level, and minimization of opportunities for regions to engage in political bargaining for authority and intergovernmental transfers); in addition, regional and municipal fiscal autonomy was significantly reduced.

At the same time, a high dependence of a region on intergovernmental transfers is positively correlated with economic growth (or, conversely, negatively correlated with economic stagnation). This result confirms the findings of Zubarevich (2015), who argues that regions that were dependent on transfers (including the Far East and North Caucasus) suffered less from the financial and economic crisis in 2008 and 2009. Another possible explanation is that a fly-

paper effect ("money sticks where it hits") reduces the excessive expenditure decentralization within a region. For instance, a regional government receives an additional unconditional equalization transfer in times of crisis. Then, by the flypaper effect, the transfer is spent directly by the regional government for a particular anti-crisis program instead of providing additional resources to less efficient local governments. Thus, unconditional transfers can have a twofold effect: first, a share of local expenditures in total regional budget is reduced, which is conducive to growth; second, financial resources are spent by more qualified regional officials.

The majority of independent variables have expected signs, which confirms the adequacy of the model. The GRP per capita logarithm, taken with a three-year lag, is negatively correlated with economic growth (at 1% significance in all specifications), which confirms the conditional convergence hypothesis. Tax pressure is also significantly negatively (at 1% or 5%) associated with growth. The share of investments in GRP and human capital proxy are positively and significantly related to economic growth, which confirms the findings of previous studies (Barro, 2003; Levine and Renelt, 1992).

Similar findings are obtained for *rentier regions* (transfer-dependent regions and regions with a high share of natural resources in GRP; see also Freinkman and Plekhanov, 2008a,b) in which the negative correlation between expenditure decentralization and growth is more significant. Nevertheless, regions that extract natural resources recovered faster after the crisis and grew faster (positive and significant coefficient for the *RES_SHARE* variable), which was most likely caused by the favorable conditions in the energy market.

Returning to the channels of correlation between fiscal decentralization and economic growth described in the theoretical part of the article, we can assume that they *do not function* efficiently in the modern Russian system of fiscal federalism. Market preservation is not working (and did not work in the 1990s, see Zhuravskaya, 2000) because local authorities have no incentives to develop markets and encourage business activity; an increased tax base (resulting from faster market development) will lead to reduced transfers from higher level budgets. The heterogeneity of preferences only works in relation to major cities and the wealthiest regions that can attract qualified workforce and young specialists. Political innovations may be used by the federal center in the future to conduct economic experiments (e.g., to introduce new local taxes), although currently, this channel also does not function properly. The structural change channel does not work in Russia because inefficient companies and industries continuously receive support in times of crises (*bailouts*) both from subnational and federal budgets. Consequently, the current intraregional decentralization and the system of intergovernmental relations *do not allow the advantages of fiscal federalism to be fully realized in the Russian Federation, thus slowing down economic growth and impeding consistent development of regions and municipalities.*

This article illustrates the current situation with fiscal (de)centralization in Russian regions and its potential link to regional economic growth. Identifying a clear causal relationship between decentralization and growth (or, more broadly, development) and solving the issues of dual causality and endogeneity in the model falls beyond the scope of this article, although it is of substantial interest for the future research of Russian fiscal federalism.

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