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THE RUSSIAN FEDERATION AT CROSSROADS:
TAX COLLECTION, TRANSFERS, AND CORRUPTION

(A REVENUE ASSIGNMENT MODEL OF THE RUSSIAN FEDERATION INTERGOVERNMENTAL RELATIONSHIP SYSTEM)

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In this study, we first, forward a theoretical model of tax collection in the Russian Federation, and then, empirically analyze the incentives provided by the Russian intergovernmental fiscal relationship system. Our theoretical model considers the incentive provision problem in the present Russian Federation intergovernmental fiscal relationship system. Our model captures the incentives for under-provision of tax collection among the subnational governments, which has been the major factor in pushing the Russian Federation to virtual bankruptcy. Our model shows that the Russian system of transfers does not ensure an adequate level of incentives for tax collection. Empirical evidence buttresses our theoretical findings and significantly illuminates recent problems in the intergovernmental relationship in the Russian Federation. There are four major findings. First, the empirical analysis shows that increasing local tax collection leads to the contraction of transfers from the federal government. Second, our analysis reveals the fact that corruption may play a significant role in reducing tax collection in Russia---we find that a higher number of tax inspection employees leads to reduction in per capita tax collection. Third, our estimates show that a decline in the demand for large military complexes and increased poverty, which reduce the tax base for region, have decreased the ability of regions to collect taxes. Finally, we find that the transition to a market system, where sovereignty of consumers is respected, has led to flourishing small enterprises that may provide a larger tax base for subnational taxes.

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Вначале мы исследовали теоретическую модель сбора налогов в Российской Федерации, а затем провели эмпирический анализ стимулов, создаваемых системой межправительственных отношений в фискальных органах России. Представленная теоретическая модель рассматривает проблему стимулов в существующей системе межправительственных отношений в фискальных структурах Российской Федерации. Данная модель выявляет причины недостаточного сбора налогов правительствами субъектов Российской Федерации, что является основным фактором, приводящим Российскую Федерацию к банкротству. Представленная модель показывает, что российская налоговая система не обеспечивает адекватных стимулов для сбора налогов. Факты подтверждают наши теоретические разработки и в значительной степени выявляют текущие проблемы межправительственных отношений в Российской Федерации. Было выявлено 4 основных факта. Первое, путем эмпирического анализа получено, что увеличение местных налогов приводит к сокращению трансфертов из федерального правительства. Второе, наш анализ обнаружил, что коррупция может существенно снизить налоговые сборы в России. Обнаружилось, что чем выше численность налоговых инспекторов, тем ниже удельный сбор налогов. Третье, наши оценки показывают, что снижение спроса на большие военно-промышленные комплексы и обнищание населения снижает налогооблагаемую базу в регионе, и, тем самым, снижает возможности регионов по сбору налогов. Последнее, мы обнаружили, что переход к рыночной системе, где уважается суверенитет потребителей, приводит к процветанию мелкого предпринимательства, что обеспечивает расширение базы для сбора федеральных налогов.

THE RUSSIAN FEDERATION AT CROSSROADS: TAX COLLECTION, TRANSFERS, AND CORRUPTION

The difficult transition towards a decentralized government in Russia will determine the economic integrity of the Russian Federation and the future course of its economic development. The 1993 Constitution, while creating a federation consisting of 89 heterogeneous subjects, removed the Soviet command system that had harnessed the inherent centrifugal forces in Russia for the last several decades. Similar to the conception of its central command system, Russia's move towards a federal system has been based on trial and error rather than a viable blueprint.[1] Nonetheless, after several years of tumultuous transition, the flux in the Russian Federation (RF) has sufficiently settled to allow for a formal economic analysis of its intergovernmental fiscal relationship.

Sharing resources between the federal government and the subnational governments is the most contentious problem in Russian transition towards a decentralized state (Jorge Martinez and Jameson Boex, 1998). In the RF, subnational governments play a more important role in tax collection than those of the Czech Republic and Poland. For 1997, tax collection by the subnational governments in the Czech Republic and Poland were only 5% and 3% of GDP, respectively, while that of Russian subnational governments was 12% of GDP (see Table 1). Table 1 also, shows that as share of GDP, Russia does not collect as much in taxes as is collected in the Czech Republic and Poland. The main culprit in this respect is the central government, which has not been able to improve its tax revenue position.

Decentralization and an efficient intergovernmental relationship are prerequisite for unleashing the competitive forces to promote sustainable growth in Russia. However, a cumulative set of unorthodox incentives and a web of inefficient institutions are keeping Russia from its economic destiny. Andrei Shleifer (1997) argues that predatory behavior by local governments, inappropriate fiscal incentives facing local politicians, and negotiable fiscal federalism have led to a set of perverse results in Russian transition to a prosperous market economy. Ekaterina V. Zhuravskaya (1998) shows that revenue sharing schemes between regional and local governments are an impediment to increasing the tax base and, thus, the growth of new businesses. Dan Berkowiz and Wei Li (1997) show that lack of well-defined tax rights in Russia is the significant cause of Russia's poor economic performance. In this paper we forward a model of tax collection and transfers in the RF, consider Russian-specific problems, such as corruption, and use a unique regional data set to provide an empirical analysis of the issues involved.

The rule in designing an intergovernmental fiscal relationship is to assign expenditures and revenues in a sequential order. This simple rule is often disobeyed in the Russian intergovernmental fiscal relationship system. Expenditure assignments reflect unilateral transfer of responsibilities (e.g., social safety net, health, education, and infrastructure) from the central government to the regions. On the other hand, while laws for revenue raising by subnational governments are in place, tax inspection employees engage in negotiation with the taxpayers for collecting taxes. Thus, the potential for personal gain by bending the rules (i.e.,

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[1] See Valery Lazarev and Paul Gregory (1999), Andrei Shleifer and Daniel Treisman (1999), and Jon Craig, John Norregaard, and George Tsibouris (1977).

corruption) is significant. Our study sheds light on these and many other issues involved in the intergovernmental relationship in the RF.

In this study, we first, forward a theoretical model of tax collection in the RF, and then, empirically analyze the incentives provided by the Russian intergovernmental fiscal relationship system. Our theoretical model considers the incentive provision problem in the present RF intergovernmental fiscal relationship system. Our model captures the incentives for under-provision of tax collection among the subnational governments, which has been the major factor in pushing the RF to virtual bankruptcy. Our model shows that the Russian system of transfers does not ensure an adequate level of incentives for tax collection. Empirical evidence buttresses our theoretical findings and significantly illuminates recent problems in the intergovernmental relationship in the RF.

In Section I, we develop a theory of the tax collection incentive mechanism that sheds light on the revenue assignment problem in the Russian intergovernmental fiscal relationship system. Our model captures the incentives for under-provision of tax collection among the subnational governments. In Section II, we use our regional data set of the RF to present an empirical analysis of the underlying issues. Conclusions are presented in Section III.

I. A Model of Tax Collection Incentive Mechanism

A. *The General Framework*

We will consider a country (Russian Federation) which consists of a large number of independent subnational governments ($i=1,2,...N$). Subnational government i collects federal and local taxes and can increase local tax collection by applying a higher level of effort e, from which it derives disutility.[2]

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[2] For example, by vigorously applying the tax laws, a subnational government can increase tax collection.

Federal taxes (FR_i) are used to provide pure public good G and to make transfer TR_i to subnational governments. Local taxes form own revenue (OR_i) of the region i. Hence, total revenue of subnational government RS_i consists of own revenues OR_i and transfers TR_i. We assume that a subnational government can spend no more than the amount of local tax revenue plus transfers. Thus, we postulate that the utility of a subnational government depends positively on its per capita revenue $\dfrac{RS_i}{N_i}$ and public goods, which are provided by the central government, and negatively on the level of effort e that it may exert to enhance tax collection, i.e., $u = u(RS_i / N_i, G, e)$. Accordingly, we summarize this general framework as follows:

(1) $RS_i = OR_i + TR_i$,

(2) $\dfrac{RS_i}{N_i} = \dfrac{OR_i + TR_i}{N_i}$,

(3) $\displaystyle\sum_1^N TR_i + G = \sum_1^N FR_i$,

(4) $u = u(RS_i / N_i, G, e)$,

and,

(5) $\begin{aligned} OR_i &= OR_i(e), \\ FR_i &= FR_i(e) \end{aligned}$

where, (5) shows that tax collection depends on effort.

B. *Subnational government problem*

Expenditure responsibilities, which are divided between the central government and subnational governments, have different priorities. Some of these responsibilities, such as salaries of teachers, are of the first priority and form the

minimum expenditure budget M_i. Such a measure M_i is usually negotiated with the central government and may reflect the size of the population in the region as well. Transfers TR_i either cover a portion of the gap between the minimum expenditure budget and local tax revenue (M_i - OR_i) or take a portion of the budget surplus to the central government budget,

(6) $\qquad TR_i = \alpha[M_i - OR_i]$.

Because individual regions cannot significantly influence the size of the federal government budget (3) and the amount of public good G, the utility function of a subnational government will only depend on its per capita revenue and tax collection effort. This allows for depicting the subnational government problems as follows:

$$\max u(\frac{RS_i(e)}{N_i}, e)$$

$$s.t.$$

(7) $\qquad RS_i = (1-\alpha)OR_i + \alpha M_i$

$$OR_i = OR_i(e);$$

$$e \in [0,1]$$

This shows that utility is an increasing function of per capita revenue of a subnational government and a decreasing function of tax collection effort. However, the relationship between tax revenue and effort is not simply linear. Tax revenue increases as effort increases, but after effort exceeds some critical value, then tax revenue decreases as effort increases, i.e., too much effort reduces tax collection. Hence, own revenue of subnational government OR_i is concave and has a maximum on the interval (0,1).

We now consider a separable utility function for the subnational governments, i.e.,

(12) $$u(RS_i / N_i, e) = h(\frac{RS_i}{N_i}) - g(e)$$

where,

$$h'(\frac{RS_i}{N_i}) > 0,$$

$$h''(\frac{RS_i}{N_i}) \leq 0;$$

thus, the utility of a subnational government is a concave and monotonically increasing function of its per capita revenue. We assume $g' > 0$ and $g'' \geq 0$, which show that exerting tax collection efforts leads to disutility for the subnational government. Other descriptions of this example are as follows,

(13) $$\begin{aligned} & RS_i = (1-\alpha)OR_i + \alpha M_i; \\ & OR'_e > 0, e \in [0, e^*); \\ & OR'_e < 0, e \in (e^*, 1]; \\ & OR''_{ee} < 0; \end{aligned}$$

which show, among other things, that own revenue is a concave function of tax collection efforts with the maximum being between zero and one.

The optimization problem in this case takes the following form:

(14) $$\begin{aligned} & \max(h(\frac{RS_i}{N_i}) - g(e)) \\ & s.t. \\ & RS_i = OR_i + \alpha M_i - \alpha OR_i \\ & OR_i = OR_i(e) \\ & e \in [0,1] \end{aligned}$$

This leads to,

$$\dot{u} = \frac{du}{de} = h'(\frac{RS_i}{N_i})\frac{RS_i'(e)}{N_i} - g'(e);$$

where, $\dot{u} < 0$ on $e \in [e^*, 1]$ and $\dot{u} \geq 0$ on $e \in [0, e^*)$. Thus, optimal effort is $e^{opt} \in [0, e^*)$. To arrive at an internal solution, optimal effort should not equal zero. This means

that the optimal effort decreases as α increases. Therefore, lack of incentive to collect taxes becomes apparent. It can be easily seen from:

$$d\dot{u} = (h'RS'_e / N_i - g'(e))'_e \, de + (h'RS'_e / N_i - g'(e))'_\alpha \, d\alpha = 0$$

that,

$$\frac{de}{d\alpha} = \frac{-(\dfrac{h''(1-\alpha)}{N^2_i}(M_i - OR_i) - \dfrac{h'}{N_i})OR'_e}{h''((1-\alpha)OR'_e)^2 / N_i^2 + (1-\alpha)h'OR_{ee}'' / N_i - g''(e)} .$$

For the majority of regions, which are recipients, minimum responsibilities (expenditures) exceed their own income $(M_i - OR_i) > 0$. Then, $\dfrac{de}{d\alpha} < 0$, $e \in [0, e*)$ and $\dfrac{de}{d\alpha} > 0, e \in (e*,1]$. If optimal tax effort is on *the increasing interval of the own revenue curve*, then each increase in the share of central government transfers will lead to a decrease in tax collection effort by the subnational government. A decrease in tax effort, in turn, will lead to *a decrease in tax collection*. If optimal tax effort *is on the decreasing interval of the own revenue curve,* than each increase in the share of central government transfers will lead to an increase in the tax collection effort of the subnational government. An increase in the tax collection effort, in turn, will again lead to a *decrease in tax collection*. This establishes a negative relationship between the share of central government transfers and the amount of subnational tax collection.

II. Empirical Evidence

A. *Data description*

The main sources of data are Goskomstat (1998), the Central Bank of Russia (1997), and the Ministry of Taxation and Fees. The Ministry of Finance also

provided us with the data not available in the above sources. While, there are 89 regions in the RF, lack of observations on some of the variables left us 72 regions with complete data. Table 2 presents definitions, notations, and descriptive statistics for our data.

For 1997, Table 2 shows that average subnational revenue (RS) for the 72 regions included in our data set was 3,655 million (old) rubles, i.e., average subnational government revenue was about 630 thousand dollars at an average exchange rate of 5.8 rubles per every dollar. Graph 1 depicts RS for various regions. Ninety percent [(3,149+157)/3,655] of this revenue was obtained by retaining tax collection at the subnational level (Graph 2). However, the relative value of Federal transfers (TR) to the subnational government revenue (354/3,655) is 9.7 percent, which is more than twice the same ratio for the VAT collection retained in the region (157/3,655). Graph 3 depicts TR for various regions. This suggests that federal transfers have substantive impact on the subnational revenues.

Subnational tax effort (E) are measured by the inverse of tax arrears and tax deferrals to the subnational governments. This reflects the fact that reduction in tax arrears and tax deferrals may show increased vigilance in collecting taxes. The subnational tax arrears are not, however, uniformly distributed. The top thirty subnational governments with tax arrears in excess of one percent are owed seventy seven percent of all tax arrears in the Russian Federation.[3] While, a host of institutional, geographical, and demographic reasons may have led to the existence and uneven distribution of arrears, federal government policies and transfers may have had a substantive role in this respect as well.

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[3] Data shows that, apart from seven regions, all of the other subnational governments are owed money by their taxpayers. A data appendix is available upon request from the authors.

B. *Federal Transfer to Regions*

The federal government, among other things, decides on the size of transfers by using the *tax capacity* of regions, which also reflects the importance of any region and the level of influence that the region may exert on the federal government. Thus, the federal government decreases transfers to the regions as the regions' tax capacity increases. Conversely, an increase in tax capacity allows regional authorities to bargain for further transfers. For the period of 1994-1998, the federation government used the actual tax collection (OR) as the measure of tax capacity; thus, we use this measure to model the federal government's transfer (TR) policy. Additionally, we include quadratic values of OR to capture the ability of large regions with large tax capacity to bargain for more transfer.

Because seventy-five percent of all VAT collected by subnational governments is passed to the federal government and the regional governments retain the rest, we expect the federal government to reward the regional government for its efforts in VAT collection. We expect to observe a favorable transfer policy when more VAT is collected and, thus, more VAT is retained.

While, the secession tendencies in Russia will eventually abate (Peter Murrell, 1995), the ongoing conflict between center and regions allows for strategic behavior by the regional governments. Treisman (1996a,b,c) shows that regional governments causing the most trouble for the central government, e.g., separatist movements, are the ones to receive the most transfers.[4] Hence, we expect regional distance to Moscow (L) to positively influence TR. Moreover, we use the number of credit agency branches per capita in each region (NF) to represent the level of financial sophistication and development in each region.

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[4] see, also, Berkowitz (1996).

We summarize all this in the following functional form:

$$TR_i = f\,(OR_i, OR_i^{\,2}, VAT_i, L_i, NF_i),$$

where, i (=1,2, 3…N) shows the ith region and, *a priori,* we expect: $\partial TR/\partial OR<0$, $\partial TR/\partial L>0$, and $\partial TR/\partial NF>0$.

<center>C. Subnational Tax Collection</center>

Tax Collection Effort and Tax Capacity

Decreases in tax arrears and tax deferrals indicate higher tax collection efforts. At any given time, in the majority of regions, there are stocks of tax arrears and a flow of tax deferrals, which may lead to arrears in the future. We approximate tax collection effort (E) by the inverse of per capita subnational tax arrears and tax deferrals [E = 1 / (tax arrears + tax deferrals+1)]. Given that tax inspection employees exercise considerable power in allowing for tax deferrals by taxpayers and collecting tax arrears, we expect a direct relationship between E and subnational tax collection (OR).

The RF government uses tax capacity to determine the size of transfers to the subnational governments. Despite the fact that the RF used 'actual tax collection' for its transfer to the regions during 1994-1998, there is no perfect method for estimating the 'true' tax capacity.[5] To approximate subnational true tax

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[5] Tax capacity is usually estimated by the actual tax collection (which was used in Russia during the 1994-1998 period), average per capita income in the region, or gross regional product (GRP). Actual tax collection does not capture tax capacity because it implicitly contains information on tax collection effort and other factors. Actual tax collection may be higher in one region than in another region because of different levels of tax collection efforts or because of different tax evasion tendencies. Average per capita income, which could be easily measured, has its own drawbacks as well. As a measure of tax capacity, average per capita income not only does not take into account the shadow economy but also ignores the fact that the regional authorities may tax economic resources which do not belong to the people living in their region. Gross regional product (GRP), which is a broader measure of economic activities, may suffer from the same shortcomings. Nonetheless, a set of economic indicators may provide a better proxy for measuring tax capacity of each region.

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capacity, we use a host of relevant variables: per capita subnational tax debt to the consolidated budget (TD), percentage of pensioners in the region (PEN), the number of small enterprises per capita (SP), and the ratio of engineering (including military) enterprises to the total number of industrial enterprises in the region (MASH). These variables capture the characteristics that may positively or negatively influence tax capacity of regions:

- Per capita total tax debt (TD) reflects, among other things, the tax capacity of a region--- higher tax liabilities imply potential for higher tax collection.

- Transition to a market system has been favorable to the flourishing of small enterprises; hence, the number of small enterprises per capita (SP) has sharply increased in recent years. Thus, higher values of SP show better economic conditions and better potential for collecting taxes at the subnational level.

- In Russia, pensioners do not receive large incomes and do not pay high taxes. Similarly, the share of people under the poverty line (*prozhitochnyi minimum*) per region (PM) indicates lower capacity for taxation. A high percentage of pensioners (PEN) in any region implies that the number of people paying taxes is relatively small. Overall, high values for PEN and/or PM in any region show the existence of a large number of poor, thus, indicating a lower tax capacity for the region.

- Share of engineering (*mashinostroenie*) industry enterprises relative to the total number of enterprises (MASH), in effect, reflects how many military industrial enterprises are in the region. Given that the military industrial complex has been hit hard from the downward shift in the demand for their products, we expect to see an inverse relationship between MASH and the subnational tax collection.

Corruption

Corruption is another feature that was deeply rooted in Russia under communism and is now flourishing under the post-communist system.[6] The state of transition to a market system has weakened government institutions and, hence, use and sale of government's properties is highly prevalent. It is, therefore, not prudent to ignore the impact of such a phenomenon and state of transition on subnational tax collection.

Several striking features of the Russian transitional economy come together in the move towards collecting taxes. First, the transition towards a market-based economy has created large packets of profitable opportunities, whereby private sector pay exceeds that of public employees (including tax inspection employees). Second, a substantial increase in wealth inequality has made it very profitable for the rich to evade paying taxes by paying a small fee. Third, low public sector pay, coupled with chronic government wage arrears, has left public employees in a dire situation, disposed to use their office and position for personal gain. Fourth, tax inspection employees are allowed to *negotiate* the actual tax payments by taxpayers that owe a substantial amount of taxes. Fifth, the transitional nature of the economy and instability of the political process and governmental jobs have made tax inspection employees behave as 'nonstationary bandits' or foxes who grab anything while they are guarding the chicken coup (see Mancur Olson, 1995). Accordingly, a fertile ground for corruption and predatory behavior is created. To capture the impact of this (corruption) phenomenon, we include the number of tax inspection employees per capita (NR) as an explanatory variable in our regression for subnational tax collection. Therefore, *a priori*, we expect $\partial TR/\partial NR < 0$.

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[6] See, Andrei Shleifer and Robert W. Vishny (1993) and Daniel Treisman (1999a,b,c) for important perspective and evidence on the problem of corruption.

Based on our theoretical model and the above arguments, our model for subnational tax collection (OR) is:

$$OR_i = g\ (E_i,\ NR_i,\ TD_i,\ PM_i,\ PEN_i,\ MASH_i)$$

where, i (=1,2, 3…N) shows the ith region and, *a priori,* we expect: $\partial OR/\partial E>0$, $\partial TR/\partial NR<0$, $\partial TR/\partial TD>0$, $\partial TR/\partial SP<0$, $\partial TR/\partial PM<0$, $\partial TR/\partial PEN<0$, and $\partial TR/\partial MASH<0$.

E. *Regression Analysis*

We approximate the above functional forms by their logarithmic equivalents. This allows us to mitigate the potential heteroskedasticity in our subnational (cross section) analysis, enforce the fact that our variables take positive values, and read the coefficient estimates as elasticities. In our empirical specifications, however, we do not use log values of L and E. Linear values of E allows us to gauge different level of effort (different elasticities), which are exerted by subnational authorities.

To obtain consistent estimates for our coefficients, we first, estimate our equation for OR and, then include its predicted value and its squared values in the equation for TR. Similarly, in our OR and TR equations, we replaced VAT and TD with their respective instrumental variables.[7] Finally, for improving the efficiency of our estimates, we applied the Seemingly Unrelated Regression (SUR) technique to our regression models to get:

lnOR = 1.44 + 54.96 E - 0.84 lnNR + 0.11 lnSP + 0.46 lnTD - 0.019 lnPM

    (1.11) (2.49) (3.71)   (1.33)   (2.29)   (2.66)

- 0.11 lnMASH - 0.69 lnPEN + Û

(1.68)   (2.81)

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[7] In addition to all of the explanatory variables, instruments included: total number of firms in the region, number of foreign firms in the region, and yearly variation in temperature.

and

lnTR = 0.68 - 1.23 lnOR + 0.77 lnOR$_i$ ^{2} + 0.96 lnVAT + 0.004 lnNF + 0.00017 L + ϖ

     (0.30) (3.41)   (3.51)   (4.63)   (0.02)   (4.62)

R^2_{system} =0.691,

where, $\hat{U}$ and ϖ are estimated residuals and t-ratios are reported in the parentheses (.). Apart from the intercepts, SP, MASH, and NF, coefficient estimates of other variables are statistically significant. Reported R^2_{system} shows that, despite the fact that we are using cross section data, a large proportion (i.e., 69%) of the variation in the dependent variables is explained by the explanatory variables.

The reported coefficient estimate (and t-ratio) support the hypothesis that, increase in tax collection effort E has positive impact on per capita tax collection (OR). Effort-elasticity of OR (= 54.96E) attains a minimum of 0.005 for Kemerovo Oblast and a maximum of 1.68 for the Ingush Republic. Effort-elasticity of OR attains its average value of 0.1 for Pskov Oblast and the Republic of Dagestan. On average, for every one-percent decrease in arrears and/or deferrals, i.e., one percent increase in efforts (E), per capita tax collection increases by one-tenth of one percent. Thus, solving the problem of tax arrears and tax deferrals at the subnational level will have a significant and substantive impact on intergovernmental problems.

Estimates also corroborate our observation that corruption is a significant problem in tax collection. Estimates show that an increase in the number of tax inspectors per capita (NR) has a negative effect on per capita tax collections. In particular, a one percent increase in the number of tax inspection employees per capita leads to a whopping 0.84 percent decline in subnational tax collections. Tax

inspection employees' power to engage in negotiation with taxpayers for granting tax deferrals and ignoring tax arrears are detrimental to the tax collection process. This also resembles the principal-agent problem, where the agent is not fully serving the principal's objective.

The elasticity estimate for total tax debt (0.46), indicates that for every one-percent increase in the per capita tax liability, only 0.46 percent is collected. This is in fact consistent with the reported low tax compliance rate in Russia and is indicative of a major ongoing deficiency in the process of tax collection.

Signs and sizes of the estimated elasticity coefficients for the variables approximating poverty (PM, -0.019, and PEN, -0.69), post-communism economic vigor (SP, 0.11), and declining demand for large engineering/military complexes (MASH, -0.11) capture the historical dynamics of moving from a command system to a market system. Increases in the number of poor (PM) pensioners (PEN) and the erosion of demand for the large engineering/military complexes have had substantial negative impacts on tax collections. On the other hand, transition to a market system leading to larger number of small enterprises than before has provided a larger tax base and OR for subnational governments.

Estimates for the TR equation show that the coefficient estimates of OR, VAT, NF, and L have substantive impact on TR. The estimated coefficient for OR (-1.23) shows that at the low level of tax collection, any increase in OR leads to a larger contraction of federal transfers (TR). For example, for subnational governments with low tax collection, every one- percent increase in the subnational tax revenue leads to 1.23 percent decrease in federal transfers. Thus, higher tax collection effort is not a worthwhile activity for a subnational government with low tax collection. But, when OR increases beyond 2.22 [= 1.23 / (2)(0.77)] new rubles per

person, TR increases as well. This suggests that after OR exceeds 2.22 rubles per person, subnational authorities bargain for further transfers.

The estimated VAT-elasticity of TR attains a value close to unity (0.96). In practice, VAT proceeds are divided between the federal and the subnational governments on a 75/25 rule. Hence, the federal government has a vested interest not to reduce transfers to the regions that collect more VAT.

The regression results also show that distance from Moscow L and number of credit agencies NF influence federal transfers to regions. A positive coefficient estimate for NF implies that the number of financial institutions has a positive impact on intergovernmental transfers. Similarly, distance from Moscow positively influences TR. Distance could indicate higher needs of regions for transfers or higher cost of transfers, such as in-kind transfers.

III. Conclusion

This study provides a theoretical and an empirical analysis of the incentives provided by the Russian intergovernmental fiscal relationship system. One of the main results of our theoretical model is that Russian system of transfers does not ensure an adequate level of incentives for tax collection by its own subnational (regional and local) governments. Empirical evidence buttresses our theoretical findings and significantly illuminates recent events in the intergovernmental relationship in the Russian Federation. There are four major findings. First, the empirical analysis shows that increasing local tax collection leads to the contraction of transfers from the federal government. Second, our analysis reveals the fact that corruption may play a significant role in reducing tax collection in Russia---we find that a higher number of tax inspection employees leads to reduction in per capita tax collection. Third, our estimates show that a decline in the demand for large military complexes and increased poverty, which reduce the

tax base for region, have decreased the ability of regions to collect taxes. Finally, we find that the transition to a market system, where sovereignty of consumers is respected, has led to flourishing small enterprises that may provide a larger tax base for subnational taxes.

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Table 1. Tax Collections by Subnational (regional and local) Governments and Central Government

| Type of Tax Revenue	Subnational Government Revenues as share of GDP				Central Government Revenues as share of GDP		
	Czech Republic (1996) %	Poland (1995) %	Russia (1997) %		Czech Republic (1996) %.)	Poland (1995) %	Russia (1997) %
Total Tax Revenue	5.1	3.2	12.3		35.9	36.8	16.1

Table 2. Descriptive Statistics

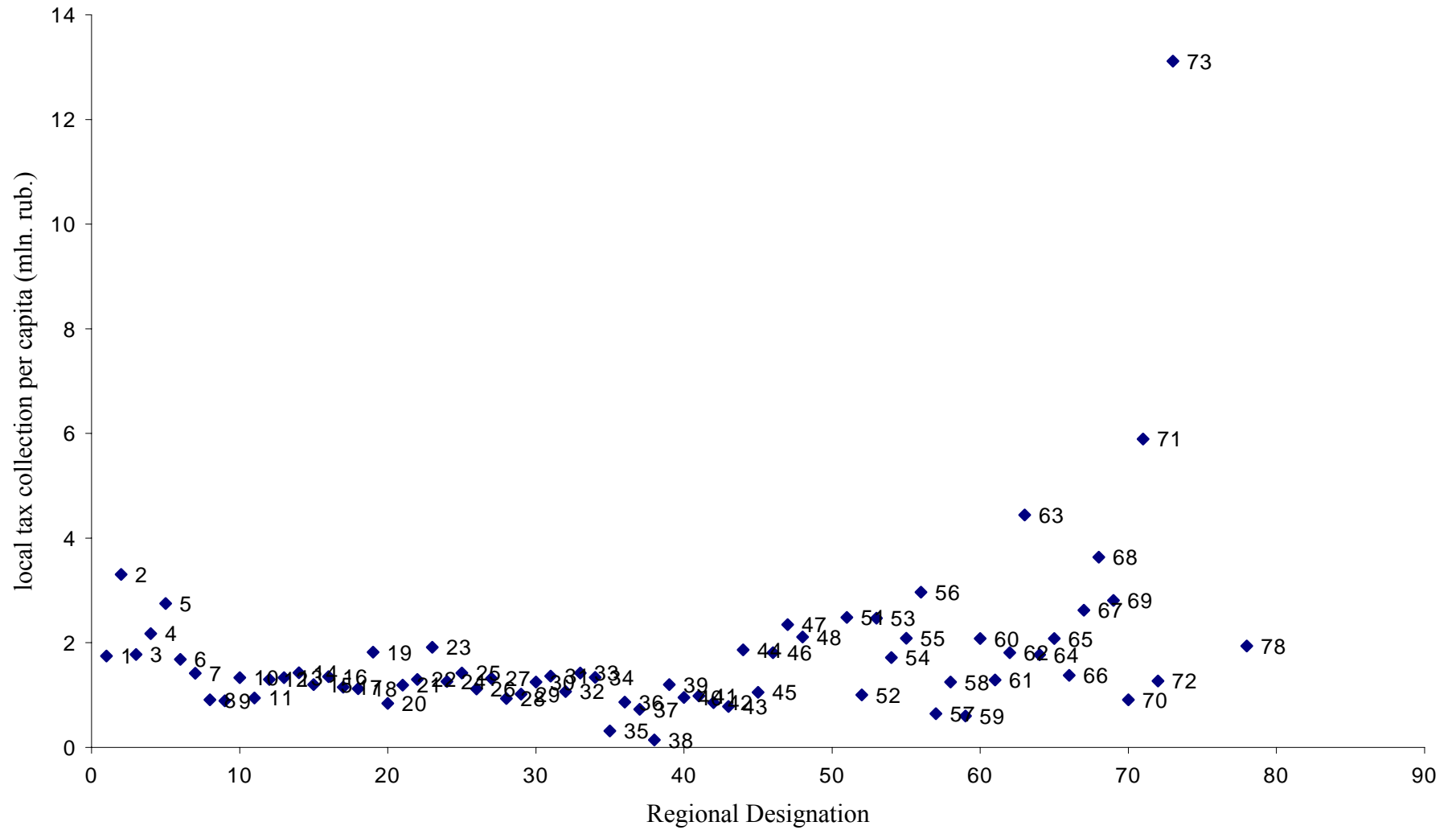| Variable		Mean	(standard Deviation)
Financial variables			
RS	Subnational government revenue (millions of ruble)	3,655.70	(2,866.34)
TR	Transfers from Federal Budget to subnational governments (millions of ruble)	354.34	(269.51)
VAT	VAT collection retained in the region (millions of ruble)	157.46	(145.43)
LTC	Tax collection (excluding VAT) retained in the region (millions of ruble)	3,149.85	(5,284.20)
Demographic variables			
POP	Size of population in each region	1,635,347	(1,231,597)
DP	Number of people per square kilometer	31.95	(41.38)
PEN	Percentage of pensioners in the region	19.49	(4.97)
Structure of the region			
TP	Number of enterprises per capita in the region	0.018	(0.0)
SP	Number of small enterprises per capita in the region	0.004	(0.002)
NC	Number of credit agencies in the region	12.34	(11.53)
NR	Number of tax inspection employees per capita	0.0013	(0.0003)
NF	Number of credit agencies per capita in the region	0.00003	(0.00001)
Geographic variables			
L	Distance of subnational capital city from Moscow (in kilometers)	2,465.91	(2,837.11)
S	Area of the region (in thousand square kilometers)	199.11	(419.76)
Type	Geographical categorization (e.g. Northern, Central, Volga region, etc.)	6.27	(3.24)
TZ	Minus lowest average monthly temperature	13.66	(8.74)
TD	Difference between the highest and lowest monthly average temperature	30.30	(8.10)

Table 3. Regional Designations (numbers) for Graphs 1-3

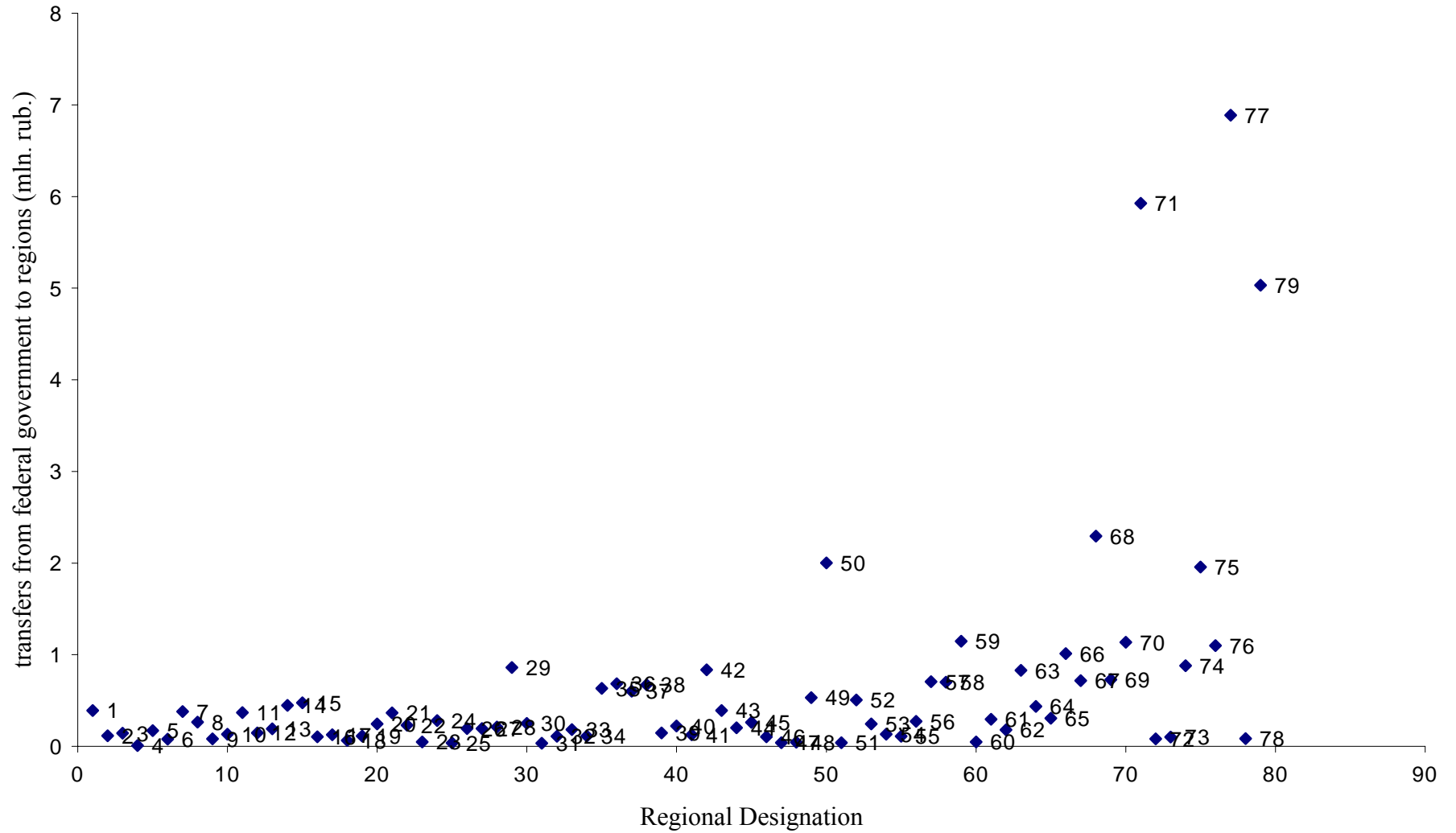|	
1 Republic of Karelia	37 Republic of North Osetia
2 Republic of Komi	38 Ingush Republic
3 Arkhangelsk Oblast	39 Krasnodar Krai
4 Vologda Oblast	40 Stavropol Krai
5 Murmansk Oblast	41 Rostov Oblast
6 Leningrad Oblast	42 Republic of Adygeya
7 Novgorod Oblast	43 Karachayevo-Circassian Republic
8 Pskov Oblast	44 Udmurt Republic
9 Bryansk Oblast	45 Kurgan Oblast
10 Vladimir Oblast	46 Orenburg Oblast
11 Ivanovo Oblast	47 Perm Oblast
12 Tver Oblast	48 Chelyabinsk Oblast
13 Kaluga Oblast	49 Komi-Perm AO
14 Kostroma Oblast	50 Nenets AO
15 Oryol Oblast	51 City of St.-Petersburg
16 Ryazan Oblast	52 Altai Krai
17 Smolensk Oblast	53 Kemerovo Oblast
18 Tula Oblast	54 Novosibirsk Oblast
19 Yaroslavl Oblast	55 Omsk Oblast
20 Republic of Mari El	56 Tomsk Oblast
21 Republic of Mordovia	57 Republic of Altai
22 Chuvash Republic	58 Republic of Buriatia
23 Nizhny Novgorod Oblast	59 Republic of Tyva
24 Kirov Oblast	60 Irkutsk Oblast
25 Belgorod Oblast	61 Chita Oblast
26 Voronezh Oblast	62 Republic of Khakasia
27 Kursk Oblast	63 Republic of Sakha
28 Tambov Oblast	64 Primorski Krai
29 Republic of Kalmykia	65 Khabarovsk Krai
30 Astrakhan Oblast	66 Amur Oblast
31 Volgograd Oblast	67 Kamchatka Oblast
32 Penza Oblast	68 Magadan Oblast
33 Saratov Oblast	69 Sakhalin Oblast
34 Ulianovsk Oblast	70 Jewish AO
35 Republic of Dagestan	71 Chukotka AO
36 Kabarda-Balkar Republic	72 Kaliningrad Oblast

Figure 1. Total regional revenue (per capita)
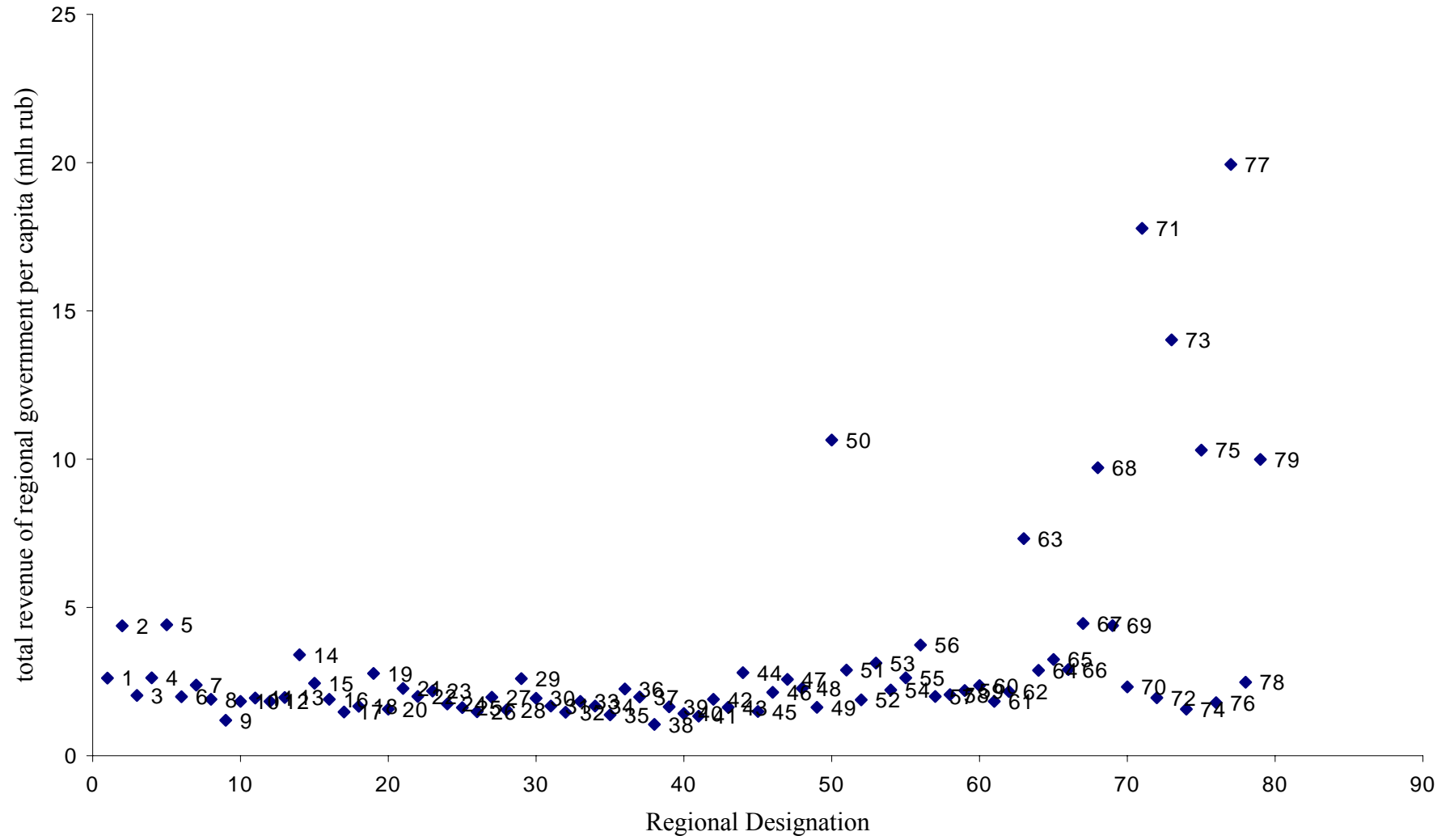
* See Table 3 for regional designations (numbers)

Figure 2. Regional tax collection (per capita)

Figure 3: Transfers from federal government to regions (per capita)