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**Constitutions, Regulations, and
Taxes: Contradictions of Different
Aspects of Decentralization**

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Abstract

The paper confronts different aspects of decentralization: fiscal decentralization, post-constitutional regulatory decentralization, and constitutional decentralization – using a single dataset from Russian Federation of the Yeltsin period as a politically asymmetric country and a variety of indicators. It finds no robust correlation between different decentralization aspects; moreover, three processes of devolution appearing in the same country at the same time seem to be driven by different (though partly overlapping) forces. Hence, a specific aspect of decentralization is hardly able to serve as a proxy for another one or for the overall decentralization process.

Key words: regulatory decentralization, fiscal decentralization, determinants of decentralization

JEL classification: D78; H77.

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1. Introduction

One of the main problems for the empirical literature on decentralization, its driving forces and economic impacts, is that decentralization is really difficult to measure. The traditional indicators like retention rates or subnational share of public expenditures have all been discussed in the literature and thoroughly criticized. There are at least two aspects able to cause trouble while bringing theory on fiscal federalism to data. First, it is crucial to distinguish among the constitutional and the post-constitutional stages of decentralization. Allocation of authorities as specified in the fundamental acts of the federation does not necessarily map into the allocation of de-facto authorities and, even more, of fiscal flows. Second, at the post-constitutional level there is always a gap between fiscal decentralization and regulatory decentralization; since both aspects are crucially important for the performance of federations, any empirical approach ignoring one of them is likely to face problems while identifying the *ceteris paribus* effect of devolution.¹ The aim of this paper is to explicitly confront different concepts of decentralization using a single dataset. The objective is rather positive than normative: first, I try to establish a correlation between different aspects of decentralization, and second, look at the driving forces determining the decentralization outcomes. From this point of view the paper aims to contribute to the growing empirical endogenous decentralization literature (e.g. Panizza, 1999; Cerniglia, 2003; Arzaghi and Henderson, 2005; Letelier, 2005; Stegarescu, 2006; Feld et al., 2008), attempting to perform a positive analysis of factors determining (various) degrees of decentralization

It is difficult to find a reasonable empirical playground for this exercise, mostly because decentralization beyond simple allocation of revenues and expenditures is very hard to quantify. This paper takes advantage of the process of asymmetric devolution in the Russian Federation in the 1990s, and uses Russia as the laboratory for comparing different aspects of decentralization. Russian Federation in the late 1990s is probably the classical example of what one may call asymmetric federalism. Individual regions achieved different levels of devolution through both bargaining with the federal center and unilateral activities, including introduction of legal norms directly contradicting federal legislation and manipulations with tax collection. On the other hand, it remained formally a highly centralized federation, with exclusive authority on the federal level in many areas of regulation, as well as in fiscal affairs. In this paper I use nine proxies to measure the degree of asymmetric devolution achieved by individual regions. First, a more traditional indicator of

¹ In this paper I use the terms “devolution” and “decentralization” as synonyms, what is probably slightly sloppy if one looks at precise definitions applied in political sciences, but is reasonable for a study of asymmetrically decentralized country.

the tax retention rates is applied to measure the degree of *fiscal decentralization*; this standard variable is supplemented by a number of modified indicators to capture some of its problems. Second, I use the data of the Federal Register to obtain the share and the number of regional acts directly contradicting federal law, thus accounting for *regulatory decentralization* at the post-constitutional level. Finally, I construct two indices to obtain the degree of autonomy incorporated in regional constitutions (using their version as of in late 1990s) and in the power-sharing treaties signed by the federal government and the regional administrations, therefore measuring the *constitutional decentralization*.

The main finding of the paper is that fiscal decentralization, post-constitutional regulatory decentralization and constitutional decentralization seem to be largely unrelated to each other; moreover, different factors identified in the theory are at work for different aspects of decentralization. The only robust correlation I find is between regulatory decentralization and degree of devolution in regional constitutions; however, even this result is simply driven by a small group of ethnic republics. It is necessary to point out that it does not follow unambiguously from the theoretical reasoning that different dimensions of devolution should be correlated. On the one hand, different preferences and rents in different policy areas are likely to result in different levels of decentralization. On the other hand, correlation is likely to occur as a consequence of bargaining, where different aspects of decentralization become subject to package deals and therefore the outcomes turn out to be interdependent. The results of this paper, nevertheless, are relevant, first, because our knowledge of interrelation of dimensions of decentralization is limited (and hence it is difficult to confront any theoretical result with reality), and second, because of somewhat simplistic treatment of decentralization in many empirical papers using just one “true” measure of decentralization. The latter could be justified if the dimensions of decentralization are correlated – so, an empirical investigation seems to be of interest.

The paper is organized as follows. In the next section I discuss the problem of measuring the degree of decentralization in the literature. The third section briefly considers the design of the Russian federalism, presents different dimensions of decentralization and looks at their correlation. The fourth section focuses on determinants of endogenous decentralization in Russia and the econometric problems of the analysis. The fifth section reports the main results with respect to the driving forces of decentralization. The sixth section summarizes and discusses the results, and the last section concludes.

2. Measuring the degree of decentralization

Since decentralization seems to be one of the main concepts for economic and political reforms in both developing and developed countries, there exists a multitude of intersecting and diverging theoretical and empirical approaches to defining and measuring decentralization, often applied as “proxies” for one another (Sharma, 2006). To start with, the main problem of the literature is actually not the choice between “centralized” and “decentralized” governments, but rather between *political*, or *constitutional* (which in turn may refer to the autonomy of decision-making, autonomous appointment of governments and their ability to participate in federal decision-making), and *administrative* (which mostly refers to the construction of public administration, i.e. deconcentration of bureaucracy) decentralization (Hutchcroft, 2001). For a large country (in terms of population or territory) administrative decentralization is unavoidable and undisputable simply because of technical reasons of governability. Hence, the question of the optimal degree of decentralization usually refers to the decision-making autonomy of regional governments (although in a world with agency problems and power asymmetries administrative decentralization may “turn into” political autonomy of regional governments through the informal migration of authority).

A further distinction should be made, as already noticed, between the (already defined) *constitutional* decentralization and the *post-constitutional decentralization*. In this case I follow the Buchanan and Tullock’s (1962) distinction of constitutional and post-constitutional decisions: the post-constitutional decentralization reflects the *outcomes* of the political process, once the constitutional rules are set, rather than the rules themselves. Or, stated otherwise, the constitutional decentralization describes the ability of regional administrations to make independent decisions, or, as Schneider (2003:33) puts it, “the degree to which central government allows non-central government entities to undertake the political functions of governance”, while the post-constitutional decentralization describes the consequences of this allocation of authority for financial flows and regulations. In what follows I will use the notion of the “regulatory” and the “fiscal” decentralization just to describe the post-constitutional level. In the literature both levels are often “merged”: and hence, for example, fiscal decentralization can refer to both rules and outcomes. However, if one intends to test the link between two levels empirically, an analytical distinction can be helpful.

Let me elaborate on the specifics of constitutional and post-constitutional decentralization in individual policy areas studied in what follows. The difference between these two aspects is particularly simple in fiscal matters: the constitutional decentralization implies the right of regions to independently decide on revenues and expenditures of their budgets; the post-constitutional decentralization, however, means just the allocation of funds

between center and regions. In countries like Germany states receive substantial portion of tax revenue, but have virtually no right to decide on bases and rates for taxes (which are then federal or joint responsibility). In what follows *fiscal decentralization* refers exclusively to these post-constitutional outcomes (as it is the case in almost all empirical studies, though not all of them acknowledge it). The situation is slightly more complicated, if one looks at the regulations. The constitutional decentralization, once again, means the allocation of decision-making rights on standards and norms for economic activity. However, this allocation may be different from the “real” significance of regional and federal regulations for economic agents. For example, it is possible that one of the parties (either center or states) is more active in filling their “regulatory niche” with acts and norms, than the other. Once again, *regulatory decentralization* in this paper refers to the post-constitutional “relative importance” of federal and regional law for economic agents. Obviously, it is a vague concept, which I will, however, operationalize in what follows. This paper therefore looks at three aspects of decentralization: constitutional and two post-constitutional (regulatory and fiscal) dimensions of devolution.²

The literature on *fiscal decentralization* usually relies on indicators like share of subnational (tax) revenues and / or expenditures, which are, in spite of common usage, also very often criticized both because of measurement problems (impact of tax and non-tax revenues, spatial allocation of federal expenditures, influence of interbudgetary transfers) and especially because they ignore the degree of autonomy (i.e. constitutional decentralization) in the decision-making with respect to the fiscal matters (Ebel and Yilmaz, 2002). Hence, there have been a number of attempts to correct the data incorporating the degree of fiscal autonomy in the analysis (Stegarescu, 2005). The *regulatory* decentralization is obviously much harder to measure, since the variety of policy aspects to be considered may be huge. On the other hand, it is also more difficult to come to data for the international analysis, and the intranational variation may be insufficient. Therefore scholars usually focus on specific aspects of regulation providing a suitable basis for the analysis.³ The *constitutional* decentralization has been subject to a great variety of studies. The most popular approach is to construct an index, incorporating several aspects of decentralization as well as may be several

² The constitutional level is usually more stable, than the post-constitutional outcomes, although in the developing countries it may also become quite volatile and even determined by individual personnel decisions. The list of post-constitutional dimensions may be expanded to include further aspects of governance (say, allocation of personnel between levels of political system, cf. Treisman, 2002); however, even measuring three main dimensions of devolution is a non-trivial task.

³ For example, Strumpf and Oberholzer-Gee (2002) test the impact of preference heterogeneity on decentralization by studying the liquor control rules in the U.S. municipalities. Traub and Sigman (2007) examine the “voluntary decentralization” in the area of several health and safety laws in the United States.

outcome measures.⁴ An alternative could be to measure the actual policy interconnection between different levels of government.⁵ Finally, special political situations may provide source for analysis of constitutional decentralization.⁶

In spite of the obvious importance of the topic, the literature explicitly comparing different dimensions of decentralization is very small (Treisman, 2002; Schneider, 2003; Blume and Voigt, 2008; Martinez-Vazquez and Timofeev, 2009) and mostly focuses on international settings.⁷ Treisman (2002) and Blume and Voigt (2008) also consider the correlation of different forms of decentralization and socioeconomic and political country characteristics, including country size, ethnic division, colonial origin, economic development and level of democracy. However, data compatibility across nations adds an additional dimension to the measurement problem. Hence it is reasonable to look at different dimensions of decentralization and their origin using the *intra-national* variation of decentralization, which, however, to my knowledge have never been considered empirically before for this problem.

Once the subnational variation is taken into account, a further distinction should be made. First, one can focus on the decentralization *within* subnational units, if they are different enough.⁸ Second, however, the degree of devolution achieved by *each region* versus the central government is often *heterogeneous*, implying the development of what one may call “asymmetric federalism”. While asymmetries in terms of *outcomes* of economic policies (say, retention rates) are always present in federations (but may have substantially different origin), the asymmetry at the level of *constitutional* decentralization is a more rare phenomenon, which is, however, observed in a variety of countries.⁹ Asymmetry is also a feature of the Russian federalism, which, combined with a large number of regions, provides us with substantial intra-national variation for a reasonable statistical analysis and makes Russia an attractive laboratory – however, it is important to remember that it is not a “unique” feature of Russia and hence may generate more generally applicable results.

⁴ Marks et al. (2008) provide a comprehensive review of these indices (as well as construct their own one).

⁵ Sheng (2007) studies the biographies of party secretaries in China to understand the logic of political decentralization, and Landry (2004) looks at the tenure duration and promotion patterns of local officials as response to formal decentralization.

⁶ For example, Hennessey (2008) discusses a specific experiment of home rule establishment for American municipalities.

⁷ A related study is done by Liu (2007), who performs a cluster analysis of different dimensions of decentralization in order to identify the typical combinations empirically observed, and Falleti (2004) in a case study of Latin American countries, who investigates the dynamic interaction of different decentralization aspects.

⁸ For example, Feld et al. (2008) perform an analysis of fiscal decentralization *within* the cantons of Switzerland, using the extreme heterogeneity of their financial constitutions.

⁹ The best example may be Spain, where each region (“*comunidad autonoma*”) determines the scope of autonomy from the “menu” offered by the federal government individually, but asymmetry is incorporated in political systems of countries like United Kingdom, Canada, Belgium or India.

3. Dimensions of decentralization in Russia

3.1. Russian asymmetric federalism and decentralization

The development of the Russian asymmetric federalism has already been subject to numerous studies in both economics and political science. First, the basic elements of the asymmetry were already inherited from the Soviet period: the federation still consists of national republics, administrative units (oblast or krai) and autonomous okrugs. Although in the early 1990s the situation was quite different, the currently valid constitution of 1993 proclaimed an identical status of all “subjects of the Federation” (the official designation of all regions regardless of their status). However, previous norms, as well as informal bargaining processes granted the national republics special privileges. Second, the asymmetric federalism in the 1990s appeared from the bilateral and multilateral bargaining between the regions and the center, partly initiated by the regions (Stoner-Weiss, 1998). Third, the federal law (acts of the parliament and also presidential decrees) was also used to give additional authorities to regions. Finally, the key component of asymmetry were the unilateral activities of the regions: manipulations with the tax retention rates and the so-called “war of laws”, i.e. introduction of regional legislation (including regional constitutions) directly contradicting the federal acts (and also the constitution of Russia). As a result, Russian regions obtained significantly different degree of autonomy, resulting into substantial differences of regional legal regimes and economic policies (Polishchuk, 2001).

Fiscal decentralization: As already mentioned, this paper looks at three dimensions of decentralization in Russia. To start with, the *fiscal decentralization* is measured by the traditional variable of the tax retention rate (share of regional government in the overall tax revenue collected from its territory, including federal and regional taxes). Although the data is published by the Federal Statistical Authority (Goskomstat) on the annual basis, in order to ensure compatibility with other data, which are available only in a cross-section, I take the average over 1995-1999 (with 1995 being the first year after the reform of the federalism in 1994, establishing the existing system of interbudgetary relations in Russia, and 1999 being the last year of the Yeltsin’s presidency before the re-centralization attempts under Putin started). The advantage of this variable is that it is consistent with the previous literature on asymmetric federalism and Russia, which often applied this indicator as both a dependent and an independent variable in various settings (for example, Treisman, 1999 or Desai et al., 2005). However, it also has several disadvantages. A formal indicator of the tax structure does not cover the high variety of financial flows between the center and the regions and between the regions and the economic actors (e.g. transfers, non-monetary transactions, barter, and

redistribution of property rights, see Eckardt, 2002). Even despite relatively high centralization in the field of taxation, regional governments still have sufficient additional powers via related business groups and banks etc (Rosefielde and Vennikova, 2004). Moreover, the use of off-budget funds was quite common in the 1990s - in this case I refer to both “off-budget funds” - public entities formally not included in the regional budget, but established according to the federal or regional law (for example, road funds), and quasi-legal formally private entities, which forced the contributions through the pressure of governors.¹⁰ To put it differently, tax retention rates may have little in common with the actual ability to produce public goods.

Hence, I have also used several modified variables to capture the potential drawbacks of the retention rate. As I will demonstrate in what follows, however, almost all variables of this group have their own clear disadvantages: and, what is even more important, they are inconsistent with the existing literature, which mostly relies on the retention rate. So, they will just be applied as supplementary indicators. The first ratio relates the *sum of the own tax revenue and federal transfers* obtained by the regional budget to the *overall tax collection from the region’s territory*. The idea is simple: it is possible that the retention rate as such is not informative, because through its strong bargaining power the regional administration was able to force the federal government to provide it with substantial transfers. Hence, in this ratio in the numerator one has the actual “flow of money” to the regional budget, which is then compared to the “flow of money” the regional territory was able to generate for the whole budgetary system.¹¹ The disadvantage of this indicator is, however, that the degree of control of the regional administration over the share of the tax revenue and the transfers from the federal budget is very different. In Russia the problem is may be less pronounced, because tax collection during the period discussed in this paper was anyway done by the federal agencies (which have however often been captured by regions, see Lavrov, 2005): but even in this case the decision-making mechanism for the re-allocation of tax revenue and for the federal transfers is different, and thus two components of the numerator could measure different things. For example, while a large retention rate is usually treated as an indicator of autonomy, large transfers could indicate both strong bargaining power of the region able to “coerce” the federal administration to provide financing, but also high dependence of the region from the federal budget (if, for instance, its own tax revenues are small).

¹⁰ For example, in Kalmykiya, one of the Russian republics in the Southern region, companies after registration paid a special “registration fee” to a so-called “Fund of Presidential Programs”. Even in the modern Russia, where the degree of federal control over these schemes is significantly higher, regional governments have enough opportunities to let the businesses “voluntary” pay for some regional projects, creating an additional tax, which is not covered by official statistics.

¹¹ Certainly, the variable can exceed one, if the region receives substantially more than it is able to generate.

The second modification I apply looks at *the retention rate for an “extended” regional budget*, which includes not just regional budget as such, but also territorial off-budget funds: social security (pension, social insurance, unemployment and medical insurance) and other funds (roads, reproductions of natural resources, environment). Most of these funds mentioned were established by the federal law (though often providing regional governments with discretion as to whether they are willing to create a particular fund) and financed through mandatory contributions of the population (employers and employees) and businesses divided between territorial and “central” funds (although the latter than once again often provided additional funding to the territorial funds). This measure covers at least a fraction of the off-budget fiscal flows in the Russian regions (although, of course, is unable to capture the “semi-private” funds “affiliated” with the regional governors – for the latter, however, no reasonable statistical data is present). However, this indicator also suffers from two problems. First, once again, the degree of control over the financial flows added up in this variable by the regional government is very different – and partly even different from region to region (for example, for the territorial social security funds one once again faces the problem of the “capture” of a territorial federal agency by the regional administration). Second, the data for this “extended budget” is available just for one year in my sample (1999), thus creating a variety of questions regarding stability over time and compatibility to other indicators. I calculate the measure using the information reported by the East-West Institute (2001).

The data of the East-West Institute (2001) also provides me with an opportunity to use a fourth indicator of the fiscal decentralization, which measures the *expenditure decentralization*. Basically, for an asymmetric federal design variation of the expenditure decentralization is often impossible to calculate: while we are aware of the particular territory the tax revenue originated from (with certain caveats), we often do not know the spatial allocation of the federal expenditures (and that is why an analogue of the “retention rate” for expenditures is impossible). East-West Institute (2001) calculates the so-called “direct” federal expenditures’ allocation over regions for 1998 and 1999. Then the measure of expenditure decentralization I use is the share of regional expenditures in the sum of regional expenditures and “direct federal expenditures” for a particular territory; and I use the average over 1998-1999. This indicator is interesting, first, for the sake of completeness of the general argument, but also because it represents the “other side” of fiscal decentralization in Russia, which has been rarely studied before (although, for example, it is known that the allocation of expenditure and revenue authorities has been very different in Russia). A problem of this indicator is that, first of all, even the “direct” expenditures do not cover all federal expenditures: for example, we have little information about military expenditures, which are

often quite important for some regions. Second, once again, I can use only a very short time period of two years.

Regulatory decentralization: A unique advantage of the Russian dataset is that one can use a specific measure for the *regulatory decentralization* encompassing multiple dimensions of economic regulation. As already mentioned, the regional legislation in the late Yeltsin period included a large number of significant contradictions to the federal law. Although the federal law existed, regional courts and regional police, captured by local governments, usually enforced the local law – so, the federal acts simply did not matter for economic agents. After the start of the Putin’s presidency, one of the first steps of the new government was to revise the regional law in order to ensure the predominance of the federal legislation. As part of this effort, the Ministry of Justice established the so-called Federal Register (*federal’nyi registr*), or catalogue of regional acts (both of the legislatures and of executive bodies, but incorporating legal norms) in power at that moment. The acts included in the Register should pass an examination by the expert commission established by the Ministry of Justice, which determines their compatibility with the federal law. As a result, a statement is published, which is then included in the file in the Federal Register as well. The acts contradicting federal law should be abolished or changed; however the file in the Register remains, even if the act is not valid any more. Although originally the Register was unable to cover all regional acts (a revision process certainly takes time), after several years one can be sure that most acts passed by the regions were included in the Register.

The idea is to use the information on the number of acts contradicting the federal law as a proxy for the regulatory decentralization. In order to understand this variable, one should recall, that *de-jure* Russian Federation has been an extremely centralized political entity in terms of regulatory authorities, mostly vested in the central government. However, due to its weakness regions basically received the option to “re-design” the federal law simply by making own acts. Nevertheless, even in this situation ignoring federal law could result into punishments from the federal administration (for example, through a reduction of transfers). Hence, one can in fact treat the resulting share or number of “illegal laws” as an outcome of an *implicit contract* between the federal and the regional government, depending upon the *preferences* of the regional administrations for the different law than the federal one (whatever could be driving these preferences) and the *costs of violating the federal law* (potential federal punishments). However, from this point of view the violations of the federal law in the regional law seem to be very similar to the traditional notion of the decentralization, which represents an *explicit contract* between the regional and the federal governments. If this contract specifies high decentralization (because of preference

heterogeneity and costs trade-off; cf. Congleton et al., 2003), it implies that the regional government makes *different* law than the federal one (of course, in certain settings both governments produce exactly identical policies – but then the debate on decentralization is meaningless). In the same way, through the implicit contract in the Russian Federation determined by the same heterogeneity-costs trade-offs some regions should have “re-designed” federal legislation to a greater extent: then high number of violations shows the regional policies are really different (and, in particular, “more different” than for regions with a small number of violations) from the federal standards.

I use the Register statistics as published by the Ministry of Justice on December 31, 2006 and calculate three indicators. To start with, I take *the share of acts, which were assessed as contradicting the federal law, in the total number of acts for which an expert opinion is present* (which is, as one should mention, smaller, than the overall number of acts included in the Register), as indicator of the degree of regulatory devolution achieved by a particular region. This measure is intuitive, but may, however, face two problems. First, it may be too small because of the acts passed after 2001 in the Putin’s period (when the war of laws was reduced significantly) and included in the Register. A solution were to take an earlier date for the Register; but in this case one runs into a problem of potentially neglected “old” acts, which may still be under revision by the panels of experts. Second, it is possible that the acts are more likely to be passed in general if the region is willing to violate the federal law: if it does not desire it, it just remains silent over a certain area of regulation, which is then covered by the federal acts. Hence, I also use the *total number of acts contradicting the federal law* as a proxy for regulatory decentralization. As shown below, both values are significantly correlated, but it is still necessary to look at both to establish the robustness of the results. In addition, I also use a logarithm of the number of contradicting acts as a separate proxy. The advantage of the log is that I reduce the impact of strong outliers through a concave transformation.¹²

Certainly, this approach to measuring the regulatory decentralization could also be flawed. The indicator may be distorted by the fact, that federal controllers of the Ministry of Justice were not entirely impartial in terms of allocating their effort among regions (though a relatively late data of the Federal Register status employed here should guarantee that all regions have had enough time to be thoroughly controlled) and the decisions on compatibility

¹² Using both total number of acts and log total number of acts is not interesting for establishing the correlation between indicators, but becomes more important for the analysis of driving forces of decentralization: for the log total number I have a continuous dependent variable and can apply OLS, while the total number is a count variable and requires a Poisson or a negative binomial estimator. Looking at both dependent variables separately ensures that I check the influence of the estimator used on the results.

with the federal law. However, it still seems interesting to look at it given the lack of any econometric empirical evidence regarding regulatory decentralization in general and Russian “war of laws” in particular.

Constitutional decentralization: The devolution at the constitutional level in Russia is, as usually, a relatively tricky part for an empirical study. The approach used in this paper combines two variables, constructed through the analysis of the text of legal acts. The first variable is based on the content of the *regional constitutions* passed by (almost all) Russian regions during the 1990s. The rules and norms of the regional constitution mostly refer to the authorities of the regional governments rather than policy actions and therefore are a better proxy for the constitutional-level institutions, as specified above.¹³ Once again, the use of this indicator relies on the idea of an implicit contract: specific provisions of a regional constitutions, although formally passed unilaterally by the regional parliaments, de-facto depend upon the preference for higher political autonomy and potential costs of the “federal punishment” (which in this case at least once took an extreme form of military intervention for Chechnya).

I use seven main dimensions of divergence in term of center-region relations for the republican constitutions (as they were valid in 1999) in order to construct the index. The dimensions include control over natural resources, right to sign international agreements, right to declare the state of emergency, restrictions on regional branches of federal government, independent monetary policy, restrictions on validity of the federal acts and special rules for the interbudgetary relations (*Appendix A* provides a detailed description of all dimensions).¹⁴ Naturally, many of these provisions have never been implemented in practice. But it is exactly what this paper intends to test: is there any relation between “higher autonomy” declared in the constitution and the outcomes of the decentralization process as measured by the fiscal and regulatory decentralization? I construct the index as follows: the region with respective provision receives 1, otherwise 0. Hence, the index may vary from 7 (all provisions contradicting federal law implemented) to 0 (no provisions implemented). The components of

¹³ In the Soviet times, all union and autonomous republics already obtained a constitution, mostly built according to the same scheme. After the collapse of the USSR, most republics adopted new constitutions. Moreover, other regions (without the status of republics) also passed their articles (*ustav*). The constitutions were quite similar in terms of guarantees and rights declared to their citizens, with may be the only exception of the agricultural land private property. However, they varied quite substantially in terms of the design of political system and also the distribution of power between the federal government and the region.

¹⁴ The list is based on research in legal sciences, which, however, mostly focused on ethnic republics, and hence may be more accurate for the latter (see Zolotareva, 1999; Bartsiz, 2001)

the index are reported in the *Appendix A*. The index is calculated for all Russian regions but Chechnya and Vladimir (which passed its “ustav” only in 2001).¹⁵

Although the idea to look at an implicit contract could be interesting given the lack of data, for the Russian case the constitutional decentralization could also be studied using the “explicit contracts” made by the regional and the federal government through the power-sharing agreements. There is a certain literature addressing this problem by examining the reasons for establishment and for the duration of power-sharing agreements (Dusseault et al., 2005; Söderlund, 2006; Obydenkova, 2008). Obviously, the existence of a power-sharing agreement may be treated as an indicator for higher constitutional devolution. However, there is very little research looking at the content of the treaties (e.g. OECD, 2000; Crosston, 2004), although the differences between them were substantial.¹⁶

In this paper I have made an attempt to provide a systematic quantitative characterization of the power-sharing agreements. Specifically, all agreements are evaluated according to eleven dimensions: alternative conscription rules; law enforcement and migration; power of pardon; monetary policy; control over the regional taxation and budget; control over the natural resources; control over the conversion for military industries; international relations, trade and customs; requirements of co-decisions of regional administrations for the appointments of federal bureaucrats in these regions and priority treatments for specific regions in the federal law (see *Appendix A* for the discussion of the dimensions, as well as for the values of the indicator). For each dimension I assign the value of 0 (if it is not mentioned), 1 (if it is attributed to the joint responsibilities of the regions and the federal government) and 2 (if it is attributed to the unique responsibilities of the regional government), and then sum up over all eleven dimensions (hence, the indicator varies from 0 to 22). The sample, once again, excludes Chechnya, but also the so-called “autonomous okrugs”, since for these units establishing the exact power allocation under the treaty is more

¹⁵ For this variable one could probably treat it as partly overlapping with the measure of the regulatory decentralization developed so far. However, the constitution is but one act, so, unlikely to heavily influence the regulatory decentralization (with usually hundreds or thousands of violations); on the other hand, regional constitutions represent to a greater extent how decision-making is done rather than individual rules. It is interesting though that the only relatively robust correlation of the dimensions of decentralization I find is between the index of regional constitutions and the regulatory decentralization.

¹⁶ There are several reasons for that: first, the “observed” set of “main” power-sharing treaties represents just the top of an iceberg of numerous agreements between regional and federal agencies, which are often not published and not available for researchers. Second, power-sharing treaties are often much more region-specific, than the constitutions, and attempt to solve particular problem of, say, individual industries (for example, a special treaty on hop-growing or on military industry), population groups (kosaks), borders to particular neighbors (China, Kazakhstan) and environment (Chernobyl, Baikal). From this point of view the power-sharing treaties, in spite of their title, often include a lot of information on particular policies rather than decision-making: so, they are post-constitutional in nature, and also very difficult to quantify and to compare.

difficult.¹⁷ I use the “main agreement” (which is always public), but at least attempt to utilize information from the “supplementary agreements” if they are available – certainly, however, fail to do so for many “hidden” acts, which have never been published. From this point of view regional constitutions index is superior (since the *complete* content of the constitution is publicly available).¹⁸

To conclude, the paper was able to obtain nine indicators for three aspects of decentralization in Russia. Four of them look at the fiscal decentralization; three are different modifications of the regulatory decentralization variable; and two study the constitutional decentralization. It should be noted that the relation between variables for each dimension of decentralization is different. For the fiscal decentralization three variables are related to the revenue decentralization (and thus essentially attempt to measure *the same thing*): I treat the traditional retention rate as a “basic” variable and use two extensions. The fourth variable measures expenditure decentralization, although for a significantly shorter time period and with strong data deficits (and hence measure a *different aspect*). For the regulatory decentralization all three indicators are simply adjustments of the same basic variable. For the constitutional decentralization, finally, I look at two very different aspects of the allocation of authorities, which cannot be reduced to each other. All variables used have certain disadvantages, but the status of the data is still better than in most other cases, and hence one can at least try to establish statistical regularities in terms of the interrelation between different aspects of decentralization.

3.2. *Interrelations of dimensions of decentralization*

The first problem to be considered in the framework of this paper is whether different dimensions of decentralization are related to each other. *Table 1* reports simple pairwise correlations between nine indicators used in this paper for the full sample of regions. To start with, I find significant correlation among almost all pairs of indicators of fiscal decentralization and among the indicators of regulatory decentralization. The second result is not really surprising, since all three variables are based on the same data. For the fiscal decentralization the results are more interesting: first, the retention rate is significantly

¹⁷ Autonomous okrugs are a subgroup of Russian regions, which are simultaneously part of the federation and of other regions. Hence, the agreements signed were trilateral, and not bilateral, and the division of powers between autonomous okrugs and “their” higher-order regions was often not entirely clear (and in fact resulted into very different allocations in practice).

¹⁸ However, both constitutional decentralization measures are also not free of problems. The constitutions discussed rarely address directly the issues of fiscal and regulatory decentralization; the index applied is rather an indirect measure. In the same way, the rules of power-sharing treaties for fiscal and regulatory matters are often difficult to interpret; in many cases my interpretation (as it is specified in the *Appendix A*) is not entirely unquestionable (as it is, probably, always the case with quantifying legal acts).

positively correlated with both other proxies of the revenue decentralization (this is good news, since in this case the measurement problems for each of the indicators could be small enough – although all variables face problems, these are, as demonstrated, *different problems* associated with (also) different advantages) and with the expenditure decentralization. The expenditure decentralization, however, exhibits negative correlation with the retention rate including transfers. The key driving force seems to be transfers, which, as I will show, are negatively correlated with expenditure decentralization. Both dimensions of the constitutional decentralization are not correlated: so, the motivation for changing the regional constitutions and for drafting the power-sharing treaties was different.¹⁹

Now consider the correlation across various dimensions of decentralization. Since I have a multitude of alternative variables measuring essentially the same aspect of decentralization, I will usually focus on what I will refer to as robust results: when the correlation exists regardless of how one measures, say, regulatory or fiscal decentralization (so, the correlation between regulatory and fiscal decentralization is robust if one finds a significant correlation between *each* measure of the fiscal decentralization (at least the three measures of the revenue decentralization) and *each* measure of the regulatory decentralization). The results of the *Table 1* are striking. The retention rate is not correlated with any of the constitutional or regulatory decentralization measures. For three other variables one does find correlation with individual indicators of regulatory decentralization in several (rare) cases, but it is never robust. None of the variables of the fiscal decentralization is correlated with the index of regional constitutions; there is some correlation with the power-sharing treaties, but, once again, not robust to the indicator of fiscal decentralization used. For the interrelation between constitutional and regulatory decentralization, however, the situation is different: one finds that all three proxies of regulatory decentralization are correlated with the index of regional constitutions (but not with the power-sharing treaties).²⁰

¹⁹ If one looks at the correlation of the index of power-sharing treaties and of constitutions just for the subsample of regions with power-sharing treaties, the correlation is still not significant.

²⁰ Only the share of contradicting acts is significantly correlated with both aspects of the constitutional decentralization – however, the signs of the correlation coefficients are different: while the number of violations seems to be larger in regions with higher autonomy in their constitutions, it is smaller in regions with more “advanced” power-sharing treaties. The simplest explanation is that if power-sharing treaty is advanced enough, there is no need to violate the federal law: one has enough free space for own decisions. However, in reality things are more difficult: when the Putin’s commission evaluated the content of the acts, they often ignored the treaties and looked just at the federal law.

Table 1: Correlation matrix: aspects of decentralization

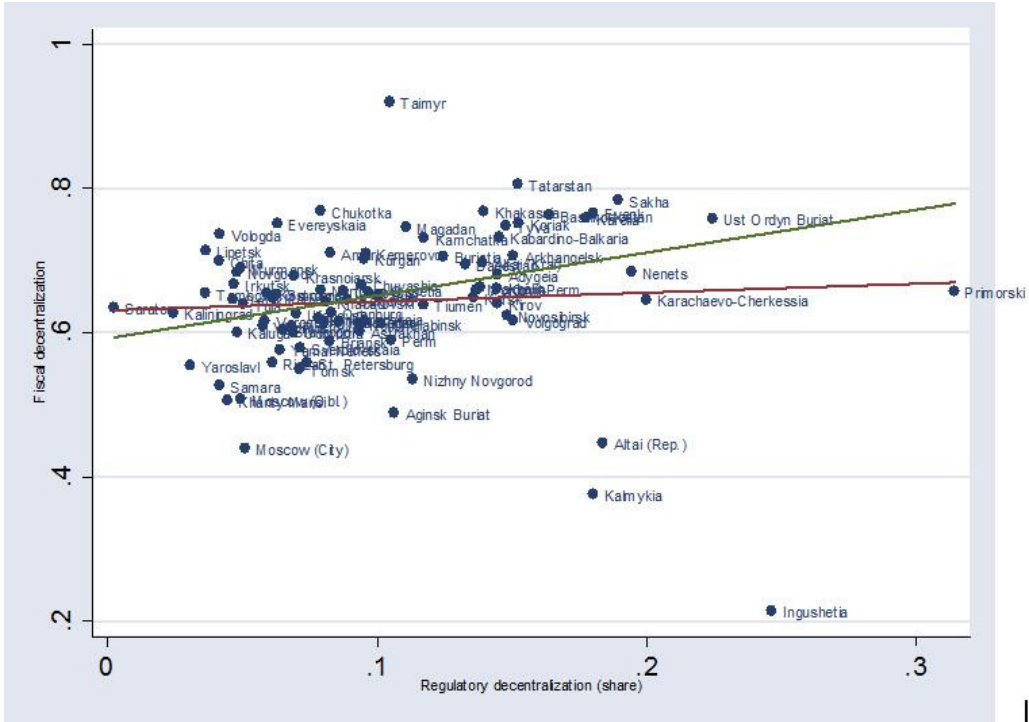
	Fiscal decentralization			Expenditure decentralization	Regulatory decentralization			Constitutional decentralization	
	Retention rate	Retention rate and transfers	Retention rate and off-budget funds		Share of contradicting acts	Log number of contradicting acts	Number of contradicting acts	Regional constitutions	Power-sharing treaties
Retention rate	1								
Retention rate and transfers	0.3379*** (0.001)	1							
Retention rate and off-budget funds	0.8285*** (0.000)	0.0155 (0.886)	1						
Expenditure decentralization	0.2004* (0.061)	-0.2054* (0.055)	0.3231*** (0.002)	1					
Share of contradicting acts	0.0705 (0.514)	0.4042*** (0.000)	-0.0381 (0.724)	-0.0563 (0.603)	1				
Log number of contradicting acts	-0.0187 (0.863)	0.0818 (0.448)	-0.0997 (0.356)	-0.0115 (0.916)	0.6721*** (0.000)	1			
Number of contradicting acts	-0.0135 (0.900)	0.0211 (0.850)	-0.0758 (0.483)	0.0535 (0.620)	0.7339*** (0.000)	0.8456*** (0.000)	1		
Regional constitutions	0.0507 (0.641)	0.0741 (0.495)	0.0588 (0.589)	-0.0408 (0.707)	0.2449** (0.022)	0.2158** (0.045)	0.3770*** (0.000)	1	
Power-sharing treaties	0.0766 (0.502)	-0.2195* (0.052)	0.1687 (0.137)	0.3532*** (0.001)	-0.1875* (0.098)	-0.0058 (0.960)	0.0518 (0.650)	-0.0337 (0.770)	1

Notes: p-values in parentheses. * significant at 10% level, ** significant at 5% level, *** significant at 1% level. Significant results are marked bold.

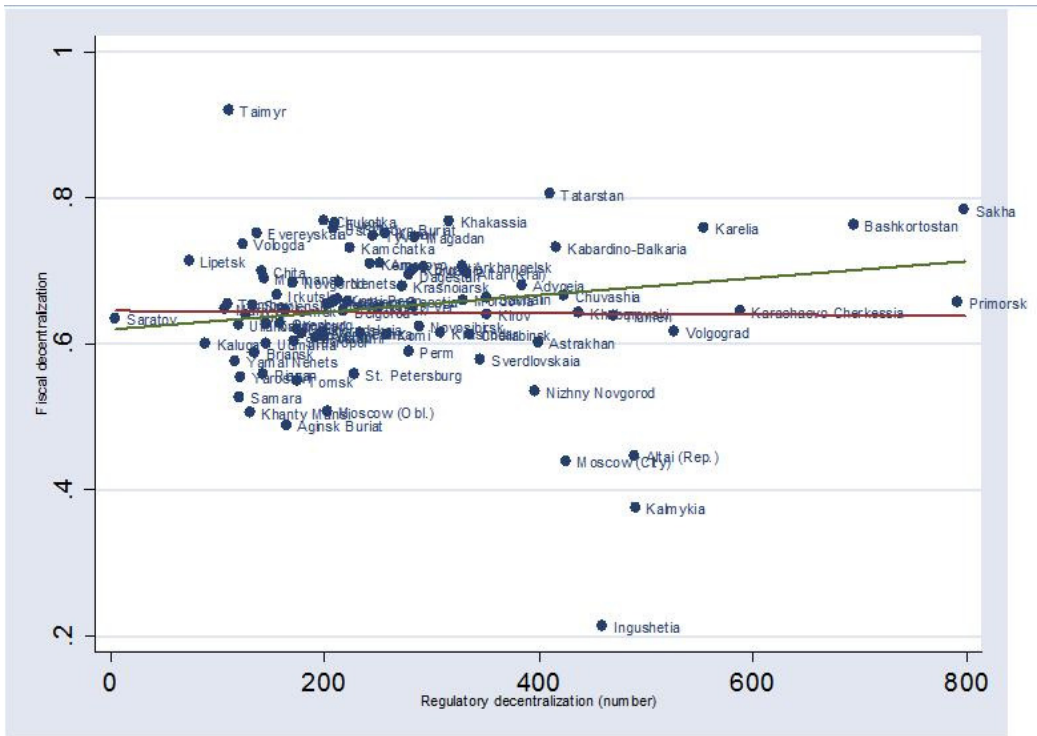
So, the main result so far is that regional constitutions and contradictions to the federal law could be driven by a similar logic, while it is unlikely for the fiscal decentralization and the power-sharing treaties design. However, the approach used has been too simplistic in two aspects, which should be explored in what follows. First, it ignores the existence of outliers. It is possible that the absence of correlation I have observed is caused just by few influential observations, which perform differently than the rest of the Russian Federation. On the opposite, the observed correlation can be driven by the presence of a small group of regions. The simple “eyeball econometrics” from the correlation graphs suggests that outliers sometimes do play a role, but not necessarily. For example, consider the retention rate as my “main” proxy for the fiscal decentralization. Excluding four outliers - regions Ingushetia, Kalmykiya, Altai Republic and Taimyr from the sample, one obtains strong and significant positive correlation between fiscal and regulatory (share) decentralization (see *Figure 1*).²¹ For the regulatory decentralization measured by *number* of negative conclusions of the

²¹ Three regions mentioned belong to the so-called “tax havens”, i.e. regions pursuing an internal offshore strategy in order to attract capital, partly due to abovementioned special regulations. Taimyr is a difficult case from the point of view of the fiscal decentralization; the tax revenue is strongly dependent upon the activity of the largest company, *Norilski Nickel*, which has actively implemented tax optimization schemes (for example, in 2000 and 2001 the activity of this company from the point of view of VAT optimization effectively led to *negative* tax revenue of the regional budget). Note that just excluding Taimyr and Ingushetiya is not enough to obtain correlation.

experts of the Ministry of Justice, the result is robust to outliers. On the opposite, if one looks at the correlation between the regulatory (share) and constitutional (regional constitutions) decentralization, the observed correlation is almost exclusively driven by a small subset of six ethnic republic (Figure 2).



(a)



(b)

and Yamalo-Nenets) the situation is different: they concentrate a dominant share of the oil and gas resources of Russia and were able to achieve higher autonomy from their “mother region” (Tyumen).²² Third, I exclude “outlier regions” and republic simultaneously.

The results of this experiment are reported in *Tables A3-A5* in *Appendix A*. Excluding ethnic republics does indeed make the correlation of constitutional and regulatory decentralization insignificant.²³ On the other hand, the fiscal decentralization measured by the retention rate now exhibits correlation with individual measures of regulatory and constitutional decentralization, but the result is not robust across various indicators of each aspect. Excluding “outlier regions” does not influence the correlation between constitutional and regulatory decentralization, but provides more pairs of variables, where fiscal decentralization is correlated with other dimensions of decentralization (though still no robust results).²⁴ Finally, excluding “outlier regions” and republic simultaneously results in almost absent correlation between all dimensions of decentralization.

Second, I also look at the conditional correlations controlling for a set of other variables (*Tables A6* and *A7* in *Appendix A*). I start with controlling for the standard key socioeconomic and geographical characteristics of the region: population, average per capita income, territory and educational background and find almost no robust effect on the significance of the correlation coefficients. The situation changes, if one controls for three further variables: the legal status (dummy autonomous okrug and dummy republic) and the distance from Moscow. The use of the legal status is important because, as demonstrated above, excluding or including autonomous okrugs and republics does influence the results of the analysis. Distance from Moscow is an attempt to account for the spatial heterogeneity of Russia due to its large size (in terms of territory). In this case one finds no evidence of any correlation across different dimensions of decentralization whatsoever, with very few exception of indicator pairs.

To conclude, one could probably summarize the results obtained so far as follows. First, I do not find any significant correlation between the fiscal decentralization and two other dimensions of decentralization. This result changes depending upon the set of outliers and of variables controlled for for individual indicators of the fiscal decentralization:

²² In addition, I also do not treat Chukotka as an outlier. Formally, Chukotka has the status of an autonomous okrug, however, unlike all other autonomous okrugs, it has no “mother region” it is subordinated to, and hence, it is more similar in its status to a standard region (oblast).

²³ If one just takes the sample of republics, there is also no correlation between autonomy in constitutions and regulatory decentralization; so, the effect does not hold in both subsamples (republics and not republics), although is present in the whole sample of regions. It should be noted that the evidence for the subsample of republics is very weak because of a small number of observations.

²⁴ For the retention rate including transfers I once again observe correlation with both dimensions of the constitutional decentralization, which, however, has a different sign.

however, the correlation, though sometimes present, is never robust in a sense that it exists regardless of how I measure the fiscal decentralization and the regulatory/constitutional decentralization. In particular, the correlation is more often (but not always) present for the share of contradicting acts than for the number of contradicting acts and for the index of power-sharing treaties than the index of constitutions. However, in the last case I observe, if any, a negative correlation: devolution paths seem to go in opposite directions. The correlation is also more likely to be observed if one drops autonomous okrugs and Ingushetiya – but even in this case no robust results are established. With respect to the regulatory and constitutional decentralization, I find significant and positive correlation between all measures of regulatory decentralization and the index of constitutions (but not of the power-sharing treaties), which is, however, driven just a small group of ethnic republics.

4. Endogenous decentralization in Russia: data and empirical strategy

4.1. Factors of decentralization

Although so far I have focused on measuring decentralization in Russia, the aim of this exercise is to empirically identify the factors determining the degree of devolution achieved by individual regions according to different dimensions. From this point of view it is necessary to find out the variables able to serve as proxies for the main theoretical factors influencing devolution. Simplifying a lot, one could probably distinguish among five main hypotheses regarding the process of decentralization. First, decentralization depends upon the trade-off between the preference heterogeneity (or other forms of heterogeneity, which may be easier to measure, like income) and the benefits from centralized public goods provision and insurance (Alesina and Spolaore, 2003). For an asymmetric federation it basically implies that regions with higher “preference distance” from the rest of the country are likely to be more decentralized. Second, federations design specific redistribution schemes between regions, which may influence the resulting demand for decentralization (on both rule and policy level) (Buchanan and Faith, 1987). Third, decentralization may result from the rules (both written and unwritten) regulating the bargaining process between the federal government and the regions and from the relative bargaining power of the parties (Filippov et al., 2004). Fourth, political system (dictatorship vs. democracy; parliament vs. referendum; presidential vs. parliamentary republic) may be important for determining the structure of the decentralization (Feld et al., 2006). Fifth, outcome of decentralization could be impacted by the interest groups on the federal and the regional level (Ruta, 2007). One should, however, not forget that the decentralization could simply result from the persistence in policies and politics, and hence, be an outcome of the path dependence. Thus it is necessary for find

variables to measure all factors mentioned above in the particular case of the Russian asymmetric federalism.

Bargaining power: First, it is reasonable to assume that the bargaining power is related to the region's economic endowment. I apply four indicators to measure these factors: territory, population, average income per capita and share of oil and gas extraction (particularly important for Russia). The choice of variables seems to be relatively straightforward given the economic structure of Russia and the availability of data. Second, bargaining power could come from the region's ability to secede, which seems to play an important role in the design of the Russian federalism in the 1990s (Dombrovsky, 2006). This effect is captured by two variables: dummy for border region²⁵ and geographical distance between the regional capital and Moscow. Third, one more variable in this selection could be the share of urban population (higher bargaining power of metropolitan areas), which, however, may also reflect the preference heterogeneity. One should also notice that although oil and gas extraction is an important characteristic, it does not cover the whole variety of natural resources potentially used in the bargaining process: for example, diamonds (Sakha) or non-ferrous metals (Taimyr) may also matter a lot. Unfortunately, the Russian statistical authority did not report the overall share of the extracting industry until mid-2000s.²⁶ However, Vainberg and Rybnikova (2006) summarize two other indicators for the resource endowment of Russian regions. The first one ranks all regions according to their coal, oil, gas and gold deposits. The second estimates the total value of the whole set of mineral deposits in the region based on the reports of the Russian Ministry of Natural Resources.²⁷

Bargaining rules: The main problem for measuring this indicator is that Russia at least formally is characterized by a uniform political system. Nevertheless, I use two types of proxies: formal status of the region – dummy for republics and dummy for autonomous okrugs - and degree of tensions between the federal center and the region: the Russian Union of Industrialists and Entrepreneurs RUIE index of tensions is applied to account for this

²⁵ Specifically, I include two dummies for border regions at the former “internal” Soviet borders (dummy border region CIS) and at the “old” external Soviet borders. Former borders between Soviet republics are often more transparent and subject to conflicts; in addition, border regions often influence (and are influenced) by the changes in the neighboring states (for example, Russian Northern Caucasus was partly involved in the conflict in Georgian Abkhazia). On the other hand, the ability of the central Russian government to influence the regimes established in the new independent states is often also different from that in relations to, say, China. Hence, one could expect regions at Soviet and post-Soviet borders to behave differently – as I will show, at least in one case it is indeed what one observes in the data.

²⁶ Moreover, share of extracting industry can be misleading: if a very small region is dominated by the extracting industry of a not really important commodity, the indicator is high, but the bargaining power is low. That is why I look at the share of oil and gas in the total Russian output rather than on the share in the regional economy.

²⁷ Both indicators are labeled in what follows “Resources I” and “Resources II” and are highly correlated.

effect. Moreover, I test the results for robustness applying a different index of tensions developed by MFK Renaissance.

Preferences: In a semi-authoritarian country like Russia in the 1990s the impact of public preferences may be significant, but should not be over-estimated. Gel'man and Popova (2003) describe the differences of preferences in terms of a “market for symbolic goods”, where regional governments act as the “supply side” and play the crucial role. I use two variables to measure potential differences in preferences: (1) the preference difference could result from the ethnic composition of the region, which is measured by the share of ethnically Russian population²⁸ and (2) the “distance” of the average income per capita in the region from the average over the whole Russian Federation.

Political institutions: Since Russian regions are characterized by a wide variety of political arrangements, it is also reasonable to look at the specifics of the regional politics. I apply two indicators: the level of democracy, estimated by an index of Carnegie Center, and the power concentration within the office of the regional governors (using the index of Jarocinska, 2004). As a robustness check I looked at two alternative indices of power reported by the RUIE and the Urban Institute respectively.

Redistribution: The most obvious way to capture this effect is to include a measure of the federal transfers in the regressions, though one, once again, could run into significant endogeneity problem.

Lobbying is measured by the index of regulatory capture, developed by Slinko, Yakovlev and Zhuravskaya (2005). In addition, I use a number of further variables potentially related to the lobbying activity and to the instruments used by influential actors. First, I control for the industrial concentration in the region, assuming that if it is high, so is the power of the interest groups. Second, I apply two indicators of corruption developed by the Transparency International in cooperation with INDEM measuring, first, the perception of corruption in the regions, and then the actual level of corruption estimated by INDEM.²⁹

²⁸ For the Russian Federation this indicator makes more sense than, say, religion or language. First, in Russia the ethnic identification is very important, partly because it was enforced through the government for the last eight decades – from the establishment of national republics by the Communist Party to the requirements to put ethnic origin (‘nacional’nost’) in passports abolished only recently. Second, religious and linguistic self-identification is usually highly correlated with ethnicity (of course, there are deeper differences like more or less “active” participation in the religious affairs, or degree of command of a language, but they are also much more problematic to measure).

²⁹ Although corruption is certainly likely to be important factor influencing the decentralization patterns, the TI/INDEM measure has two shortcomings. First, it was estimated in 2002, i.e. after the period of observation and the first wave of Putin reforms, which could have influenced the structure of political relations in the region. Second, it is available just for 40 regions, i.e. less than a half of my sample and probably too few regions to achieve robust econometric evidence.

Path dependence could be most simply measured by the status of the region (for the period of the mature Russian federalism after adoption of the constitution in 1993). Hence, significant results for dummy republic and dummy autonomous region have a double interpretation in terms of rules of bargaining and path dependence. However, for this study I use a specific indicator of the declarations of regional elites (based on the event count by Dowley (1998) for the early 1990s³⁰). The declarations of the first year of independence seem to be a good proxy for the orientation of regional elites, which could be preserved in the future.

The variables of bargaining power, bargaining rules and preferences are expected to have a positive sign, i.e. increase the degree of devolution; the variables of redistribution, on the contrary, should have a negative sign, decreasing the desire of the region to achieve higher autonomy. It is more difficult to make predictions for political institutions and lobbying, since the literature is inconclusive. Moreover, the path dependence variable is likely to have a positive sign, since the active declarations of the regions in the early 1990s could in fact map into higher devolution. Details on the variables are reported in *Appendix A*.

One can immediately see that this broad selection of variables faces three problems: multicollinearity, endogeneity and measurement error. On the one hand, many of the variables are highly correlated with each other, partly by construction (i.e. power indices include natural resources etc.). The problem of collinearity is especially important for the income per capita and distance from the average income per capita (although one should notice, that the second is not a linear transformation of the first; so, collinearity is not perfect). It is also acute for dummies republic / autonomous region and share of Russians (since the autonomous territories are in fact per construction of the Soviet territorial design regions where the share of Russians is usually smaller). However, it is not restricted to these variables.

The endogeneity problem is always present in the research on determinants of decentralization. For Russia the situation is ambiguous. On the one hand, one can disregard several “traditional” dimensions of endogeneity like mobility of population (as a factor influencing both ethnic composition and population size), partly because of the short time horizon of the analysis, but partly because of Russian specifics (like low population migration). However, there are also dimensions where endogeneity may be of greater

³⁰ This variable does *not* represent the *current* power and aspirations of governor, first, because of the time lag, and second, because of the shift to less public political environment in the second half of the 1990s (as opposed to the early period of Russian independence).

importance. For example, retention rates obviously depend on federal transfers, if one takes the effect on tax effort into account.³¹

Finally, measurement errors are particularly important for what one may call “expert opinion” variables: democracy, tensions, regulatory capture, declarations of regional elites, Transparency International corruption measures, but also the industrial concentration and both additional “resources variables” of Vainberg and Rybnikova (2006) – although the latter do measure more “tangible” objects, they still are at least partly based on the expert evaluation, which can be disputed. One should notice that “expert opinion” variables are particularly problematic from the point of view of endogeneity and multicollinearity problems as well.

4.2. Econometric strategy

I attempt to partly fix these problems by using the following procedure. In the first step I estimate the “basic” specification, which does not include the “expert opinion” variables. Since most decentralization indicators do not vary over time, I estimate a cross-section for 88 Russian regions (i.e. all regions including Chechnya) and average time-varying variables over 1995-1999.³² The choice of the period is, as already mentioned, straightforward: the reforms of 1994 established the basic structure of modern Russian federalism, and in 2000 the reforms of Putin significantly reduced the ability of regions for asymmetric devolution (for example, the regional legislation and constitutions were standardized according to the federal law).

For all fiscal decentralization variables and the share and the log number of negative conclusions as indicators of regulatory decentralization the simple OLS could be applied. The number of negative conclusions is a count variable, and hence a Poisson or a negative binomial model should be applied. Because the data are characterized by overdispersion, I estimate the negative binomial model (although I have also estimated the Poisson model and did not find any significant differences). Index of regional constitutions is measured by a discrete ordered variable. A usual approach to estimate is the ordered logit; I check for proportional odds assumption, and if it is violated also estimate the generalized ordered logit, analyzing marginal effects at the mean. Finally, for the index of power-sharing treaties I use tobit regressions, since the variable is censored from below (about half of the regions in the sample did not sign any reported treaties with the central government).

³¹ The problem may be even greater because of time-invariant dependent variables, which prevent me from exploiting the time variation of controls. In several cases (constitutional decentralization) I just “fixed” a particular moment in time, when the variables were measured, what is, of course, a huge simplification, which is unavoidable given the quality of data.

³² If the dependent variable is available for a shorter period of time (expenditure decentralization, retention rate and off-budget funds), I, respectively, average the dependent variables over a shorter period of time.

In order to solve the multicollinearity problem, I estimate two “basic” specifications for each dimension of decentralization: with distance from average income and with average income per capita. I also exclude the share of Russians at this stage, since it is highly collinear with dummy republic, in all regressions.³³ For the fiscal revenue decentralization indicators I also include two variables measuring the structure of the tax base, since the composition of tax revenue may as well have an impact on the outcome: volume of retail trade and net profits of the enterprises.³⁴ For the retention rate including transfers I exclude fiscal transfers from the set of covariates in order to avoid the “endogeneity by design”: i.e. when the same value is by construction influencing a covariate and the dependent variable. For the number and log number of negative conclusions I also control for the total number of acts in the Federal Register: it is possible that the regions with larger number of acts also have more negative conclusions.³⁵

The next step aims to look at the measurement error and multicollinearity problems more closely. First, I re-estimate the regressions by adding the “expert opinion” variables one by one. Second, as a “limiting case” for this analysis I take a completely agnostic view on the validity of variables and theories and perform an extreme bounds analysis. At this stage I also introduce several “specific” variables, which are more difficult to interpret in terms of the theory, but can be relevant given the quantitative indicators of decentralization I have introduced in the paper; I also look at the impact of the “outlier regions”, as defined in the previous section (Ingushetiya and autonomous okrugs with the exception of Khanty Mansi and Yamalo Nenets) on the robustness of my results.

The third step of the analysis finally focuses on the endogeneity problem. It is important to notice, that an unambiguous solution of this issue is hardly possible in the framework of this study. First of all, there is no clear set of “hypothesis-driven” variables extended by a set of controls. In fact, almost all variables I use (with the exception of tax base variables for fiscal decentralization) are driven by hypotheses. Hence, however, one requires a

³³ It is an interesting question whether it makes more sense to include share of Russians or dummies autonomous okrug and republic in the analysis. From the theoretical point of view share of Russians is easier to explain, because the link to the preference heterogeneity is obvious. However, for the Russian Federation it seems more suitable to focus on institutional variables. First, the effect of ethnic composition of the population on policies in the short run automatically goes *through the specifics of political institutions* - in this case, republican status. Second, since Russia is a semi-autocracy at best, public preferences may be less important than preferences of political elites – and for the latter republican status is very important (cf. Obydenkova, 2008). Finally, since the status of a republic was usually granted by the Soviet government (all current republics were either republics or autonomous oblast in the RSFSR), it is not subject to reverse causality problem at all.

³⁴ It should be noted that I take logs of population and retail trade (as well as number of total acts and total tax revenue in other specifications to be discussed in what follows) to reduce the impact of potential outliers through a concave transformation.

³⁵ I have also estimated regressions for the share of negative conclusions with this covariate, but did not find any difference from the reported results, while total number of acts was insignificant. Controlling for total number of conclusions (instead of acts in the Register) does not change the results.

large list of instruments to achieve at least exact identification in the first stage – a task certainly beyond any reasonable research exercise. Moreover, cross-sectional data with relatively small sample exacerbate the problem of low efficiency of IV estimator. Hence, what I am doing in what follows is in fact only a partial solution: I restrict my attention to results, which remain robust at the second step of the econometric strategy; therefore I ignore the problem of endogenous controls (the usual way to deal with this issue – exclusion of potential endogenous controls and analysis of robustness of results with and without them – is per construction performed at the second step). As I will show, most of the “suspicious” variables actually turn out to be insignificant, thus “resolving” me from the endogeneity problem, so, part of the problem disappears “by default” (although even then, as it will be discussed in greater detail, caution may be necessary). There are however situations when two-stage estimation techniques are required. Of course, in this case the results are based on the “hope” that the omitted variable bias through the exclusion of endogenous controls and the bias from reverse causality from endogenous controls do not run in the same direction (and hence the results become not robust in these two settings). Anyway, the results of this paper in terms of endogeneity analysis should be treated with great caution.

5. Endogenous decentralization in Russia: results

5.1. Basic regressions

As the first step in the analysis I consider the “basic” specifications without “expert opinion” variables. The results are reported in *Tables 2* (fiscal decentralization) and *3* (other aspects of decentralization). As usually, for the OLS specifications I check the distribution of residuals using the Jarque-Bera test; if it is significant, I exclude regions with large residuals until the test becomes insignificant and re-estimate the regressions. A reasonable interpretation is possible only for results, which are robust to this modification. In what follows hence I refer to two types of outliers: (1) outliers determined through the Jarque-Bera test and (2) “outlier regions” set *ex ante* (autonomous okrugs and Ingushetiya). The former are troublesome because they make statistical inference problematic; the latter may cause problems because of their impact on the slope. In this paper I always specifically describe which “outliers” I am considering.

There are several results interesting from the point of view of the theoretical predictions. *Fiscal decentralization* seems to be particularly driven by the bargaining factors, although their set is somewhat different for four variables considered. For the “basic” variable of the retention rate I find strong and positive effect of the distance from Moscow and territory on the degree of autonomy achieved. Distance from Moscow is among few variables

which matters for two of four measures of fiscal decentralization. If one looks at the retention rate including transfers, the degree of decentralization decreases if urbanization goes up. It may, however, reflect the fact that relatively poor regions (i.e. those with low urbanization) are major recipients of the federal grants – or, at least that in this case grants are too large as opposed to their own fiscal revenue (however income per capita and distance from average income are insignificant). There is no evidence that transfers flow mostly to metropolitan regions. For the retention rate including off-budget funds population seems to have a negative and significant impact on the degree of devolution, though hardly because of its role as a bargaining power factor: the size of population is important for social security funds contributions, and therefore the negative sign could just reflect the allocation of revenues between territorial and federal funds.

Interestingly enough, I find a negative impact of both income per capita and distance from average income per capita on the degree of fiscal devolution (for the retention rate – although this result is not robust to outliers according to Jarque-Bera test - and the retention rate including off-budget funds). The results for the income per capita seem to contradict the common prediction of the literature on cross-national comparisons, where richer countries are also more likely to be decentralized. However, it is similar to that reported by Freinkman and Plekhanov (2009) for the decentralization *within* Russian regions (i.e. for municipalities) and could be explained, as in that paper, by an analogue to the Popitz' law: rich jurisdictions seem to have stronger demand for large-scale public goods programs provided by the federal administration. It is possible to suggest a “bargaining power” explanation as well: the desire of the federal government to control rich regions and to limit their autonomy – logic similar to the appointment policy of the Chinese government (see Sheng, 2007). Regarding the distance from average income per capita, the story is more interesting: my results suggest that regions with higher preference distance are likely to have lower retention rates. One possible interpretation could be that not only the size of the distance, but also its sign matters: relatively poor and relatively rich regions have different expectations towards federation (for example, for poor regions lower retention rates may be associated with expectation of higher redistribution through the federation).³⁶

For the expenditure decentralization three variables seem to matter. First, it decreases with higher fiscal transfers. This observation is interesting (although very likely to be subject to the endogeneity problems): it indicates that federal transfers to the regional budgets and

³⁶ Replacing the measure of distance by the simple difference between average income in the federation and the regional income once again negative and significant result – as one could expect, since it is just a linear transformation of income per capita.

“direct expenditures” are positively correlated. Hence, the federal government uses both indirect financial flows to the regional budgets and own spending in order to redistribute financial resources in favor of the same regions. Second, expenditure decentralization is higher for regions with substantial oil and gas resources (also because for this regions it is feasible to increase its own spending) and for autonomous okrugs (they partly often have significant natural resources, which are incompletely captured by the oil and gas variable, – like ferrous metals in Taimyr - but partly just seem to receive only limited attention of the federal government resulting in smaller federal expenditures – like the smaller Ust Ordyn Buriatski, Koriakski and Aginsk Buriatski autonomous okrugs).

If one looks at two other dimensions of decentralization (*Table 3*), the strongest effect observed for all dependent variables is that republics are on average able to achieve higher degree of devolution. This is consistent with the existing literature on Russian devolution and can represent a strong and significant effect of the rules of bargaining / path dependence factors. It is worth noticing however that the dummy republic has never been significant for the fiscal decentralization – what is somewhat unexpected if one looks at the usual debates on Russian experience. Second, distance from Moscow is also significant and positive for almost all dependent variables, but it is partly non-robust to outliers according to Jarque-Bera test.³⁷ For the constitutional decentralization I also find a positive and significant impact of the population. For the power-sharing treaties urbanization and dummy border region for the “new” post-Soviet borders are significant. While for urbanization the result could indeed reflect stronger preference heterogeneity and bargaining power of urbanized regions (for example, the City of Moscow, which has a relatively high score), dummy border region CIS is more unusual – particularly because the second dummy for the border regions at the “olds” Soviet borders is insignificant (and even has a different sign). It could be driven by the regions in Northern Caucasus (i.e. at the Georgian border), which often have a high score in the power-sharing treaties rating (also because of their strong involvement in the very complicated international affairs in this region, which influences their bargaining position). Finally, for the regulatory decentralization I find strong significant positive impact of the number of total acts on the degree of devolution.³⁸

³⁷ The reason could be the presence of Primorski krai – a region extremely far from Moscow (at the Pacific Ocean) with very high share of contradicting acts. This is a territory with a very specific “warlordist” political system (Kirkow, 1995) may have generated an over-proportionally high number of violations of federal law, but may as well be especially “interesting” for federal officials of the early Putin period responsible for the construction of the Federal Register.

³⁸ So, the regions, which pass more acts, also pass more acts violating the federal law. It is worth noticing that including the total number of acts may in fact influenced the outcomes of regression for other covariates: for example, number of acts issued is highly correlated with the population.

Let me summarize the findings obtained at this stage. To start with, there is just one variable relevant simultaneously for all three dimensions of decentralization, which is distance from Moscow (that is, ignoring its non-robustness to outliers according to the Jarque-Bera test for the regulatory decentralization). Second, for the regulatory and the constitutional decentralization dummy republic is a strong predictor for the level of devolution: it does not, however, matter for the fiscal decentralization. All other variables are either relevant just for one dimensions (or, usually, one measure of a particular dimension) of decentralization, or (like population) have different signs for fiscal and constitutional decentralization. What I find is therefore that there seem to be significant differences in terms of driving forces for the three aspects of decentralization studied in this paper. It corroborates and strengthens the result reported in the previous section of the paper.

Table 2: Determinants of fiscal decentralization, 1995-1999

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) OLS	(7) OLS	(8) OLS
	Retention rate	Retention rate	Retention rate and transfers	Retention rate and transfers	Expenditure decentrali- zation	Expenditure decentrali- zation	Retention rate and off-budget funds	Retention rate and off-budget funds
Territory	0.037** (0.016)	0.033** (0.016)	-0.084 (0.060)	-0.075 (0.057)	0.014 (0.012)	0.014 (0.013)	0.041 (0.029)	0.040 (0.029)
Population	-0.113 (0.079)	-0.082 (0.061)	-0.047 (0.281)	-0.021 (0.236)	0.008 (0.008)	0.008 (0.008)	-0.166* (0.088)	-0.156** (0.073)
Oil and gas	0.099 (0.098)	0.102 (0.092)	-0.418 (0.266)	-0.487* (0.272)	0.120*** (0.042)	0.129*** (0.042)	-0.130 (0.098)	-0.123 (0.097)
Income per capita	-0.088* (0.049)		0.003 (0.168)		-0.002 (0.010)		-0.102** (0.046)	
Distance from average income		-0.094** (0.044)		0.068 (0.161)		-0.006 (0.008)		-0.120*** (0.042)
Dummy autonomous okrug	0.081 (0.084)	0.089 (0.081)	0.045 (0.290)	0.006 (0.269)	0.108*** (0.028)	0.112*** (0.028)	0.140 (0.103)	0.175 (0.108)
Dummy republic	0.040 (0.028)	0.042 (0.028)	0.125 (0.128)	0.110 (0.125)	0.030 (0.019)	0.031 (0.019)	0.075 (0.052)	0.080 (0.050)
Distance from Moscow	0.009** (0.004)	0.007* (0.004)	0.059*** (0.017)	0.058*** (0.018)	0.002 (0.003)	0.002 (0.003)	0.010 (0.007)	0.010 (0.007)
Dummy border region non-CIS	-0.002 (0.031)	-0.000 (0.031)	-0.037 (0.137)	-0.032 (0.138)	-0.024 (0.024)	-0.024 (0.024)	-0.027 (0.049)	-0.035 (0.049)
Dummy border region CIS	0.004 (0.024)	0.005 (0.023)	0.042 (0.091)	0.041 (0.090)	-0.022 (0.016)	-0.023 (0.016)	0.016 (0.039)	0.015 (0.036)
Urbanization	0.912 (1.112)	0.682 (1.109)	-14.388** (5.721)	-14.559*** (5.401)	-0.653 (0.705)	-0.611 (0.678)	3.126 (1.954)	3.421* (1.913)
Fiscal transfers	-0.081 (0.125)	-0.019 (0.126)			-0.192*** (0.043)	-0.185*** (0.045)	-0.199 (0.154)	-0.153 (0.152)
Retail trade	0.096 (0.085)	0.073 (0.068)	-0.084 (0.218)	-0.106 (0.178)			0.131 (0.087)	0.123* (0.072)
Net profit	-0.003* (0.002)	-0.003* (0.002)	0.008 (0.007)	0.007 (0.007)			0.000 (0.001)	0.000 (0.001)
Constant	0.491*** (0.127)	0.497*** (0.116)	1.928*** (0.423)	1.959*** (0.366)	0.868*** (0.052)	0.863*** (0.053)	0.361* (0.204)	0.265 (0.210)
Observations	88	88	88	88	88	88	88	88
R²	0.317	0.334	0.622	0.623	0.514	0.515	0.279	0.320
J.-B. test	56.19***	42.72***	519.4***	492.8***	9.744***	9.997***	1.981	0.286

Notes: for OLS, negative binomial and ordered logit – robust standard errors in parentheses; for tobit – robust standard errors in parentheses. * significance at 10% level, ** significance at 5% level, *** significance at 1% level. Significant results are marked bold. Outliers are: Ingushetia, Kalmykia, Altai Rep., Aginsk Buriat, Tatarstan, Bashkortostan, Taimyr, Vologda in regressions (1) and (2); Dagestan, Ust Ordyn Buriatski, Evenkia, Tyva, Kabardino-Balkaria in regressions (3) and (4); Briansk, Rostov and Tula in regressions (5) and (6). After exclusion of outliers income per capita in regression (1) becomes insignificant, but holds its sign; distance from average income per capita in regression (2) becomes insignificant, but holds its sign; oil and gas in regression (4) becomes insignificant, but holds its sign. Outliers in notes to all tables refer to the outliers according to Jarque-Bera test

Table 3: Determinants of regulatory and constitutional decentralization, 1995-1999

	Regulatory decentralization						Constitutional decentralization			
	(9) OLS	(10) OLS	(11) OLS	(12) OLS	(13) Negative binomial	(14) Negative binomial	(15) Ordered logit	(16) Ordered logit	(17) Tobit	(18) Tobit
	Share of acts	Share of acts	Log number	Log number	Number of acts	Number of acts	Consti- tutions	Consti- tutions	Treaties	Treaties
Territory	0.003 (0.011)	0.002 (0.011)	0.048 (0.082)	0.050 (0.080)	0.048 (0.069)	0.044 (0.069)	0.553 (0.714)	0.515 (0.713)	2.314 (2.049)	2.142 (2.015)
Population	0.003 (0.010)	0.004 (0.010)	0.064 (0.081)	0.065 (0.081)	0.073 (0.074)	0.079 (0.073)	0.877** (0.344)	0.902*** (0.350)	2.686* (1.407)	2.708* (1.417)
Oil and gas	0.022 (0.046)	0.021 (0.044)	0.433 (0.647)	0.523 (0.654)	0.376 (0.424)	0.396 (0.413)	-2.698 (1.687)	-2.837 (1.754)	-23.526 (17.413)	-24.087 (17.452)
Income per capita	-0.014 (0.012)		0.012 (0.138)		-0.053 (0.105)		-0.394 (0.363)		-1.544 (2.144)	
Distance from average income		-0.014 (0.014)		-0.033 (0.167)		-0.073 (0.121)		-0.354 (0.462)		-1.377 (2.435)
Dummy autonomous okrug	0.044 (0.030)	0.044 (0.031)	-0.122 (0.316)	-0.080 (0.315)	0.074 (0.244)	0.089 (0.246)	1.377 (1.010)	1.328 (1.062)		
Dummy republic	0.050*** (0.012)	0.051*** (0.012)	0.503*** (0.132)	0.509*** (0.133)	0.498*** (0.113)	0.502*** (0.113)	2.253*** (0.651)	2.247*** (0.649)	5.951*** (2.179)	5.934*** (2.183)
Distance from Moscow	0.006* (0.003)	0.005 (0.003)	0.059** (0.025)	0.060** (0.024)	0.056*** (0.021)	0.054*** (0.020)	0.167* (0.095)	0.151* (0.089)	-0.106 (0.419)	-0.153 (0.419)
Dummy border region non-CIS	0.017 (0.021)	0.017 (0.021)	-0.043 (0.182)	-0.047 (0.182)	0.050 (0.166)	0.047 (0.165)	-0.456 (0.774)	-0.446 (0.781)	-0.502 (2.858)	-0.529 (2.861)
Dummy border region CIS	0.008 (0.012)	0.008 (0.012)	0.005 (0.207)	0.003 (0.209)	0.133 (0.116)	0.134 (0.117)	0.381 (0.584)	0.394 (0.583)	3.767* (1.979)	3.771* (1.979)
Urbanization	-0.674 (0.470)	-0.766 (0.466)	-7.795 (5.655)	-7.163 (5.158)	-4.184 (4.226)	-4.298 (4.085)	-18.316 (20.027)	-21.413 (20.321)	331.145*** (108.111)	313.394*** (100.419)
Fiscal transfers	-0.010 (0.040)	0.002 (0.041)	0.188 (0.427)	0.211 (0.431)	0.246 (0.382)	0.311 (0.390)	-0.586 (2.081)	-0.272 (2.047)	-1.162 (8.280)	-0.405 (8.563)
Total acts			0.536*** (0.179)	0.552*** (0.178)	0.620*** (0.183)	0.625*** (0.181)				
Constant	0.125*** (0.035)	0.124*** (0.037)	1.330 (1.527)	1.173 (1.510)	0.509 (1.493)	0.448 (1.483)			-23.061*** (8.159)	-22.572*** (8.083)
Observations	88	88	88	88	88	88	87	87	79	79
R²	0.401	0.400	0.276	0.276						
Pseudo R²					0.040	0.040	0.101	0.101	0.085	0.086
Wald Chi-stat					3728.92***	3728.937***				
LR proportional odds							68.34**	71.12**		
J.-B. test	45.25***	47.66***	1578***	1594***						

Notes: see Table 2. Outliers are Primorski in regressions (9) and (10), Saratov in regressions (11) and (12). After exclusion of outliers distance from Moscow in regression (9) becomes insignificant, but holds its sign. Wald Chi-stat refers to the goodness-of-the-fit test for the Poisson regression; LR proportional odds refers to the test for the proportional-odds assumption for the ordered logit

The list of outliers according to Jarque-Bera test for the different dimensions of fiscal and of regulatory decentralization differs dramatically: while for the regulatory decentralization the outliers are Saratov and Primorski krai, for the retention rate the list of outliers includes tax havens (like Altai Republic, Kalmykia or Ingushetia), several Siberian autonomous regions (Taimyr and Aginsk Buriat), as well as republics of Tatarstan, and Bashkortostan which received a special tax regime through a power-sharing agreement. For the retention rate including transfers the set of outliers almost exclusively covers poorer republics and autonomous okrugs, which are significant recipients of central transfers. For the expenditure decentralization the set of outliers consists mostly of some non-ethnic regions in Central Russia. Difference in the list of outliers may also confirm that the regulatory and fiscal decentralization (and even different aspects of the latter) were driven by different factors.

Several robustness tests can be implemented at this stage. To start with, in the previous subsection I have shown that the results partly differ for the case when ethnic republics are included and when they are dropped. In order to check for this problem I have re-estimated the regressions for the set of Russian regions excluding ethnic republics and for the set of ethnic republics separately. The results are reported in *Appendix B*. Excluding ethnic republics produces several minor changes in the significance of the variables. However, one still can show that the only variable simultaneously affecting different dimensions of decentralization is the distance from Moscow. In addition, dummy border region for the “new” post-Soviet borders is significant for one of the retention rate variables and for the power-sharing treaty index, but in the first case it is not robust to outliers according to Jarque-Bera test. What is probably the most interesting finding for this sample is that territory has a significant and positive impact on the retention rates (as above), but negative and significant impact on regional constitutions (the change is due to the fact that I have now excluded “huge” republics like Sakha, which is the largest region of Russia in terms of territory). It is possible to claim that different dimensions of decentralization serve as “substitutes” in the center-region bargaining. For example, implementing a less “aggressive” constitution is “rewarded” by a higher retention rate (i.e. tolerance to the manipulations with the tax collection). In the same way, urbanization is negative and significant for several fiscal decentralization indicators, but

positive and significant for the power-sharing treaties index, suggesting a similar interpretation.³⁹

Second, I implement a number of adjustments to the basic specification.⁴⁰ I estimate all regressions including *both distance from average income and average income per capita*. In this case both variables are insignificant, probably because of the multicollinearity. So, the sign and significance of distance from average income and average income per capita is not robust. Then I have estimated regressions where both share of Russians and dummies republic / autonomous okrug are included, and also those only with share of Russians. If the dummy republic was significant and positive in the initial specification, after it is dropped and replaced by the share of Russians, the latter becomes significant and negative. If all three variables are included, share of Russians is almost never significant (although dummy republic may remain significant – the exception is the power-sharing treaties index, where the situation is exactly the opposite). There are almost no changes in other results. Then I account for the fact that dependent variables in specifications (1) – (2) and (7)-(10) are bounded from above by performing *log-odds transformation* ($\text{Log}(\text{Variable} / (1 - \text{Variable}))$) and re-estimating the regressions.⁴¹ Once again, almost nothing changes (just territory in regressions (7)-(8) becomes significant and positive).

The final three modifications are based on using different estimation techniques. To start with, for the regional constitutions regression I was able to reject the proportional odds assumption, therefore using generalized ordered logit becomes necessary. For the marginal effects at the mean population and dummy republic are still significant and positive; one also finds a significant and positive effect of the dummy autonomous okrug and of territory. What is more interesting, however, that distance is now significant and *negative* – there is once again an indication of using different dimensions of decentralization as substitutes. Finally, fiscal transfers are significant and positive, suggesting that regions with high autonomy incorporated in their constitutions also received large federal funding (it seems to be particularly influenced by regions like Tatarstan, Sakha and Bashkortostan, which, as mentioned, received a special federal funding program).

³⁹ For the sample of republics the results are difficult to interpret, because the sample size is extremely small. For the fiscal decentralization there are almost no significant variables. For the regulatory and constitutional decentralization there seems to be a strong impact of urbanization and of dummy CIS border region, which, however, once again has different signs for different dimensions of decentralization. Hence, in this case one also has some indication that different dimensions of decentralization serve as substitutes.

⁴⁰ The regressions are not reported, but can be made available on request.

⁴¹ The actual retention rate including off-budget funds sometimes exceeds one, but this is due to special situations for some territorial funds which received huge transfers from the central fund and is not a common case.

Moreover, so far I have estimated just the cross-section for all dependent variables. For almost all measures of decentralization it is also the only approach possible, because the dependent variable does not vary over time. The situation is different for the “basic” measure of the fiscal decentralization (the retention rate), for which annual observations are available. Estimating panel data is problematic even in this case, since almost all “interesting” variables are time-invariant or almost time-invariant (like population or oil and gas extraction). However, a fixed effects estimator could be highly advantageous to cope with the unobserved heterogeneity. Hence, as a robustness check I apply the approach suggested by Besley and Coate (2003): I estimate a two-way fixed effects panel data specification, including just time-varying income per capita (or distance from average income), fiscal transfers, net profits and retail trade; then I predict the fixed effects and regress them (in a cross-section) on the time-invariant and almost time-invariant variables: dummy republic, dummy border region CIS and non-CIS, territory, distance from Moscow, population, oil and gas and urbanization. In this estimation I find significant and positive impact of distance from Moscow and territory, as in the basic specification; in addition, there is also a significant and negative impact of population. Other variables are insignificant. Therefore at least the key results of the regressions reported so far (for distance from Moscow, territory and dummy republic) survive the panel-data estimation.

Finally, since the variables might be determined jointly, I also use the SURE approach for different combinations of OLS regressions.⁴² Specifically, I estimate all possible pairs of regressions, where the first variable is a measure of the fiscal decentralization, and the second either share or log number of contradicting acts; each pair is estimated controlling for average income per capita and distance from average income per capita. Since expenditure decentralization is in fact a different characteristic and not just another proxy for the retention rate, I also estimate systems of three equations, including one of the measures of revenue decentralization, expenditure decentralization and log number or share of contradicting acts, and also systems of two equations of a measure of a retention rate (or its two modifications) and the expenditure decentralization indicator. Overall I find almost no changes in the results of the regressions: territory for the retention rates often becomes insignificant, and distance from Moscow for this dependent variable is also sometimes marginally insignificant (especially if controlled for distance from average income).

⁴² For regressions, which are estimated by non-linear techniques looking at systems of equations is unreasonable; it is impossible to use linear- and non-linear models in one system, and reducing all models to linear form guarantees misspecification of at least one equation, and therefore, of the whole system.

5.2. Expert opinion variables and EBA

The next step of my analysis is, as mentioned, to look at the variations of specifications of regressions, and also at potential impact of expert opinion variables. First, I estimate a set of regressions adding expert opinion variables to the covariates and also varying the set of controls. The results are reported in *Appendix C*. To start with, almost all results reported so far are robust to the variation of specifications and inclusion of expert opinion variable (although in some cases not in all specifications, as, for example, for distance from Moscow in the retention rate regressions). The latter are mostly insignificant. There are, however, several interesting exceptions, which should be discussed in what follows.

1. For the retention rate I find a significant and negative impact of the Transparency International corruption indices on the level of decentralization. This observation is difficult to interpret because of an extremely small sample of 40 regions and potential reverse causality, but it looks like higher corruption is at least correlated with lower decentralization. This is consistent with the Albornoz and Cabrales (2010), who claim that corruption is easier under high level of centralization because in this case it is more difficult for citizens to identify the corrupt bureaucrats and politicians; it is also possible that in regions with low retention rates federal bureaucracy is more relevant than the regional one, and the ability of regional population to influence its development given a sophisticated hierarchy directed from Moscow is lower. The result is also present for the retention rate including off-budget funds.

2. For the expenditure decentralization I find a strong positive impact of the industrial concentration. For the 1990s it is likely that the industrial structure was (still) inherited from the Soviet past, and therefore the reverse causality problem in this case is less likely. From the results of the regressions one could infer that powerful regional lobbies support stronger decentralization. It can however represent rather the increase of regional expenditures as such than the re-allocation of the structure of the expenditures: if the interest groups focus on influencing regional spending and the federal spending is kept constant, the results of the regression would hold. However, for other indicators of the lobbyists activity (like regulatory capture) no significant impact was observed. In a similar way, I find that stronger power of the regional governors according to one of three indicators results in larger expenditure decentralization; the result does not hold for other indicators of power.

3. Regardless of the measure of the regulatory decentralization, there seems to exist a strong negative correlation between the level of tensions in the relations between the regional and the federal government and the regulatory decentralization. Once again, reverse causality is possible, but the result is surprising: one would probably expect the federal government to be more aggressive towards regions with higher number or share of violations of the federal

law (or, on the contrary, conflicts should cause regions to violate federal law more actively). On the contrary, it looks like violating federal law is correlated with more “peaceful” relations with the federal government. In fact, this result could be interpreted as an indirect support of interpreting the results of the “war of laws” as an “implicit contract” between the center and the regions. Regions increase the number of violations only if they know that they are not “punished” for it in terms of stronger conflicts between the regional and the federal government. This punishment, however, should take other forms than transfers (because fiscal transfers are mostly insignificant).

4. If one looks at the retention rate including off-budget funds and the index of regional constitutions, there is a highly robust negative impact of democracy on the level of decentralization.⁴³ Once again, here I cannot exclude reverse causality, but even if interpreting the finding as simple correlation it looks like more democratic regions have been also more centralized in terms of center-region relations. For the off-budget funds, since the effect is not observed for the “standard” retention rate, the results could be related to the functioning of the territorial funds. One possible interpretation is that non-democracies are more likely to establish control over territorial funds, therefore re-directing the overall revenue of the off-budget funds on the territorial level. For the regional constitutions one could expect non-democracies to be more likely to incorporate greater autonomy to ensure the stability of the regional regime from any federal intervention (since during the period studied in this paper federal political system was often more competitive than many regional autocracies).

5. For the index of power-sharing treaties I find significant and positive impact of declarations of regional elites.⁴⁴ In this case one can exclude the reverse causality by construction (most of the treaties were signed in the second half of the 1990s, while declarations measure the activity of the regional governors in the early 1990s); the result seems to at least partly explain the reasons for absent correlation between the constitutional and post-constitutional decentralization observed in this paper. It is possible that the actions at the level of power-sharing treaties were rather designed as “symbolic claims” of the regional governors never intended to influence the real political decisions. This is an interesting aspect, which is worth analyzing if one looks at the constitutional allocation of authorities in general: setting particular rights and obligations of the regional government the basic acts of the federations could rather transfer a “symbolic statement” of the relevance of the regional level than indeed empower it with real decision-making authorities.

⁴³ The result for the index of regional constitutions is also present in the generalized ordered logit estimations.

⁴⁴ It is interesting to notice that the tensions are insignificant, although these variables by construction take the existence of a power-sharing treaty into account. This is once again an important indicator that looking just at the existence or the duration of the power-sharing treaties may not be enough.

In addition, I also look at two further modifications of the set of controls (*Appendix D*). To start with, I include education in the set of covariates. The impact of the education (measured by the share of population with university degrees or incomplete university education – this is a reasonable approach for Russia, where high school is mandatory) can be related to two factors. First, it can be interpreted as yet another “preference heterogeneity” variable: higher education then should result in stronger demand for decentralization. However, even more important is to recognize that implementing many tools of “de-facto” decentralization like violations of federal law depends not just on the position of the federal government, but also is influenced by the attitude of the population. If people have better education, they can be more difficult to “fool” by the regional bureaucrats. In addition, violations in acts can also be a simple result of mistakes, and in this case human capital of the bureaucracy is crucial. So, one has two potentially contradicting effects, and in the regressions I include the level of education and its square, and, indeed, find a non-linear relation between decentralization and education for various dimensions of decentralization.⁴⁵ Generally speaking, the results suggest that increasing the level of education first results in a reduction of the level of decentralization; however, once the educational background of the population is good enough, the effect is reversed. Nevertheless, interpreting this result requires significant caution: the “upward arm” of the parabola includes just a small number of regions with very high share of university education. So, for the lion’s share of the sample education does reduce the level of decentralization.⁴⁶ It cannot be explained just by the difficulty to “fool” people with regional acts, because the effect is also observed for (some dimensions of) the fiscal decentralization (although probably for a higher education level of the taxpayers manipulating tax collection also becomes more problematic for the tax authorities).

The second modification replaces the income per capita by the (log of the) overall tax revenue in a region. Income per capita is obviously endogenous, also because the variable includes transfers. On the other hand, in many cases the debate over decentralization was concentrated on the re-allocation of the tax revenue and the power asymmetry between the donor and the recipient regions in the Russian fiscal equalization scheme. However, the tax revenue variable can also cause some problems: particularly because it depends upon the tax

⁴⁵ Once again, since education is (still) mostly determined by the Soviet past, one can exclude reverse causality. Generally speaking, almost all other results hold when including education (although regressions become highly susceptible to outliers according to Jarque-Bera test).

⁴⁶ The small group of regions with high overall education level is also very heterogeneous: it includes Moscow and St. Petersburg – the traditional centers of university education and studies in Russia – but also Northern Ossetia, where proliferation of higher education can be explained by a high level of corruption in the university system of Northern Caucasus, effectively turning many local universities in “diploma mills”. This reflects also a general problem of the variable of education used in the inter-regional comparison for Russia: identical university degree can be associated with very different level of human capital.

effort of the regional tax authorities (officially controlled by the federal administration, but de-facto often captured by the regional governments). In this case the size of the tax collection is endogenous to the marginal retention rate (Weingast, 2009). The results of the estimations are reported in *Appendix D*. The overall fiscal revenue is indeed significant for five of nine measures of decentralization: however, the sign of the coefficient is negative for the fiscal decentralization and positive for the regulatory decentralization. So, once again, there is some evidence that similar factors cause the opposite effects for different dimensions of the decentralization, which could then serve as substitutes in bargaining. The positive relation for the regulatory decentralization seems to be relatively simple to explain: tax revenue is in fact one of the bargaining power variables, and from this perspective strengthens the position of the donor regions in the negotiations. The situation is different for the fiscal decentralization: one possible interpretation could be that the federal government puts more effort to prevent capturing the tax authorities in regions generating significant fiscal flows – however, this interpretation is very much speculative and difficult to support by empirical evidence.

Given the fact that many effects observed seem to depend on the set of covariates, I turn to a more formal way to approach the problem of robustness of specifications, which becomes crucial in a small sample environment, by implementing the extreme bounds analysis. Once again, this method has its merits and demerits. On the one hand, it is a more systematic analysis of effect of specification on estimation outcomes. However, on the other hand, while so far my selection of specifications was at least partly driven by the structure of the theories, the EBA simply looks at all possible combinations of regressors. Theoretically, it is possible that the “true” result is reflected just by one specification, which is “lost” in the endless combinations of EBA. Hence, it is important to interpret the results of EBA in a conservative fashion: while they are unlikely to give evidence *against* the influence of certain parameters on decentralization, if the covariates survive the EBA, it provides additional argument *in favor* of the influence.

This paper uses two versions of EBA. The original suggestion of Levine and Renelt (1992) was to estimate the upper and the lower bounds by taking all possible combinations of regressors and to look at the smallest estimate minus two standard errors and at the largest estimate plus two standard errors. If the null is within the interval formed by the upper and the lower bounds, the impact is not robust. Sala-i-Martin (1997) proposes a less extreme version of the approach, considering the entire distribution of the coefficient. In this case the coefficient is robust if the CDF(0) statistics is sufficiently high. Most applications of the EBA in the literature assume some variables to be present in all regressions (mostly because of the theoretical results or research traditions) and vary the rest. The literature on endogenous

decentralization is too young to develop similar assumptions. So, I take all possible combinations for all possible variables (from bivariate regression to regression with all possible covariates). Unfortunately, in this setting the multicollinearity can impose very high volatility of coefficients over regressions; however, there is no better theoretically motivated alternative.

The EBA is performed for usually 22 variables: territory, population, share of oil and gas, income per capita, distance from average income, dummy autonomous okrug (dropped from the EBA for index of power-sharing treaties) and dummy republic, education and education squared (always included simultaneously), dummy border region CIS and non-CIS, tax revenue, industrial concentration, one of the additional resource variables (including both of them is meaningless since they are highly correlated), distance from Moscow, urbanization, fiscal transfers (dropped from regressions for EBA for retention rate including transfers), tensions (RUIE), power (Jarocinska), democracy, declarations and regulatory capture:⁴⁷ Since industrial concentration and resources are not reported for autonomous okrugs, number of regressions estimated is different for different variables and in fact regressions include from 1 to 21 covariates (because 22 covariates would mean simultaneously including dummy autonomous okrug and industrial concentration – and in this specification dummy autonomous okrug is dropped because of the lack of observations). As a robust result I consider only variables with $CDF(0) > .95$ as in Sala-i-Martin (1997). Then I estimate the regressions for the determinants of the decentralization, using only robust variables: only those of them which remain significant could be claimed to have finally “passed the test”.

The results are reported in *Table 4*. From the point of view of the original Levine and Renelt approach, there is not a single variable with both upper and lower bounds strictly larger (or smaller) zero. This is hardly surprising and quite typical for empirical research. However, the Sala-i-Martin approach yields some robust variables, mostly identical to those reported above. For different dimensions of fiscal decentralization the most robust variables seems to be tax revenue. Distance from Moscow and territory for the retention rate, distance from Moscow for the retention rate including transfers, industrial concentration and fiscal transfers for the expenditure decentralization also remain robust. For the regulatory decentralization robust variables are, once again, dummy republic and distance from Moscow. Finally, for both dimensions of the constitutional decentralization the set of robust variables is very different: it includes dummy republic, oil and gas and population for the constitutions

⁴⁷ Unfortunately, I cannot include the Transparency International indicators, because the sample size is in this case too small and the results will be inconsistent with other regressions estimated throughout the EBA procedure.

and urbanization and declarations for the power-sharing treaties. Thus, almost all results discussed in *Tables 2 and 3* so far seem to survive the EBA. Total tax revenue is also often robust, as are several expert opinion variables; education, however, is not robust.

The final regression, including just the robust variables, is reported in *Table 5*. To start with, it provides strong evidence in favor of the main claim of this paper: I find very few variables, which are simultaneously significant for several measures of different aspects of decentralization. The most pronounced are distance from Moscow, which is relevant for regulations and taxes, and dummy republic, which influences regulatory decentralization and index of regional constitutions (there is also urbanization, which matters, however, just for one dimension of the fiscal decentralization and the index of power-sharing treaties). The strongest predictor for the regulatory decentralization – dummy republic – is even never robust according to the EBA for the fiscal decentralization. Thus, if one systematically checks the influence of different specifications, the certain similarity between the results of the regressions of *Tables 2 and 3* seems to become smaller or even disappear.⁴⁸

Table 4: Results of the extreme bounds analysis

Variable	Average coefficient	Average standard error	Lower bound	Upper bound	CDF(0)	No. regressions
Fiscal decentralization: retention rate						
Territory	0.042	0.016	-0.037	0.159	0.995	655,360
Population	0.007	0.056	-0.360	0.386	0.548	655,360
Oil and gas	0.221	0.124	-0.573	1.114	0.963	655,360
Average income per capita	0.104	0.063	-0.323	0.704	0.951	655,360
Distance from average income	-0.109	0.069	-0.801	0.321	0.947	655,360
Dummy autonomous okrug	-0.022	0.064	-0.426	0.381	0.636	262,144
Dummy republic	0.032	0.035	-0.196	0.253	0.816	655,360
Distance from Moscow	0.009	0.004	-0.013	0.033	0.991	655,360
Dummy border region non-CIS	-0.008	0.033	-0.157	0.121	0.596	655,360
Dummy border region CIS	0.005	0.018	-0.107	0.076	0.611	655,360
Urbanization	1.245	1.773	-3.847	7.176	0.923	655,360
Fiscal transfers	-0.140	0.116	-0.950	0.447	0.887	655,360
Tax revenue	-0.100	0.040	-0.378	0.128	0.991	655,360
Education	-1.557	1.213	-8.804	5.985	0.900	655,360
Education squared	1.504	2.850	-18.865	19.980	0.701	655,360
Tensions (RUIE)	0.001	0.012	-0.068	0.090	0.533	655,360
Power	-0.011	0.018	-0.142	0.104	0.732	655,360
Democracy	-0.003	0.002	-0.011	0.007	0.969	655,360
Regulatory capture	-0.017	0.056	-0.274	0.281	0.618	655,360
Industrial concentration	0.001	0.001	-0.003	0.004	0.832	524,288
Declarations	0.027	0.044	-0.116	0.181	0.950	655,360
Resources II	-0.000	0.001	-0.004	0.004	0.738	524,288

⁴⁸ Almost all significant results of the Table 5 have been significant in Tables 2 and 3 and Appendix C. There are just two exceptions: oil and gas for the index of regional constitutions and urbanization for the retention rate including off-budget funds. The reason for the latter can be that urbanization in Russia is correlated with the size of the population (which has been significant for this variable in Table 2), so one was dealing with a multicollinearity problem.

Variable	Average coefficient	Average standard error	Lower bound	Upper bound	CDF(0)	No. regressions
Fiscal decentralization: retention rate and transfers						
Territory	0.037	0.070	-0.374	0.472	0.703	327,680
Population	-0.374	0.281	-1.080	2.663	0.908	327,680
Oil and gas	-0.376	0.378	-1.989	3.722	0.840	327,680
Average income per capita	-0.390	0.234	-2.838	3.183	0.952	327,680
Distance from average income	0.541	0.404	-2.456	3.855	0.909	327,680
Dummy autonomous okrug	-0.012	0.286	-2.391	2.329	0.517	131,071
Dummy republic	0.210	0.253	-0.619	1.635	0.796	327,680
Distance from Moscow	0.043	0.018	-0.029	0.143	0.993	327,680
Dummy border region non-CIS	0.088	0.125	-0.504	0.513	0.757	327,680
Dummy border region CIS	0.113	0.093	-0.349	0.510	0.887	327,680
Urbanization	-13.355	7.260	-35.987	16.088	0.967	327,680
Tax revenue	-1.333	0.463	-2.086	0.072	0.998	327,680
Education	-5.381	5.689	-30.052	36.005	0.827	327,680
Education squared	14.420	12.608	-91.222	72.667	0.874	327,680
Tensions (RUIE)	0.107	0.090	-0.268	0.609	0.883	327,680
Power	-0.051	0.081	-0.818	0.511	0.736	327,680
Democracy	-0.012	0.007	-0.034	0.036	0.968	327,680
Regulatory capture	-0.738	0.190	-1.002	1.665	0.999	327,680
Industrial concentration	-0.005	0.002	-0.015	0.010	0.981	262,143
Declarations	-0.010	0.138	-0.936	0.527	0.528	327,680
Resources II	-0.000	0.005	-0.024	.011	0.521	262,143
Fiscal decentralization: expenditure decentralization						
Territory	0.016	0.015	-0.059	0.088	0.864	655,360
Population	-0.017	0.019	-0.245	0.100	0.815	655,360
Oil and gas	0.076	0.052	-0.386	0.497	0.928	655,360
Average income per capita	0.018	0.021	-0.148	0.094	0.807	655,360
Distance from average income	-0.018	0.020	-0.185	0.101	0.813	655,360
Dummy autonomous okrug	0.120	0.026	-0.102	0.325	0.999	262,144
Dummy republic	0.015	0.025	-0.152	0.133	0.724	655,360
Distance from Moscow	-0.004	0.003	-0.024	0.011	0.887	655,360
Dummy border region non-CIS	-0.033	0.023	-0.141	0.048	0.928	655,360
Dummy border region CIS	-0.015	0.017	-0.089	0.051	0.817	655,360
Urbanization	-0.333	0.901	-4.292	4.611	0.644	655,360
Fiscal transfers	-0.125	0.057	-0.397	0.435	0.985	655,360
Tax revenue	0.041	0.017	-0.084	0.265	0.991	655,360
Education	0.586	0.962	-4.221	5.538	0.729	655,360
Education squared	-2.451	2.132	-13.743	10.029	0.875	655,360
Tensions (RUIE)	-0.006	0.010	-0.068	0.045	0.728	655,360
Power	0.007	0.017	-0.081	0.111	0.671	655,360
Democracy	-0.001	0.002	-0.007	0.006	0.783	655,360
Regulatory capture	0.024	0.054	-0.213	0.243	0.671	524,288
Industrial concentration	0.001	0.000	-0.000	0.003	0.999	655,360
Declarations	0.032	0.021	-0.059	0.156	0.938	655,360
Resources II	0.000	0.001	-0.003	0.003	0.598	524,288
Fiscal decentralization: retention rate and off-budget funds						
Territory	0.029	0.028	-0.109	0.221	0.833	655,360
Population	-0.043	0.083	-0.527	0.470	0.700	655,360
Oil and gas	0.061	0.150	-0.946	1.095	0.657	655,360
Average income per capita	0.137	0.101	-0.762	1.214	0.913	655,360
Distance from average income	-0.146	0.097	-1.210	0.703	0.933	655,360
Dummy autonomous okrug	0.102	0.077	-0.206	0.559	0.905	262,144
Dummy republic	0.042	0.056	-0.295	0.325	0.773	655,360
Distance from Moscow	0.007	0.006	-0.020	0.048	0.889	655,360

Variable	Average coefficient	Average standard error	Lower bound	Upper bound	CDF(0)	No. regressions
Dummy border region non-CIS	-0.049	0.053	-0.282	0.148	0.827	655,360
Dummy border region CIS	0.001	0.030	-0.150	0.126	0.516	655,360
Urbanization	3.753	1.810	-4.579	11.685	0.981	655,360
Fiscal transfers	-0.271	0.135	-1.277	0.424	0.977	655,360
Tax revenue	-0.113	0.046	-0.442	0.157	0.993	655,360
Education	-3.097	1.912	-12.202	6.286	0.947	655,360
Education squared	3.178	4.722	-20.944	24.622	0.750	655,360
Tensions (RUIE)	-0.004	0.020	-0.112	0.149	0.581	655,360
Power	-0.016	0.029	-0.232	0.167	0.716	655,360
Democracy	-0.007	0.003	-0.020	0.009	0.987	655,360
Regulatory capture	-0.016	0.111	-0.408	0.467	0.559	524,288
Industrial concentration	0.000	0.001	-0.004	0.005	0.619	655,360
Declarations	0.076	0.051	-0.171	0.281	0.930	655,360
Resources II	-0.002	0.001	-0.007	0.004	0.907	524,288
Regulatory decentralization: share of contradicting acts						
Territory	0.004	0.011	-0.051	0.063	0.651	655,360
Population	-0.006	0.014	-0.157	0.113	0.658	655,360
Oil and gas	0.033	0.035	-0.233	0.301	0.826	655,360
Average income per capita	-0.013	0.030	-0.310	0.222	0.673	655,360
Distance from average income	0.010	0.034	-0.273	0.300	0.620	655,360
Dummy autonomous okrug	-0.009	0.027	-0.239	0.139	0.631	262,144
Dummy republic	0.058	0.018	-0.035	0.150	0.999	655,360
Distance from Moscow	0.006	0.004	-0.008	0.021	0.951	655,360
Dummy border region non-CIS	0.031	0.032	-0.060	0.153	0.837	655,360
Dummy border region CIS	0.009	0.013	-0.052	0.053	0.766	655,360
Urbanization	-0.807	0.518	-3.094	2.242	0.941	655,360
Fiscal transfers	0.062	0.055	-0.250	0.452	0.868	655,360
Tax revenue	0.011	0.013	-0.106	0.169	0.789	655,360
Education	0.215	0.897	-2.914	4.586	0.594	655,360
Education squared	-0.521	1.919	-11.348	7.359	0.607	655,360
Tensions (RUIE)	-0.015	0.011	-0.071	0.028	0.914	655,360
Power	0.005	0.013	-0.058	0.082	0.634	655,360
Democracy	-0.001	0.001	-0.006	0.004	0.695	655,360
Regulatory capture	-0.029	0.045	-0.214	0.128	0.746	655,360
Industrial concentration	-0.000	0.000	-0.002	0.001	0.690	524,288
Declarations	0.013	0.014	-0.062	0.069	0.834	655,360
Resources II	-0.001	0.001	-0.003	0.001	0.877	524,288
Regulatory decentralization: log of number of contradicting acts						
Territory	0.093	0.106	-0.561	0.709	0.809	655,360
Population	-0.056	0.168	-1.762	1.569	0.629	655,360
Oil and gas	0.807	0.641	-3.276	6.947	0.896	655,360
Average income per capita	0.092	0.363	-3.163	3.575	0.598	655,360
Distance from average income	0.114	0.390	-3.517	3.547	0.615	655,360
Dummy autonomous okrug	-0.639	0.291	-2.937	0.845	0.986	262,144
Dummy republic	0.591	0.222	-0.522	1.867	0.996	655,360
Distance from Moscow	0.058	0.031	-0.090	0.222	0.971	655,360
Dummy border region non-CIS	0.086	0.252	-1.018	1.113	0.633	655,360
Dummy border region CIS	0.070	0.208	-0.929	0.838	0.631	655,360
Urbanization	-10.111	6.776	-48.243	21.078	0.932	655,360
Fiscal transfers	1.138	0.619	-2.789	5.367	0.967	655,360
Tax revenue	0.129	0.161	-1.574	1.696	0.789	655,360
Education	-4.411	10.472	-45.717	41.329	0.663	655,360
Education squared	10.186	23.924	-101.520	112.758	0.665	655,360
Tensions (RUIE)	-0.157	0.129	-0.702	0.459	0.888	655,360
Power	-0.021	0.233	-1.345	0.985	0.536	655,360

Variable	Average coefficient	Average standard error	Lower bound	Upper bound	CDF(0)	No. regressions
Democracy	0.005	0.015	-0.049	0.075	0.618	655,360
Regulatory capture	-0.078	0.497	-1.938	2.117	0.562	655,360
Industrial concentration	0.001	0.007	-0.021	0.030	0.580	524,288
Declarations	0.211	0.186	-0.769	0.959	0.871	655,360
Resources II	-0.011	0.009	-0.057	0.022	0.892	524,288
Regulatory decentralization: number of contradicting acts						
Territory	0.059	0.086	-0.386	0.603	0.753	655,360
Population	-0.012	0.127	-1.332	1.052	0.538	655,360
Oil and gas	0.533	0.390	-2.398	4.071	0.914	655,360
Average income per capita	-0.102	0.250	-2.753	2.155	0.658	655,360
Distance from average income	0.227	0.281	-2.263	3.106	0.790	655,360
Dummy autonomous okrug	-0.592	0.232	-2.844	0.862	0.995	262,144
Dummy republic	0.550	0.173	-0.359	1.513	0.999	655,360
Distance from Moscow	0.053	0.025	-0.078	0.160	0.985	655,360
Dummy border region non-CIS	0.190	0.213	0.538	1.118	0.813	655,360
Dummy border region CIS	0.184	0.121	-0.396	0.627	0.935	655,360
Urbanization	-6.373	4.636	-29.886	21.325	0.915	655,360
Fiscal transfers	1.064	0.530	-1.798	4.565	0.978	655,360
Tax revenue	0.127	0.125	-1.089	1.578	0.846	655,360
Education	2.207	8.135	-32.347	43.738	0.607	655,360
Education squared	-5.657	17.956	-101.791	85.463	0.624	655,360
Tensions (RUIE)	-0.153	0.095	-0.723	0.245	0.945	655,360
Power	0.100	0.136	-0.580	0.994	-0.769	655,360
Democracy	-0.000	0.010	-0.042	0.044	0.505	655,360
Regulatory capture	-0.141	0.406	-1.824	1.358	0.631	655,360
Industrial concentration	-0.001	0.005	-0.019	0.018	0.592	524,288
Declarations	0.184	0.135	-0.631	0.750	0.913	655,360
Resources II	-0.007	0.005	-0.034	0.014	0.884	524,288
Constitutional decentralization: power-sharing treaties						
Territory	0.519	2.011	-6.507	8.440	0.602	524,288
Population	1.576	2.591	-30.784	14.992	0.728	524,288
Oil and gas	-29.822	23.428	-380.109	222.630	0.898	524,288
Average income per capita	-2.782	4.753	-51.571	24.567	0.721	524,288
Distance from average income	2.488	5.592	-29.450	47.433	0.672	524,288
Dummy republic	0.224	3.188	-20.572	12.823	0.528	524,288
Distance from Moscow	0.005	0.414	-2.241	1.876	0.505	524,288
Dummy border region non-CIS	-2.867	3.111	-14.758	7.260	0.822	524,288
Dummy border region CIS	2.875	1.986	-5.024	12.707	0.926	524,288
Urbanization	247.080	107.150	-144.467	728.959	0.989	524,288
Fiscal transfers	2.367	10.073	-40.884	72.324	0.593	524,288
Tax revenue	2.321	2.407	-12.384	33.885	0.833	524,288
Education	-8.092	143.546	-492.905	471.670	0.522	524,288
Education squared	10.117	337.093	-1162.534	1214.543	0.512	524,288
Tensions (RUIE)	-0.606	1.342	-8.177	3.565	0.674	524,288
Power	2.285	1.905	-4.866	13.693	0.885	524,288
Democracy	0.019	0.172	-0.607	0.750	0.545	524,288
Regulatory capture	7.990	6.503	-23.754	30.042	0.890	524,288
Industrial concentration	0.085	0.066	-0.147	0.333	0.900	524,288
Declarations	5.001	2.425	-4.180	17.572	0.980	524,288
Resources II	-0.035	0.080	-0.335	0.315	0.672	524,288
Constitutional decentralization: regional constitutions						
Territory	0.726	0.921	-3.081	5.012	0.785	655,360
Population	1.195	0.703	-6.033	6.967	0.955	655,360
Oil and gas	-3.427	1.875	-16.110	8.093	0.966	655,360

Variable	Average coefficient	Average standard error	Lower bound	Upper bound	CDF(0)	No. regressions
Average income per capita	-0.662	1.235	-14.229	9.514	0.704	655,360
Distance from average income	0.290	1.315	-9.905	13.168	0.587	655,360
Dummy autonomous okrug	0.463	1.183	-9.579	8.322	0.652	262,144
Dummy republic	1.682	0.981	-3.599	6.524	0.956	655,360
Distance from Moscow	0.115	0.110	-0.440	0.795	0.852	655,360
Dummy border region non-CIS	-0.378	0.942	-5.323	3.895	0.656	655,360
Dummy border region CIS	0.077	0.570	-2.800	1.940	0.554	655,360
Urbanization	-29.560	25.861	-148.041	79.902	0.873	655,360
Fiscal transfers	0.020	3.132	-17.527	14.189	0.503	655,360
Tax revenue	0.160	0.711	-5.862	7.203	0.589	655,360
Education	15.673	38.958	-154.798	190.319	0.656	655,360
Education squared	-55.200	86.126	-522.489	359.223	0.739	655,360
Tensions (RUIE)	0.233	0.420	-1.402	3.078	0.711	655,360
Power	-0.520	0.621	-5.691	2.082	0.799	655,360
Democracy	-0.080	0.055	-0.270	0.169	0.926	655,360
Regulatory capture	0.538	1.642	-6.440	7.753	0.628	655,360
Industrial concentration	-0.018	0.022	-0.099	0.053	0.781	524,288
Declarations	0.752	0.720	-2.868	4.409	0.852	655,360
Resources II	-0.044	0.031	-0.173	0.087	0.919	524,288

Notes: all regressions estimated with OLS (fiscal decentralization, regulatory decentralization as share and log number of contradictions), negative binomial (regulatory decentralization as number of contradictions), ordered logit (regional constitutions) and tobit (power-sharing treaties). All estimates use robust standard errors, if possible. Average indicators weighted by the value of log likelihood. CDF(0) calculation approach assuming normal distribution (case 1 by Sala-i-Martin, 1997) is used. Robust variables are marked bold. Retail trade and net profit, as well as total number of conclusions included in the respective regressions

The results of the estimations suggest that the retention rate is almost exclusively determined by the bargaining power variables (territory and distance from Moscow). If one adds transfers, one still has a strong and positive effect of the distance from Moscow, but in this case regulatory capture seems also to have a positive impact on the decentralization measure. This is a new result I have not observed in the previous specifications: it could be interpreted as the ability of influential business groups to extract concessions on the regional level (regulations), but also influence the federal decision-making (transfers). However, the significance of regulatory capture is not robust to outliers according to Jarque-Bera test, and therefore cannot be interpreted in a reasonable way (since normality of residuals cannot be supported) and is likely to be driven just by two regions: Dagestan and Kabardino-Balkaria. Both of them are located in Northern Caucasus, are relatively poor and receive substantial transfers, but are also notorious for high level of corruption and intervention of local politicians in the business activity – so, it is not surprising that they are driving the results, which otherwise would disappear.

Table 5: Determinants of decentralization, only regressors robust to EBA, 1995-1999

	Fiscal decentralization					Regulatory decentralization			Constitutional decentralization	
	(EBA1) OLS	(EBA2) OLS	(EBA3) OLS	(EBA4) OLS	(EBA5) OLS	(EBA6) OLS	(EBA7) OLS	(EBA8) Negative binomial	(EBA9) Ordered logit	(EBA10) Tobit
	Retention rate	Retention rate and transfers	Expenditure	Expenditure	Retention rate and off-budget funds	Share of acts	Log number	Number	Regional cons-titutions	Power-sharing treaties
Territory	0.055** (0.021)									
Population									0.379*** (0.143)	
Oil and gas	0.110 (0.133)								-2.126*** (0.665)	
Income per capita	0.020 (0.030)	-0.157 (0.116)								
Dummy autonomous okrug				0.128*** (0.012)			-0.046 (0.158)	-0.088 (0.492)		
Dummy republic						0.055*** (0.011)	0.545*** (0.142)	0.492*** (0.108)	1.823*** (0.514)	
Distance from Moscow	0.007** (0.003)	0.054*** (0.017)				0.006*** (0.002)	0.050*** (0.019)	0.046** (0.018)		
Tax revenue	-0.067 (0.041)	-0.679** (0.287)	0.010 (0.009)	0.012 (0.007)	-0.074*** (0.026)					
Fiscal transfers			-0.093** (0.044)	-0.123*** (0.037)	0.398*** (0.139)		0.338 (0.318)	0.347 (0.298)		
Urbanization		-4.070 (4.564)			3.715*** (1.339)					252.511*** (71.896)
Declarations	0.025 (0.024)									3.486* (1.706)
Democracy	0.001 (0.002)	0.003 (0.008)			-0.006 (0.004)					
Regulatory capture		0.510* (0.302)								
Industrial concentration		-0.000 (0.001)	0.001*** (0.000)							
Retail trade	0.063 (0.041)	0.476 (0.286)								
Net profit	-0.004* (0.002)	0.027** (0.011)								
Total acts							0.558*** (0.160)	0.618*** (0.146)		
Constant	1.398*** (0.513)	10.374*** (3.858)	0.638*** -0.144	0.635*** -0.117	1.863 (0.377)	0.073*** (0.006)	0.633 1.288	0.295 (1.204)		-25.347*** (7.800)
Observations	88	72	79	88	88	88	88	88	87	79
Pseudo R²	0.283	0.615	0.334	0.432	0.129	0.288	0.252	0.035	0.066	0.042
Wald Chi-stat								4074.555***		
LR									29.35**	
proportional odds										
J.-B. test	112.7***	1798***	10.83***	13.42***	25.84***	33.43***	1346.0***			

Notes: see Tables 1 and 2. Outliers in regression (EBA1) are Ingushetia, Kalmykia, Altai Republic, Aginsk Buriatski, Vologda, Tatarstan, Bashkortostan, Taimyr, Karelia, Khakassia, (EBA2) are Dagestan and Kabardino-Balkaria, (EBA3) and (EBA4) are

Rostov, Tula, Bryansk, Novosibirsk, Tatarstan, Bashkortostan, (EBA5) are Taimyr, Ingushetia, Bashkortostan, Tatarstan, Aginsk Buriat, Kalmykia, Altai Rep., (EBA6) are Primorski and Ust Ordyn Buriatski, (EBA6) is Saratov. All significant variables remain significant and keep their sign after exclusion of outliers. Re-estimating (EBA6), (EBA7) and (EBA8) just excluding Primorski krai, just excluding Saratov and excluding both of these regions simultaneously does not change the results, with the exception of regulatory capture in regression (EBA2), which becomes insignificant, but keeps its sign. Re-estimating (EBA10) just excluding Moscow and St. Petersburg (or just Moscow) does not change the results for urbanization. Since in (EBA9) the proportional-odds assumption was rejected, the regression was re-estimated using generalized ordered logit. For marginal effects at the mean population and dummy republic still have a significant and positive impact, while oil and gas is insignificant. Excluding from (EBA2) just regulatory capture or just industrial concentration to check for the changes of sample size (because of the data availability) does not change the results

For the expenditure decentralization I run two regressions, because industrial concentration is unavailable for the autonomous okrugs: the variables that matter are still the same as discussed in the previous specifications (the the exception of oil and gas). Finally, for the retention rate including off-budget funds, one has the negative impact of the tax revenue, positive influence of preferences (urbanization), but also a positive correlation between decentralization and fiscal transfers – so, once again, it is possible that strong regions simultaneously force a large retention rate and large federal transfers. Regulatory decentralization, as above, is determined exclusively by dummy republic and distance from Moscow. For the constitutional decentralization I first find that both indices seem to be influenced by a completely different set of variables, mostly already discussed before: the most interesting finding is that dummy republic is even not robust after EBA for the power-sharing treaties (in fact, republics are among regions with the highest (Tatarstan and Bashkortostan) and lowest (Buryatia) values of the indicator).

5.3. *Outlier regions*

In addition, I re-estimate the regressions from *Tables 2 and 3* excluding outlier regions with “weaker” public governance systems, as defined in the section 3. To start with, almost all results reported so far survive this approach (which is reported in *Appendix E*), although sometimes are only marginally significant and do not remain robust if one excludes further outliers according to Jarque-Bera test to ensure normal distribution of residuals (like distance from Moscow for the fiscal decentralization). However, in this case one obtains several additional significant variables. For the fiscal decentralization dummy autonomous okrug is now often significant (although it has different signs for different proxies). However, this result is probably to be attributed to the strong effect of the only two autonomous regions still in the sample: Khanty Mansi and Yamalo Nenets (the main source of Russian oil and gas extraction). One finds in addition a significant impact of the dummy republic on the retention rate – the effect, however, does not survive if one excludes outliers to ensure not significant Jarque-Bera test and is therefore difficult to interpret. For the regulatory decentralization and constitutional decentralization oil and gas becomes significant, but, once again, it has

different signs for regulatory and for the constitutional decentralization (measured for regional constitutions).

5.4. *Endogeneity*

The last part of the analysis, finally, directly considers the problem of endogeneity. As mentioned, I focus on variables significant in *Table 5*. Although it was expected to generate substantial problems, actually, most variables used in the specifications are either stable over time or time-invariant and therefore unlikely to be subject to reverse causality (territory, population, distance from Moscow naturally, dummy republic or dummy autonomous okrug because they were completely pre-determined by the Soviet territorial organization) or insignificant. Obviously, time-invariance solves the reverse causality problem, but still calls for caution in terms of possible common cause for the covariate and the dependent variable, which may create endogeneity bias. This common cause could be rooted deeply in the historical development, and therefore difficult to control for statistically. One could probably cautiously claim that for the Russian data and nine variables mentioned above this problems are less pronounced because the center-region bargaining for autonomy is an extremely recent phenomenon (due to the political structural break in Russian development in 1990-1991), but even in this case an unambiguous clarification is difficult. As already mentioned, the results which remain robust in most specifications one should also hardly be worrying about the problem of endogenous controls: obviously, exclusion of variables may create an omitted variable problem, but it is unlikely to run in the same direction as the reverse causality (and in the EBA approach various combinations of controls were tested). One should finally notice that it is impossible to make any claims with respect to the results for which the null hypothesis was actually *not* rejected or happened to be rejected in a non-robust fashion through different specifications: for this variables endogeneity bias may make me ignore actually existing effects – once again, a reason for caution.

There are several cases when the endogeneity problem may be driving the robust results. For the retention rate, all three measures of regulatory decentralization and indices of regional constitutions and power-sharing treaties there seems to be no problem with reverse causality among significant (*Table 5*) variables.⁴⁹ The results are more troubling for three other measures of fiscal decentralization. In the expenditure decentralization the questionable

⁴⁹ There can be a problem with the Transparency International indices not included in EBA; but in this case a very small sample size of just 40 regions (even less if one attempts to look at possible outliers according to Jarque-Bera test for some of the specifications) precludes any reasonable instrumentation strategy. Moreover, recall that declarations or regional elites are endogenous by design: determined for the early 1990s before almost all agreements were signed.

variable is the industrial concentration; however, at least during the 1990s it is still likely to reflect the Soviet allocation of industrial assets (since during this period there was almost no construction of new production centers) and therefore could be treated as endogenous (although this argument may be questionable, for example, for the services like the retail trade, which have however been still very deconcentrated in the 1990s before the emergence of the large trade chains). For the retention rate including transfers one could be concerned about the regulatory capture, but the variable is not robust to outliers to ensure non-significant Jarque-Bera test and hence cannot be interpreted properly. However, for the tax revenue (retention rate with transfers and retention rate with the off-budget funds) and fiscal transfers (expenditure decentralization and retention rate with the off-budget funds) the reverse causality is very possible, and the variables are robust – so, this case should be considered more carefully.⁵⁰

In what follows I will attempt to check the robustness of the results in an instrumental variables estimation. To start with, in order to instrument for the tax revenue, I use past (1985 and 1990) values of income per capita. The logic is the following: tax revenue is larger in jurisdictions with large income per capita. However, current income per capita suffers from the same reverse causality problem as the tax revenue. Nevertheless, I can instrument the endogenous control by the lagged (by 5 and 10 years respectively) income per capita of the pre-reform period. To be more precise, I include both income per capita 1995-1999 and tax revenue 1995-1999 in the regressions and instrument both variables (otherwise, since current income is correlated with the past income and with the tax revenue, the instruments were not exogenous). For the fiscal transfers the same approach is applied.⁵¹ Unfortunately, it precludes me from simultaneously including both variables in one regression (since I always have to control for income per capita as well, it would make my regression under-identified). The empirical properties of this estimation technique are relatively good (F-statistics for almost all first-stage regressions are well above 10). However, the theoretical justification can be problematic, as it is the case with almost all instrumentation strategies using lagged variables (although they are quite popular). Hence, the results I report in what follows should be treated with caution.

⁵⁰ For example, there is a substantial literature linking interbudgetary grants to loyalty of Russian regions to the center (Treisman, 1996, 1998; Solanko, 1999; Popov, 2004; Jarocinska, 2004; Dombrovsky, 2006): the question is whether it is the “loyal” or the “secessionist” regions receiving higher amount of funds, but for the purposes of this paper it is sufficient that the link might exist.

⁵¹ The literature on the determinants of fiscal transfers, which has been used as a basis for similar instrumentation strategies so far (Desai et al., 2005), usually relies on the variables I have used as part of this study (like population or status of the autonomous okrug) to determine the extent of the decentralization and hence is not applicable. However, since fiscal transfers are also correlated with income per capita, one can apply the same approach as for the tax revenue.

I will consider each dimension of decentralization where endogeneity can be present one by one. In the regressions I exclude all insignificant variables (as well as regulatory capture for retention rates with transfers to ensure strict exogeneity of all controls). In *Table 6* column (IV1) reports the results of the TSLS estimations for the retention rates with transfers. Tax revenue in the TSLS estimation is insignificant, and therefore the findings of the *Table 5* could not be confirmed. However, distance from Moscow remains significant.⁵² The next column reports the results for expenditures for the specification including dummy autonomous okrug (which is obviously endogenous). Here TSLS strongly supports the previously obtained results of the OLS: fiscal transfers remain significant. Dummy autonomous okrug is significant and positive. In (IV3) and (IV4) I provide estimations for the retention rate with off-budget funds – including fiscal transfers and tax revenue as controls respectively. Unfortunately, in this case the statistical properties of the instruments are much worse (hence, suggesting the possibility of weak instruments). In both regressions the significance and sign of the potentially endogenous regressors are confirmed as opposed to the findings of *Table 5*; urbanization also remains significant and positive.

To conclude, the instrumentation strategy confirmed almost all potentially “endogenous” results, with the exception of the tax revenue for the retention rate including transfers. This is, however, an outcome which should be treated with utmost caution, given the imperfections of the instrumentation strategy.

Table 6: Determinants of decentralization, problems of endogeneity

	(IV1) TSLS	(IV2) TSLS	(IV3) TSLS	(IV4) TSLS
	Retention rate and transfers	Expenditures	Retention rate and off- budget funds	Retention rate and off- budget funds
Distance from Moscow	0.084*** (0.025)			
Dummy autonomous okrug		0.102*** (0.017)		
Urbanization			35.012*** (10.771)	32.384*** (6.576)
Income per capita	-0.072 (0.115)	0.004 (0.010)	-1.180 (0.122)	-0.106 (0.096)
Fiscal transfers		-0.117*** (0.032)	2.818** (1.184)	
Tax revenue	-0.037 (0.058)			-0.425*** (0.117)
Constant	1.418* (0.770)	0.807*** (0.022)	-2.095** (0.863)	5.173*** (1.448)
Observations	88	88	88	88
F-stat first stage income per capita	50.52***	59.98***	15.52***	15.52***
F-stat fist stage tax	64.70***			8.90***

⁵² Including regulatory capture would also make the distance from Moscow marginally insignificant

revenue F-stat first stage fiscal transfers	66.97***	5.70***
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Notes: see Table 2. In (IV1) and (IV4) instrumented variables are income per capita and tax revenue, in (IV2) and (IV3) fiscal transfers and income per capita. Instruments are income per capita 1985 and 1990

6. Discussion

The main results of the previous sections could be summarized as follows. First, no robust correlation between dimensions of decentralization was found. Second, after all refinements the set of determinants of individual dimensions of decentralization is also substantially different, although for two variables (dummy republic and distance from Moscow) one does find an effect for several decentralization dimensions. It is probably interesting to consider these results from two perspectives: first, our general knowledge regarding the decentralization process, and second, the Russian specifics.

If one looks at the existing research on determinants of decentralization, the results I obtained for the Russian Federation seem to be consistent with claims made in several papers (Blume and Voigt, 2008; Martinez-Vazquez and Timofeev, 2009) that reducing different dimensions of decentralization to each other results in significant loss of information and that, as Treisman (2002) puts it, “different types of decentralization may have quite different causes”. However, this paper puts this result into an “extreme” situation: the decisions are made simultaneously for all dimensions of decentralization within a relatively short period of time within one country. Treisman (2002) provides clear evidence that long-term path dependent factors (associated with the colonial heritage or geographic location in different world regions) have strong influence on the patterns of decentralization. Even if one eliminates all these differences, as in this paper, dimensions of decentralization are still not robustly correlated. Probably, the most pronounced result of this paper is the absent correlation between fiscal and regulatory decentralization (which has not been established in other papers): while fiscal aspects have been subject to detailed studies in the economics of federalism since its onset, we know much less about regulatory decentralization: so, the paper suggests that focusing on this dimension could generate very different insights for the determinants of decentralization.

However, simply stating the absent correlation of the dimensions of decentralization does not seem to be enough. The real puzzle could be the reasons for the differences. Here three explanations could be discussed. To start with, differences can be caused, as mentioned in the introduction, by differences in preferences. This is an “easy” explanation, since preferences are per definition not observable. However, one important aspect in this case is the difference between constitutional and post-constitutional outcomes. It is possible that the

constitutional decentralization should be interpreted as a “status claim” on the side of the regional or central governments, or a “threat” in their bargaining rather than its outcome. Then it is not surprising that there is no clear correlation between regulations and fiscal flows on the one hand and constitutions and treaties on the other: the latter could have been intended to be just a “symbol” of the autonomy, or just a preliminary point in the negotiations process. For example, as demonstrated above, the power-sharing treaties could be strongly influenced by the declarations of regional governors rather than by any economic or social considerations: from this point of view treaties could in fact be interpreted as an “extended” declaration. But then relying on the constitutional decentralization to understand the allocation of influence in a federation could be insufficient, since at this level real authority could be mixed up with “symbolic claims” – at least in countries without strong rule of law, like Russia. In addition, both central and regional government can have *preferences regarding these symbolic actions* as well, and not just regarding the “tangible” outcomes, and then an exchange of “real autonomy” for “lower status claims” is possible.

Second, differences in decentralization could follow from different mechanisms implemented. In the Russian Federation, as already mentioned, the tax collection is done by the regional agencies of the federal tax collection service; hence, in order to manipulate the retention rate, regional governors have to “capture” this agencies by providing benefits to their bureaucrats and to design “schemes” allowing manipulations with tax revenue (for example, by manipulating the tax auditing effort). Yet another approach could be lobbying on the federal level: changing tax rates and bases the central parliament automatically generates advantages or disadvantages for different regions with different economic structures. For the regulatory decentralization and the index of autonomy in regional constitutions, as mentioned, one could interpret the results as outcomes of an “implicit contract”, while the power-sharing treaties are based on an “explicit contract”, and direct bilateral bargaining could be more important. For the regulations it could also be important to capture federal agencies, but rather regional law enforcement structures (specifically, procurators) and judges than the tax collectors. For the power-sharing treaties the key federal agency is the presidential administration (which in fact prepared many agreements). So, the same regional governments achieve different results using different channels of influence.

Finally, there is some relatively weak evidence that different dimensions of decentralization could have been used as substitutes in the bargaining process. If that is the case, one receives yet additional argument in favor of separate analysis of different dimensions of decentralization: it is possible that the country which seems “decentralized” according to one dimension is in fact “highly centralized” according to the other one. Then

any empirical result obtained could be driven either by “decentralization” or “centralization” and is difficult to interpret. To be more precise, in this case one *can* look just at one dimension of decentralization (and thus interpret other dimensions as well), but only with a clear understanding on how this dimension is related to the other ones.

With respect to the individual determinants of decentralization, probably, the results of this paper are more interesting in the Russian-specific context. It is however still worth mentioning that I find a very strong and pronounced impact of the geographical determinants on different dimensions of decentralization: territory (for the retention rate) and distance from Moscow. Since almost all papers in economics define “size of the nation” in terms of population (cf. Alesina and Spolaore, 2003), this result is particularly important: probably, geographical territory is an aspect which is worth thinking about. Since Russia is a relatively well developed country (and does not have the “classical” problems of developing world, where certain parts of the territory may be simply cut off from the central administration), this result is especially interesting. Other robust determinants of decentralization (*Table 5*) seem mostly to be consistent with the theoretical predictions in terms of sign: the only difference is for tax revenue (as discussed above; the result is partly not sustained if controlled for endogeneity) and oil and gas for regional constitutions (probably representing the fact that the main oil and gas provinces of Russia – Khanty Mansi and Yamalo Nenets – did not attempt to achieve high constitutional autonomy; it could once again represent the “symbolic” nature of claims of regional constitutions, irrelevant for territories with a “real” bargaining instrument).

It is interesting though that in the studies of the determinants of retention rates in Russia in 1993-1994 Treisman (1999) reports several factors to be significantly influencing the retention rate (dummy republic, population) that have no (robust) influence in my sample (1995-1999). For some variables (like GRP per capita) the sign turns around (although in my sample they are not robust). It could represent the changes in the Russian Federalism after 1994: while in the early 1990s the bargaining was influenced by the coalition of ethnic republics, after 1994 it was gradually replaced by bilateral bargaining between regions. There are certain changes in mechanisms as well: in the early 1990s retention rates were negotiated on the regular basis and were more similar to the “explicit contract” of the power-sharing treaties (or an “implicit contract”, since the decision to withhold tax payments to the center was often unilateral) than to the “capturing the local tax authorities” approach of the late 1990s. In a similar way, the results of this paper in terms of determinants of power-sharing treaties are quite different from the literature operating just with a dummy for these agreements: Söderlund (2003) reports distance from Moscow, share of non-Russian population and dependence on federal subsidies to determine the signing of an agreement; if

one looks at the *content* of the agreement, almost all these factors turn out to be insignificant. Thus, there is one more confirmation of high heterogeneity of agreements. Finally, as already discussed, there are interesting analogies between the logic of the retention rate formation and the decentralization “within” regions (between regions and municipalities), for example, in terms of the influence of GDP per capita.⁵³

As it has been discussed in the previous part of the paper, differentiating among the aspects of the decentralization is important, because different aspects of decentralization could generate different effects for the economic performance. It goes well beyond the framework of this paper to provide a detailed study of this problem; however, at this stage it is possible to look at least at some simple correlation analysis of the problem. For this purpose I correlate the nine decentralization indicators of this paper with two performance variables: gross regional product growth rate, as included in the dataset of Berkowitz and DeJong (forthcoming), and growth rate of industrial output as reported by Goskomstat. For the growth rate I also look at the conditional correlation controlling for the initial level of the GRP and education (once again using data from the same source). It should be noted that the theory on impact of decentralization on growth is not entirely conclusive, and this interrelation has been subject to a long discussion and numerous speculations (see e.g. Baskaran and Feld, 2009, Feld and Schnellenbach, 2010).

The results are reported in *Table 6*. To start with, different aspects of decentralization indeed seem to provide different correlations with the performance indicators. Probably the most pronounced results are obtained for the industrial output growth. Here, looking at the constitutional decentralization (measured by regional constitutions) one would see a significant and positive relation between growth and decentralization. However, for the fiscal decentralization indicators, the situation is more difficult: there is still a positive correlation between industrial output growth and the expenditure decentralization, but the retention rate with transfers is negatively correlated with this variable. Regulatory decentralization does not matter in any of the columns of *Table 7*. For the growth of the GRP results differ for conditional and unconditional correlation, but in this case one can still come to different conclusions regarding the correlation between the decentralization and growth looking at different dimensions. Basically, for the conditional correlation the only determinant which seems to matter is the expenditure decentralization, which has a negative sign.⁵⁴ Anyway, at

⁵³ Libman (2010) reports, by the way, that the retention rate and the share of regional budget in the consolidated tax revenue of the regional and municipal budgets are positively correlated in Russia.

⁵⁴ In several cases (expenditure decentralization, retention rate and transfers) signs of correlation coefficients are the opposite for the GRP and industrial output growth rate: there is, however, no contradiction, since the latter

this stage the important message is not the signs of the coefficients as such, but rather the fact that results differ for different dimensions of decentralization.

Table 7: Economic performance and decentralization

	Growth rate of GRP	Growth rate of GRP conditional on initial level of GRP and education	Growth rate of industrial output
Retention rate	0.0058 (0.962) 0.1999*	-0.0500 (0.685) 0.0180	-0.0746 (0.490) -0.4507***
Retention rate and transfers	(0.097) -0.0024 (0.984)	(0.140) -0.0584 (0.636)	(0.000) 0.0831 (0.442)
Retention rate and off-budget funds	-0.1823 (0.131)	-0.2212* (0.070)	0.2150** (0.044)
Expenditure decentralization	0.0752 (0.536) -0.0268 (0.825)	0.0606 (0.624) -0.0125 (0.919)	-0.0070 (0.948) 0.0900 (0.404)
Share of contradicting acts	0.0076 (0.950)	0.0168 (0.892)	0.0531 (0.623)
Number of contradicting acts	-0.0744 (0.540) 0.2022*	-0.0460 (0.709) 0.1811	0.1177 (0.302) 0.1980*
Log number of contradicting acts	(0.096)	(0.142)	(0.066)

Notes: numbers are correlation coefficients; numbers in parentheses are p-values

7. Conclusion

Decentralization encompasses multiple aspects with partly sophisticated connection to each other. This paper tried to look at both interrelation of different aspects of decentralization and the factors of the endogenous devolution using the example of the Russian Federation. In an asymmetric setting with weak rule of law and public hierarchy different forms of devolution became subject to bargaining between the federal government and the regions. However, identical agents seem to generate very different outcomes for different components of the decentralization process. In particular, I looked at decentralization at the rules level, i.e.

also measures the structural shifts in the Russian economy towards a greater importance of services, which could be associated with better GRP performance.

allocation of authorities set by regional constitutions, as well as at the decentralization at the outcomes level, i.e. split of tax revenue and the regulation authority. Indeed, constitutional and both post-constitutional level forms of decentralization are not robustly correlated to each other, with the only exception of regulatory decentralization and decentralization in regional constitutions (where, however, the correlation appears because of a small group of Russian regions). The results depend upon the set of controls and the set of regions excluded from the analysis. It is important to notice, that the paper does not attempt to reveal a “true” or “correct” measure of decentralization: all three dimensions may be relevant depending upon the particular policy and research question – one should just carefully identify what one is looking for.

Moreover, different aspects of decentralization are driven by different sets of factors. The only two robust factors influencing several dimensions of decentralization are distance from Moscow (a measure of bargaining power: relevant for fiscal and regulatory decentralization) and dummy republic (bargaining rules and / or path dependence: relevant for regulatory and constitutional decentralization). However, even for these variables the impact is not robust and depends on how regulatory, fiscal or constitutional decentralization is measured. Dummy republic fits the predictions for the Russian federalism, the importance of distance from Moscow is less expected. In addition, for different dimensions of the fiscal decentralization I find an important role of territory (bargaining power), industrial concentration (lobbying) and fiscal flows (fiscal transfers and tax revenue – in this case some of the results seem to be driven by the endogeneity). It is interesting to notice that the sign of the fiscal flows variables is often contradicting the theory, while the signs of other variables are theory-consistent: that is probably because both small transfers from the federal government and large fiscal revenue of the region represent both a sign of their strength (in terms of greater survival potential without any central support) and weakness (inability to lobby for larger grants from the center and higher redistributive appetites of the central administration). Urbanization often turns out to be significant in the fiscal decentralization regressions, but is not robust to specification and partly changes sign. For the power-sharing treaties I find a strong and robust impact of the declarations of regional elites, suggesting that this dimension of decentralization was of a rather “symbolic” nature. Autonomy incorporated in regional constitutions increases for regions with large population (and strong bargaining power).

There are a number of limitations for the study from the point of view of the generalization of results. First, all indicators have limited ability to measure the underlying decentralization concepts. Second, the contradiction between unilateral and bilateral

devolution and formally highly symmetric design of the Russian federalism may influence the results. Third, I am considering a relatively short time period in an unstable institutional, economic and political environment. For example, the data includes the period of economic crisis in 1998, which had a profound impact on the behavior of all bargaining parties. Finally, this paper has only limited ability to resolve the endogeneity problem (as usually); hence, the results should be treated rather like correlations than causal links. Nevertheless, it still provides additional evidence in favor of the suspicion that different aspects of decentralization are really different from each other in terms of determinants and outcomes, what may be quite important for the empirical studies of the factors and impact of decentralization.

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Appendix A: Data

Table A1: Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Constitutional decentralization (power-sharing treaties)	79	4.291	4.426	0.000	15.000
Constitutional decentralization (regional constitutions)	87	2.230	1.336	0.000	6.000
Declarations	88	2.821	0.498	1.600	4.330
Democracy	88	27.568	6.238	14.000	45.000
Distance from Moscow	88	2.639	2.925	0.000	12.866
Distance from average income	88	0.466	0.492	0.244	3.191
Dummy autonomous okrug	88	0.102	0.305	0.000	1.000
Dummy border region CIS	88	0.295	0.459	0.000	1.000
Dummy border region non-CIS	88	0.114	0.319	0.000	1.000
Dummy republic	88	0.227	0.421	0.000	1.000
Education	88	0.169	0.038	0.069	0.360
Education squared	88	0.030	0.016	0.005	0.129
Fiscal decentralization (expenditures)	88	0.790	0.073	0.611	0.982
Fiscal decentralization (retention rate and parafiscal funds)	88	0.709	0.143	0.208	1.272
Fiscal decentralization (retention rate and transfers)	88	1.032	0.570	0.456	3.437
Fiscal decentralization (retention rate)	88	0.643	0.096	0.213	0.920
Fiscal transfers	88	0.235	0.179	0.008	0.749
Income per capita	88	0.908	0.649	0.258	4.056
Industrial concentration	79	10.357	14.016	0.000	61.033
Industrial production index	88	97.406	4.790	77.600	106.300
Net profit	88	3.036	7.264	-1.532	42.082
Oil and gas	88	0.020	0.103	0.000	0.786
Population	88	0.028	1.203	-3.963	2.144
Power (Jarocinska)	88	6.999	0.686	5.700	8.500
Power (RUIE)	88	2.341	0.676	1.000	3.000
Power (UI)	81	2.136	0.833	1.000	3.000
Regulatory capture	73	0.000	0.137	-0.306	0.416
Regulatory decentralization (log number)	88	5.422	0.656	1.609	6.682
Regulatory decentralization (number)	88	267.330	152.317	5.000	798.000
Regulatory decentralization (share)	88	0.102	0.055	0.002	0.314
Resources I	78	33.077	12.669	3.000	42.000
Resources II	78	5.397	1.061	2.000	6.000
Retail trade	88	1.568	1.428	-2.421	5.581
Share of Russians	88	0.746	0.238	0.012	0.966
Tax revenue	88	14.808	1.449	11.131	18.612
Tension (MFK)	88	3.330	1.460	1.000	5.000
Tension (RUIE)	88	2.170	0.834	1.000	3.000
Territory	88	0.233	0.460	0.000	3.103
TI perceived	40	0.587	0.208	0.000	1.000
TI real	40	0.443	0.297	0.000	1.000
Total acts	88	7.989	0.352	7.144	9.044
Urbanization	88	0.067	0.016	0.019	0.100

Table A2: Description of data

Name	Description	Period	Source
Bargaining power (RUIE)	Index of bargaining power of the region vis-à-vis the federation, ranging from 1 to 3, higher value indicates higher bargaining power	1996	Russian Union of Industrialist and Entrepreneurs
Bargaining power (UI)	Index of bargaining power of the region vis-à-vis the federal centre, ranging from 1 to 3, higher values indicate higher bargaining power. Components of index: violations of federal law by regional legislation, natural resources, vote against federal policies at national elections	1996	Institute of Urban Economics
Constitutional decentralization (power-sharing treaties)	Index of autonomy incorporated in power-sharing treaties (see table A9)	1999	Own estimation, based on data from Garant
Constitutional decentralization (regional constitutions)	Index of autonomy incorporated in regional constitutions (see table A8)	1999	Own estimation, based on data from Garant
Declaration	Index of declaration of regional elites in 1991-1995 based on count of events, e.g. statements of sovereignty of the region, requests to reallocate powers in the federation etc. The higher value of index represents a greater support of decentralisation	1995	Dowley, 1998
Democratisation	Index of democratisation of the region, estimated by the experts of the Carnegie Centre in Moscow. The higher value of index represents a higher degree of democratisation	1991-2001	Carnegie Centre and Independent Institute for Social Policy
Distance from Moscow	Distance between the capital of the region and Moscow, thousands of km, 0 for Moscow and Moscow oblast, identical for St. Petersburg and St. Petersburg oblast	n.a.	Goskomstat
Distance of the average income	Absolute value (Average income per capita in the Russian Federation – Average income per capita in the region)	1995-1999	Goskomstat
Dummy autonomous okrug	1 if the region has the status of an autonomous okrug but Chukotka (which is not part of any other region), 0 otherwise	n.a.	Own estimation
Dummy border region CIS	1 if the region has a border to any state outside the Russian Federation, which belongs to the CIS (Ukraine, Belarus, Georgia, Azerbaijan, Kazakhstan) 0 otherwise	n.a.	Own estimation
Dummy border region non-CIS	1 if the region has a border to any state outside the Russian Federation, which does not to the CIS (Norway, Finland, Estonia, Lithuania, Poland, Mongolia, China, Korea and Japan) 0 otherwise	n.a.	Own estimation
Dummy republic	1 if the region has the status of a republic, 0 otherwise	n.a.	Own estimation
Education	Share of population of the region with a university degree or incomplete university education	2002	Russian Census
Fiscal decentralization (expenditures)	Average share of regional fiscal expenditures over the sum of the regional fiscal expenditures and the direct federal expenditures	1998-1999	East-West Institute, 2001
Fiscal decentralization (retention rate and parafiscal funds)	Average tax revenue of the regional budget and territorial parafiscal funds over the total tax collection and revenue of parafiscal funds from the territory of the region	1999	As in retention rate, as well as East-West Institute (2001) for the extended budget
Fiscal decentralization (retention rate and transfers)	Average sum of tax revenue of the regional budget and total transfers to the regional budget over the total tax collection on the territory of the region	1995-1999	As in retention rate and fiscal transfers

Name	Description	Period	Source
Fiscal decentralization (retention rate)	Average tax revenue of the consolidated regional budget executed over the total tax collection on the territory of the region	1995-1999	Until 1997: Freinkman, Treisman and Titov, 1999 Since 1998: Ministry of Finance (for budget data), State Tax Service and Goskomstat (for tax collection data)
Fiscal transfers	Average fiscal transfers from other budgets over total expenditures of the region's consolidated budget	1995-2003	Until 1997: Freinkman, Treisman and Titov, 1999 Since 1998: Ministry of Finance
Income per capita	Average income per capita of the region, thousands of RUR ⁵⁵	1995-1999	Goskomstat
Industrial concentration	Average share of dominant enterprises, as defined by the Russian antitrust law, in the total industrial output	1995-1999	Goskomstat
Industrial production index	Average growth of industrial production in a region (measured as an index, i.e. 1 + growth rate)	1995-1999	Goskomstat
Net profit	Average net profit (profit – loss) of all region's organizations, bln. RUR	1995-1999	Goskomstat
Oil & gas share	Average share of oil extraction in the region in the total oil extraction in Russia plus share of the gas extraction in the region to the total gas extraction in Russia over two	1995-1999	Goskomstat
Population	Log average population of the region, mln. People	1995-1999	Goskomstat
Power (Jarocinska)	Index of power of regional governors, based on data like years in office, share on regional elections, control of parliament etc. The higher value of index represents a higher influence of regional governor.	1995-2000	Jarocinska, 2004
Regulatory capture (log number)	Log number of acts assessed as contradicting the federal legislation	2006	Ministry of Justice
Regulatory capture (number)	Number of acts assessed as contradicting the federal legislation	2006	Ministry of Justice
Regulatory capture (share)	Number of acts assessed as contradicting the federal legislation over total number of acts assessed as either contradicting or conforming the federal legislation	2006	Ministry of Justice
Resources I	Ranking of regions from 1 (highest resources) to 42 (lowest resources) based on the deposits of oil, gas, coal and gold	1998	Vainberg and Rybnikova, 2006
Resources II	Ranks regions from 1 (highest resources) to 6 (lowest resources) depending upon the value of their explored natural resource deposits (USD)	1996	Vainberg and Rybnikova, 2006
Retail trade	Log average total retail trade revenue (current prices), bln. RUR	1995-1999	Goskomstat
Share of Russians	Share of ethnic Russians in the region's population	2002	Russia's Census, 2002
State capture	Index of regulatory capture: residual average preferential treatment concentration after controlling for the number of preferential treatments 1995-2000. The higher value of index represents a higher degree of capture	2000	Slinko, Yakovlev and Zhuravskaya, 2005
Tax revenue	Log average total tax revenue from the region's territory	1995-1999	Goskomstat

⁵⁵ In 1998 the Russian rubl was denominated; therefore all indicators for previous years were divided by 1000.

Name	Description	Period	Source
Tensions (MFK)	Index of tensions between the federal and the regional governments, ranging from 1 to 5, higher value indicates higher level of tensions. Components of index: number of critical statements of governors against president, electoral support of the president in the region and existence of power-sharing agreement	1997	MFK Renaissance
Tensions (RUIE)	Index of tensions between the federal and the regional government, ranging from 1 to 3, higher value indicates higher level of tensions	1996	Russian Union of Industrialist and Entrepreneurs
Territory	Territory of the region, mln. sq.km, 0 for Moscow and St. Petersburg	n.a.	Goskomstat
TI perceived	Transparency International index, measuring the perception of corruption in the region, from 0 (very low) to 1 (very high)	2002	Transparency International and INDEM
TI real	Transparency International index, measuring the actual level of corruption in the region, from 0 (very low) to 1 (very high)	2002	Transparency International and INDEM
Total acts	Log total number of acts in the Federal Register	2006	Ministry of Justice
Urbanization	Average share of urban population, % / 1000 (for representational purposes)	1995-1999	Goskomstat

Table A3: Correlation matrix, excluding republics

	Fiscal decentralization			Expenditure decentralization	Regulatory decentralization			Constitutional decentralization	
	Revenue				Share of contradicting acts	Log number of contradicting acts	Number of contradicting acts	Regional constitutions	Power-sharing treaties
	Retention rate	Retention rate and transfers	Retention rate and parafiscal funds						
Retention rate	1								
Retention rate and transfers	0.5410*** (0.000)	1							
Retention rate and parafiscal funds	0.7722*** (0.000)	0.1378 (0.263)	1						
Expenditure decentralization	-0.0276 (0.823)	-0.0677 (0.584)	0.0565 (0.647)	1					
Share of contradicting acts	0.2866** (0.018)	0.4409*** (0.000)	0.1307 (0.288)	-0.0290 (0.814)	1				
Log number of contradicting acts	-0.0426 (0.730)	0.0253 (0.838)	-0.1274 (0.301)	-0.0651 (0.598)	0.5762*** (0.000)	1			
Number of contradicting acts	-0.0757 (0.540)	-0.0512 (0.679)	-0.1324 (0.282)	-0.0582 (0.637)	0.6641*** (0.000)	0.8115*** (0.000)	1		
Regional constitutions	-0.1184 (0.340)	-0.2304 (0.061)	-0.0652 (0.600)	-0.1278 (0.303)	0.0502 (0.686)	0.0219 (0.861)	0.2020 (0.101)	1	
Power-sharing treaties	-0.2245* (0.087)	-0.2163* (0.100)	-0.2120 (0.107)	0.2114 (0.108)	-0.1675 (0.205)	-0.0021 (0.987)	0.0477 (0.720)	-0.2137 (0.101)	1

Note: see Table 1

Table A4: Correlation matrix, excluding outliers

	Fiscal decentralization			Expenditure decentralization	Regulatory decentralization			Constitutional decentralization	
	Revenue				Share of contradicting acts	Log number of contradicting acts	Number of contradicting acts	Regional constitutions	Power-sharing treaties
	Retention rate	Retention rate and transfers	Retention rate and parafiscal funds						
Retention rate	1								
Retention rate and transfers	0.4109*** (0.002)	1							
Retention rate and parafiscal funds	0.7917*** (0.000)	0.1106 (0.329)	1						
Expenditure decentralization	0.0736 (0.517)	-0.3696*** (0.000)	0.2530** (0.024)	1					
Share of contradicting acts	0.1946* (0.084)	0.2859** (0.010)	0.0803 (0.479)	-0.0782 (0.490)	1				
Log number of contradicting acts	0.0856 (0.450)	0.1326 (0.241)	-0.0238 (0.834)	0.0217 (0.848)	0.7472*** (0.000)	1			
Number of contradicting acts	0.1149 (0.310)	0.1005 (0.375)	0.0080 (0.944)	0.1011 (0.372)	0.8443*** (0.000)	0.8424*** (0.000)	1		
Regional constitutions	0.2508** (0.026)	0.2772** (0.013)	0.2020 (0.074)	0.0135 (0.906)	0.3246** (0.004)	0.1931* (0.089)	0.3522** (0.002)	1	
Power-sharing treaties	0.0209 (0.856)	-0.2135* (0.061)	0.1348 (0.239)	0.3423*** (0.002)	-0.1616 (0.158)	0.0069 (0.952)	0.0675 (0.557)	-0.0181 (0.876)	1

Note: see Table 1

Table A5: Correlation matrix, excluding republics and outliers

	Fiscal decentralization			Expenditure decentralization	Regulatory decentralization			Constitutional decentralization	
	Revenue				Share of contradicting acts	Log number of contradicting acts	Number of contradicting acts	Regional constitutions	Power-sharing treaties
	Retention rate	Retention rate and transfers	Retention rate and parafiscal funds						
Retention rate	1								
Retention rate and transfers	0.7362*** (0.000)	1							
Retention rate and parafiscal funds	0.7501*** (0.000)	0.5130*** (0.000)	1						
Expenditure decentralization	-0.2110 (0.103)	-0.3472*** (0.001)	-0.1082 (0.407)	1					
Share of contradicting acts	0.1728 (0.183)	0.1300 (0.318)	0.1542 (0.235)	-0.1436 (0.270)	1				
Log number of contradicting acts	-0.0198 (0.880)	0.0228 (0.861)	-0.1025 (0.432)	-0.0588 (0.653)	0.6711*** (0.000)	1			
Number of contradicting acts	-0.0403 (0.758)	-0.0207 (0.874)	-0.1142 (0.381)	-0.0414 (0.751)	0.8212*** (0.000)	0.8108*** (0.000)	1		
Regional constitutions	-0.0112 (0.933)	-0.1257 (0.338)	0.0016 (0.990)	-0.0979 (0.457)	0.1818 (0.165)	0.0137 (0.917)	0.1910 (0.144)	1	
Power-sharing treaties	-0.2245* (0.087)	-0.2163* (0.100)	-0.2120 (0.107)	0.2114 (0.108)	-0.1675 (0.205)	-0.0021 (0.987)	0.0477 (0.720)	-0.2137 (0.101)	1

Note: see Table 1

Table A6: Correlation matrix, controlling for population, income, territory and education

	Fiscal decentralization				Regulatory decentralization			Constitutional decentralization	
	Revenue			Expenditure decentralization	Share of contradicting acts	Log number of contradicting acts	Number of contradicting acts	Regional constitutions	Power-sharing treaties
	Retention rate	Retention rate and transfers	Retention rate and parafiscal funds						
Retention rate	1								
Retention rate and transfers	0.2579** (0.018)	1							
Retention rate and parafiscal funds	0.8358*** (0.000)	-0.0098 (0.929)	1						
Expenditure decentralization	0.1499 (0.173)	-0.1431 (0.200)	0.2775** (0.011)	1					
Share of contradicting acts	-0.0753 (0.496)	0.2060* (0.060)	-0.0838 (0.449)	0.0084 (0.920)	1				
Log number of contradicting acts	-0.0550 (0.619)	0.1267 (0.251)	-0.1189 (0.281)	-0.0466 (0.674)	0.7361*** (0.000)	1			
Number of contradicting acts	-0.0510 (0.645)	0.0987 (0.327)	-0.0948 (0.391)	0.0182 (0.870)	0.8473*** (0.000)	0.8428*** (0.000)	1		
Regional constitutions	0.0237 (0.832)	0.2188** (0.047)	0.0265 (0.812)	-0.0339 (0.761)	0.2920*** (0.007)	0.1870* (0.091)	0.3401*** (0.002)	1	
Power-sharing treaties	0.1429 (0.221)	-0.0263 (0.823)	0.1859 (0.110)	0.2607** (0.024)	-0.1158 (0.322)	-0.0127 (0.914)	0.0319 (0.786)	-0.0515 (0.663)	1

Note: see Table 1

Table A7: Correlation matrix, controlling for population, income, territory and education, dummy republic, dummy autonomous okrug and distance

	Fiscal decentralization				Regulatory decentralization			Constitutional decentralization	
	Revenue			Expenditure decentralization	Share of contradicting acts	Log number of contradicting acts	Number of contradicting acts	Regional constitutions	Power-sharing treaties
	Retention rate	Retention rate and transfers	Retention rate and parafiscal funds						
Retention rate	1								
Retention rate and transfers	0.2244** (0.044)	1							
Retention rate and parafiscal funds	0.8492*** (0.000)	-0.0171 (0.880)	1						
Expenditure decentralization	0.2685** (0.015)	-0.1759 (0.116)	0.3395*** (0.002)	1					
Share of contradicting acts	-0.1529 (0.173)	0.0385 (0.733)	-0.1008 (0.370)	-0.0184 (0.871)	1				
Log number of contradicting acts	-0.1309 (0.244)	0.0089 (0.937)	-0.1438 (0.200)	0.0919 (0.415)	0.6961*** (0.000)	1			
Number of contradicting acts	-0.1452 (0.196)	-0.0664 (0.556)	-0.1256 (0.264)	0.0080 (0.943)	0.8255*** (0.000)	0.8028*** (0.000)	1		
Regional constitutions	-0.0145 (0.898)	0.1048 (0.355)	0.0283 (0.803)	-0.0600 (0.597)	0.0943 (0.406)	-0.0089 (0.938)	0.1302 (0.250)	1	
Power-sharing treaties	0.1298 (0.274)	-0.0911 (0.443)	0.1794 (0.129)	0.2532** (0.031)	-0.2395** (0.041)	-0.0961 (0.418)	-0.0700 (0.556)	-0.1444 (0.226)	1

Note: see Table 1

Table A8: Index of constitutional decentralization – regional constitutions

Region	Natural resources	International agreements	State of emergency	Branches of federal agencies	Monetary policy	Restrictions on federal law	Interbudgetary relations and customs	Index
Evreyskaia								0
Aginsk Buriat		X					X	2
Chukotka		X						1
Evenk		X						1
Khanty Mansi		X			X			2
Komi-Perm		X	X					2
Koriak		X			X			2
Nenets		X			X			2
Taimyr		X						1
Ust Ordyn Buriat								0
Yamal Nenets		X						1
Moscow (Dity)		X						1
St. Petersburg			X					1
Altai (Krai)	X	X			X			3
Khabarovsk		X					X	2
Krasnodar	X	X					X	3
Krasnoiarsk	X	X						2
Primorski	X	X					X	3
Stavropol	X	X						2
Amur		X						1
Arkhangelsk	X	X						2
Astrakhan	X	X			X		X	4
Belgorod		X			X		X	3
Briansk	X							1
Cheliabinsk		X			X		X	3
Chita	X	X			X			3
Irkutsk		X						1
Ivanovo		X						1
Kaliningrad								0
Kaluga		X						1
Kamchatka	X	X						2
Kemerovo	X	X	X				X	4
Kirov		X				X		2
Kostroma	X	X						2
Kurgan		X			X	X		3
Kursk		X						1
Leningradskaia		X						1
Lipetsk		X					X	2
Magadan	X	X						2
Moscow (Obl.)		X			X			2
Murmansk								0
Nizhny Novgorod		X						1
Novgorod		X					X	2
Novosibirsk	X	X			X			3
Omsk		X			X			2
Orel		X						1
Orenburg	X	X			X			3
Penza	X	X			X			3
Perm		X						1
Pskov	X							1
Rostov		X						1
Riazan	X	X						2
Sakhalin	X	X						2
Samara	X	X						2
Saratov	X	X				X	X	4
Smolensk	X	X					X	3
Sverdlovsk	X	X			X		X	4
Tambov	X	X			X		X	4
Tomsk	X	X			X		X	4
Tula	X	X					X	3
Tver	X	X			X			3
Tiumen		X						1
Ulianovsk		X					X	2
Vladimir								NA
Volgograd		X	X		X			3
Vologda								0
Voronezh		X					X	2
Yaroslavl								0
Adygeia	X	X	X			X		4
Altai (Rep.)	X	X						2
Bashkortostan	X	X	X		X		X	5
Buriatia	X	X	X					3
Chuvashia	X	X	X					3
Dagestan	X	X	X	X		X		5
Ingushetia	X	X	X			X		4
Kabardino-Balkaria	X					X		2
Kalmykiya	X					X		2
Karachaevo-Cherkessia	X	X						2
Karelia	X	X	X					3
Khakassia			X					1
Komi		X	X			X		3
Mariy El		X				X		2
Mordovia		X						1
Northern Ossetia	X	X	X			X		4

Region	Natural resources	International agreements	State of emergency	Branches of federal agencies	Monetary policy	Restrictions on federal law	Interbudgetary relations and customs	Index
Sakha	X	X	X		X	X	X	6
Tatarstan	X	X	X		X	X		5
Tyva	X	X	X		X	X	X	6
Udmurtia	X		X					2

Notes: the dimensions include:

(1) property on natural resources (regions, in spite of the federal regulation, declare natural resources – mostly mineral – their possession or take over the right to regulate the resources access regime); any claim on natural resources as property or estate (“dostoyanie”) of the peoples of the region is counted as “X”, as well as any official claims of the right of regional government to monitor and control the resource use and any restrictions on resource use against the interests of the regional population.

(2) international agreements (regions, in spite of the federal regulation, declare their right to sign international agreements with other countries independently from the Russian Federation); any claim of the region to be an independent subject of international or external economic relations, as well as its right to sign international agreements is counted as “X”.

(3) state of emergency (the region takes over the right to declare the state of emergency, or restricts the right of the federation to declare the state of emergency on its territory);

(4) restrictions on regional branches of federal government (this feature applies basically to one region, Dagestan, which restricts the right of federal agencies to establish their local branches on its territory by requiring a special agreement);

(5) independent monetary policy; any claim of the region to implement its own monetary policy is counted as “X”, as well as existence of the regional National bank.

(6) restrictions on validity of federal acts (the region requires federal acts to be ratified by the regional legislature; declares its right to (temporary) put federal law out of action; declares the priority of regional law at least in the area of shared responsibility of the federation and the region and / or reserves the right to take over the federal responsibilities if the federation does not implement them); any restrictions on federal law (including the right of the regional government to put it out of effect in several cases) are counted as “X”.

(7) special regime of interbudgetary relations (Bashkortostan and Sakha reserve their right to determine the share of the federation in the over tax revenue from the region; Tyva maintains its own customs service); independent customs policy; right of the region to request compensation from the federal government for its actions influencing the region; requirement to negotiate the split of federal taxes between budgets of the region and the federation are counted as “X”.

Table A9: Index of constitutional decentralization – power sharing treaties

Region	Alternative conscription	Law enforcement and migration	Power of pardon	Monetary policy	Tax control & budget	Natural resources	Conversion	Internationa l relations, trade and customs	Federal staff co- work	Priority rules	Index
Amur	0	1	0	0	2	1	0	2	1	1	8
Cheliabinsk	1	0	0	0	2	1	1	2	1	1	9
Irkutsk	0	0	0	0	2	1	1	2	0	1	6
Ivanovo	1	1	0	0	2	1	0	2	1	1	9
Kaliningrad	0	1	0	0	1	1	0	2	1	0	6
Kirov	0	0	0	0	2	1	1	2	1	1	8
Leningradskaia	0	0	0	0	2	1	0	2	1	1	7
Magadan	0	1	0	0	2	1	0	2	1	1	8
Moscow City	1	1	0	0	2	1	1	2	1	1	10
Murmansk	0	1	0	0	2	1	1	2	1	1	9
Nizhniy Novgorod	0	0	0	0	2	1	1	2	1	1	8
Omsk	0	1	0	0	2	1	1	2	0	1	7
Orenburg	0	1	0	0	0	0	1	0	0	0	2
Perm	1	0	0	0	2	1	1	2	1	1	9
Rostov	0	1	0	0	2	1	1	2	1	1	9
Sakhalin	0	1	0	0	2	1	0	2	1	1	8
Samara	0	0	0	0	2	1	1	2	1	1	8
Saratov	1	0	0	0	2	1	1	2	1	1	9
St. Petersburg	0	0	0	0	2	1	1	2	1	1	8
Sverdlovsk	1	1	0	0	2	1	1	2	1	1	10
Tver	1	0	0	0	2	1	0	2	1	0	7
Ulianovsk	0	1	0	0	2	1	0	2	1	1	8
Vologda	0	0	0	0	2	1	1	2	1	1	8
Voronezh	1	0	0	0	2	1	1	2	1	1	9
Briansk	1	0	0	0	2	1	1	2	1	1	9
Astrakhan	1	1	0	0	2	1	0	2	1	1	9
Yaroslavl	0	0	0	0	2	1	0	2	1	1	7
Kostroma	1	1	0	0	1	2	0	2	1	1	9
Altai (Krai)	1	0	0	0	2	1	0	2	0	0	6
Khabarovsk	0	0	0	0	2	1	1	1	1	1	7
Krasnodar	0	1	0	0	2	1	0	1	0	0	5
Krasnoyarsk	0	1	0	0	2	1	1	2	1	1	9
Bashkortostan	2	2	2	1	2	2	1	2	0	0	14
Buriatia	0	0	0	0	0	1	0	0	0	0	1
Chuvashia	0	0	0	0	2	1	1	2	1	1	8
Kabardino- Balkaria	2	2	0	1	2	2	0	2	1	0	12
Komi	0	2	0	0	2	1	0	2	0	0	7
Mariy El	0	1	0	0	2	1	1	2	1	1	9
Northern Ossetia	0	2	0	1	2	2	1	2	0	0	10
Sakha	0	1	0	0	2	1	0	2	1	0	7
Tatarstan	2	1	2	1	2	2	2	2	1	0	15
Udmurtia	0	1	0	0	0	1	1	1	1	0	5

Notes: 2 = sole responsibility of the region, 1 = joint responsibility of the region and of the federal government. The dimensions include (1) the right of the region to regulate alternative conscription (in many cases used as a legal tool to avoid the draft to the Russian military forces for the region's population); (2) control over law enforcement agencies and migration; (3) power of pardon; (4) control over monetary policy; (5) control over regional taxes and budget; (6) control over natural resources (including oversight over the federal resources); (7) control over the conversion process for the military enterprises; (8) control over region's international relations and customs; (9) co-work of the regional administration by the appointments of the federal staff in the region and (10) priority rules, which include explicit rules allowing the regional government to declare federal acts null and void and the regulation automatically extending any general improvement of the status of the regions through the federal law beyond the treaty rules on the region signing the treaty. Data include the main treaty and (when possible) supplementary treaties. Table includes only regions with a treaty: regions without a treaty excluded; autonomous okrugs excluded

APPENDIX B: WITH AND WITHOUT REPUBLICS

Table B1: Determinants of fiscal decentralization, 1995-1999, the sample of republics

	(B1) OLS	(B2) OLS	(B3) OLS	(B4) OLS	(B5) OLS	(B6) OLS	(B7) OLS	(B8) OLS
	Retention rate	Retention rate	Retention rate and transfers	Retention rate and transfers	Expenditure decentrali- zation	Expenditure decentrali- zation	Retention rate and non- budget funds	Retention rate and non- budget funds
Territory	-0.089 (0.227)	0.331 (0.295)	-0.700 (0.603)	0.152 (1.187)	0.096 (0.074)	0.127 (0.084)	-0.140 (0.198)	0.003 (0.169)
Population	-0.007 (0.197)	0.108 (0.157)	0.627 (0.833)	0.603 (0.856)	0.038 (0.024)	0.032 (0.032)	0.115 (0.137)	0.053 (0.156)
Oil and gas	-2.497 (4.944)	-1.771 (2.530)	-6.276 (15.873)	0.159 (14.057)	2.936** (0.976)	0.972 (1.519)	-0.285 (5.153)	0.54 (4.156)
Income per capita	-0.027 (0.383)		0.988 (1.227)		-0.125 (0.118)		0.174 (0.247)	
Distance from average income		-1.309 (0.909)		-1.259 (2.594)		-0.276 (0.232)		-0.061 (0.153)
Share of Russians	0.041 (0.333)	-0.100 (0.308)	-1.277 (1.372)	-1.032 (1.299)	0.095 (0.105)	-0.051 (0.112)	0.241 (0.230)	0.287 (0.201)
Distance from Moscow	0.043 (0.054)	-0.014 (0.051)	0.173 (0.155)	0.095 (0.254)	0.002 (0.014)	-0.010 (0.012)	-0.009 (0.040)	-0.007 (0.049)
Dummy border region non-CIS	0.001 (0.157)	0.038 (0.109)	0.130 (0.574)	0.281 (0.598)	-0.024 (0.051)	-0.074** (0.033)	-0.023 (0.097)	0.005 (0.089)
Dummy border region CIS	0.012 (0.167)	0.070 (0.154)	0.167 (0.523)	0.287 (0.512)	-0.010 (0.045)	-0.046 (0.039)	-0.080 (0.124)	-0.034 (0.098)
Urbanization	4.024 (5.985)	0.405 (6.969)	-27.286 (18.016)	-21.064 (15.939)	0.962 (1.889)	-1.539 (2.004)	5.662 (3.170)	8.256** (3.110)
Fiscal transfers	0.016 (0.451)	-0.137 (0.527)			-0.079 (0.134)	-0.023 (0.089)	0.522** (0.193)	0.408** (0.172)
Retail trade	0.095 (0.197)	-0.011 (0.119)	0.008 (0.558)	-0.040 (0.603)			0.011 (0.140)	0.044 (0.140)
Net profit	0.000 (0.020)	-0.020 (0.026)	-0.125* (0.056)	-0.140* (0.070)			0.009 (0.008)	0.009 (0.007)
Constant	0.239 (0.356)	1.233 (0.879)	2.736** (1.046)	3.395 (2.088)	0.799*** (0.137)	1.047*** (0.200)	-0.085 (0.218)	-0.122 (0.239)
Observations	20	20	20	20	20	20	20	20
R²	0.61	0.693	0.716	0.697	0.804	0.827	0.85	0.839
J.-B. test	1.481	0.659	0.227	0.290	0.836	1.626	1.005	2.996

Notes: see Table 2

Table B2: Determinants of regulatory and constitutional decentralization, 1995-1999, the sample of republics

	Regulatory decentralization						Constitutional decentralization			
	(B9) OLS	(B10) OLS	(B11) OLS	(B12) OLS	(B13) Negative binomial	(B14) Negative binomial	(B15) Ordered logit	(B16) Ordered logit	(B17) Tobit	(B18) Tobit
	Share of acts	Share of acts	Log number	Log number	Number of acts	Number of acts	Consti- tutions	Consti- tutions	Treaties	Treaties
Territory	0.054 (0.047)	-0.006 (0.065)	0.029 (0.740)	0.546 (0.672)	0.078 (0.517)	0.461 (0.474)	2.941 (2.004)	6.197 (8.768)	5.823 (5.037)	5.297 (8.641)
Population	-0.023 (0.016)	-0.015 (0.012)	-0.205 (0.194)	-0.258 (0.189)	-0.242** (0.109)	-0.272** (0.117)	0.507 (0.760)	0.169 (0.588)	3.437 (2.407)	2.571 (2.897)
Oil and gas	1.390 (1.047)	1.431 (1.283)	6.873 (10.813)	4.607 (12.175)	6.699 (5.314)	4.445 (7.246)	185.647** (91.863)	214.897** (109.368)	-51.937 (148.363)	-66.535 (154.282)
Income per capita	-0.046 (0.092)		0.186 (1.554)		0.100 (1.146)		4.088 (3.606)		-16.097* (8.851)	
Distance from average income		0.147 (0.253)		-1.585 (2.227)		-1.212 (1.566)		-0.026 (7.759)		-24.939 (28.414)
Share of Russians	0.060 (0.061)	0.062 (0.060)	-0.062 (0.693)	-0.192 (0.589)	-0.068 (0.477)	-0.163 (0.362)	-23.869 (16.431)	-22.348 (16.999)	-20.556* (10.702)	-27.108** (9.730)
Distance from Moscow	-0.004 (0.011)	0.002 (0.011)	0.013 (0.122)	-0.048 (0.128)	-0.006 (0.065)	-0.053 (0.077)	-0.072 (0.344)	-0.369 (0.783)	0.282 (1.019)	-0.245 (1.583)
Dummy border region non-CIS	0.026 (0.040)	0.022 (0.038)	0.002 (0.421)	0.000 (0.406)	-0.007 (0.236)	-0.006 (0.191)	6.878 (5.747)	7.529 (6.269)	-0.187 (3.668)	-3.195 (3.667)
Dummy border region CIS	0.076* (0.035)	0.066* (0.033)	0.593 (0.432)	0.676 (0.518)	0.531** (0.240)	0.604** (0.304)	-3.833** (1.764)	-3.572** (1.794)	1.902 (6.010)	-1.918 (5.592)
Urbanization	-3.060 (1.768)	3.090* (1.653)	-23.665 (21.124)	-26.287 (20.092)	-19.941 (13.264)	-23.030* (13.922)	150.662** (63.100)	183.734** (79.472)	843.328*** (240.925)	571.240* (304.546)
Fiscal transfers	-0.190* (0.103)	0.175* (0.096)	-0.796 (1.373)	-0.977 (1.523)	-0.618 (0.728)	-0.808 (0.892)	10.791** (4.628)	11.122** (5.126)	-5.191 (14.036)	2.371 (14.47)
Total acts		1.259* (0.554)	1.212* (0.631)	1.321*** (0.364)	1.248*** (0.448)	1.259* (0.554)				
Constant	0.262 (0.197)	-2.914 (5.282)	-1.516 (6.546)	-3.539 (3.391)	-2.118 (4.705)	0.262 (0.197)			-28.825* (14.080)	-10.006 (27.235)
Observations	20	20	20	20	20	20	20	20	20	20
R²	0.627	0.635	0.636	0.652						
Pseudo R²					0.082	0.084	0.497	0.487	0.336	0.308
Wald Chi-test LR proportional odds					448.881***	427.941***				
J.-B. test	1.008	1.157	6.364**	4.870*			30.14	29.96		

Notes: see Table 3. Outlier in regressions (B11) and (B12) is Mariy El; all significant variables hold their sign and significance after exclusion of outliers

Table B3: Determinants of fiscal decentralization, 1995-1999, excluding republics

	(B19) OLS	(B20) OLS	(B21) OLS	(B22) OLS	(B23) OLS	(B24) OLS	(B25) OLS	(B26) OLS
	Retention rate	Retention rate	Retention rate and transfers	Retention rate and transfers	Expenditure decentrali- zation	Expenditure decentrali- zation	Retention rate and non- budget funds	Retention rate and non- budget funds
Territory	0.068** (0.026)	0.066** (0.026)	-0.050 (0.101)	-0.039 (0.096)	0.000 (0.013)	0.000 (0.013)	0.064 (0.048)	0.063 (0.048)
Population	-0.056 (0.048)	-0.055 (0.036)	0.055 (0.287)	0.013 (0.252)	-0.007 (0.008)	-0.007 (0.008)	-0.081 (0.093)	-0.077 (0.083)
Oil and gas	0.016 (0.063)	0.022 (0.063)	-0.501** (0.205)	-0.494** (0.199)	0.121** (0.049)	0.125** (0.048)	-0.155 (0.114)	-0.155 (0.116)
Income per capita	-0.012 (0.034)		0.087 (0.130)		0.002 (0.010)		-0.022 (0.043)	
Distance from average income		-0.016 (0.024)		0.084 (0.130)		0.000 (0.009)		-0.024 (0.041)
Dummy autonomous okrug	-0.030 (0.055)	-0.026 (0.050)	-0.290 (0.271)	-0.286 (0.265)	0.040 (0.036)	0.041 (0.036)	0.039 (0.092)	0.043 (0.095)
Share of Russians	0.147 (0.099)	0.147 (0.095)	0.017 (0.443)	0.010 (0.449)	-0.121 (0.081)	-0.124 (0.081)	0.353** (0.167)	0.344** (0.171)
Distance from Moscow	0.003 (0.003)	0.003 (0.003)	0.050*** (0.018)	0.051*** (0.018)	0.000 (0.003)	0.000 (0.003)	0.004 (0.007)	0.004 (0.007)
Dummy border region non-CIS	0.018 (0.020)	0.018 (0.020)	-0.101 (0.136)	-0.104 (0.138)	0.004 (0.027)	0.003 (0.027)	0.004 (0.031)	0.004 (0.031)
Dummy border region CIS	0.017 (0.016)	0.017 (0.016)	-0.088 (0.064)	-0.088 (0.064)	-0.021 (0.018)	-0.021 (0.018)	0.054* (0.030)	0.053* (0.030)
Urbanization	-0.425 (0.799)	-0.428 (0.722)	-13.491*** (4.318)	-13.151*** (4.228)	-1.151* (0.634)	-1.094* (0.623)	0.843 (1.592)	0.876 (1.592)
Fiscal transfers	-0.012 (0.110)	0.001 (0.112)			-0.255*** (0.060)	-0.257*** (0.058)	-0.264 (0.168)	-0.256 (0.171)
Retail trade	0.014 (0.045)	0.014 (0.033)	-0.269 (0.234)	-0.231 (0.201)			-0.002 (0.081)	-0.004 (0.074)
Net profit	-0.002 (0.001)	-0.002* (0.001)	0.015*** (0.005)	0.014*** (0.005)			0.000 (0.001)	0.000 (0.001)
Constant	0.523*** (0.100)	0.519*** (0.100)	2.164*** (0.490)	2.125*** (0.461)	1.029*** (0.103)	1.030*** (0.103)	0.417* (0.218)	0.408* (0.224)
Observations	68	68	68	68	68	68	68	68
R²	0.600	0.602	0.796	0.797	0.522	0.521	0.440	0.441
J.-B. test	15.79***	15.55**	78.79***	81.49***	14.79***	14.93***	17.42***	16.92***

Notes: see Table 2. Outliers in regressions (B19) and (B20) are Taimyr, Aginsk Buriatski, Lipetsk and Vologda; in (B21) and (B22) Evenkia and Ust Ordyn Buriatski, in (B24) and (B25) Briansk, Rostov, Tula and

Novosibirsk, in (B26) and (B27) Taimyr and Tomsk. After exclusion of outliers in regressions (B24) and (B25) urbanization becomes insignificant, but holds its sign, dummy border region CIS in regressions (B26) ad (B27) becomes insignificant, but holds its sign.

Table B4: Determinants of regulatory and constitutional decentralization, 1995-1999, excluding republics

	Regulatory decentralization						Constitutional decentralization			
	(B27) OLS	(B28) OLS	(B29) OLS	(B30) OLS	(B31) Negative binomial	(B32) Negative binomial	(B33) Ordered logit	(B34) Ordered logit	(B35) Tobit	(B36) Tobit
	Share of acts	Share of acts	Log number	Log number	Number of acts	Number of acts	Consti- tutions	Consti- tutions	Treaties	Treaties
Territory	-0.007 (0.013)	-0.009 (0.013)	0.051 (0.131)	0.037 (0.130)	0.068 (0.125)	0.054 (0.122)	-0.666* (0.386)	-0.693* (0.410)	3.874 (2.761)	3.834 (2.753)
Population	0.008 (0.011)	0.010 (0.011)	0.132 (0.099)	0.138 (0.099)	0.154* (0.081)	0.165** (0.078)	0.624 (0.382)	0.671* (0.391)	2.370 (1.572)	2.429 (1.590)
Oil and gas	0.049 (0.057)	0.056 (0.056)	0.425 (0.784)	0.554 (0.803)	0.258 (0.504)	0.317 (0.491)	-0.829 (1.458)	-1.084 (1.535)	-38.563 (52.615)	-38.812 (54.567)
Income per capita	-0.021 (0.014)		-0.029 (0.159)		-0.084 (0.116)		-0.691* (0.370)		-0.896 (2.146)	
Distance from average income		-0.027 (0.017)		-0.097 (0.199)		-0.133 (0.137)		-0.628 (0.481)		-1.164 (2.451)
Dummy autonomous okrug	0.076* (0.038)	0.082** (0.039)	-0.026 (0.369)	0.038 (0.370)	0.182 (0.333)	0.226 (0.327)	0.510 (1.246)	0.441 (1.277)		
Share of Russians	0.037 (0.054)	0.036 (0.053)	-0.191 (0.693)	-0.218 (0.684)	-0.370 (0.524)	-0.396 (0.513)	-1.681 (2.499)	-1.717 (2.520)	-20.676 (12.636)	-20.744 (12.573)
Distance from Moscow	0.007* (0.004)	0.006* (0.003)	0.065** (0.031)	0.066** (0.030)	0.058** (0.023)	0.056*** (0.021)	0.237** (0.105)	0.202** (0.097)	-0.531 (0.455)	-0.569 (0.455)
Dummy border region non-CIS	0.011 (0.031)	0.012 (0.031)	-0.091 (0.229)	-0.100 (0.229)	0.019 (0.227)	0.016 (0.225)	-1.367 (1.054)	-1.261 (1.079)	2.675 (3.249)	2.713 (3.243)
Dummy border region CIS	0.003 (0.013)	0.003 (0.013)	-0.041 (0.269)	-0.047 (0.272)	0.125 (0.137)	0.124 (0.137)	0.120 (0.734)	0.155 (0.733)	3.563* (2.103)	3.578* (2.098)
Urbanization	-0.195 (0.521)	-0.239 (0.506)	-3.223 (8.007)	-2.526 (7.585)	1.300 (5.028)	1.478 (4.935)	-17.065 (24.08)	-21.943 (24.755)	272.648** (112.606)	269.810** (107.294)
Fiscal transfers	0.016 (0.057)	0.039 (0.055)	0.444 (0.707)	0.486 (0.698)	0.549 (0.530)	0.658 (0.498)	-3.357 (2.829)	-2.657 (2.717)	6.030 (11.479)	6.921 (11.783)
Total acts			0.388** (0.190)	0.413** (0.191)	0.439** (0.200)	0.459** (0.199)				
Constant	0.058 (0.060)	0.051 (0.061)	2.319 (1.455)	2.099 (1.460)	1.823 (1.583)	1.634 (1.588)			-1.463 (14.142)	-1.626 (14.139)
Observations	68	68	68	68	68	68	68	67	59	59
R²	0.441	0.313	0.321	0.138						
Pseudo R²					0.025	0.025	0.069	0.066	0.074	0.074
Wald Chi-stat					2669.537***	2659.325***				
LR proportional odds							50.65**	45.60**		
J.-B. test	33.47***	31.53***	1260***	1282***						

Notes: see Table 3. Outlier in regression (B27) and (B28) is Primorski, in regression (B29) and (B30) Saratov. After exclusion of outliers distance from Moscow in regression (B27) and (B28) becomes insignificant, but holds its sign.

APPENDIX C: INSTITUTIONAL DETERMINANTS OF DECENTRALIZATION

Table C1: Determinants of fiscal decentralization, 1995-1999, dep.var.: retention rate, controlling for income per capita

	(C1) OLS	(C2) OLS	(C3) OLS	(C4) OLS	(C5) OLS	(C6) OLS	(C7) OLS	(C8) OLS	(C9) OLS	(C10) OLS	(C11) OLS	(C12) OLS	(C13) OLS
Territory	0.036** (0.016)	0.042** (0.018)	0.035** (0.016)	0.028 (0.018)	0.049** (0.020)	0.046** (0.018)	0.039** (0.018)	0.039*** (0.015)	0.039* (0.021)	0.054*** (0.016)	0.066*** (0.020)	0.041** (0.018)	0.038** (0.018)
Population	-0.118 (0.081)	-0.114 (0.079)	-0.123 (0.080)	-0.075 (0.092)	-0.100 (0.078)	-0.095 (0.072)	-0.117 (0.081)	0.010 (0.038)	-0.064 (0.098)	0.015 (0.062)	0.095 (0.078)	-0.080 (0.103)	-0.085 (0.104)
Oil and gas	0.102 (0.100)	0.113 (0.097)	0.097 (0.092)	-0.260 (0.297)	0.115 (0.096)	0.111 (0.095)	0.103 (0.100)	0.116 (0.079)	0.308** (0.134)	0.066 (0.086)	0.048 (0.113)		
Income per capita	-0.096* (0.050)	-0.094* (0.049)	-0.097* (0.049)	-0.020 (0.067)	-0.091* (0.049)	-0.087* (0.047)	-0.090* (0.049)	-0.025 (0.046)	-0.020 (0.070)	-0.002 (0.069)	0.028 (0.084)	-0.075 (0.072)	-0.079 (0.073)
Dummy autonomous okrug	0.093 (0.085)	0.093 (0.086)	0.095 (0.087)	0.060 (0.105)	0.089 (0.083)	0.099 (0.086)	0.075 (0.086)	-0.078** (0.039)					
Dummy republic	0.038 (0.026)	0.044 (0.027)	0.04 (0.027)	0.040 (0.029)	0.046* (0.027)	0.046* (0.027)	0.013 (0.043)	0.058* (0.029)	0.054* (0.027)	0.138** (0.051)	0.119* (0.059)	0.052* (0.028)	0.050* (0.027)
Distance from Moscow	0.009** (0.004)	0.010** (0.005)	0.010** (0.004)	0.007 (0.004)	0.012** (0.005)	0.012** (0.005)	0.010** (0.005)	0.006 (0.004)	0.008 (0.005)	-0.002 (0.005)	-0.004 (0.005)	0.007* (0.004)	0.007 (0.004)
Dummy border region non-CIS	0.005 (0.029)	0.005 (0.029)	0.007 (0.030)	0.031 (0.025)	0.002 (0.029)	0.001 (0.030)	0.003 (0.029)	0.004 (0.040)	0.019 (0.028)	0.055 (0.039)	0.019 (0.040)	0.019 (0.028)	0.017 (0.029)
Dummy border region CIS	0.001 (0.024)	-0.003 (0.024)	-0.001 (0.025)	-0.004 (0.025)	-0.009 (0.025)	-0.003 (0.024)	-0.002 (0.025)	0.011 (0.016)	0.000 (0.022)	0.036** (0.017)	0.033 (0.021)	0.014 (0.021)	0.015 (0.021)
Urbanization	1.225 (1.117)	1.345 (1.100)	1.243 (1.141)	-0.021 (1.062)	1.219 (1.012)	1.357 (1.080)	0.949 (1.233)	2.418 (1.561)	1.983 (1.235)	0.649 (1.035)	2.159* (1.230)	1.681 (1.329)	1.665 (1.321)
Fiscal transfers	-0.105 (0.133)	-0.113 (0.134)	-0.111 (0.132)	-0.102 (0.124)	-0.155 (0.132)	-0.14 (0.129)	-0.109 (0.138)	-0.08 (0.086)	-0.057 (0.139)	0.255 (0.165)	0.247 (0.165)	-0.060 (0.121)	-0.056 (0.121)
Retail trade	0.103 (0.087)	0.099 (0.085)	0.108 (0.086)	0.075 (0.093)	0.086 (0.084)	0.084 (0.078)	0.104 (0.086)	-0.022 (0.030)	0.067 (0.095)	-0.003 (0.056)	-0.065 (0.063)	0.075 (0.101)	0.077 (0.102)
Net profit	-0.003 (0.002)	-0.003 (0.002)	-0.003 (0.002)	-0.006* (0.004)	-0.003 (0.002)	-0.003 (0.002)	-0.003* (0.002)	-0.002 (0.003)	-0.007* (0.004)	-0.004 (0.004)	-0.004 (0.005)	-0.003 (0.003)	-0.002 (0.003)
Democracy	-0.003 (0.002)	-0.002 (0.002)	-0.003 (0.002)	-0.001 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.004** (0.002)	-0.003 (0.002)	-0.002 (0.002)	-0.003 (0.002)	-0.003 (0.002)	-0.003 (0.002)
Power (Jarocinska)		-0.019 (0.014)			-0.046* (0.024)	-0.045 (0.030)	-0.020 (0.014)	-0.010 (0.012)	-0.024* (0.014)	0.003 (0.014)	-0.002 (0.015)		
Power (RUIE)			-0.015 (0.015)										
Power (UI)				-0.005 (0.009)									
Tension (RUIE)					0.025 (0.016)								
Tension (MFK)						0.013 (0.013)							
Declarations							0.031 (0.031)						
Regulatory capture								-0.032 (0.058)					
Industrial concentration									0.001 (0.001)				
TI perceived										-0.133** (0.047)			
TI real											-0.094** (0.039)		
Resources I												0.002 (0.008)	
Resources II													0.000 (0.001)
Constant	0.543*** (0.133)	0.659*** (0.148)	0.582*** (0.123)	0.601*** (0.134)	0.822*** (0.161)	0.809*** (0.181)	0.607*** (0.157)	0.713*** (0.112)	0.638*** (0.144)	0.635*** (0.158)	0.624*** (0.159)	0.435*** (0.156)	0.453*** (0.145)
Observations	88	88	88	81	88	88	88	73	79	40	40	78	78
R²	0.331	0.343	0.34	0.298	0.358	0.354	0.35	0.49	0.337	0.755	0.714	0.254	0.254
J.-B. test	70.28***	62.11***	51.47***	111.3***	55.12***	50.87***	66.51***	1.566	84.49***	1.256	5.256*	66.7***	68.43***

Note: see Table 2. Outliers in regression (C1), (C3), (C7) are Ingushetia, Kalmykia, Altai Rep. and Aginsk Buriatski, in (C2) Ingushetia, Kalmykia, Altai Rep., Aginsk Buriatski, Vologda, Taimyr, Tatarstan and Bashkortostan, in (C4) Ingushetia, Kalmykia, Aginsk Buriatski, Tatarstan, Bashkortostan and Vologda, in (C5) Ingushetia, Kalmykia, Altai Rep., Aginsk Buriatski, Tatarstan, Taimyr, Bashkortostan, Vologda and Kemerovo, in (C6) Tatarstan, Ingushetia, Kalmykia., Altai Republic and Aginsk Buriatski, in (C9) Ingushetia and Kalmykia, in (C11) Udmurtia, in (C12) and (C13) Kalmykia, Ingushetia, Altai Rep., Tatarstan and Bashkortostan. After exclusion of outliers average income per capita in (C2) becomes insignificant and changes its sign, in (C5) distance from Moscow and dummy republic lose their significance, but keep their sign, and power (Jarocinska) and income per capita are not significant and change their sign, in (C6) dummy republic and income per capita lose their significance, but keep their sign, in (C9) net profit and power (Jarocinska) become insignificant, but keep their signs, in (C11) urbanization becomes insignificant, but keeps its sign, in (C12) dummy republic and distance become insignificant, but keep their sign, in (C13) dummy republic becomes insignificant, but keeps its sign.

Table C2: Determinants of fiscal decentralization, 1995-1999, dep.var.: retention rate, controlling for distance from average income

	(C14) OLS	(C15) OLS	(C16) OLS	(C17) OLS	(C18) OLS	(C19) OLS	(C20) OLS	(C21) OLS	(C22) OLS	(C23) OLS	(C24) OLS	(C25) OLS	(C26) OLS
Territory	0.031* (0.016)	0.038** (0.017)	0.031* (0.016)	0.025 (0.017)	0.045** (0.019)	0.043** (0.017)	0.035** (0.017)	0.039*** (0.014)	0.038** (0.018)	0.051** (0.019)	0.062** (0.022)	0.039** (0.018)	0.035* (0.018)
Population	-0.085 (0.062)	-0.083 (0.060)	-0.089 (0.062)	-0.087 (0.074)	-0.069 (0.058)	-0.066 (0.054)	-0.087 (0.062)	0.006 (0.033)	-0.075 (0.083)	0.008 (0.047)	0.069 (0.059)	-0.06 (0.078)	-0.062 (0.079)
Oil and gas	0.108 (0.090)	0.124 (0.088)	0.102 (0.084)	0.027 (0.308)	0.129 (0.088)	0.124 (0.087)	0.115 (0.091)	0.068 (0.083)	0.225** (0.108)	0.041 (0.116)	0.017 (0.139)		
Distance from average income	-0.106** (0.045)	-0.107** (0.044)	-0.107** (0.044)	-0.072 (0.063)	-0.107** (0.043)	-0.102** (0.041)	-0.103** (0.044)	-0.059 (0.043)	-0.077 (0.077)	-0.022 (0.076)	-0.008 (0.083)	-0.095 (0.070)	-0.095 (0.071)
Dummy autonomous okrug	0.105 (0.082)	0.108 (0.083)	0.107 (0.084)	0.048 (0.105)	0.105 (0.080)	0.115 (0.084)	0.091 (0.084)	-0.051 (0.036)					
Dummy republic	0.039 (0.026)	0.047* (0.026)	0.041 (0.027)	0.041 (0.027)	0.049* (0.027)	0.049* (0.027)	0.018 (0.043)	0.062** (0.028)	0.056** (0.027)	0.136** (0.052)	0.116* (0.061)	0.053* (0.028)	0.052* (0.027)
Distance from Moscow	0.006 (0.004)	0.008* (0.004)	0.007 (0.004)	0.007 (0.004)	0.009** (0.004)	0.009** (0.004)	0.007* (0.004)	0.005 (0.004)	0.007 (0.005)	-0.003 (0.006)	-0.004 (0.006)	0.005 (0.004)	0.005 (0.004)
Dummy border region CIS	0.008 (0.029)	0.008 (0.029)	0.01 (0.030)	0.027 (0.026)	0.004 (0.028)	0.003 (0.030)	0.006 (0.029)	0.002 (0.039)	0.016 (0.030)	0.059 (0.039)	0.025 (0.041)	0.018 (0.029)	0.016 (0.029)
Dummy border region non-CIS	0.001 (0.024)	-0.003 (0.024)	-0.001 (0.024)	-0.004 (0.025)	-0.01 (0.024)	-0.004 (0.024)	-0.003 (0.024)	0.012 (0.016)	0.001 (0.022)	0.038** (0.017)	0.034 (0.021)	0.013 (0.021)	0.014 (0.021)
Urbanization	1.047 (1.094)	1.21 (1.077)	1.056 (1.114)	-0.021 (1.068)	1.101 (0.988)	1.260 (1.051)	0.854 (1.203)	2.533* (1.477)	2.122* (1.195)	0.742 (0.912)	2.381* (1.214)	1.443 (1.388)	1.384 (1.375)
Fiscal transfers	-0.040 (0.132)	-0.048 (0.132)	-0.045 (0.130)	-0.048 (0.130)	-0.094 (0.129)	-0.079 (0.125)	-0.047 (0.137)	-0.046 (0.085)	-0.024 (0.139)	0.276 (0.167)	0.279* (0.157)	-0.004 (0.125)	-0.003 (0.123)
Retail trade	0.079 (0.070)	0.076 (0.067)	0.084 (0.069)	0.082 (0.078)	0.064 (0.066)	0.064 (0.061)	0.082 (0.069)	-0.02 (0.025)	0.071 (0.082)	0.001 (0.042)	-0.046 (0.047)	0.059 (0.080)	0.06 (0.081)
Net profit	-0.003* (0.002)	-0.002 (0.002)	-0.003* (0.001)	-0.004 (0.003)	-0.002 (0.001)	-0.002 (0.002)	-0.003* (0.001)	-0.001 (0.003)	-0.004 (0.004)	-0.003 (0.005)	-0.002 (0.005)	-0.002 (0.002)	-0.002 (0.002)
Democracy	-0.003 (0.002)	-0.003 (0.002)	-0.004* (0.002)	-0.002 (0.002)	-0.003 (0.002)	-0.003 (0.002)	-0.003 (0.002)	-0.005** (0.002)	-0.003 (0.002)	-0.002 (0.002)	-0.003 (0.002)	-0.003 (0.002)	-0.003 (0.002)
Power (Jarocinska)		-0.022 (0.014)			-0.052** (0.024)	-0.049* (0.029)	-0.023* (0.014)	-0.013 (0.012)	-0.027* (0.015)	0.003 (0.013)	-0.001 (0.014)		
Power (RUIE)			-0.014 (0.015)										
Power (UI)				-0.007 (0.009)									
Tensions (RUIE)					0.028* (0.016)								
Tensions (MFK)						0.014 (0.013)							
Declarations							0.029 (0.031)						
Regulatory capture								-0.040 (0.058)					
Industrial concentration									0.001 (0.001)				
TI perceived										-0.133** (0.047)			
TI real											-0.092** (0.039)		
Resources I												0.005 (0.009)	
Resources II													0.000 (0.001)
Constant	0.559*** (0.121)	0.690*** (0.132)	0.597*** (0.111)	0.597*** (0.125)	0.867*** (0.147)	0.843*** (0.166)	0.639*** (0.140)	0.728*** (0.111)	0.659*** (0.141)	0.632*** (0.128)	0.595*** (0.136)	0.426*** (0.156)	0.453*** (0.139)
Observations	88	88	88	81	88	88	88	73	79	40	40	78	78
R²	0.354	0.369	0.362	0.314	0.388	0.382	0.376	0.499	0.349	0.756	0.712	0.268	0.266
J.-B. test	53.64***	44.31***	39.54***	96.73***	37.45***	37.54***	47.56***	1.692	66.34***	1.01	4.277	49.62***	51.58***

Notes: see Table 2. Outliers are Ingushetia, Kalmykia, Altai Rep. and Aginsk Buriatski in (C14), (C15), (C16), (C18), (C19), (C20), Ingushetia, Kalmykia and Aginsk Buriatski in (C17), Ingushetia and Kalmykia in (C22), Kalmykia, Ingushetia, Altai Rep. and Tatarstan in (C25) and (C26). After exclusion of outliers in (C14) and (C16) net profit becomes insignificant, but keeps its sign, in (C18) power (Jarocinska) and tensions (RUIE) become insignificant, but keep their signs, in (C19) power (Jarocinska) becomes insignificant, but keeps its sign, in (C20) power (Jarocinska) and net profit become insignificant, but keep their signs, in (C22) power (Jarocinska), urbanization and oil and gas variable become insignificant, but maintain their signs, in (C25) and (C26) dummy republic becomes insignificant, but keeps its sign.

Table C3: Determinants of fiscal decentralization, 1995-1999, dep.var.: retention rate including fiscal transfers, controlling for income per capita

	(C27) OLS	(C28) OLS	(C29) OLS	(C30) OLS	(C31) OLS	(C32) OLS	(C33) OLS	(C34) OLS	(C35) OLS	(C36) OLS	(C37) OLS	(C38) OLS	(C39) OLS
Territory	-0.083 (0.062)	-0.084 (0.067)	-0.083 (0.062)	-0.057 (0.076)	-0.036 (0.061)	-0.066 (0.052)	-0.08 (0.064)	-0.09 (0.076)	-0.09 (0.088)	0.054 (0.042)	0.067 (0.044)	-0.106 (0.071)	-0.1 (0.073)
Population	-0.058 (0.287)	-0.059 (0.286)	-0.067 (0.292)	0.091 (0.411)	0.007 (0.328)	-0.004 (0.368)	-0.054 (0.295)	0.201 (0.531)	0.061 (0.449)	0.115 (0.184)	0.089 (0.188)	0.032 (0.373)	0.04 (0.370)
Oil and gas	-0.409 (0.261)	-0.411 (0.266)	-0.415 (0.256)	-2.065 (1.716)	-0.387 (0.264)	-0.412 (0.267)	-0.395 (0.272)	-0.063 (0.415)	-0.009 (0.500)	0.245 (0.178)	0.272 (0.191)		
Income per capita	-0.015 (0.180)	-0.015 (0.179)	-0.017 (0.181)	0.171 (0.342)	-0.004 (0.182)	0.004 (0.203)	-0.022 (0.173)	0.198 (0.438)	0.184 (0.419)	0.267 (0.157)	0.248 (0.164)	0.088 (0.287)	0.094 (0.286)
Dummy autonomous okrug	0.074 (0.293)	0.074 (0.296)	0.079 (0.299)	0.344 (0.490)	0.074 (0.289)	0.098 (0.296)	0.103 (0.341)	-0.369 (0.342)					
Dummy republic	0.118 (0.132)	0.117 (0.130)	0.121 (0.135)	0.126 (0.125)	0.119 (0.128)	0.119 (0.130)	0.166 (0.302)	0.218* (0.123)	0.192* (0.112)	0.147** (0.064)	0.149* (0.073)	0.257** (0.109)	0.257** (0.106)
Distance from Moscow	0.058*** (0.017)	0.057*** (0.017)	0.058*** (0.017)	0.041** (0.018)	0.061*** (0.019)	0.060*** (0.021)	0.058*** (0.018)	0.036** (0.015)	0.038** (0.015)	0.024** (0.012)	0.024* (0.012)	0.043*** (0.015)	0.043*** (0.015)
Dummy border region non-CIS	-0.025 (0.135)	-0.025 (0.136)	-0.021 (0.137)	0.072 (0.129)	-0.045 (0.141)	-0.04 (0.146)	-0.022 (0.136)	0.022 (0.119)	0.049 (0.120)	-0.041 (0.070)	-0.054 (0.063)	0.065 (0.111)	0.069 (0.114)
Dummy border region CIS	0.033 (0.095)	0.034 (0.097)	0.031 (0.095)	0.037 (0.090)	0.000 (0.086)	0.032 (0.095)	0.032 (0.094)	0.098 (0.074)	0.084 (0.071)	0.038 (0.053)	0.026 (0.050)	0.110 (0.070)	0.108 (0.071)
Urbanization	-13.545** (6.336)	-13.576** (6.511)	-13.486** (6.387)	-14.979* (8.360)	-13.431** (6.075)	-13.245** (6.317)	-12.941** (5.791)	-7.994 (8.491)	-7.470 (8.921)	-3.258 (3.306)	-3.129 (3.709)	-8.416 (6.714)	-8.343 (6.712)
Retail trade	-0.065 (0.223)	-0.064 (0.222)	-0.056 (0.230)	-0.170 (0.290)	-0.112 (0.242)	-0.102 (0.265)	-0.072 (0.231)	-0.251 (0.404)	-0.144 (0.314)	-0.146 (0.138)	-0.134 (0.134)	-0.103 (0.264)	-0.108 (0.265)
Net profits	0.008 (0.007)	0.008 (0.007)	0.009 (0.007)	-0.002 (0.020)	0.008 (0.007)	0.008 (0.008)	0.009 (0.006)	-0.004 (0.020)	-0.007 (0.022)	-0.016* (0.008)	-0.015* (0.009)	-0.002 (0.012)	-0.003 (0.011)
Democracy	-0.005 (0.008)	-0.005 (0.008)	-0.006 (0.007)	-0.003 (0.008)	-0.003 (0.008)	-0.004 (0.008)	-0.005 (0.008)	-0.007 (0.007)	-0.007 (0.009)	-0.002 (0.004)	-0.002 (0.004)		
Power (Jarocinska)		0.004 (0.045)			-0.133 (0.119)	-0.072 (0.139)	0.006 (0.047)	0.023 (0.050)	0.029 (0.052)	-0.051 (0.039)	-0.049 (0.042)		
Power (RUIE)			-0.023 (0.047)										
Power (UI)				0.073 (0.061)									
Tensions (RUIE)					0.127 (0.114)								
Tensions (MFK)						0.039 (0.077)							
Declarations							-0.049 (0.194)						
Regulatory capture								-0.283 (0.231)					
Industrial concentration									-0.002 (0.002)				
TI perceived										-0.081 (0.086)			
TI real											0.030 (0.073)		
Resources I												-0.010 (0.028)	
Resources II													0.000 (0.003)
Constant	2.003*** (0.395)	1.980*** (0.376)	2.059*** (0.402)	1.923*** (0.452)	2.648*** (0.738)	2.361*** (0.857)	2.058*** (0.519)	1.623*** (0.436)	1.442*** (0.388)	1.490*** (0.283)	1.421*** (0.271)	1.504** (0.593)	1.459** (0.575)
Observations	88	88	88	81	88	88	88	73	79	40	40	78	78
R²	0.623	0.623	0.624	0.649	0.636	0.626	0.624	0.464	0.495	0.717	0.711	0.468	0.467
J.-B. test	561.4***	559.8***	556.4***	368***	461***	525***	523.6***	2223***	1541***	0.985	1.412	1493***	1496***

Notes: see Table 2. Outliers are Ust Ordyn Buriatski, Evenkia, Tyva and Dagestan in regressions (C27)- (C33), as well as Kabardino-Balkaria and Northern Ossetia in regression (C33), Dagestan, Kabardino-Balkaria and Altai Krai in (C34), Dagestan, Tyva, Kabardino-Balkaria, Chukotka and Altai Krai in (C35), Dagestan, Tyva, Kabardino-Balkaria, Northern Ossetia, Adygeya, and Evreiskaya in (C38) and (C39). After exclusion of outliers in regressions (C27), (C28), (C29), (C30), (C32) urbanization becomes insignificant, but keeps its sign; dummy republic in (C38) and (C39) becomes insignificant, but keeps its sign.

Table C4: Determinants of fiscal decentralization, 1995-1999, dep.var.: retention rate including fiscal transfers, controlling for distance from average income

	(C40) OLS	(C41) OLS	(C42) OLS	(C43) OLS	(C44) OLS	(C45) OLS	(C46) OLS	(C47) OLS	(C48) OLS	(C49) OLS	(C50) OLS	(C51) OLS	(C52) OLS
Territory	-0.076 (0.057)	-0.078 (0.062)	-0.076 (0.058)	-0.029 (0.077)	-0.032 (0.061)	-0.059 (0.051)	-0.074 (0.061)	-0.064 (0.080)	-0.07 (0.091)	0.068 (0.052)	0.08 (0.056)	-0.073 (0.073)	-0.07 (0.073)
Population	-0.026 (0.240)	-0.027 (0.241)	-0.034 (0.245)	0.074 (0.310)	0.023 (0.271)	0.016 (0.300)	-0.020 (0.253)	0.300 (0.396)	0.104 (0.345)	0.023 (0.156)	0.000 (0.166)	0.108 (0.280)	0.112 (0.282)
Oil and gas	-0.476* (0.270)	-0.479* (0.278)	-0.483* (0.262)	-2.856 (1.817)	-0.427 (0.263)	-0.465* (0.274)	-0.467* (0.278)	0.512 (0.727)	0.487 (0.807)	0.357 (0.243)	0.369 (0.262)		
Distance from average income per capita	0.049 (0.183)	0.050 (0.186)	0.048 (0.184)	0.311 (0.362)	0.034 (0.177)	0.056 (0.196)	0.044 (0.178)	0.603 (0.524)	0.490 (0.529)	0.268 (0.170)	0.242 (0.178)	0.353 (0.287)	0.358 (0.299)
Dummy autonomous okrug	0.032 (0.276)	0.031 (0.280)	0.037 (0.281)	0.402 (0.480)	0.050 (0.277)	0.065 (0.281)	0.055 (0.320)	-0.658** (0.306)					
Dummy republic	0.106 (0.129)	0.104 (0.126)	0.109 (0.132)	0.123 (0.126)	0.112 (0.126)	0.108 (0.127)	0.144 (0.293)	0.16 (0.104)	0.173 (0.105)	0.154* (0.080)	0.155* (0.088)	0.226** (0.101)	0.224** (0.097)
Distance from Moscow	0.057*** (0.019)	0.056*** (0.018)	0.057*** (0.019)	0.042** (0.018)	0.060*** (0.020)	0.060** (0.023)	0.057*** (0.019)	0.036** (0.018)	0.040** (0.019)	0.030** (0.013)	0.029** (0.013)	0.041** (0.016)	0.040*** (0.015)
Dummy border region non-CIS	-0.022 (0.137)	-0.022 (0.138)	-0.017 (0.139)	0.075 (0.136)	-0.043 (0.143)	-0.038 (0.148)	-0.019 (0.138)	0.035 (0.131)	0.062 (0.130)	-0.039 (0.073)	-0.052 (0.066)	0.093 (0.113)	0.096 (0.114)
Dummy border region CIS	0.034 (0.094)	0.035 (0.097)	0.032 (0.094)	0.033 (0.087)	0.001 (0.086)	0.033 (0.095)	0.034 (0.094)	0.073 (0.062)	0.076 (0.067)	0.034 (0.050)	0.021 (0.049)	0.106 (0.068)	0.105 (0.068)
Urbanization	-13.950** (5.982)	-13.990** (6.188)	-13.902** (6.038)	-13.797* (7.022)	-13.652** (5.742)	-13.493** (5.995)	-13.502** (5.615)	-8.374 (7.120)	-7.204 (7.139)	-2.611 (2.741)	-2.464 (3.139)	-7.686 (5.379)	-7.596 (5.340)
Retail trade	-0.095 (0.182)	-0.094 (0.182)	-0.086 (0.189)	-0.138 (0.204)	-0.127 (0.193)	-0.121 (0.208)	-0.102 (0.191)	-0.288 (0.266)	-0.144 (0.217)	-0.051 (0.104)	-0.044 (0.103)	-0.145 (0.190)	-0.149 (0.195)
Net profit	0.007 (0.007)	0.007 (0.008)	0.007 (0.007)	-0.01 (0.022)	0.008 (0.007)	0.007 (0.008)	0.007 (0.007)	-0.025 (0.028)	-0.024 (0.030)	-0.018* (0.010)	-0.017 (0.011)	-0.012 (0.012)	-0.013 (0.013)
Democracy	-0.004 (0.008)	-0.004 (0.008)	-0.005 (0.008)	-0.001 (0.009)	-0.003 (0.008)	-0.003 (0.009)	-0.004 (0.008)	-0.001 (0.010)	-0.003 (0.010)	0.000 (0.005)	-0.001 (0.005)		
Power (Jarocinska)		0.005 (0.048)			-0.131 (0.111)	-0.073 (0.131)	0.006 (0.050)	0.061 (0.070)	0.049 (0.065)	-0.039 (0.036)	-0.038 (0.038)		
Power (RUIE)			-0.023 (0.048)										
Power (UI)				0.075 (0.060)									
Tensions (RUIE)					0.125 (0.107)								
Tensions (MFK)						0.040 (0.074)							
Declarations							-0.040 (0.188)						
Regulatory capture								-0.155 (0.206)					
Industrial concentration									0.000 (0.001)				
TI perceived										-0.091 (0.091)			
TI real											0.030 (0.076)		
Resources I												-0.016 (0.032)	
Resources II													-0.001 (0.003)
Constant	2.024*** (0.338)	1.997*** (0.349)	2.080*** (0.351)	1.763*** (0.369)	2.648*** (0.620)	2.370*** (0.718)	2.065*** (0.474)	1.251*** (0.323)	1.150*** (0.344)	1.286*** (0.217)	1.229*** (0.212)	1.506*** (0.521)	1.463*** (0.486)
Observations	88	88	88	81	88	88	88	73	79	40	40	78	78
R²	0.624	0.624	0.624	0.656	0.636	0.627	0.624	0.507	0.516	0.721	0.713	0.490	0.489
J.-B. test	526.2***	524.2***	520.7***	322.2***	447.1***	500.4***	496.3***	1414***	1074***	0.601	0.413	1194***	1174***

Note: see Table 2. Outliers are Dagestan, Ust Ordyn Buriatski, Tyva and Evenkia for (C40) – (C46), Dagestan, Evreyskaya, Kabardino-Balkaria and Adygeiya in (C47), Dagestan, Tyva, Kabardino-Balkaria, Chukotka, Northern Ossetia, Evreyskaya, Adygeya in (C48), Dagestan, Tyva, Evreyskaya, Kabardino-Balkaria, Northern Ossetia, Adygeya in (C51) and (C52). After exclusion of outliers oil and gas in regressions (C40), (C41), (C42), (C45), (C46) becomes insignificant, but keeps its sign; urbanization in regression (C43) becomes insignificant, but keeps its sign, dummy republic in (C51) and (C52) becomes insignificant, but keeps its sign

Table C5: Determinants of fiscal decentralization, 1999, dep. Var.: expenditure decentralization, controlling for income per capita

	(C53) OLS	(C54) OLS	(C55) OLS	(C56) OLS	(C57) OLS	(C58) OLS	(C59) OLS	(C60) OLS	(C61) OLS	(C62) OLS	(C63) OLS	(C64) OLS	(C65) OLS
Territory	0.014 (0.012)	0.013 (0.013)	0.013 (0.012)	0.015 (0.012)	0.013 (0.014)	0.013 (0.013)	0.011 (0.014)	0.017 (0.016)	0.02 (0.015)	-0.014 (0.024)	-0.009 (0.023)	0.029* (0.015)	0.025* (0.015)
Population	0.009 (0.009)	0.009 (0.008)	0.007 (0.008)	0.005 (0.009)	0.009 (0.009)	0.009 (0.008)	0.009 (0.008)	0.006 (0.011)	0.004 (0.010)	0.006 (0.025)	0.009 (0.029)	0.009 (0.012)	0.007 (0.011)
Oil and gas	0.118*** (0.041)	0.117** (0.044)	0.127*** (0.039)	0.191** (0.084)	0.116** (0.045)	0.116** (0.045)	0.102** (0.046)	0.107** (0.040)	0.126*** (0.041)	0.116** (0.043)	0.117** (0.047)		
Income per capita	-0.004 (0.011)	-0.004 (0.011)	-0.008 (0.010)	-0.001 (0.009)	-0.004 (0.011)	-0.004 (0.011)	-0.002 (0.012)	-0.011 (0.010)	-0.003 (0.010)	-0.001 (0.014)	-0.004 (0.014)	-0.004 (0.012)	-0.003 (0.012)
Dummy autonomous okrug	0.113*** (0.029)	0.113*** (0.029)	0.110*** (0.029)	0.081** (0.040)	0.113*** (0.030)	0.112*** (0.029)	0.096*** (0.032)	0.154*** (0.018)					
Dummy republic	0.029 (0.018)	0.028 (0.018)	0.028 (0.017)	0.023 (0.020)	0.028 (0.018)	0.028 (0.018)	0.001 (0.025)	0.032 (0.022)	0.029 (0.021)	0.080** (0.033)	0.075** (0.035)	0.034 (0.022)	0.032 (0.021)
Distance from Moscow	0.002 (0.003)	0.002 (0.003)	0.002 (0.003)	0.002 (0.003)	0.002 (0.003)	0.002 (0.003)	0.002 (0.003)	0.000 (0.004)	0.001 (0.003)	0.002 (0.009)	0.001 (0.009)	0.000 (0.004)	0.000 (0.004)
Dummy border region non-CIS	-0.020 (0.024)	-0.020 (0.024)	-0.024 (0.025)	-0.008 (0.023)	-0.020 (0.024)	-0.020 (0.024)	-0.021 (0.024)	-0.032 (0.028)	-0.016 (0.021)	-0.008 (0.049)	-0.017 (0.051)	-0.010 (0.023)	-0.012 (0.023)
Dummy border region CIS	-0.024 (0.016)	-0.023 (0.016)	-0.021 (0.016)	-0.027 (0.017)	-0.023 (0.017)	-0.023 (0.016)	-0.022 (0.016)	-0.018 (0.018)	-0.018 (0.016)	-0.013 (0.031)	-0.015 (0.032)	-0.015 (0.016)	-0.014 (0.016)
Urbanization	-0.506 (0.747)	-0.513 (0.772)	-0.559 (0.741)	-1.404* (0.781)	-0.503 (0.778)	-0.514 (0.777)	-0.819 (0.860)	0.017 (1.108)	-0.256 (1.037)	-2.269 (1.794)	-1.878 (1.925)	-0.534 (0.948)	-0.591 (0.928)
Fiscal transfers	-0.203*** (0.043)	-0.203*** (0.044)	-0.203*** (0.043)	-0.216*** (0.048)	-0.201*** (0.044)	-0.202*** (0.045)	-0.208*** (0.045)	-0.174*** (0.057)	-0.172*** (0.054)	-0.194 (0.214)	-0.194 (0.218)	-0.204*** (0.054)	-0.203*** (0.054)
Democracy	-0.001 (0.001)	-0.001 (0.002)	-0.001 (0.001)	0.000 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.001)	-0.001 (0.002)	-0.001 (0.002)	0.000 (0.002)	0.000 (0.002)		
Power (Jarocinska)		0.002 (0.013)			0.004 (0.017)	0.003 (0.018)	0.000 (0.013)	0.005 (0.015)	-0.001 (0.014)	0.012 (0.031)	0.010 (0.031)		
Power (RUIE)			0.020** (0.010)										
Power (UI)				0.001 (0.008)									
Tensions (RUIE)					-0.002 (0.009)								
Tensions (MFK)						-0.001 (0.006)							
Declarations							0.027 (0.022)						
Regulatory capture								0.048 (0.056)					
Industrial concentration									0.001*** (0.000)				
TI perceived										-0.040 (0.043)			
TI real											-0.019 (0.042)		
Resources I												0.004 (0.008)	
Resources II													0.000 (0.001)
Constant	0.895*** (0.056)	0.886*** (0.076)	0.840*** (0.058)	0.938*** (0.056)	0.876*** (0.087)	0.880*** (0.092)	0.851*** (0.074)	0.829*** (0.088)	0.870*** (0.083)	0.910*** (0.225)	0.890*** (0.226)	0.842*** (0.083)	0.869*** (0.072)
Observations	88	88	88	81	88	88	88	73	79	40	40	78	78
R²	0.519	0.519	0.551	0.474	0.52	0.519	0.529	0.441	0.447	0.432	0.424	0.391	0.389
J.-B. test	11.97***	11.95***	8.13**	8.802**	12.0***	12.04***	13.22***	17.03***	12.5***	11.21***	12.54***	9.082**	9.680***

Note: see Table 2. Outliers are Briansk, Rostov and Tula in all regressions. After exclusion of outliers urbanization in regression (C56) becomes insignificant, but keeps its sign.

Table C6: Determinants of fiscal decentralization, 1999, dep. var.: expenditure decentralization, controlling for distance from average income

	(C66)	(C67)	(C68)	(C69)	(C70)	(C71)	(C72)	(C73)	(C74)	(C75)	(C76)	(C77)	(C78)
	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Territory	0.014 (0.012)	0.013 (0.014)	0.012 (0.012)	0.015 (0.013)	0.013 (0.014)	0.013 (0.014)	0.011 (0.014)	0.019 (0.015)	0.021 (0.015)	-0.015 (0.024)	-0.01 (0.023)	0.031** (0.014)	0.027* (0.015)
Population	0.010 (0.009)	0.010 (0.009)	0.009 (0.009)	0.006 (0.010)	0.010 (0.009)	0.010 (0.009)	0.010 (0.008)	0.008 (0.011)	0.005 (0.010)	0.006 (0.025)	0.008 (0.029)	0.01 (0.012)	0.008 (0.011)
Oil and gas	0.129*** (0.040)	0.128*** (0.043)	0.133*** (0.038)	0.211*** (0.076)	0.127*** (0.044)	0.127*** (0.044)	0.113** (0.045)	0.117*** (0.039)	0.133*** (0.041)	0.112** (0.044)	0.114** (0.048)		
Distance from average income	-0.009 (0.010)	-0.009 (0.010)	-0.01 (0.010)	-0.006 (0.009)	-0.009 (0.010)	-0.009 (0.010)	-0.007 (0.011)	-0.019** (0.010)	-0.009 (0.010)	0.001 (0.015)	-0.001 (0.015)	-0.01 (0.010)	-0.008 (0.010)
Dummy autonomous okrug	0.118*** (0.030)	0.118*** (0.030)	0.113*** (0.030)	0.086** (0.039)	0.118*** (0.030)	0.117*** (0.029)	0.102*** (0.033)	0.167*** (0.015)					
Dummy republic	0.029 (0.018)	0.029 (0.018)	0.028 (0.017)	0.023 (0.020)	0.029 (0.018)	0.029 (0.018)	0.003 (0.026)	0.034 (0.021)	0.029 (0.020)	0.080** (0.034)	0.076** (0.036)	0.035 (0.022)	0.033 (0.021)
Distance from Moscow	0.002 (0.003)	0.002 (0.003)	0.001 (0.003)	0.002 (0.003)	0.002 (0.003)	0.002 (0.003)	0.002 (0.003)	-0.001 (0.004)	0.001 (0.003)	0.002 (0.010)	0.002 (0.009)	-0.001 (0.004)	-0.001 (0.004)
Dummy border region non-CIS	-0.02 (0.024)	-0.02 (0.024)	-0.024 (0.025)	-0.008 (0.023)	-0.02 (0.024)	-0.02 (0.024)	-0.021 (0.024)	-0.032 (0.027)	-0.016 (0.021)	-0.009 (0.049)	-0.018 (0.051)	-0.01 (0.023)	-0.012 (0.023)
Dummy border region CIS	-0.025 (0.016)	-0.024 (0.016)	-0.022 (0.016)	-0.028 (0.017)	-0.024 (0.017)	-0.024 (0.017)	-0.023 (0.016)	-0.019 (0.018)	-0.019 (0.016)	-0.013 (0.031)	-0.015 (0.033)	-0.015 (0.017)	-0.014 (0.016)
Urbanization	-0.445 (0.725)	-0.454 (0.759)	-0.572 (0.738)	-1.308 (0.790)	-0.444 (0.763)	-0.454 (0.764)	-0.726 (0.842)	0.133 (1.067)	-0.163 (1.001)	-2.389 (1.762)	-2.029 (1.891)	-0.466 (0.895)	-0.540 (0.873)
Fiscal transfers	-0.193*** (0.043)	-0.193*** (0.044)	-0.191*** (0.044)	-0.210*** (0.045)	-0.192*** (0.044)	-0.193*** (0.045)	-0.201*** (0.046)	-0.152** (0.057)	-0.163*** (0.055)	-0.197 (0.217)	-0.199 (0.222)	-0.192*** (0.057)	-0.194*** (0.057)
Democracy	-0.001 (0.001)	-0.001 (0.002)	-0.001 (0.001)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.002 (0.002)	0.001 (0.003)	0.000 (0.003)		
Power		0.001 (0.013)			0.003 (0.017)	0.002 (0.018)	0.000 (0.014)	0.004 (0.015)	-0.001 (0.014)	0.012 (0.031)	0.010 (0.031)		
Power (RUIE)			0.020** (0.010)										
Power (UI)				0.001 (0.008)									
Tensions (RUIE)					-0.002 (0.009)								
Tensions (UI)						-0.001 (0.006)							
Declarations							0.025 (0.022)						
Regulatory capture								0.048 (0.056)					
Industrial concentration									0.001*** (0.000)				
TI perceived										-0.041 (0.043)			
TI real											-0.018 (0.043)		
Resources I												0.005 (0.008)	
Resources II													0.000 (0.001)
Constant	0.893*** (0.056)	0.885*** (0.077)	0.840*** (0.058)	0.935*** (0.056)	0.876*** (0.088)	0.880*** (0.093)	0.850*** (0.075)	0.830*** (0.089)	0.868*** (0.083)	0.915*** (0.222)	0.898*** (0.223)	0.829*** (0.086)	0.860*** (0.073)
Observations	88	88	88	81	88	88	88	73	79	40	40	78	78
R²	0.522	0.522	0.553	0.476	0.522	0.522	0.531	0.451	0.45	0.432	0.423	0.394	0.391
J.-B. test	12.92***	12.90***	9.023**	9.565***	12.92***	12.98***	13.73***	21.08***	14.3***	10.51***	11.68***	9.643***	10.04***

Note: see Table 2. Outliers are Rostov, Tula and Briansk in all regressions, as well as Komi in regression (C73). There are no changes for sign and significance of significant variables after the exclusion of outliers

Table C7: Determinants of fiscal decentralization, 1998-1999, dep. Var.: retention rate including non-budgetary funds, controlling for average income per capita

	(C79) OLS	(C80) OLS	(C81) OLS	(C82) OLS	(C83) OLS	(C84) OLS	(C85) OLS	(C86) OLS	(C87) OLS	(C88) OLS	(C89) OLS	(C90) OLS	(C91) OLS
Territory	0.043 (0.028)	0.052* (0.030)	0.043 (0.029)	0.024 (0.022)	0.064* (0.035)	0.058* (0.032)	0.044 (0.030)	0.03 (0.022)	0.035 (0.027)	-0.090* (0.051)	-0.072 (0.055)	0.015 (0.029)	0.007 (0.031)
Population	-0.161* (0.090)	-0.158* (0.088)	-0.168* (0.088)	-0.125 (0.102)	-0.137* (0.082)	-0.139* (0.081)	-0.171* (0.091)	-0.051 (0.067)	-0.106 (0.114)	-0.322* (0.163)	-0.222 (0.194)	-0.121 (0.115)	-0.131 (0.117)
Oil and gas	-0.145 (0.106)	-0.122 (0.102)	-0.148 (0.102)	-0.147 (0.433)	-0.128 (0.101)	-0.125 (0.100)	-0.145 (0.106)	-0.056 (0.107)	0.098 (0.137)	-0.332* (0.162)	-0.354* (0.190)		
Income per capita	-0.111** (0.045)	-0.109** (0.045)	-0.111** (0.045)	-0.064 (0.068)	-0.106** (0.044)	-0.104** (0.045)	-0.104** (0.042)	-0.074 (0.060)	-0.061 (0.069)	-0.252* (0.128)	-0.242* (0.139)	-0.085 (0.070)	-0.091 (0.070)
Dummy autonomous okrug	0.173* (0.101)	0.175* (0.102)	0.177* (0.104)	0.042 (0.131)	0.176* (0.100)	0.186* (0.103)	0.131 (0.095)	0.068* (0.040)					
Dummy republic	0.065 (0.045)	0.075 (0.045)	0.067 (0.046)	0.06 (0.047)	0.078* (0.046)	0.077* (0.046)	-0.002 (0.059)	0.100* (0.055)	0.068 (0.051)	0.202** (0.075)	0.168* (0.091)	0.070 (0.058)	0.063 (0.055)
Distance from Moscow	0.009 (0.007)	0.011 (0.007)	0.010 (0.007)	0.009 (0.008)	0.013* (0.007)	0.012* (0.007)	0.010 (0.006)	0.008 (0.008)	0.008 (0.009)	-0.002 (0.009)	-0.006 (0.011)	0.008 (0.009)	0.007 (0.008)
Dummy border region non-CIS	-0.004 (0.044)	-0.003 (0.044)	0.000 (0.046)	0.026 (0.038)	-0.005 (0.044)	-0.007 (0.044)	-0.008 (0.044)	-0.032 (0.064)	-0.005 (0.044)	0.074 (0.055)	0.021 (0.063)	-0.025 (0.048)	-0.03 (0.050)
Dummy border region CIS	0.006 (0.039)	0.000 (0.038)	0.002 (0.039)	-0.009 (0.040)	-0.005 (0.038)	0.001 (0.038)	0.001 (0.038)	0.015 (0.032)	-0.010 (0.038)	0.066 (0.044)	0.056 (0.048)	0.005 (0.034)	0.006 (0.033)
Urbanization	4.112** (1.830)	4.238** (1.824)	4.127** (1.855)	1.466 (1.914)	4.131** (1.767)	4.287** (1.826)	3.258* (1.862)	4.639* (2.394)	4.017* (2.233)	2.023 (2.402)	4.332 (2.688)	2.682 (2.300)	2.728 (2.257)
Fiscal transfers	-0.258 (0.161)	-0.261 (0.162)	-0.257 (0.162)	-0.273* (0.148)	-0.310* (0.160)	-0.279* (0.165)	-0.262 (0.166)	-0.216 (0.136)	-0.146 (0.167)	0.512* (0.286)	0.544 (0.325)	-0.103 (0.145)	-0.088 (0.141)
Retail trade	0.136 (0.090)	0.133 (0.088)	0.144 (0.088)	0.106 (0.097)	0.115 (0.084)	0.119 (0.083)	0.148 (0.091)	0.037 (0.056)	0.108 (0.105)	0.248* (0.135)	0.17 (0.155)	0.118 (0.109)	0.121 (0.110)
Net profit	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	-0.001 (0.002)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.002)	-0.001 (0.002)	0.005 (0.004)	0.005 (0.004)	-0.001 (0.002)	0 (0.002)
Democracy	-0.007** (0.003)	-0.007** (0.004)	-0.008** (0.003)	-0.006* (0.003)	-0.007* (0.004)	-0.007* (0.004)	-0.007** (0.003)	-0.010*** (0.003)	-0.007* (0.004)	-0.006** (0.003)	-0.008** (0.003)		
Power (Jarocinska)		-0.027 (0.022)			-0.062* (0.037)	-0.054 (0.045)	-0.032 (0.021)	-0.018 (0.022)	-0.031 (0.024)	0.053 (0.032)	0.051 (0.033)		
Power (RUIE)			-0.022 (0.019)										
Power (UI)				-0.011 (0.015)									
Tension (RUIE)					0.032 (0.025)								
Tension (MFK)						0.014 (0.019)							
Declarations							0.077 (0.054)						
Regulatory capture								-0.050 (0.129)					
Industrial concentration									0.001 (0.001)				
TI perceived										-0.236** (0.098)			
TI real											-0.122* (0.068)		
Resources I												-0.006 (0.013)	
Resources II													-0.002 (0.001)
Constant	0.519** (0.214)	0.683*** (0.228)	0.570*** (0.204)	0.689*** (0.225)	0.900*** (0.249)	0.841*** (0.303)	0.553** (0.258)	0.820*** (0.200)	0.696*** (0.234)	0.232 (0.383)	0.188 (0.387)	0.409 (0.253)	0.431* (0.233)
Observations	88	88	88	81	88	88	88	73	79	40	40	78	78
R²	0.334	0.345	0.344	0.24	0.356	0.351	0.365	0.346	0.267	0.717	0.654	0.197	0.210
J.-B. test	4.133	3.174	2.458	20.12***	2.506	3.445	3.252	0.346	5.69*	0.139	0.071	3.231	3.502

Notes: see Table 2. Outliers are Kalmykia and Ingushetia in regression (C82), (C87). After exclusion of outliers urbanization in regression (C87) becomes insignificant, but keeps its sign.

Table C8: Determinants of fiscal decentralization, 1998-1999, dep. Var.: retention rate including non-budgetary funds, controlling for distance from average income

	(C92)	(C93)	(C94)	(C95)	(C96)	(C97)	(C98)	(C99)	(C100)	(C101)	(C102)	(C103)	(C104)
	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Territory	0.043 (0.027)	0.050* (0.029)	0.043 (0.028)	0.022 (0.023)	0.061* (0.034)	0.055* (0.031)	0.042 (0.028)	0.029 (0.023)	0.037 (0.025)	-0.090* (0.051)	-0.072 (0.055)	0.008 (0.033)	0.002 (0.035)
Population	-0.146* (0.076)	-0.142* (0.075)	-0.151** (0.074)	-0.153 (0.095)	-0.123* (0.070)	-0.127* (0.070)	-0.156** (0.078)	-0.048 (0.063)	-0.151 (0.110)	-0.322* (0.163)	-0.222 (0.194)	-0.161 (0.103)	-0.168 (0.103)
Oil and gas	-0.142 (0.098)	-0.126 (0.097)	-0.145 (0.097)	0.198 (0.399)	-0.131 (0.096)	-0.127 (0.095)	-0.146 (0.100)	-0.057 (0.105)	-0.028 (0.134)	-0.332* (0.162)	-0.354* (0.190)		
Distance from average income	-0.126*** (0.041)	-0.123*** (0.041)	-0.124*** (0.040)	-0.118* (0.067)	-0.120*** (0.040)	-0.119*** (0.040)	-0.118*** (0.039)	-0.075 (0.057)	-0.127* (0.071)	-0.252* (0.128)	-0.242* (0.139)	-0.143** (0.067)	-0.147** (0.067)
Dummy autonomous okrug	0.207* (0.105)	0.208* (0.106)	0.209* (0.107)	0.048 (0.134)	0.208* (0.105)	0.217** (0.107)	0.164 (0.099)	0.070* (0.040)					
Dummy republic	0.070 (0.044)	0.077* (0.044)	0.072 (0.045)	0.067 (0.045)	0.081* (0.046)	0.079* (0.045)	0.003 (0.060)	0.104* (0.056)	0.078 (0.051)	0.202** (0.075)	0.168* (0.091)	0.081 (0.056)	0.074 (0.053)
Distance from Moscow	0.009 (0.006)	0.010 (0.006)	0.009 (0.006)	0.012 (0.007)	0.012* (0.006)	0.012* (0.006)	0.010 (0.006)	0.008 (0.008)	0.010 (0.008)	-0.002 (0.009)	-0.006 (0.011)	0.010 (0.008)	0.008 (0.008)
Dummy border region non-CIS	-0.012 (0.044)	-0.011 (0.044)	-0.009 (0.045)	0.007 (0.041)	-0.013 (0.044)	-0.015 (0.044)	-0.016 (0.044)	-0.033 (0.064)	-0.023 (0.046)	0.074 (0.055)	0.021 (0.063)	-0.045 (0.050)	-0.049 (0.052)
Dummy border region CIS	0.005 (0.037)	0.001 (0.036)	0.002 (0.036)	-0.009 (0.037)	-0.005 (0.036)	0.002 (0.036)	0.002 (0.036)	0.015 (0.032)	-0.006 (0.036)	0.066 (0.044)	0.056 (0.048)	0.006 (0.032)	0.007 (0.032)
Urbanization	4.365** (1.784)	4.434** (1.788)	4.354** (1.806)	2.022 (1.917)	4.335** (1.736)	4.479** (1.800)	3.495* (1.826)	4.677* (2.405)	4.861** (2.244)	2.023 (2.402)	4.332 (2.688)	3.395 (2.293)	3.469 (2.244)
Fiscal transfers	-0.209 (0.158)	-0.213 (0.158)	-0.209 (0.158)	-0.229 (0.146)	-0.262* (0.155)	-0.230 (0.162)	-0.215 (0.164)	-0.194 (0.138)	-0.113 (0.166)	0.512* (0.286)	0.544 (0.325)	-0.053 (0.143)	-0.035 (0.139)
Retail trade	0.123 (0.075)	0.120 (0.074)	0.129* (0.073)	0.121 (0.088)	0.103 (0.071)	0.109 (0.071)	0.136* (0.077)	0.036 (0.052)	0.135 (0.096)	0.248* (0.135)	0.17 (0.155)	0.143 (0.093)	0.144 (0.093)
Net profit	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.001 (0.002)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.002)	0.000 (0.002)	0.005 (0.004)	0.005 (0.004)	0.001 (0.002)	0.001 (0.002)
Democracy	-0.007** (0.003)	-0.007** (0.003)	-0.008** (0.003)	-0.005* (0.003)	-0.007* (0.003)	-0.007** (0.003)	-0.007** (0.003)	-0.010*** (0.003)	-0.007* (0.004)	-0.006** (0.003)	-0.008** (0.003)		
Power (Jarocinska)		-0.021 (0.021)			-0.055 (0.036)	-0.045 (0.041)	-0.026 (0.020)	-0.017 (0.022)	-0.028 (0.023)	0.053 (0.032)	0.051 (0.033)		
Power (RUIE)			-0.018 (0.018)										
Power (UI)				-0.009 (0.015)									
Tensions (RUIE)					0.032 (0.025)								
Tensions (MFK)						0.012 (0.018)							
Declarations							0.074 (0.053)						
Regulatory capture								-0.055 (0.126)					
Industrial concentration									0.001 (0.001)				
TI perceived										-0.236** (0.098)			
TI real											-0.122* (0.068)		
Resources I												-0.011 (0.014)	
Resources II													-0.002 (0.001)
Constant	0.424* (0.221)	0.555** (0.238)	0.469** (0.213)	0.555** (0.257)	0.770*** (0.256)	0.694** (0.303)	0.432 (0.265)	0.743*** (0.222)	0.518* (0.263)	0.01 (0.473)	-0.024 (0.482)	0.269 (0.266)	0.272 (0.249)
Observations	88	88	88	81	88	88	88	73	79	40	40	78	78
R²	0.374	0.381	0.381	0.289	0.391	0.385	0.399	0.348	0.313	0.717	0.654	0.256	0.272
J.-B. test	0.769	0.580	0.413	7.404**	0.407	0.996	0.693	0.296	0.693	0.139	0.071	0.291	0.652

Notes: see Table 2. Outliers are Kalmykia and Ingushetia in regression (C95). After exclusion of outliers distance from average income becomes insignificant in this regression, but keeps its sign.

Table C9: Determinants of regulatory decentralization, 1995-1999, dep. Var.: share of contradictions to federal law, controlling for income per capita

	(C105) OLS	(C106) OLS	(C107) OLS	(C108) OLS	(C109) OLS	(C110) OLS	(C111) OLS	(C112) OLS	(C113) OLS	(C114) OLS	(C115) OLS	(C116) OLS	(C117) OLS
Territory	0.003 (0.011)	0.004 (0.010)	0.003 (0.011)	0.003 (0.009)	-0.001 (0.010)	0.001 (0.009)	0.003 (0.010)	0.002 (0.009)	-0.003 (0.010)	-0.014 (0.013)	-0.008 (0.016)	-0.002 (0.010)	-0.002 (0.010)
Population	0.004 (0.010)	0.004 (0.011)	0.004 (0.010)	0.006 (0.010)	0.003 (0.010)	0.000 (0.009)	0.004 (0.011)	0.013 (0.012)	0.009 (0.011)	0.025** (0.011)	0.034** (0.016)	0.007 (0.012)	0.007 (0.012)
Oil and gas	0.022 (0.047)	0.026 (0.049)	0.021 (0.046)	-0.125* (0.071)	0.013 (0.049)	0.016 (0.052)	0.022 (0.050)	0.060** (0.028)	0.055* (0.030)	0.078** (0.038)	0.070* (0.038)		
Income per capita	-0.014 (0.013)	-0.014 (0.013)	-0.014 (0.013)	-0.007 (0.010)	-0.011 (0.012)	-0.012 (0.012)	-0.013 (0.013)	-0.004 (0.010)	-0.004 (0.010)	-0.012 (0.012)	-0.018 (0.011)	-0.000 (0.010)	-0.000 (0.009)
Dummy autonomous okrug	0.046 (0.032)	0.046 (0.033)	0.046 (0.032)	0.086* (0.045)	0.046 (0.030)	0.035 (0.029)	0.043 (0.033)	-0.035* (0.018)					
Dummy republic	0.050*** (0.013)	0.051*** (0.014)	0.050*** (0.013)	0.059*** (0.014)	0.048*** (0.013)	0.047*** (0.013)	0.046** (0.020)	0.068*** (0.015)	0.057*** (0.015)	0.055* (0.027)	0.045 (0.030)	0.054*** (0.013)	0.053*** (0.014)
Distance from Moscow	0.006* (0.003)	0.006 (0.003)	0.006* (0.003)	0.005 (0.003)	0.005 (0.003)	0.004 (0.003)	0.006 (0.003)	0.007** (0.003)	0.007* (0.004)	0.012* (0.006)	0.010* (0.005)	0.007* (0.004)	0.007 (0.004)
Dummy border region non-CIS	0.018 (0.024)	0.018 (0.024)	0.018 (0.024)	0.022 (0.024)	0.022 (0.023)	0.024 (0.024)	0.018 (0.024)	0.035 (0.032)	0.015 (0.023)	0.089 (0.053)	0.077* (0.042)	0.014 (0.022)	0.014 (0.022)
Dummy border region CIS	0.007 (0.012)	0.007 (0.013)	0.007 (0.013)	0.009 (0.012)	0.013 (0.012)	0.007 (0.013)	0.007 (0.013)	0.009 (0.013)	0.006 (0.014)	0.001 (0.018)	0.002 (0.018)	0.01 (0.012)	0.01 (0.012)
Urbanization	-0.621 (0.529)	-0.605 (0.545)	-0.616 (0.530)	-0.09 (0.687)	-0.458 (0.515)	-0.591 (0.497)	-0.661 (0.561)	-0.225 (0.573)	-0.63 (0.567)	-0.098 (0.967)	0.682 (1.027)	-0.745 (0.504)	-0.741 (0.495)
Fiscal transfers	-0.014 (0.040)	-0.015 (0.041)	-0.016 (0.040)	-0.013 (0.038)	0.018 (0.036)	0.008 (0.037)	-0.015 (0.040)	-0.014 (0.041)	-0.019 (0.042)	0.030 (0.114)	0.052 (0.136)	-0.006 (0.041)	-0.005 (0.042)
Democracy	-0.000 (0.001)	-0.000 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)		
Power (Jarocinska)		-0.003 (0.009)			0.022* (0.013)	0.026** (0.013)	-0.003 (0.009)	-0.013 (0.010)	-0.005 (0.010)	-0.012 (0.012)	-0.014 (0.012)		
Power (RUIE)			-0.003 (0.006)										
Power (UI)				-0.010 (0.007)									
Tensions (RUIE)					-0.023** (0.011)								
Tensions (MFK)						-0.015** (0.006)							
Declarations							0.005 (0.015)						
Regulatory capture								-0.035 (0.042)					
Industry concentration									-0.000 (0.000)				
TI perceived										-0.053 (0.045)			
TI real											-0.047 (0.042)		
Resources I												-0.001 (0.005)	
Resources II													0.000 (0.000)
Constant	0.135*** (0.043)	0.154** (0.071)	0.145*** (0.047)	0.122*** (0.044)	0.015 (0.079)	0.004 (0.074)	0.147* (0.076)	0.163** (0.079)	0.156** (0.075)	0.132 (0.098)	0.099 (0.101)	0.120** (0.052)	0.118*** (0.044)
Observations	88	88	88	81	88	88	88	73	79	40	40	78	78
R²	0.403	0.404	0.404	0.437	0.447	0.453	0.404	0.42	0.395	0.561	0.56	0.384	0.384
J.-B. test	38.2***	35.37***	40.08***	24.16***	22.05***	15.78***	35.56***	12.08***	33.98***	0.624	0.966	47.33***	47.9***

Note: see Table 3. Outlier is Primorski krai in all regressions with a significant Jarque-Bera test. After exclusion of the outlier distance from Moscow becomes insignificant, but keeps its sign in regression (C105), (C107), (C116) dummy autonomous okrug becomes insignificant, but keeps its sign in regression (C108), power (Jarocinska) becomes insignificant, but keeps its sign in regressions (C109) and (C110), distance and oil and gas variable become insignificant, but keep their sign in regression (C112) and (C113)

Table C10: Determinants of regulatory decentralization, 1995-1999, dep. Var.: share of contradictions to federal law, controlling for distance from average income

	(C118) OLS	(C119) OLS	(C120) OLS	(C121) OLS	(C122) OLS	(C123) OLS	(C124) OLS	(C125) OLS	(C126) OLS	(C127) OLS	(C128) OLS	(C129) OLS	(C130) OLS
Territory	0.002 (0.011)	0.003 (0.010)	0.002 (0.011)	0.002 (0.010)	-0.002 (0.011)	0.000 (0.010)	0.002 (0.010)	0.002 (0.009)	-0.004 (0.010)	-0.015 (0.013)	-0.009 (0.016)	-0.004 (0.010)	-0.004 (0.010)
Population	0.005 (0.011)	0.005 (0.011)	0.005 (0.011)	0.007 (0.010)	0.004 (0.010)	0.001 (0.009)	0.005 (0.011)	0.013 (0.012)	0.008 (0.012)	0.024** (0.011)	0.032* (0.016)	0.006 (0.013)	0.006 (0.013)
Oil and gas	0.022 (0.045)	0.026 (0.048)	0.020 (0.045)	-0.131* (0.070)	0.013 (0.049)	0.018 (0.051)	0.022 (0.049)	0.061** (0.028)	0.049 (0.031)	0.072* (0.037)	0.063* (0.037)		
Distance from average income	-0.016 (0.015)	-0.015 (0.016)	-0.015 (0.015)	-0.005 (0.012)	-0.012 (0.014)	-0.014 (0.014)	-0.015 (0.016)	-0.006 (0.010)	0.002 (0.012)	-0.009 (0.011)	-0.015 (0.010)	0.008 (0.013)	0.008 (0.013)
Dummy autonomous okrug	0.047 (0.034)	0.047 (0.035)	0.047 (0.034)	0.084* (0.045)	0.047 (0.032)	0.037 (0.031)	0.044 (0.036)	-0.032* (0.017)					
Dummy republic	0.050*** (0.013)	0.052*** (0.014)	0.050*** (0.013)	0.059*** (0.013)	0.048*** (0.013)	0.047*** (0.013)	0.046** (0.021)	0.068*** (0.015)	0.057*** (0.015)	0.055* (0.027)	0.045 (0.030)	0.053*** (0.013)	0.052*** (0.014)
Distance from Moscow	0.005 (0.003)	0.005 (0.003)	0.005* (0.003)	0.005 (0.003)	0.004 (0.003)	0.004 (0.003)	0.005 (0.003)	0.007** (0.003)	0.007* (0.004)	0.012* (0.006)	0.010* (0.005)	0.007* (0.004)	0.007* (0.004)
Dummy border region non-CIS	0.018 (0.024)	0.018 (0.024)	0.019 (0.024)	0.023 (0.023)	0.022 (0.023)	0.025 (0.023)	0.018 (0.024)	0.035 (0.032)	0.015 (0.023)	0.089 (0.053)	0.076* (0.042)	0.014 (0.022)	0.014 (0.021)
Dummy border region CIS	0.008 (0.013)	0.007 (0.013)	0.007 (0.013)	0.009 (0.012)	0.013 (0.013)	0.007 (0.013)	0.007 (0.013)	0.009 (0.013)	0.006 (0.014)	0.001 (0.018)	0.001 (0.018)	0.010 (0.012)	0.010 (0.012)
Urbanization	-0.700 (0.524)	-0.678 (0.544)	-0.69 (0.523)	-0.177 (0.670)	-0.509 (0.515)	-0.637 (0.499)	-0.736 (0.565)	-0.218 (0.570)	-0.744 (0.550)	-0.263 (0.924)	0.435 (1.012)	-0.832* (0.499)	-0.827* (0.491)
Fiscal transfers	-0.003 (0.040)	-0.004 (0.041)	-0.005 (0.041)	-0.008 (0.041)	0.027 (0.038)	0.018 (0.038)	-0.004 (0.040)	-0.010 (0.042)	-0.019 (0.044)	0.026 (0.115)	0.043 (0.136)	-0.012 (0.043)	-0.010 (0.043)
Democracy	-0.000 (0.001)	-0.000 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.001 (0.002)	0.001 (0.001)		
Power (Jarocinska)		-0.004 (0.009)			0.022* (0.013)	0.026* (0.013)	-0.004 (0.009)	-0.013 (0.010)	-0.006 (0.010)	-0.012 (0.012)	-0.015 (0.012)		
Power (RUIE)			-0.004 (0.006)										
Power (UI)				-0.010 (0.007)									
Tensions (RUIE)					-0.023** (0.011)								
Tensions (MFK)						-0.015** (0.006)							
Declarations							0.006 (0.015)						
Regulatory capture								-0.036 (0.042)					
Industrial concentration									-0.000 (0.000)				
TI perceived										-0.053 (0.045)			
TI real											-0.044 (0.043)		
Resources I												-0.001 (0.005)	
Resources II													-0.000 (0.000)
Constant	0.135*** (0.043)	0.156** (0.071)	0.146*** (0.048)	0.124*** (0.045)	0.016 (0.079)	0.004 (0.075)	0.148* (0.076)	0.163** (0.079)	0.161** (0.076)	0.144 (0.095)	0.116 (0.097)	0.128** (0.055)	0.125*** (0.045)
Observations	88	88	88	81	88	88	88	73	79	40	40	78	78
R²	0.402	0.403	0.403	0.435	0.447	0.453	0.404	0.420	0.394	0.556	0.553	0.386	0.386
J.-B. test	38.99***	35.84***	40.90***	25.27***	22.22***	15.35***	35.94***	12.43***	37.14***	0.773	0.966	47.33***	47.90***

Note: see Table 3. Outlier is Primorski krai in all regressions, where the Jarque-Bera statistics is significant. After exclusion of the outlier distance from Moscow in the regression (C120), (C126), (C129) and (C130) becomes insignificant, but keeps its sign; power, dummy autonomous okrug in the regression (C121) becomes insignificant, but keeps its sign; power (Jarocinska) in regressions (C122) and (C123) becomes insignificant, but keeps its sign; oil and gas in regression (C125) becomes insignificant, but keeps its sign; urbanization in the regressions (C129) and (C130) becomes insignificant, but keeps its sign.

Table C11: Determinants of regulatory decentralization, 1995-1999, dep. Var.: log number of contradictions, controlling for income per capita

	(C131)	(C132)	(C133)	(C134)	(C135)	(C136)	(C137)	(C138)	(C139)	(C140)	(C141)	(C142)	(C143)
	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Territory	0.053 (0.088)	0.077 (0.080)	0.053 (0.088)	0.031 (0.087)	0.031 (0.080)	0.042 (0.076)	0.068 (0.077)	0.02 (0.087)	-0.011 (0.087)	-0.113 (0.203)	0.007 (0.211)	-0.018 (0.122)	-0.019 (0.117)
Population	0.058 (0.088)	0.06 (0.087)	0.058 (0.089)	0.092 (0.083)	0.05 (0.082)	0.011 (0.081)	0.068 (0.086)	0.157 (0.103)	0.107 (0.099)	0.265 (0.185)	0.285 (0.220)	0.094 (0.112)	0.088 (0.113)
Oil and gas	0.425 (0.642)	0.515 (0.728)	0.424 (0.649)	-1.606** (0.793)	0.395 (0.756)	0.428 (0.768)	0.391 (0.703)	0.992* (0.511)	1.024 (0.624)	0.814 (0.561)	0.982 (0.643)		
Income per capita	0.031 (0.152)	0.035 (0.158)	0.032 (0.151)	0.158 (0.137)	0.068 (0.152)	0.052 (0.152)	0.064 (0.163)	0.195 (0.168)	0.214 (0.167)	0.337 (0.347)	0.238 (0.311)	0.236 (0.158)	0.238 (0.158)
Dummy autonomous okrug	-0.161 (0.343)	-0.147 (0.335)	-0.160 (0.350)	0.183 (0.489)	-0.147 (0.313)	-0.261 (0.324)	-0.251 (0.378)	-1.013*** (0.309)					
Dummy republic	0.519*** (0.145)	0.548*** (0.179)	0.520*** (0.146)	0.626*** (0.160)	0.519*** (0.178)	0.501*** (0.175)	0.404* (0.208)	0.686*** (0.195)	0.627*** (0.189)	0.702* (0.366)	0.565 (0.421)	0.543*** (0.145)	0.529*** (0.148)
Distance from Moscow	0.059** (0.027)	0.063** (0.030)	0.059** (0.027)	0.057** (0.026)	0.052* (0.029)	0.046* (0.026)	0.062** (0.030)	0.086* (0.045)	0.080* (0.043)	0.186 (0.122)	0.172 (0.120)	0.059* (0.030)	0.055* (0.030)
Dummy border region non-CIS	-0.067 (0.196)	-0.066 (0.195)	-0.066 (0.199)	-0.009 (0.179)	-0.028 (0.183)	0.002 (0.181)	-0.071 (0.200)	0.042 (0.261)	-0.087 (0.215)	0.334 (0.467)	0.083 (0.513)	-0.042 (0.210)	-0.041 (0.209)
Dummy border region CIS	0.019 (0.200)	0.004 (0.224)	0.019 (0.198)	0.014 (0.206)	0.056 (0.231)	0.006 (0.222)	0.010 (0.222)	-0.002 (0.272)	0.004 (0.224)	-0.142 (0.437)	-0.213 (0.488)	0.054 (0.204)	0.054 (0.204)
Urbanization	-9.000 (6.311)	-8.619 (6.034)	-8.994 (6.404)	-4.242 (8.264)	-7.294 (5.947)	-8.452 (5.729)	-10.288 (6.567)	-8.172 (10.038)	-9.754 (7.971)	-21.946 (22.978)	-13.216 (19.751)	-9.202 (7.836)	-9.058 (7.713)
Fiscal transfers	0.284 (0.454)	0.267 (0.470)	0.283 (0.453)	0.3 (0.439)	0.567 (0.452)	0.516 (0.444)	0.259 (0.449)	0.276 (0.627)	0.372 (0.541)	-1.149 (2.239)	-1.389 (2.615)	0.196 (0.520)	0.246 (0.524)
Democracy	0.009 (0.014)	0.01 (0.015)	0.009 (0.015)	0.004 (0.016)	0.009 (0.015)	0.009 (0.015)	0.011 (0.016)	0.018 (0.020)	0.012 (0.016)	0.042 (0.031)	0.033 (0.029)		
Power (Jarocinska)		-0.078 (0.168)			0.149 (0.223)	0.227 (0.153)	-0.086 (0.174)	-0.177 (0.201)	-0.13 (0.212)	-0.384 (0.382)	-0.43 (0.425)		
Power (RUIE)			-0.003 (0.088)										
Power (UI)				-0.115 (0.101)									
Tension (RUIE)					-0.209* (0.115)								
Tension (MFK)						-0.159*** (0.056)							
Declarations							0.145 (0.206)						
Regulatory capture								0.041 (0.508)					
Industrial concentration									0.003 (0.008)				
TI perceived										-1.099 (0.782)			
TI real											-0.442 (0.611)		
Resources I												-0.041 (0.063)	
Resources II													-0.005 (0.006)
Total acts	0.511** (0.194)	0.523*** (0.191)	0.512** (0.202)	0.482** (0.198)	0.515** (0.198)	0.552*** (0.198)	0.479** (0.196)	0.523** (0.207)	0.549** (0.218)	0.465 (0.368)	0.562 (0.425)	0.491** (0.194)	0.499** (0.189)
Constant	1.305 (1.554)	1.681 (2.023)	1.307 (1.556)	1.463 (1.629)	0.486 (2.153)	-0.135 (1.942)	1.795 (2.028)	1.872 (2.221)	1.601 (1.936)	4.595 (4.440)	3.468 (4.375)	1.807 (1.670)	1.669 (1.632)
Observations	88	88	88	81	88	88	88	73	79	40	40	78	78
R²	0.280	0.285	0.280	0.299	0.309	0.323	0.288	0.328	0.308	0.444	0.400	0.285	0.287
J.-B. test	1503***	1284***	1507***	1372***	1570***	1398***	1259***	873.2***	947.7***	109.1***	144.4***	1274***	1254***

Note: see Table 3. Outlier is Saratov in all regressions with a significant Jarque-Bera statistics. After exclusion of the outlier distance from Moscow in regressions (C135) and (C136) becomes insignificant, but keeps its sign

Table C12: Determinants of regulatory decentralization, 1995-1999, dep. Var.: log number of contradictions, controlling for distance from average income

	(C144) OLS	(C145) OLS	(C146) OLS	(C147) OLS	(C148) OLS	(C149) OLS	(C150) OLS	(C151) OLS	(C152) OLS	(C153) OLS	(C154) OLS	(C155) OLS	(C156) OLS
Territory	0.055 (0.086)	0.08 (0.080)	0.055 (0.087)	0.045 (0.083)	0.037 (0.081)	0.047 (0.076)	0.074 (0.078)	0.035 (0.082)	0.002 (0.084)	-0.105 (0.195)	0.011 (0.208)	-0.007 (0.120)	-0.009 (0.114)
Population	0.056 (0.090)	0.059 (0.088)	0.056 (0.090)	0.08 (0.088)	0.046 (0.082)	0.009 (0.082)	0.063 (0.087)	0.149 (0.107)	0.096 (0.103)	0.265 (0.187)	0.292 (0.219)	0.082 (0.113)	0.075 (0.116)
Oil and gas	0.495 (0.651)	0.593 (0.751)	0.494 (0.658)	-1.707** (0.830)	0.478 (0.781)	0.531 (0.787)	0.487 (0.732)	1.039* (0.550)	1.037 (0.662)	0.912 (0.614)	1.037 (0.690)		
Distance from average income	-0.002 (0.183)	-0.002 (0.188)	-0.002 (0.183)	0.166 (0.134)	0.031 (0.182)	0.003 (0.182)	0.024 (0.192)	0.190 (0.148)	0.262 (0.160)	0.354 (0.319)	0.248 (0.281)	0.284* (0.158)	0.292* (0.162)
Dummy autonomous okrug	-0.127 (0.352)	-0.11 (0.341)	-0.127 (0.359)	0.211 (0.470)	-0.109 (0.315)	-0.212 (0.320)	-0.202 (0.378)	-0.997*** (0.270)					
Dummy republic	0.523*** (0.144)	0.551*** (0.179)	0.523*** (0.146)	0.624*** (0.160)	0.521*** (0.179)	0.505*** (0.175)	0.422** (0.207)	0.677*** (0.197)	0.618*** (0.189)	0.704* (0.374)	0.562 (0.429)	0.533*** (0.147)	0.516*** (0.150)
Distance from Moscow	0.061** (0.026)	0.064** (0.030)	0.061** (0.026)	0.062** (0.027)	0.055* (0.029)	0.048* (0.026)	0.065** (0.030)	0.092* (0.047)	0.088* (0.046)	0.196 (0.129)	0.179 (0.124)	0.066** (0.031)	0.062** (0.030)
Dummy border region non-CIS	-0.069 (0.197)	-0.068 (0.196)	-0.069 (0.199)	-0.013 (0.180)	-0.032 (0.184)	-0.002 (0.181)	-0.074 (0.201)	0.047 (0.263)	-0.086 (0.217)	0.336 (0.475)	0.084 (0.510)	-0.037 (0.214)	-0.035 (0.213)
Dummy border region CIS	0.016 (0.201)	0.001 (0.226)	0.016 (0.199)	0.015 (0.208)	0.052 (0.233)	0.003 (0.224)	0.007 (0.224)	-0.006 (0.276)	0.002 (0.227)	-0.152 (0.449)	-0.217 (0.493)	0.052 (0.205)	0.052 (0.205)
Urbanization	-8.329 (5.798)	-7.86 (5.443)	-8.323 (5.924)	-2.985 (7.300)	-6.364 (5.414)	-7.439 (5.181)	-9.183 (5.819)	-6.877 (8.901)	-8.687 (6.773)	-20.126 (20.532)	-11.65 (17.125)	-7.789 (6.950)	-7.67 (6.852)
Fiscal transfers	0.278 (0.442)	0.261 (0.463)	0.277 (0.438)	0.163 (0.447)	0.530 (0.449)	0.502 (0.432)	0.233 (0.443)	0.178 (0.649)	0.234 (0.543)	-1.171 (2.251)	-1.371 (2.548)	0.025 (0.541)	0.077 (0.540)
Democracy	0.009 (0.014)	0.01 (0.016)	0.009 (0.015)	0.004 (0.016)	0.009 (0.015)	0.008 (0.015)	0.011 (0.016)	0.018 (0.020)	0.013 (0.017)	0.044 (0.033)	0.035 (0.029)		
Power (Jarocinska)		-0.077 (0.167)			0.147 (0.223)	0.227 (0.153)	-0.084 (0.172)	-0.167 (0.196)	-0.123 (0.208)	-0.365 (0.373)	-0.417 (0.417)		
Power (RUIE)			-0.002 (0.088)										
Power (UI)				-0.111 (0.099)									
Tensions (RUIE)					-0.206* (0.115)								
Tensions (MFK)						-0.158*** (0.055)							
Declarations							0.129 (0.200)						
Regulatory capture								0.077 (0.515)					
Industrial concentration									0.003 (0.008)				
TI perceived										-1.096 (0.782)			
TI real											-0.467 (0.629)		
Resources I												-0.050 (0.064)	
Resources II													-0.006 (0.006)
Total acts	0.525*** (0.193)	0.538*** (0.190)	0.525** (0.201)	0.483** (0.197)	0.532*** (0.195)	0.572*** (0.195)	0.501** (0.193)	0.529** (0.207)	0.546** (0.219)	0.479 (0.362)	0.573 (0.425)	0.495** (0.189)	0.502*** (0.184)
Constant	1.184 (1.542)	1.539 (1.978)	1.184 (1.547)	1.429 (1.604)	0.351 (2.114)	-0.309 (1.918)	1.629 (1.977)	1.744 (2.124)	1.558 (1.857)	4.286 (4.054)	3.228 (3.979)	1.829 (1.617)	1.682 (1.576)
Observations	88	88	88	81	88	88	88	73	79	40	40	78	78
R²	0.280	0.284	0.280	0.297	0.308	0.322	0.287	0.325	0.308	0.441	0.398	0.286	0.288
J.-B. test	1520***	1304***	1523***	1413***	1594***	1427***	1286***	911.9***	987.9***	124***	155.9***	1322***	1298***

Note: see Table 3. Outlier in all regressions with a significant Jarque-Bera statistics is Saratov. After exclusion of the outlier distance from Moscow in regression (C149) becomes insignificant, but keeps its sign, distance from average income in regression (C155) and (C156) becomes insignificant, but keeps its sign

Table C13: Determinants of regulatory decentralization, 1995-1999, dep. Var.: number of contradictions, controlling for income per capita

	(C157) Negative binomial	(C158) Negative binomial	(C159) Negative binomial	(C160) Negative binomial	(C161) Negative binomial	(C162) Negative binomial	(C163) Negative binomial	(C164) Negative binomial	(C165) Negative binomial	(C166) Negative binomial	(C167) Negative binomial	(C168) Negative binomial	(C169) Negative binomial
Territory	0.047 (0.070)	0.047 (0.070)	0.048 (0.071)	0.031 (0.067)	-0.005 (0.069)	0.015 (0.067)	0.042 (0.068)	0.034 (0.072)	-0.01 (0.072)	-0.043 (0.136)	0.024 (0.151)	0.031 (0.085)	0.03 (0.081)
Population	0.072 (0.076)	0.072 (0.076)	0.073 (0.076)	0.104 (0.066)	0.061 (0.071)	0.02 (0.071)	0.076 (0.075)	0.168* (0.094)	0.132 (0.090)	0.254*** (0.085)	0.278*** (0.098)	0.133 (0.101)	0.132 (0.100)
Oil and gas	0.375 (0.423)	0.373 (0.446)	0.365 (0.418)	-1.651*** (0.532)	0.231 (0.450)	0.328 (0.461)	0.301 (0.452)	0.729*** (0.255)	0.728** (0.325)	0.724** (0.326)	0.732** (0.374)		
Income per capita	-0.045 (0.109)	-0.045 (0.110)	-0.041 (0.108)	0.047 (0.082)	-0.006 (0.104)	-0.022 (0.102)	-0.029 (0.111)	0.053 (0.093)	0.064 (0.097)	0.068 (0.175)	0.024 (0.176)	0.107 (0.096)	0.108 (0.097)
Dummy autonomous okrug	0.059 (0.253)	0.059 (0.253)	0.068 (0.250)	0.404 (0.273)	0.047 (0.219)	-0.086 (0.224)	-0.014 (0.269)	-0.824*** (0.191)					
Dummy republic	0.507*** (0.119)	0.507*** (0.134)	0.511*** (0.122)	0.615*** (0.127)	0.469*** (0.129)	0.461*** (0.132)	0.414** (0.176)	0.660*** (0.143)	0.586*** (0.140)	0.580** (0.270)	0.550* (0.318)	0.562*** (0.122)	0.558*** (0.123)
Distance from Moscow	0.057*** (0.021)	0.057*** (0.021)	0.057*** (0.021)	0.054*** (0.020)	0.044** (0.019)	0.040** (0.019)	0.057*** (0.021)	0.066** (0.026)	0.067** (0.027)	0.105* (0.057)	0.097* (0.055)	0.055** (0.026)	0.053** (0.026)
Dummy border region non-CIS	0.037 (0.180)	0.037 (0.180)	0.048 (0.183)	0.035 (0.171)	0.042 (0.160)	0.058 (0.167)	0.036 (0.181)	0.162 (0.229)	0.015 (0.180)	0.500 (0.350)	0.333 (0.325)	0.071 (0.173)	0.073 (0.173)
Dummy border region CIS	0.136 (0.116)	0.136 (0.123)	0.130 (0.113)	0.113 (0.111)	0.201* (0.121)	0.132 (0.120)	0.140 (0.122)	0.155 (0.135)	0.129 (0.130)	0.105 (0.214)	0.093 (0.218)	0.174 (0.120)	0.175 (0.119)
Urbanization	-4.699 (4.398)	-4.702 (4.389)	-4.579 (4.409)	-0.215 (5.142)	-3.049 (4.012)	-4.693 (4.028)	-5.768 (4.510)	-1.718 (5.503)	-4.689 (5.093)	-6.174 (11.125)	-1.440 (10.045)	-4.051 (5.094)	-4.003 (5.076)
Fiscal transfers	0.285 (0.395)	0.285 (0.396)	0.281 (0.393)	0.289 (0.375)	0.700* (0.373)	0.529 (0.374)	0.279 (0.383)	0.421 (0.522)	0.390 (0.499)	-0.125 (0.978)	-0.154 (1.075)	0.337 (0.488)	0.363 (0.510)
Democracy	0.004 (0.009)	0.004 (0.010)	0.002 (0.010)	-0.001 (0.010)	0.004 (0.009)	0.003 (0.009)	0.004 (0.010)	0.009 (0.010)	0.006 (0.010)	0.023 (0.016)	0.019 (0.015)		
Power (Jarocinska)		0.001 (0.089)			0.282** (0.126)	0.284*** (0.102)	-0.005 (0.090)	-0.069 (0.095)	-0.021 (0.110)	-0.174 (0.182)	-0.177 (0.184)		
Power (RUIE)			-0.045 (0.066)										
Power (UI)				-0.067 (0.058)									
Tensions (RUIE)					-0.248*** (0.091)								
Tensions (MFK)						-0.146*** (0.041)							
Declarations							0.091 (0.138)						
Regulatory capture								-0.109 (0.357)					
Industrial concentration									0.000 (0.005)				
TI perceived										-0.579 (0.411)			
TI real											-0.247 (0.379)		
Resources I												-0.013 (0.048)	
Resources II													-0.002 (0.004)
Total acts	0.610*** (0.187)	0.610*** (0.186)	0.628*** (0.186)	0.561*** (0.185)	0.596*** (0.187)	0.630*** (0.183)	0.582*** (0.186)	0.560*** (0.196)	0.578*** (0.200)	0.563** (0.244)	0.576** (0.290)	0.552*** (0.192)	0.556*** (0.188)
Constant	0.502 (1.490)	0.496 (1.637)	0.494 (1.473)	0.739 (1.484)	-1.034 (1.673)	-1.157 (1.617)	0.572 (1.620)	0.81 (1.753)	0.683 (1.696)	1.708 (2.355)	1.226 (2.660)	0.925 (1.498)	0.875 (1.499)
Observations	88	88	88	81	88	88	88	73	79	40	40	78	78
Pseudo R²	0.040	0.040	0.041	0.044	0.046	0.046	0.040	0.046	0.041	0.050	0.047	0.039	0.039
Wald Chi-stat	3727.767 ***	3727.575 ***	3723.614 ***	3087.271 ***	3410.582 ***	3346.211 ***	3720.470 ***	3899.282 ***	3434.767 ***	1297.565 ***	1364.419 ***	3521.712 ***	3521.861 ***

Notes: see Table 3

Table C14: Determinants of regulatory decentralization, 1995-1999, dep. Var.: number of contradictions, controlling for distance from average income

	(C170) Negative binomial	(C171) Negative binomial	(C172) Negative binomial	(C173) Negative binomial	(C174) Negative binomial	(C175) Negative binomial	(C176) Negative binomial	(C177) Negative binomial	(C178) Negative binomial	(C179) Negative binomial	(C180) Negative binomial	(C181) Negative binomial	(C182) Negative binomial
Territory	0.043 (0.070)	0.043 (0.070)	0.044 (0.072)	0.033 (0.068)	-0.006 (0.070)	0.014 (0.068)	0.04 (0.069)	0.035 (0.071)	-0.013 (0.072)	-0.047 (0.132)	0.020 (0.150)	0.026 (0.086)	0.025 (0.082)
Population	0.077 (0.075)	0.077 (0.075)	0.078 (0.075)	0.100 (0.066)	0.062 (0.069)	0.023 (0.069)	0.079 (0.074)	0.165* (0.095)	0.129 (0.091)	0.247*** (0.083)	0.266*** (0.096)	0.124 (0.101)	0.123 (0.100)
Oil and gas	0.389 (0.415)	0.389 (0.440)	0.38 (0.410)	-1.791*** (0.547)	0.252 (0.446)	0.363 (0.455)	0.32 (0.448)	0.711*** (0.255)	0.687** (0.330)	0.691** (0.332)	0.696* (0.379)		
Distance from average income	-0.061 (0.128)	-0.062 (0.128)	-0.057 (0.127)	0.075 (0.088)	-0.020 (0.122)	-0.049 (0.122)	-0.044 (0.129)	0.084 (0.093)	0.138 (0.102)	0.125 (0.162)	0.081 (0.175)	0.176 (0.119)	0.181 (0.121)
Dummy autonomous okrug	0.072 (0.258)	0.072 (0.258)	0.081 (0.255)	0.398 (0.270)	0.060 (0.222)	-0.062 (0.224)	0.002 (0.276)	-0.871*** (0.183)					
Dummy republic	0.510*** (0.119)	0.510*** (0.133)	0.514*** (0.121)	0.613*** (0.127)	0.471*** (0.128)	0.464*** (0.131)	0.420** (0.177)	0.657*** (0.143)	0.582*** (0.139)	0.594** (0.279)	0.568* (0.330)	0.552*** (0.122)	0.546*** (0.123)
Distance from Moscow	0.056*** (0.019)	0.056*** (0.020)	0.056*** (0.019)	0.056*** (0.020)	0.043** (0.018)	0.039** (0.018)	0.056*** (0.020)	0.068** (0.027)	0.071** (0.028)	0.112* (0.058)	0.103* (0.057)	0.059** (0.025)	0.057** (0.026)
Dummy border region non-CIS	0.036 (0.179)	0.036 (0.179)	0.047 (0.182)	0.037 (0.171)	0.041 (0.159)	0.057 (0.166)	0.035 (0.180)	0.165 (0.227)	0.016 (0.181)	0.489 (0.352)	0.318 (0.322)	0.077 (0.174)	0.080 (0.174)
Dummy border region CIS	0.137 (0.116)	0.137 (0.123)	0.13 (0.113)	0.113 (0.111)	0.200* (0.121)	0.131 (0.120)	0.140 (0.123)	0.155 (0.134)	0.127 (0.130)	0.104 (0.214)	0.089 (0.216)	0.171 (0.119)	0.172 (0.119)
Urbanization	-4.761 (4.259)	-4.762 (4.254)	-4.608 (4.264)	-0.145 (4.926)	-2.881 (3.922)	-4.450 (3.923)	-5.707 (4.356)	-1.816 (5.245)	-5.181 (4.753)	-6.989 (9.807)	-2.639 (8.896)	-3.96 (4.827)	-3.908 (4.807)
Fiscal transfers	0.336 (0.397)	0.336 (0.397)	0.327 (0.394)	0.226 (0.395)	0.714* (0.369)	0.568 (0.371)	0.315 (0.386)	0.362 (0.538)	0.305 (0.507)	-0.196 (0.956)	-0.244 (1.033)	0.216 (0.497)	0.246 (0.516)
Democracy	0.003 (0.009)	0.003 (0.010)	0.002 (0.010)	0.000 (0.010)	0.004 (0.009)	0.003 (0.009)	0.004 (0.010)	0.009 (0.011)	0.007 (0.010)	0.025 (0.016)	0.020 (0.015)		
Power (Jarocinska)		0.000 (0.089)			0.281** (0.126)	0.284*** (0.102)	-0.005 (0.090)	-0.066 (0.094)	-0.023 (0.108)	-0.169 (0.172)	-0.175 (0.175)		
Power (RUIE)			-0.045 (0.066)										
Power (UI)				-0.067 (0.058)									
Tensions (RUIE)					-0.247*** (0.091)								
Tensions (MFK)						-0.146*** (0.041)							
Declarations							0.088 (0.139)						
Regulatory capture								-0.107 (0.356)					
Industrial concentration									0.000 (0.005)				
TI perceived										-0.583 (0.407)			
TI real											-0.233 (0.381)		
Resources I												-0.02 (0.048)	
Resources II													-0.002 (0.004)
Constant	0.458 (1.483)	0.456 (1.619)	0.448 (1.469)	0.81 (1.478)	-1.091 (1.651)	-1.264 (1.615)	0.524 (1.602)	0.893 (1.732)	0.853 (1.657)	1.938 (2.170)	1.525 (2.498)	1.043 (1.472)	0.984 (1.471)
Total acts	0.614*** (0.186)	0.614*** (0.184)	0.633*** (0.186)	0.552*** (0.185)	0.603*** (0.184)	0.643*** (0.181)	0.589*** (0.185)	0.549*** (0.197)	0.559*** (0.198)	0.533** (0.246)	0.542* (0.295)	0.546*** (0.188)	0.549*** (0.183)
Observations	88	88	88	81	88	88	88	73	79	40	40	78	78
Pseudo R2	0.040	0.040	0.041	0.044	0.046	0.046	0.040	0.046	0.041	0.050	0.047	0.040	0.040
Wald Chi-stat	3727.792 ***	3727.59 ***	3723.619 ***	3079.432 ***	3410.791 ***	3345.815 ***	3720.550 ***	2897.817 ***	3412.284 ***	1291.575 ***	1362.612 ***	3498.373 ***	3498.532 ***

Note: see Table 3

Table C15: Determinants of constitutional decentralization, 1995-1999, dep. Var.: index for regional constitutions, controlling for average income per capita

	(C183) Ordered logit	(C184) Ordered logit	(C185) Ordered logit	(C186) Ordered logit	(C187) Ordered logit	(C188) Ordered logit	(C189) Ordered logit	(C190) Ordered logit	(C191) Ordered logit	(C192) Ordered logit	(C193) Ordered logit	(C194) Ordered logit	(C195) Ordered logit
Territory	0.594 (0.661)	0.67 (0.629)	0.597 (0.650)	0.667 (0.697)	0.767 (0.639)	0.655 (0.627)	0.662 (0.642)	0.961 (0.995)	0.779 (0.702)	-0.272 (0.718)	-0.201 (0.630)	0.226 (0.845)	0.186 (0.873)
Population	0.978*** (0.360)	0.985*** (0.361)	0.969*** (0.362)	0.825** (0.417)	1.017*** (0.368)	0.957*** (0.370)	0.986*** (0.362)	1.256*** (0.478)	1.092*** (0.403)	0.327 (0.878)	0.102 (1.039)	0.999** (0.396)	0.975** (0.389)
Oil and gas	-2.883* (1.681)	-2.653 (1.702)	-2.832* (1.657)	-0.610 (3.215)	-2.437 (1.736)	-2.724 (1.701)	-2.695 (1.668)	-2.768 (1.939)	-2.931* (1.513)	-1.733 (1.508)	-1.34 (1.981)		
Income per capita	-0.495 (0.399)	-0.482 (0.392)	-0.515 (0.395)	-0.606 (0.388)	-0.532 (0.392)	-0.473 (0.392)	-0.471 (0.402)	-0.660* (0.389)	-0.790** (0.360)	-1.196 (0.762)	-1.142 (0.802)	-0.698** (0.341)	-0.670** (0.341)
Dummy autonomous okrug	1.692 (1.041)	1.716 (1.046)	1.657 (1.059)	1.084 (1.841)	1.694 (1.077)	1.651 (1.046)	1.664 (1.202)	2.928*** (0.909)					
Dummy republic	2.214*** (0.624)	2.305*** (0.682)	2.198*** (0.612)	1.976*** (0.653)	2.346*** (0.678)	2.292*** (0.686)	2.225** (1.084)	1.867** (0.907)	2.068*** (0.717)	3.528 (2.225)	3.536 (2.292)	1.905*** (0.704)	1.814** (0.711)
Distance from Moscow	0.156 (0.101)	0.164 (0.103)	0.153 (0.100)	0.17 (0.105)	0.183* (0.098)	0.155 (0.103)	0.164 (0.104)	0.212 (0.151)	0.178 (0.127)	0.219 (0.321)	0.238 (0.333)	0.213* (0.111)	0.192* (0.114)
Dummy border region non-CIS	-0.146 (0.871)	-0.161 (0.883)	-0.171 (0.857)	-0.097 (0.937)	-0.213 (0.871)	-0.122 (0.886)	-0.166 (0.890)	-0.532 (1.144)	-0.344 (0.914)	-1.08 (2.192)	-1.164 (2.121)	-0.802 (0.850)	-0.817 (0.883)
Dummy border region CIS	0.303 (0.598)	0.244 (0.618)	0.326 (0.604)	0.308 (0.621)	0.128 (0.633)	0.249 (0.622)	0.243 (0.622)	-0.318 (0.754)	0.023 (0.648)	-0.224 (1.097)	-0.344 (1.186)	0.036 (0.585)	0.046 (0.592)
Urbanization	-8.421 (20.580)	-7.166 (20.107)	-9.387 (21.687)	-11.783 (28.566)	-11.097 (20.952)	-6.668 (20.634)	-8.105 (23.668)	-25.803 (30.176)	-14.268 (27.265)	-0.969 (55.104)	-8.611 (66.819)	-30.398 (26.812)	-30.515 (27.062)
Fiscal transfers	-1.265 (2.190)	-1.32 (2.244)	-1.2 (2.184)	-2.121 (2.558)	-1.906 (2.204)	-1.17 (2.276)	-1.325 (2.266)	-0.645 (2.899)	-1.192 (3.153)	-7.161 (6.803)	-8.058 (7.346)	0.441 (2.143)	0.722 (2.102)
Democracy	-0.082* (0.046)	-0.079* (0.045)	-0.077 (0.051)	-0.086* (0.050)	-0.079* (0.046)	-0.079* (0.045)	-0.079* (0.047)	-0.062 (0.057)	-0.08 (0.049)	-0.138 (0.089)	-0.134 (0.092)		
Power (Jarocinska)		-0.209 (0.406)			-0.662 (0.616)	-0.018 (0.553)	-0.215 (0.419)	-0.289 (0.514)	-0.142 (0.456)	-0.335 (0.864)	-0.323 (0.851)		
Power (RUIE)			0.144 (0.395)										
Power (UI)				0.063 (0.298)									
Tensions (RUIE)					0.424 (0.425)								
Tensions (MFK)						-0.103 (0.233)							
Declarations							0.078 (0.783)						
Regulatory capture								0.479 (1.666)					
Industrial concentration									-0.014 (0.023)				
TI perceived										-0.442 (2.131)			
TI real											0.569 (1.887)		
Resources I												-0.217 (0.323)	
Resources II													-0.027 (0.025)
Observations	87	87	87	80	87	87	87	72	78	40	40	77	77
Pseudo R²	0.113	0.114	0.114	0.109	0.118	0.115	0.114	0.111	0.120	0.155	0.156	0.098	0.102
LR proportional odds	76.88**	78.23*	79.97**	78.68*	93.62**	92.01**	99.05***	78.97*	81.17*	53.92	59.89	70.86**	83.75***

Note: see Table 3

Table C16: Determinants of constitutional decentralization, 1995-1999, dep. Var.: index for regional constitutions, controlling for distance from average income

	(C196) Ordered logit	(C197) Ordered logit	(C198) Ordered logit	(C199) Ordered logit	(C200) Ordered logit	(C201) Ordered logit	(C202) Ordered logit	(C203) Ordered logit	(C204) Ordered logit	(C205) Ordered logit	(C206) Ordered logit	(C207) Ordered logit	(C208) Ordered logit
Territory	0.548 (0.661)	0.630 (0.630)	0.549 (0.649)	0.616 (0.690)	0.725 (0.641)	0.615 (0.627)	0.622 (0.641)	0.928 (0.977)	0.723 (0.688)	-0.281 (0.705)	-0.196 (0.616)	0.132 (0.833)	0.087 (0.853)
Population	1.025*** (0.362)	1.032*** (0.363)	1.018*** (0.363)	0.877** (0.420)	1.070*** (0.371)	1.001*** (0.371)	1.031*** (0.364)	1.295*** (0.478)	1.131*** (0.400)	0.346 (0.877)	0.099 (1.003)	0.995** (0.394)	0.968** (0.386)
Oil and gas	-2.869* (1.721)	-2.616 (1.734)	-2.823* (1.699)	0.253 (3.150)	-2.389 (1.781)	-2.678 (1.717)	-2.664 (1.707)	-2.779 (1.918)	-3.025** (1.498)	-1.958 (1.534)	-1.504 (2.010)		
Distance from average income	-0.555 (0.459)	-0.547 (0.445)	-0.574 (0.457)	-0.749* (0.409)	-0.608 (0.451)	-0.546 (0.441)	-0.535 (0.459)	-0.807** (0.399)	-0.887** (0.397)	-1.414* (0.797)	-1.359 (0.850)	-0.600 (0.368)	-0.539 (0.369)
Dummy autonomous okrug	1.749 (1.088)	1.780 (1.091)	1.715 (1.107)	1.039 (1.813)	1.768 (1.124)	1.717 (1.087)	1.717 (1.249)	3.137*** (0.875)					
Dummy republic	2.230*** (0.622)	2.325*** (0.678)	2.215*** (0.610)	1.991*** (0.648)	2.368*** (0.671)	2.312*** (0.682)	2.230** (1.076)	1.920** (0.899)	2.094*** (0.704)	3.464* (2.077)	3.472 (2.161)	1.883*** (0.693)	1.791** (0.702)
Distance from Moscow	0.137 (0.095)	0.146 (0.097)	0.134 (0.094)	0.149 (0.100)	0.164* (0.093)	0.137 (0.098)	0.147 (0.099)	0.191 (0.153)	0.152 (0.128)	0.174 (0.344)	0.196 (0.353)	0.195* (0.109)	0.175 (0.113)
Dummy border region non-CIS	-0.131 (0.870)	-0.148 (0.884)	-0.156 (0.860)	-0.09 (0.930)	-0.195 (0.870)	-0.107 (0.888)	-0.155 (0.892)	-0.536 (1.154)	-0.34 (0.924)	-1.038 (2.122)	-1.126 (2.073)	-0.815 (0.847)	-0.828 (0.879)
Dummy border region CIS	0.309 (0.597)	0.247 (0.619)	0.331 (0.604)	0.299 (0.623)	0.129 (0.636)	0.252 (0.623)	0.245 (0.622)	-0.307 (0.752)	0.035 (0.650)	-0.188 (1.110)	-0.318 (1.180)	0.047 (0.588)	0.057 (0.595)
Urbanization	-10.459 (20.761)	-8.976 (20.357)	-11.528 (21.848)	-14.917 (27.784)	-13.139 (21.055)	-8.244 (21.017)	-10.034 (23.877)	-27.516 (30.590)	-18.875 (27.021)	-3.791 (52.357)	-11.496 (62.677)	-37.668 (26.089)	-37.951 (26.448)
Fiscal transfers	-0.821 (2.145)	-0.886 (2.202)	-0.744 (2.136)	-1.509 (2.499)	-1.440 (2.162)	-0.724 (2.250)	-0.901 (2.238)	-0.163 (2.949)	-0.696 (3.110)	-6.892 (6.927)	-7.869 (7.319)	0.734 (2.159)	0.966 (2.125)
Democracy	-0.086* (0.046)	-0.083* (0.046)	-0.080 (0.051)	-0.089* (0.050)	-0.083* (0.046)	-0.082* (0.045)	-0.082* (0.048)	-0.067 (0.058)	-0.084* (0.050)	-0.151 (0.095)	-0.146 (0.098)		
Power (Jarocinska)		-0.218 (0.409)			-0.674 (0.623)	-0.01 (0.562)	-0.225 (0.422)	-0.321 (0.509)	-0.172 (0.452)	-0.414 (0.849)	-0.394 (0.842)		
Power (RUIE)			0.139 (0.392)										
Power (UI)				0.059 (0.300)									
Tension (RUIE)					0.426 (0.429)								
Tension (MFK)						-0.112 (0.238)							
Declarations							0.093 (0.776)						
Regulatory capture								0.349 (1.663)					
Industrial concentration									-0.013 (0.023)				
TI perceived										-0.508 (2.078)			
TI real											0.632 (1.846)		
Resources I												-0.209 (0.328)	
Resources II													-0.027 (0.025)
Observations	87	87	87	80	87	87	87	72	78	40	40	77	77
Pseudo R²	0.113	0.114	0.114	0.109	0.118	0.115	0.114	0.112	0.119	0.157	0.158	0.095	0.099
LR proportional odds	76.48**	82.36**	79.57**	77.45*	84.70*	84.24*	98.82***	78.95*	81.76*	54.84	59.26	83.80***	92.99***

Note: see Table 3

Table C17: Determinants of constitutional decentralization, 1995-1999, dep. Var.: index for power-sharing treaties, controlling for average income per capita

	(C209) Tobit	(C210) Tobit	(C211) Tobit	(C212) Tobit	(C213) Tobit	(C214) Tobit	(C215) Tobit	(C216) Tobit	(C217) Tobit	(C218) Tobit	(C219) Tobit	(C220) Tobit	(C221) Tobit
Territory	2.342 (2.047)	1.979 (2.044)	2.398 (2.030)	3.172 (1.999)	1.745 (2.051)	1.899 (2.034)	1.952 (1.987)	1.4 (2.071)	2.043 (2.006)	-0.561 (2.980)	-0.309 (2.904)	1.329 (2.144)	1.213 (2.092)
Population	2.715* (1.407)	2.645* (1.381)	2.613* (1.395)	2.302* (1.329)	2.561* (1.373)	2.415* (1.404)	2.631* (1.332)	2.413 (1.462)	2.649* (1.350)	4.769** (2.202)	5.937** (2.608)	2.605* (1.501)	2.513* (1.492)
Oil and as	-23.543 (17.573)	-25.471 (18.750)	-22.957 (17.899)	167.884 (106.549)	-26.066 (18.945)	-25.948 (19.289)	-29.285 (19.707)	-25.962 (20.647)	-23.051 (17.772)	-28.341 (25.461)	-30.603 (29.641)		
Income per capita	-1.695 (2.202)	-1.869 (2.174)	-1.973 (2.201)	-1.335 (2.115)	-1.641 (2.174)	-1.754 (2.165)	-1.742 (2.096)	-1.808 (2.237)	-1.426 (2.148)	-0.258 (2.256)	-0.872 (2.299)	-2.320 (2.180)	-2.256 (2.169)
Dummy republic	5.875*** (2.187)	5.252** (2.219)	5.764*** (2.168)	4.536** (2.194)	5.006** (2.221)	5.051** (2.219)	-0.170 (3.792)	4.184* (2.495)	5.440** (2.194)	5.700* (3.339)	4.889 (3.364)	5.820** (2.255)	5.628** (2.271)
Distance from Moscow	-0.116 (0.419)	-0.200 (0.421)	-0.160 (0.417)	-0.306 (0.407)	-0.288 (0.435)	-0.300 (0.442)	-0.339 (0.420)	-0.004 (0.441)	-0.120 (0.416)	0.249 (0.631)	0.112 (0.641)	0.011 (0.426)	-0.045 (0.438)
Dummy border region non-CIS	-0.382 (2.882)	-0.192 (2.830)	-0.517 (2.849)	0.117 (2.758)	0.204 (2.855)	0.215 (2.873)	0.030 (2.729)	-3.289 (3.586)	-0.331 (2.788)	-1.612 (4.217)	-2.064 (4.021)	-1.167 (2.953)	-1.236 (2.941)
Dummy border region CIS	3.703* (1.983)	3.837* (1.964)	3.790* (1.971)	4.247** (1.932)	4.072** (1.980)	3.876* (1.953)	3.964** (1.917)	2.998 (2.105)	4.015** (1.940)	3.168 (2.566)	3.510 (2.594)	3.046 (1.986)	3.085 (1.975)
Urbanization	343.231*** (115.841)	329.909*** (114.251)	349.264*** (115.451)	348.568*** (110.697)	327.088*** (112.656)	329.392*** (113.399)	299.370*** (111.542)	298.098** (126.769)	338.792*** (112.630)	-17.258 (152.848)	62.825 (168.602)	337.914*** (111.559)	337.180*** (110.746)
Fiscal transfers	-1.651 (8.443)	-0.119 (8.412)	-0.821 (8.401)	5.374 (8.828)	2.031 (8.849)	1.14 (8.553)	2.524 (8.530)	3.315 (8.936)	3.909 (8.618)	-7.66 (17.835)	-3.359 (18.511)	-0.117 (8.474)	0.487 (8.498)
Democracy	-0.049 (0.168)	-0.062 (0.166)	-0.023 (0.169)	0.043 (0.165)	-0.064 (0.165)	-0.068 (0.165)	-0.076 (0.162)	-0.010 (0.179)	-0.065 (0.163)	-0.035 (0.190)	-0.080 (0.186)		
Power (Jarocinska)		1.401 (1.314)			2.688 (2.176)	2.685 (2.233)	1.445 (1.277)	1.853 (1.376)	0.989 (1.320)	2.712 (1.805)	2.544 (1.783)		
Power (RUIE)			1.143 (1.164)										
Power (UI)				-0.160 (0.914)									
Tensions (RUIE)					-1.129 (1.526)								
Tensions (MFK)						-0.667 (0.940)							
Declarations							4.932* (2.946)						
Regulatory capture								9.003 (6.248)					
Industrial concentration									0.093 (0.062)				
TI perceived										-3.068 (5.074)			
TI real											-4.649 (4.599)		
Resources I												-0.231 (0.829)	
Resources II													-0.044 (0.071)
Constant	-22.241** (8.583)	-30.459** (11.667)	-25.847*** (9.364)	-26.377*** (8.534)	-37.185** (14.898)	-37.082** (15.034)	-41.012*** (13.566)	-33.196*** (12.316)	-30.626*** (11.389)	-15.981 (16.125)	-19.8 (16.560)	-21.796** (9.936)	-21.491** (8.799)
Observations	79	79	79	75	79	79	79	72	79	40	40	78	78
Pseudo R²	0.086	0.089	0.089	0.090	0.091	0.091	0.097	0.085	0.096	0.116	0.119	0.071	0.072

Notes: see Table 3

Table C18: Determinants of constitutional decentralization, 1995-1999, dep. Var.: index for power-sharing treaties, controlling for distance from average income

	(C222) Tobit	(C2223) Tobit	(C224) Tobit	(C225) Tobit	(C226) Tobit	(C227) Tobit	(C228) Tobit	(C229) Tobit	(C230) Tobit	(C231) Tobit	(C232) Tobit	(C233) Tobit	(C234) Tobit
Territory	2.164 (2.012)	1.788 (2.017)	2.178 (1.996)	2.995 (1.971)	1.565 (2.019)	1.725 (2.005)	1.783 (1.961)	1.171 (2.048)	1.865 (1.979)	-0.815 (2.971)	-0.574 (2.905)	1.068 (2.111)	0.931 (2.056)
Population	2.746* (1.420)	2.675* (1.395)	2.651* (1.409)	2.284* (1.344)	2.582* (1.386)	2.433* (1.415)	2.676* (1.346)	2.388 (1.487)	2.647* (1.363)	4.508** (2.196)	5.482** (2.576)	2.643* (1.526)	2.538* (1.517)
Oil and gas	-24.101 (17.625)	-26.068 (18.776)	-23.690 (17.941)	169.264 (107.327)	-26.623 (18.970)	-26.494 (19.370)	-29.84 (19.773)	-26.691 (20.455)	-23.638 (17.726)	-29.183 (25.072)	-31.266 (28.781)		
Distance from average income	-1.582 (2.534)	-1.646 (2.498)	-1.759 (2.520)	-0.874 (2.432)	-1.431 (2.488)	-1.611 (2.478)	-1.609 (2.414)	-1.235 (2.603)	-1.011 (2.480)	0.873 (2.583)	0.342 (2.608)	-2.134 (2.526)	-1.968 (2.514)
Dummy republic	5.865*** (2.188)	5.267** (2.224)	5.757** (2.172)	4.507** (2.202)	5.005** (2.225)	5.056** (2.223)	-0.201 (3.791)	4.202* (2.514)	5.442** (2.199)	5.768* (3.329)	5.017 (3.361)	5.800** (2.267)	5.608** (2.287)
Distance from Moscow	-0.169 (0.422)	-0.252 (0.424)	-0.217 (0.421)	-0.343 (0.406)	-0.339 (0.436)	-0.358 (0.445)	-0.391 (0.423)	-0.048 (0.444)	-0.155 (0.421)	0.333 (0.655)	0.203 (0.668)	-0.051 (0.428)	-0.100 (0.439)
Dummy border region non-CIS	-0.414 (2.884)	-0.232 (2.834)	-0.545 (2.855)	0.106 (2.763)	0.187 (2.857)	0.205 (2.877)	0.008 (2.732)	-3.355 (3.595)	-0.364 (2.791)	-1.895 (4.216)	-2.411 (4.031)	-1.228 (2.956)	-1.298 (2.945)
Dummy border region CIS	3.705* (1.985)	3.842* (1.968)	3.792* (1.974)	4.265** (1.936)	4.091** (1.983)	3.881* (1.956)	3.971** (1.920)	3.027 (2.108)	4.035** (1.944)	3.162 (2.560)	3.410 (2.588)	2.999 (1.988)	3.041 (1.977)
Urbanization	324.707*** (108.047)	308.598*** (107.058)	326.177*** (107.479)	327.986*** (103.720)	308.521*** (105.471)	310.777*** (106.270)	280.465*** (104.481)	272.571** (122.021)	318.368*** (105.613)	-53.826 (149.619)	13.177 (162.935)	312.147*** (103.892)	310.207*** (103.003)
Fiscal transfers	-0.746 (8.638)	0.729 (8.618)	0.122 (8.609)	5.938 (8.912)	2.883 (8.995)	2.075 (8.752)	3.404 (8.728)	3.769 (9.233)	4.434 (8.741)	-9.429 (17.957)	-6.062 (18.614)	1.058 (8.751)	1.484 (8.747)
Democracy	-0.049 (0.171)	-0.060 (0.169)	-0.023 (0.172)	0.052 (0.168)	-0.062 (0.167)	-0.067 (0.168)	-0.075 (0.164)	-0.003 (0.182)	-0.058 (0.166)	-0.005 (0.196)	-0.050 (0.193)		
Power (Jarocinska)		1.335 (1.313)			2.701 (2.178)	2.714 (2.240)	1.383 (1.275)	1.778 (1.377)	0.931 (1.318)	2.729 (1.807)	2.540 (1.789)		
Power (RUIE)			1.068 (1.159)										
Power (UI)				-0.215 (0.910)									
Tension (RUIE)					-1.192 (1.522)								
Tension (UI)						-0.713 (0.940)							
Declarations							4.984* (2.949)						
Regulatory capture								8.651 (6.242)					
Industrial concentration									0.094 (0.062)				
TI perceived										-3.200 (5.069)			
TI real											-4.135 (4.547)		
Resources I												-0.184 (0.846)	
Resources II													-0.040 (0.073)
Constant	-21.777** (8.506)	-29.519** (11.543)	-25.038*** (9.234)	-25.813*** (8.454)	-36.738** (14.881)	-36.708** (15.036)	-40.295*** (13.494)	-32.031** (12.198)	-29.786** (11.273)	-14.444 (15.875)	-17.490 (16.226)	-21.368** (10.053)	-20.849** (8.830)
Observations	79	79	79	75	79	79	79	72	79	40	40	78	78
Pseudo R²	0.085	0.088	0.088	0.090	0.090	0.090	0.097	0.084	0.095	0.116	0.119	0.070	0.071

Note: see Table 3

APPENDIX D: EDUCATION AND TAXATION

Table D1: Determinants of fiscal decentralization, 1995-1999, controlling for education

	(D1) OLS	(D2) OLS	(D3) OLS	(D4) OLS	(D5) OLS	(D6) OLS	(D7) OLS	(D8) OLS
	Retention rate	Retention rate	Retention rate and transfers	Retention rate and transfers	Expenditure decentrali- zation	Expenditure decentrali- zation	Retention rate and non-budget funds	Retention rate and non-budget funds
Territory	0.034** (0.017)	0.031* (0.016)	-0.039 (0.064)	-0.040 (0.062)	0.007 (0.012)	0.011 (0.012)	0.017 (0.030)	0.020 (0.029)
Population	-0.143* (0.080)	-0.113* (0.063)	-0.038 (0.282)	0.009 (0.236)	0.014* (0.007)	0.011 (0.008)	-0.234** (0.095)	-0.218*** (0.078)
Oil and gas	0.125 (0.092)	0.134 (0.088)	0.030 (0.304)	-0.076 (0.306)	0.047 (0.045)	0.072* (0.041)	-0.132 (0.106)	-0.109 (0.109)
Income per capita	-0.080* (0.044)		-0.065 (0.174)		0.023* (0.012)		-0.088** (0.043)	
Distance from average income		-0.086** (0.038)		-0.001 (0.171)		0.012 (0.009)		-0.103*** (0.039)
Dummy autonomous okrug	0.068 (0.075)	0.074 (0.072)	0.065 (0.292)	0.027 (0.272)	0.111*** (0.025)	0.115*** (0.025)	0.114 (0.094)	0.142 (0.098)
Dummy republic	0.072** (0.032)	0.073** (0.033)	0.114 (0.130)	0.102 (0.127)	0.031 (0.021)	0.032 (0.021)	0.126** (0.051)	0.128** (0.050)
Distance from Moscow	0.009** (0.004)	0.007* (0.004)	0.061*** (0.017)	0.058*** (0.018)	0.000 (0.003)	0.002 (0.003)	0.008 (0.007)	0.009 (0.007)
Dummy border region non-CIS	-0.023 (0.029)	-0.021 (0.029)	-0.035 (0.139)	-0.028 (0.140)	-0.025 (0.024)	-0.025 (0.024)	-0.067 (0.046)	-0.071 (0.047)
Dummy border region CIS	0.022 (0.021)	0.023 (0.021)	0.029 (0.092)	0.031 (0.092)	-0.021 (0.015)	-0.021 (0.016)	0.040 (0.033)	0.039 (0.032)
Urbanization	2.010* (1.037)	1.762* (1.048)	-14.257** (5.930)	-14.790** (5.689)	-0.581 (0.704)	-0.367 (0.693)	4.778*** (1.786)	4.905*** (1.795)
Fiscal transfers	-0.005 (0.126)	0.047 (0.123)			-0.155*** (0.043)	-0.181*** (0.043)	-0.087 (0.138)	-0.059 (0.135)
Education	-3.623*** (1.150)	-3.681*** (1.214)	-4.208 (5.037)	-3.769 (4.944)	0.862 (0.712)	0.681 (0.696)	-4.736*** (1.730)	-4.913*** (1.682)
Education squared	6.009** (2.356)	6.259** (2.566)	14.352 (10.795)	12.966 (10.616)	-3.188* (1.621)	-2.491* (1.454)	6.134 (3.728)	6.950* (3.764)
Retail trade	0.135 (0.087)	0.112 (0.070)	-0.090 (0.221)	-0.132 (0.180)			0.213** (0.094)	0.199** (0.077)
Net profit	-0.004** (0.002)	-0.004** (0.002)	0.002 (0.007)	0.001 (0.007)			0.000 (0.001)	0.000 (0.001)
Constant	0.757*** (0.136)	0.772*** (0.128)	2.273*** (0.542)	2.295*** (0.510)	0.781*** (0.080)	0.798*** (0.081)	0.645*** (0.212)	0.594*** (0.212)
Minimum quadratic function	0.301	0.294						0.353
Observations	88	88	88	88	88	88	88	88
R²	0.446	0.458	0.631	0.63	0.546	0.537	0.442	0.466
J.-B. test	36.02***	27.54***	559.7***	528.1***	22.93***	19.26***	4.082	3.715

Note: see Table 2. Outliers in regression (D1) and (D2) are Taimyr, Ingushetia, Kalmykia, Altai Rep., Tatarstan, Aginsk Buriatski, in (D3) an (D4) Dagestan, Evenkia, Ust Ordyn Buriatski, Tyva, Kabardino-Balkaria, Chukotka, Northern Ossetia, in (D5) and (D6) Briansk, Rostov, Tula and Novosibirsk. After exclusion of outliers in regression (D1) population, dummy republic, income per capita, urbanization and education squared become insignificant, but keep their sign, in (D2) population, dummy republic, distance from average income, urbanization and education squared become insignificant, but keep their sign, in (D6) oil and gas variable becomes insignificant, but keeps its sign. Minimum of the quadratic function refers to the minimum of the parabola of the function describing the change of decentralization depending upon the level of education.

Table D2: Determinants of regulatory and constitutional decentralization, 1995-1999, controlling for education

	Regulatory decentralization						Constitutional decentralization			
	(D9) OLS	(D10) OLS	(D11) OLS	(D12) OLS	(D13) Negative binomial	(D14) Negative binomial	(D15) Ordered logit	(D16) Ordered logit	(D17) Tobit	(D18) Tobit
	Share of acts	Share of acts	Log number	Log number	Number of acts	Number of acts	Consti- tutions	Consti- tutions	Treaties	Treaties
Territory	0.005	0.003	0.084	0.08	0.077	0.063	0.484	0.503	1.942	1.823
	(0.011)	(0.011)	(0.077)	(0.077)	(0.067)	(0.068)	(0.694)	(0.699)	(2.139)	(2.063)
Population	0.001	0.003	0.052	0.058	0.058	0.073	1.091***	1.072***	3.352**	3.376**
	(0.009)	(0.010)	(0.078)	(0.079)	(0.070)	(0.07)	(0.357)	(0.360)	(1.505)	(1.485)
Oil and gas	0.052	0.048	0.816	0.953*	0.686*	0.709**	-4.285**	4.358***	-27.351	-28.254
	(0.036)	(0.033)	(0.512)	(0.493)	(0.355)	(0.323)	(1.714)	(1.609)	(18.786)	(18.639)
Income per capita	-0.022*		-0.080		-0.148		0.205		0.660	
	(0.012)		(0.101)		(0.099)		(0.364)		(3.289)	
Distance from average income		-0.022		-0.152		-0.177*		0.259		1.754
		(0.014)		(0.098)		(0.101)		(0.361)		(3.956)
Dummy autonomous okrug	0.040	0.041	-0.204	-0.155	-0.023	-0.003	1.319	1.275		
	(0.030)	(0.031)	(0.314)	(0.307)	(0.229)	(0.232)	(0.976)	(1.007)		
Dummy republic	0.053***	0.054***	0.567***	0.579***	0.548***	0.560***	2.417***	2.402***	6.707***	6.680***
	(0.012)	(0.012)	(0.142)	(0.143)	(0.114)	(0.115)	(0.699)	(0.704)	(2.241)	(2.239)
Distance from Moscow	0.006*	0.006*	0.069**	0.067**	0.067***	0.062***	0.140	0.147	-0.213	-0.193
	(0.003)	(0.003)	(0.026)	(0.026)	(0.021)	(0.020)	(0.102)	(0.095)	(0.431)	(0.414)
Dummy border region non-CIS	0.015	0.015	-0.078	-0.082	0.032	0.025	-0.517	-0.512	-0.609	-0.571
	(0.023)	(0.022)	(0.199)	(0.198)	(0.170)	(0.168)	(0.780)	(0.78)	(2.821)	(2.818)
Dummy border region CIS	0.010	0.010	0.044	0.043	0.159	0.163	0.472	0.468	4.440**	4.451**
	(0.040)	(0.041)	(0.204)	(0.155)	(0.023)	(0.003)	(1.319)	(1.275)	(2.062)	(2.059)
Urbanization	-0.565	-0.683	-5.437	-5.440	-2.493	-3.092	-8.873	-8.339	380.965***	385.257***
	(0.472)	(0.477)	(5.501)	(5.249)	(4.181)	(4.156)	(22.379)	(23.097)	(116.503)	(112.960)
Fiscal transfers	-0.023	-0.003	0.019	0.110	0.083	0.238	0.695	0.493	2.706	1.995
	(0.038)	(0.041)	(0.435)	(0.453)	(0.383)	(0.392)	(2.212)	(2.167)	(8.663)	(8.575)
Total acts			0.472**	0.482***	0.561***	0.561***				
			(0.182)	(0.180)	(0.181)	(0.180)				
Education	-0.819	-0.808	-13.946**	-14.537**	-11.107**	-11.237**	-1.411	-1.015	-26.375	-0.537
	(0.593)	(0.595)	(6.687)	(6.870)	(5.442)	(5.370)	(21.128)	(21.052)	(145.286)	(154.228)
Education squared	2.060*	1.968	33.217**	35.176**	26.654**	26.924**	-28.989	-29.905	-40.270	-110.498
	(1.185)	(1.208)	(14.279)	(14.996)	(11.833)	(11.638)	(42.648)	(41.473)	(348.777)	(373.294)
Constant	0.202***	0.198***	3.108	3.046	2.017	1.988			-23.646	-26.228
	(0.065)	(0.066)	(1.881)	(1.863)	(1.684)	(1.670)			(16.459)	(17.409)
Minimum quadratic function			0.210	0.207	0.208	0.209				
Observations	88	88	88	88	88	88	87	87	79	79
R²	0.414	0.412	0.299	0.301						
Pseudo R²					0.043	0.043	0.112	0.113	0.092	0.092
Wald Chi-stat					3650.397***	3652.032***				
LR proportional odds							78.41*	79.68**		
J-B. test	59.22***	64.89***	1581***	1591***						

Notes: see Table 3. Outlier in regressions (D9) and (D10) is Primorski, in (D11) and (D12) Saratov. After exclusion of outliers in regression (D9) income per capita and distance from Moscow become insignificant, but keep their sign, in (D10) distance from Moscow becomes insignificant, but keeps its sign, in (D11) and (D12) oil and gas variable becomes insignificant, but keeps its sign. Minimum of the quadratic function refers to the minimum of the parabola of the function describing the change of decentralization depending upon the level of education.

Table D3: Determinants of decentralization, 1995-1999, impact of total tax revenue

	Fiscal decentralization				Regulatory decentralization			Constitutional decentralization	
	(D19) OLS	(D20) OLS	(D21) OLS	(D22) OLS	(D23) OLS	(D24) OLS	(D25) Negative binomial	(D26) Ordered logit	(D27) Tobit
	Retention rate	Retention rate and transfers	Expenditure decentrali- zation	Retention rate and non- budget funds	Share of acts	Log number	Number of acts	Consti- tutions	Treaties
Territory	0.040** (0.015)	0.018 (0.060)	0.011 (0.013)	0.087*** (0.030)	0.000 (0.011)	0.031 (0.081)	0.029 (0.071)	0.564 (0.699)	1.706 (2.014)
Population	0.020 (0.041)	0.143 (0.176)	-0.002 (0.019)	0.079* (0.046)	-0.003 (0.017)	-0.110 (0.116)	-0.059 (0.099)	1.340* (0.718)	0.950 (3.135)
Oil and gas	0.282** (0.123)	0.651* (0.384)	0.092* (0.050)	0.076 (0.127)	-0.023 (0.057)	-0.051 (0.729)	-0.132 (0.482)	-2.217 (2.369)	-28.713 (18.574)
Tax revenue	-0.191*** (0.050)	-0.669*** (0.169)	0.012 (0.020)	-0.271*** (0.053)	0.008 (0.013)	0.216* (0.117)	0.178* (0.101)	-0.549 (0.720)	1.668 (2.913)
Dummy autonomous okrug	0.065 (0.063)	0.369 (0.290)	0.098*** (0.030)	0.216** (0.089)	0.027 (0.027)	-0.212 (0.272)	-0.049 (0.243)	1.211 (0.896)	
Dummy republic	0.049* (0.026)	0.166 (0.118)	0.028 (0.019)	0.122** (0.051)	0.047*** (0.012)	0.486*** (0.133)	0.478*** (0.113)	2.269*** (0.675)	5.668** (2.164)
Distance from Moscow	0.016*** (0.005)	0.064*** (0.017)	0.001 (0.003)	0.023*** (0.007)	0.005 (0.003)	0.047* (0.026)	0.044** (0.021)	0.182 (0.112)	-0.225 (0.445)
Dummy border region non-CIS	-0.028 (0.025)	-0.166 (0.114)	-0.023 (0.024)	-0.009 (0.041)	0.019 (0.022)	-0.003 (0.183)	0.090 (0.170)	-0.484 (0.747)	-0.285 (2.861)
Dummy border region CIS	-0.011 (0.023)	-0.048 (0.060)	-0.021 (0.015)	0.006 (0.030)	0.010 (0.012)	0.031 (0.212)	0.154 (0.117)	0.333 (0.604)	4.023** (2.006)
Urbanization	1.397* (0.828)	-3.508 (2.655)	-0.872 (0.760)	3.879** (1.531)	-1.074** (0.444)	-10.432** (4.655)	-7.687* (4.105)	-19.768 (18.55)	264.454** (103.296)
Fiscal transfers	-0.524*** (0.144)		-0.167*** (0.056)	-0.811*** (0.182)	0.011 (0.043)	0.698 (0.500)	0.656 (0.443)	-1.863 (2.903)	1.490 (9.949)
Retail trade	0.115** (0.056)	0.325** (0.125)		0.105*** (0.035)					
Net profit	-0.001 (0.002)	0.019*** (0.004)		0.001 (0.001)					
Total acts						0.478*** (0.172)	0.528*** (0.171)		
Constant	3.249*** (0.681)	10.371*** (2.270)	0.702** (0.280)	4.424*** (0.743)	0.027 (0.183)	-1.285 (1.823)	-1.251 (1.520)		-44.331 (41.147)
Observations	88	88	88	88	88	88	88	87	79
R²	0.486	0.762	0.516	0.467	0.394	0.286		0.101	0.085
Pseudo R²							0.041		
Wald Chi-stat							3636.091***		
LR									
proportional odds									
J.-B. test	24.95***	375.00***	9.629***	14.06***	56.69***	1698.00***		81.52***	

Notes: see Tables 2 and 3. Outliers in regression (D19) are Tatarstan, Ingushetia and Aginsk Buriatski, in (D20) Dagestan, Evenkia, Chukotka, Ust Ordyn Buriatski, Aginsk Buriatski, Tyva, Koriatkia and Kabardino-Balkaria,

in (D21) Briansk, Rostov and Novosibirsk, in (D22) Tatarstan, Bashkortostan, Taimyr and Altai Republic, in (D23) Primorski, in (D24) Saratov. After exclusion of outliers in regression (D19) retail trade and dummy republic become insignificant, but keep their signs, in (D21) oil and gas variable becomes insignificant, but keeps its sign, in (D22) dummies republic and autonomous okrug and population become insignificant, but keep their sign, in (D24) distance from Moscow becomes insignificant, but keeps its sign.

APPENDIX E: OUTLIER ANALYSIS

Table E1: Determinants of fiscal decentralization, 1995-1999, excluding outlier regions with weak governance

	(E1) OLS	(E2) OLS	(E3) OLS	(E4) OLS	(E5) OLS	(E6) OLS	(E7) OLS	(E8) OLS
	Retention rate	Retention rate	Retention rate and transfers	Retention rate and transfers	Expenditure decentrali- zation	Expenditure decentrali- zation	Retention rate and non- budget funds	Retention rate and non- budget funds
Territory	0.038*** (0.014)	0.037** (0.014)	-0.083 (0.061)	-0.055 (0.060)	0.020 (0.014)	0.021 (0.014)	0.027 (0.025)	0.027 (0.026)
Population	0.013 (0.041)	0.018 (0.037)	0.171 (0.465)	0.208 (0.355)	0.004 (0.010)	0.005 (0.010)	-0.043 (0.068)	-0.054 (0.068)
Oil and gas	0.111** (0.043)	0.109** (0.043)	-0.267 (0.167)	-0.191 (0.251)	0.102*** (0.035)	0.109*** (0.035)	-0.066 (0.077)	-0.066 (0.079)
Income per capita	-0.010 (0.027)		0.212 (0.278)		-0.005 (0.010)		-0.058* (0.034)	
Distance from average income		-0.007 (0.024)		0.373 (0.263)		-0.011 (0.007)		-0.069** (0.035)
Dummy autonomous okrug	-0.097** (0.044)	-0.101** (0.040)	-0.485 (0.344)	-0.766** (0.343)	0.128*** (0.025)	0.138*** (0.021)	0.057 (0.053)	0.077 (0.055)
Dummy republic	0.047* (0.026)	0.046* (0.026)	0.212* (0.111)	0.194* (0.105)	0.029 (0.022)	0.030 (0.022)	0.061 (0.055)	0.065 (0.055)
Distance from Moscow	0.007* (0.004)	0.007* (0.004)	0.045*** (0.016)	0.049** (0.019)	0.001 (0.004)	0.000 (0.004)	0.007 (0.008)	0.007 (0.007)
Dummy border region non-CIS	0.009 (0.030)	0.009 (0.029)	0.024 (0.119)	0.040 (0.122)	-0.020 (0.024)	-0.021 (0.024)	-0.038 (0.050)	-0.042 (0.050)
Dummy border region CIS	0.021 (0.018)	0.021 (0.018)	0.119* (0.071)	0.111 (0.067)	-0.020 (0.017)	-0.020 (0.017)	0.020 (0.034)	0.018 (0.034)
Urbanization	1.753 (1.338)	1.706 (1.321)	-8.010 (6.400)	-6.156 (5.388)	-0.551 (0.940)	-0.508 (0.887)	3.019 (2.270)	3.123 (2.282)
Fiscal transfers	-0.067 (0.088)	-0.063 (0.084)			-0.194*** (0.056)	-0.182*** (0.058)	-0.067 (0.135)	-0.050 (0.136)
Retail trade	-0.023 (0.036)	-0.027 (0.031)	-0.287 (0.368)	-0.303 (0.265)			0.033 (0.063)	0.042 (0.064)
Net profit	-0.003** (0.001)	-0.003** (0.002)	0.001 (0.008)	-0.004 (0.009)			0.000 (0.001)	0.000 (0.001)
Constant	0.550*** (0.112)	0.553*** (0.107)	1.630*** (0.550)	1.555*** (0.426)	0.866*** (0.068)	0.860*** (0.067)	0.496** (0.209)	0.421* (0.229)
Observations	80	80	80	80	80	80	80	80
R²	0.360	0.360	0.513	0.535	0.488	0.491	0.154	0.165
J.-B. test	46.23***	47.62***	1340***	1211***	8.555***	9.088***	9.546***	7.522**

Note: see Table 2. Outliers in regressions (E1) and (E2) are Kalmykia, Tatarstan, Bashkortostan, Altai Republic and Vologda, in (E3) Dagestan, Tyva, Kabardino-Balkaria, Chukotka, Northern Ossetia and Altai Krai, in (E4) the same as in (E3), as well as Evreiskaia and Adygeia, in (E5) and (E6) Briansk, Tula and Rostov, in (E7) and (E8) Tatarstan, Bashkortostan, Kalmykia, Altai Republic and Tomsk. After exclusion of outliers in regression (E1) dummy republic, oil and gas and distance lose significance, but keep their sign, in (E2) dummy republic and distance lose significance, but keep their sign, in (E3) dummies border region CIS and republic lose significance, but keep their sign, in (E4) dummy republic loses significance, but keeps its sign, in (E7) income per capita loses significance and changes its sign, in (E8) distance from average income loses significance, but keeps its sign

Table E2: Determinants of regulatory and constitutional decentralization, 1995-1999, excluding outlier regions with weak governance

	Regulatory decentralization						Constitutional decentralization			
	(E9) OLS	(E10) OLS	(E11) OLS	(E12) OLS	(E13) Negative binomial	(E14) Negative binomial	(E15) Ordered logit	(E16) Ordered logit	(E17) Tobit	(E18) Tobit
	Share of acts	Share of acts	Log number	Log number	Number of acts	Number of acts	Consti- tutions	Consti- tutions	Treaties	Treaties
Territory	-0.004	-0.005	-0.033	-0.019	-0.009	-0.008	0.649	0.589	2.287	2.098
	(0.012)	(0.012)	(0.098)	(0.094)	(0.076)	(0.077)	(0.847)	(0.841)	(2.043)	(2.009)
Population	0.010	0.010	0.129	0.122	0.136	0.134	1.088***	1.118***	2.577*	2.589*
	(0.010)	(0.010)	(0.086)	(0.088)	(0.083)	(0.083)	(0.362)	(0.364)	(1.406)	(1.418)
Oil and gas	0.055**	0.052**	0.834***	0.877***	0.724***	0.706***	-2.908*	-3.008*	-23.538	-24.208
	(0.026)	(0.025)	(0.310)	(0.330)	(0.208)	(0.198)	(1.552)	(1.550)	(17.398)	(17.423)
Income per capita	-0.003		0.151		0.047		-0.614**		-1.488	
	(0.008)		(0.107)		(0.075)		(0.305)		(2.137)	
Distance from average income		-0.002		0.150*		0.075		-0.664*		-1.169
		(0.008)		(0.086)		(0.074)		(0.353)		(2.446)
Dummy autonomous okrug	-0.022	-0.024	-1.018***	-1.021***	-0.798***	-0.853***	2.823***	2.930***		
	(0.021)	(0.020)	(0.291)	(0.247)	(0.190)	(0.183)	(0.719)	(0.765)		
Dummy republic	0.052***	0.051***	0.546***	0.545***	0.541***	0.540***	1.927***	1.927***	6.036***	5.999***
	(0.012)	(0.012)	(0.138)	(0.139)	(0.117)	(0.117)	(0.668)	(0.656)	(2.175)	(2.177)
Distance from Moscow	0.007*	0.007*	0.069**	0.074**	0.063***	0.065***	0.210*	0.192*	-0.115	-0.158
	(0.004)	(0.004)	(0.030)	(0.030)	(0.024)	(0.024)	(0.115)	(0.113)	(0.418)	(0.417)
Dummy border region non-CIS	0.017	0.017	-0.033	-0.033	0.053	0.056	-0.628	-0.636	-0.551	-0.567
	(0.020)	(0.020)	(0.185)	(0.189)	(0.163)	(0.163)	(0.821)	(0.825)	(2.846)	(2.848)
Dummy border region CIS	0.003	0.003	-0.015	-0.017	0.112	0.112	0.053	0.061	3.862*	3.866*
	(0.013)	(0.013)	(0.221)	(0.224)	(0.124)	(0.124)	(0.627)	(0.626)	(1.976)	(1.977)
Urbanization	-0.664	-0.710	-7.751	-6.492	-3.626	-3.522	-29.829	-34.467	325.253***	306.076***
	(0.469)	(0.463)	(6.984)	(6.292)	(4.810)	(4.620)	(26.398)	(25.843)	(107.697)	(100.327)
Fiscal transfers	-0.008	-0.007	0.208	0.122	0.32	0.268	0.106	0.491	-1.086	-0.515
	(0.038)	(0.040)	(0.489)	(0.503)	(0.437)	(0.449)	(2.238)	(2.254)	(8.234)	(8.521)
Total acts			0.538***	0.543***	0.618***	0.610***				
			(0.180)	(0.177)	(0.184)	(0.183)				
Constant	0.111***	0.112***	1.144	1.088	0.345	0.418			-22.625***	-22.034***
	(0.036)	(0.036)	(1.549)	(1.508)	(1.485)	(1.479)			(8.125)	(8.064)
Observations	80	80	80	80	80	80	79	79	78	78
R²	0.386	0.386	0.305	0.304						
Pseudo R²					0.044	0.044	0.106	0.105	0.083	0.082
Wald Chi-stat					3359.014***	3353.738***				
LR										
proportional odds							70.78**	83.41***		
J.-B. test	44.0***	45.09***	1496***	1529***						

Note: see Table 3. Outlier is Primorski in regressions (E9) and (E10), Saratov in regressions (E11) and (E12). After exclusion of outliers distance in regression (E9) becomes insignificant, but keeps its sign, distance from average income in regression (E12) becomes insignificant, but keeps its sign.

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