

EFFECTS OF INTERGOVERNMENTAL AID ON FISCAL BEHAVIOR
OF LOCAL GOVERNMENTS: THE CASE OF UKRAINE

by

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Abstract

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This thesis examines intergovernmental fiscal relations in Ukraine. The phenomenon of “flypaper effect” is in the focus of the analysis. A classical partial-equilibrium model of the flypaper effect (Niskanen) is applied in the environment of transition economy of Ukraine. Much attention is paid to the integration of institutional factors into the analysis. On the basis of pooled data estimates, it is shown that at the micro level (*oblast*) the flypaper effect is not observed in Ukraine hence not contributing to the growth of public sector. Asymmetric response is found in the revenue function at the micro level. The macro level analysis of the flypaper effect supports the microeconomic evidence. However, the flypaper effect can be detected in short run. The discussed reasons for the absence of the flypaper effect are: maturity of ‘the Leviathan’, constrained taxing power of local governments, and the ‘gap-filling’ feature of grants in Ukraine. In policy implications, the study suggests that the projected distribution system of intergovernmental aid should not lead to an excessive growth of public sector.

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GLOSSARY

Closed ended grant has a ceiling, that is a maximum amount available to the grantee.

Conditional (specific) grants – grants with stipulations imposed by grantor governments as to how revenues are to be spent by recipient governments.

Fiscal Behavior – Government’s decisions and/or policies concerned with government’s expenditures (e.g. provision of public goods and services) and revenues.

Flypaper effect. The empirical observation that unrestricted grants to localities from higher levels of government induce excessive expenditures by lower tier governments.

Intergovernmental fiscal relations – fiscal relations between various levels (tiers) of the government body.

Leviathan state is the state that has considerable market and political power controlling essential spheres of community life, e.g. control over entry, budgets and information to citizens.

Local government – the government of a subnational administrative unit of country. In Ukraine, they are governments of oblasts, Autonomous Republic of Crimea, rayons, cities, towns, villages and settlements.

Local public good (service) is public good locally provided for the benefit of a local community and financed largely out of local taxation; a spatially limited public good.

Lump-sum grant is a single transfer to a grantee unconditional on the expenditures and revenues of the grantee.

Matching grant is a rebate to a grantee for a given fraction of expenditures incurred by the grantee.

Matryoshka (матрьошка) – a hierarchical organization of intergovernmental fiscal relations when the budget of a lower tier government is included in the body of higher tier government’s budget.

Merezha (мережа) is a network of public property and non-profit organizations, such as utilities, roads, hospitals, etc. It also includes all recipients

of public aid. This term also often means a dataset of local government characteristics.

Oblast (область) – a subnational administrative unit in Ukraine. There are 24 oblasts in Ukraine and Autonomous Republic of Ukraine.

Open ended grant – a grant that is not restricted in its amount. In other words, the grantor agrees to cover a share of costs incurred by the grantee without specifying the maximum amount of grant (no ceiling). Only conditional grants could be open ended.

Own revenues (власні доходи) – taxes, fees and duties that are collected exclusive to or shared with a given tier of the government.

Own revenues are tax and non tax revenues assigned to an authority.

Rada (рада) is the legislative body of a local government.

Reversion level – a level to which government’s expenditures revert when a proposed budget fails to pass a vote.

Tiebout – the hypothesis, expressed by Tiebout (1956), that efficient public-goods provision is ensured given free mobility of citizens. Among various jurisdictions, an individual will choose the jurisdiction that offers taxes/services closest to his/her desired amounts.

Unconditional (general) grants – grants carrying no restrictions on the ways in which revenues are to be spent by recipient governments.

Vykonavchyy komitet (виконавчий комітет) is the executive body of a local government.

ATU – Administrative territorial unit

STA – State tax administration

FAO – Fiscal Analysis Office

TACIS – Technical Assistance to Commonwealth of Independent States

UEPLAC – Ukrainian-European Policy and Legal Advice Centre

Chapter 1

INTRODUCTION

Transition from a command economy to a market one is a process that involves major changes in public finance, a cornerstone of reforms. The success of the reforms, to a great extent, depends on whether the state can commit itself to preserving and protecting private property, and constraining government's growth, which often results in unsustainable budget deficits and too much power. A good historical example of how such commitment can promote the growth of social welfare is presented by North and Weingast (1996). Qian and Weingast (1997) show how commitment to the channels of federalism could help to reach this objective.

In addition, transition to a market economy implies decentralization of economic decisions. The “invisible hand” of the market order guides economic agents to efficient allocation of resources. Although the government is likely to operate with different incentives and objectives than the private agents do, a similar principle may be applicable in public finance too. For instance, local governments can provide some public goods more efficiently than the national government (Fisher, 1996)¹. Apart from economic considerations, decentralization in providing a greater freedom to a community in the allocation of resources is believed to promote democracy by moving toward ‘... more

¹ Invisible hand deals with at least two fundamental economic problems: i) information, ii) incentives. Incentives inherent to private agents, e.g. profit maximization, may not hold for public organizations. Thus ii) is less appropriate in this context. However, the decentralization of the government appears to be at the heart of i). The very idea of the decentralization is to effectively collect and process information. In this respect, local governments are likely to have comparative advantage in providing local public goods relative to the central government. This comment is greatly due to Dr. Steele.

democratic and participatory forms of government...’ (Ter-Minassian, 1997). In brief, Leviathanian central government is replaced by competing sub-national governments.

Recently, in most developed countries, as well as developing and transition ones, there has been a persistent trend to decentralization of fiscal decisions (OECD, 1999; Woller and Philips, 1998, p. 139). Oates (1999) even notes, ‘Fiscal decentralization is in vogue.’ Briefly, intergovernmental fiscal relations are of particular importance in the transition context because they include both dimensions, that is, decentralization and commitment.

Ukraine chose its way in decentralizing and reforming public finance. Unsystematic transition, full of controversy in the delineation of responsibilities and revenues (Kravchenko, 2000)² among the tiers of the government, is perhaps the most important feature of the last years of the Soviet Union (Berkowitz and Mitchneck, 1992) and early years of Ukraine (Kravchenko, 1999). Gradually, the budgetary system of Ukraine has been put into order, but this order appears to be highly controversial since it combines the Soviet and market public finance systems (Kravchenko, 2000). In this study, we focus on Ukraine’s intergovernmental fiscal relations that have been barely reformed since the independence. Relicts of the command budgetary system are ubiquitous. For instance, the current system of forming budgets is preserved from the times of central plan (top-down).

² More generally, property rights over tax flows were poorly defined.

Table 1. Grants to local governments in Ukraine

	1995	1996	1997	1998	1999
mn UAH	355	525	2 021	2 147	2 037
mn UAH, constant 1995 hryvnya	355	321	1 105	1 042	786
% of GDP	0.65	0.64	2.16	2.09	1.57
% of total transfer to local gov'ts	37.2	50.4	82.0	93.3	30.8
% of total local government revenues	3.96	4.62	14.27	14.12	13.41

Grants to local governments, the core of current intergovernmental fiscal relations in Ukraine, have been steadily increasing since Ukraine's independence (see Table 1). The switch from tax sharing to grants occurred in 1997. Since that time approximately two per cent of Ukraine's GDP was distributed in grants to local governments. In 1999, for example, more than two billion hryvnya, or roughly six per cent of consolidated budget expenditures and more than thirteen per cent of local government revenues, was allotted to the grants³. Consequently, substantial amounts of resources were involved in intergovernmental fiscal relations. Such major expenditures are a matter of public concern. Heated debates on proposed reforms in this field are held in mass media and academic circles⁴. Despite significant aid to less developed

³ This figure, however, concerns only general grants. We do not present other types because specific grants have been changing every year. For instance in 1999 five billion UAH 'energy' subvention was provided to local governments.

⁴ This list is not complete but it gives a general notion. Pynzenyk, 2000; Ivaskiv, Valeriy. 2000. "Budgetnyy kodeks: hodinnya po mukah." *Vlada I polityka*, 27 October – 2 November; Marunych, Dmytro. 2000. "Potystoyannya poglybluetsya." *Presidentsky visnyk*, 13 October, 13.; Kostyreva, Galina. 2000. "Kodeks na rasput'e." *Kiivskiy telegraf*, 21 October.; Semena, Nikolay. 2000. "Svoy osobyby finansovyy krah" *Zerkalo nedeli*, 28 October, 42.; Kovtun, Tetyana. 2000. "Regionam – «koshyk dohodiv» chy budgetnyy suharik?" *Ukraina moloda*, 14 November.; Zhovtiak, Yevgen. 2000. "Our biggest doubts concern planned privatization revenues." *Eastern Economist*, October 16-22.; Zaplavska, Maria. 2000. "Konflikt razgoraetsya mezhdru stononnikami I protivnikamy Budgetnogo kodeksa." *Biznes*, 9 October, 41.; Yankovskiy, Olexiy. 2000. "Mizhbudgetni prystrasti na mizhnarodnomu rivni." *Ukraina-Biznes*, 5-11 October, 40.; Silina, Tat'yana. 2000. "Ispytanie demokratyey." *Kiivskie vedomosti*, 5 October.; Shlinchak, Victor. 2000. "Gryadet "holodnay voyna"?" *Segodnya*, 2 October.; Korablev, Sergey. 2000. "Kabmin I regiony: trudnya "lubov" na fone budgetnogo procesa." *Zerkalo nedeli*, 30 September, 38.

oblasts, many studies document that regional disparities⁵ in Ukraine are still considerable and likely to be growing (Pavlyuk, 1996; Popovkin *et al*, 1994; Lukyanenko and Gorodnichenko, 1999).

In this study, we analyze the effects of state grants to upper tiers of local governments (*oblast* level). In particular, we test whether the so-called “flypaper” effect exists in Ukraine, and if it does, we try to estimate its magnitude. The essence of the flypaper effect is in an empirical observation that local governments tend to have much greater spending propensity from grants than from own (tax) sources. Apart from testing theoretical models, this study could help in designing policy. In particular, Ukraine is going to establish an elaborated system of lump-sum grants⁶, and it is important to predict what the likely consequences will be. Unfortunately, there has been no quantitative study investigating the existence of the flypaper effect in transition economies, in general, and consequences of the budgetary reform in Ukraine, in particular. Thus, this paper is the first attempt to explore this gray area.

The structure of the paper is as follows. In the next chapter we review relevant literature on the flypaper effect. The institutional arrangement of intergovernmental fiscal relations is discussed in Chapter 3. In Chapter 4 the

⁵ There is no unique measure for regional disparity. However, it can be estimated by, for instance, output per capita or synthetic indices that compress a wider set of indicators (such as wages, employment, output per capita, etc.) into one dimension, that is single figure. However, in Ukraine at least in three dimensions the regional differentiation is sharp: (i) overall economic activity (ii) ability of regional governments to provide comparable levels of public services or (iii) local government revenue

⁶ The purpose of this reform is to break up the ‘matryoshka’ principle in the Ukrainian intergovernmental fiscal relations. This leads to decentralization of fiscal powers and, consequently, public decision making. Technically, the role of oblast budget is greatly reduced from the largest resource ‘collector’ at the regional level to a pass-through intermediary transferring resources from the central governments to the local governments of rayons and cities. The transfer is planned to remain lump sum grants. Unlike current lump sum grants, they are going to be determined according to complicated formulas based on per capita calculations adjusted for special groups (such as children with disabilities). The parameters of the formula are to be recalculated every three years. The major features of the reforms are drastically increased role of grants and clear assignment of taxes to government tiers (more details in Verkhovna Rada (2001)).

theory of the flypaper effect is presented. Chapter 5 contains empirical findings in both aggregated and disaggregated models. In this chapter we also discuss the obtained results and briefly present policy implications. Finally, in Chapter 6 we draw conclusions.

Chapter 2

LITERATURE REVIEW

We open the literature review with outlining the purpose of using grants in intergovernmental relations. Then, we survey theoretical and empirical literature of the effects of grants on the fiscal behavior of local governments. The chapter is finished with implications for our study. To avoid terminological confusions, we use King (1984) as a reference for definitions (see also Glossary).

Grants: economic justification

Approximately five percent of GDP of developed countries is redistributed via grants to local governments (OECD, 1999, p. 276; Fisher, 1996, p. 230). The share of transfers (grants) in total revenues of local governments in developed and transition countries is in the range of 25 to 80 percent (Nemec *et al*, 1997, p. 496). Apparently, the distribution of such enormous sums should be somehow justified in terms of economics.

It is argued that the national-level government is supposed to stabilize economy, (re)distribute income, and efficiently provide public goods. Economists generally agree that the stabilization of an economy and, to a lesser extent, (re)distribution of income are the prerogatives of national governments. Most countries have a comprehensive division of rights and responsibilities among the levels of government. The relations are particularly elaborate in federations such as Canada, Australia, Germany, Russia, and the USA. Despite the diversity in the arrangement of intergovernmental relations, there are many similar features in decentralizing fiscal and economic powers.

A brief summary of the appropriate division of responsibilities among government levels can be found in Gramlich (1993) and Oates (1999). At this point, it is important to note that the efficiency of public goods provision depends on how close the provider is to consumers. Since subnational governments are the closest to consumers of certain public goods, the decentralization of fiscal power and economic decision-making may be required for efficiency. Such public goods are called local public goods. Fisher (1996, p. 129) defines them as a ‘...type of public good, which can be simultaneously consumed in equal quantities by all but only in a limited spatial area...’ The examples of local public goods are abundant: fire stations, police, road maintenance, etc.

To provide local governments with resources, the central (national) government transfers some taxes to local governments and grants them a limited taxing power. In addition, the central government provides lower tiers of the government with grants to cover costs of providing local public goods.

Normally taxes with mobile base (e.g. enterprises profit tax, EPT; value added tax, VAT) are levied at the national level. On the contrary, taxes with relatively immobile base (e.g. property tax; to a lesser extent, personal income tax, PIT) are sources of revenues for subnational governments (Kravchenko, 1999; Nemeč et al, 1997)⁷. These tax revenues, charges and fees constitute “own revenues” of local governments. Tens (sometimes hundreds) of local taxes, charges and fees can be found in every country.

⁷ The economic justification for such practice is based on the externality arguments, in particular on the competition among subnational governments. For instance, by reducing a tax rate, a local government attracts mobile tax bases from other jurisdictions thus decreasing their revenues. Such undercutting leads to sub-optimal tax rates. The solution to this problem is nationally set up tax rates. However, Oates (1999) correctly notes that benefit taxes, charged for goods and services that derive utility to a taxpayer, can be charged locally regardless whether tax base is mobile or not.

In spite of multitude of local taxes, in many cases own revenues are not sufficient to cover costs of providing local public goods. The discrepancy between revenues and expenditures can arise, at least in part, because of vertical fiscal imbalances. In other words, some levels of government receive in revenues more than they need for the execution of their responsibilities. Excepting China, national governments usually have excess revenues (surplus) while subnational governments experience deficits in funds necessary to cover costs (for statistics and measures of fiscal gap see Ahmad and Craig, 1997). Boadway *et al* (1982, p. 2) call this imbalance ‘fiscal gap’. To fix this problem, central governments provide subnational governments with transfers so that the latter can cover their costs.

Sometimes, local governments serve as agents of the central government in providing local public goods, e.g. social protection (Levaggi, 1991). The state can provide this type of goods itself but it is more efficient to let local authorities provide them. Obviously, in the positive transaction cost world the behavior of local governments, or agents, cannot be perfectly monitored and regulated by the national government, or principal. As a result, central authorities do not have complete control over the use of grants. However, this is exactly the purpose of (unconditional) grants: local governments themselves determine the most efficient uses of intergovernmental aid. Thus, some resources should be redistributed among different levels of the government⁸.

In addition to vertical fiscal imbalances, there are horizontal fiscal imbalances. Term “horizontal fiscal imbalance” means that some local governments have a larger tax base⁹ than others do. As a result, local governments with a small tax base

⁸ Here we implicitly assume that objectives of the central government and local governments are congruent. If this assumption does not hold, there is no reason for the central government to provide resources for local governments since these transfers leave the central government’s objectives unaffected.

⁹ Although we are intentionally somewhat vague here, larger tax base can be interpreted as a larger per capita tax base.

have to impose excessively heavy taxation on their citizens to provide an adequate service level. Some theories of the state suggest that citizens can expect equal or similar standards of living, i.e. volume and quality of public goods, regardless of their domicile. For instance, Buchanan, as cited in Boadway *et al* (1982), suggests that citizens should have an equal fiscal residuum, i.e. benefits from public services net of taxes. In such a situation, grants as well as other equalization tools¹⁰ are used to ensure relatively homogenous inter-jurisdictional supply of public goods.

Apart from presented fiscal gap and fiscal equity arguments for intergovernmental aid, the literature (Boadway *et al*, 1982) also offers the externality argument. Local public goods may have spillover effects. For instance, better police services in one jurisdiction may reduce the crime rates in other jurisdictions. Since the provider of public goods does not consider the utility of external parties, local public goods are likely to be under-supplied. Therefore, matching grants may be necessary to guarantee the efficient provision of local public goods.

In the context of the externality argument, Boadway *et al* (1982) shows that even under free mobility of citizens the allocation of resources could be inefficient because of the divergence between private and public returns. Agents are seeking a high fiscal residuum, and they do not take into account the residuum of the rest of community. The result of the residuum-seeking behavior is the inefficient allocation of resources. The Boadway's point is similar to common pool resource problem.

Thus, arguments for intergovernmental aid could be grouped into two categories: efficiency and equity arguments¹¹. Oates (1999, p. 1126) summarizes the purpose of

¹⁰ For instance, tax sharing.

¹¹ However, Oates (1999, p. 1128) claims, '... primary justification for fiscal equalization must be on equity grounds'.

grants into three points: ‘...the internalization of spillover benefits to other jurisdictions, fiscal equalization across jurisdictions, and an improved tax system.’ Given the significant role of grants in the intergovernmental relations, it is vital to analyze how grants affect the behavior of local governments.

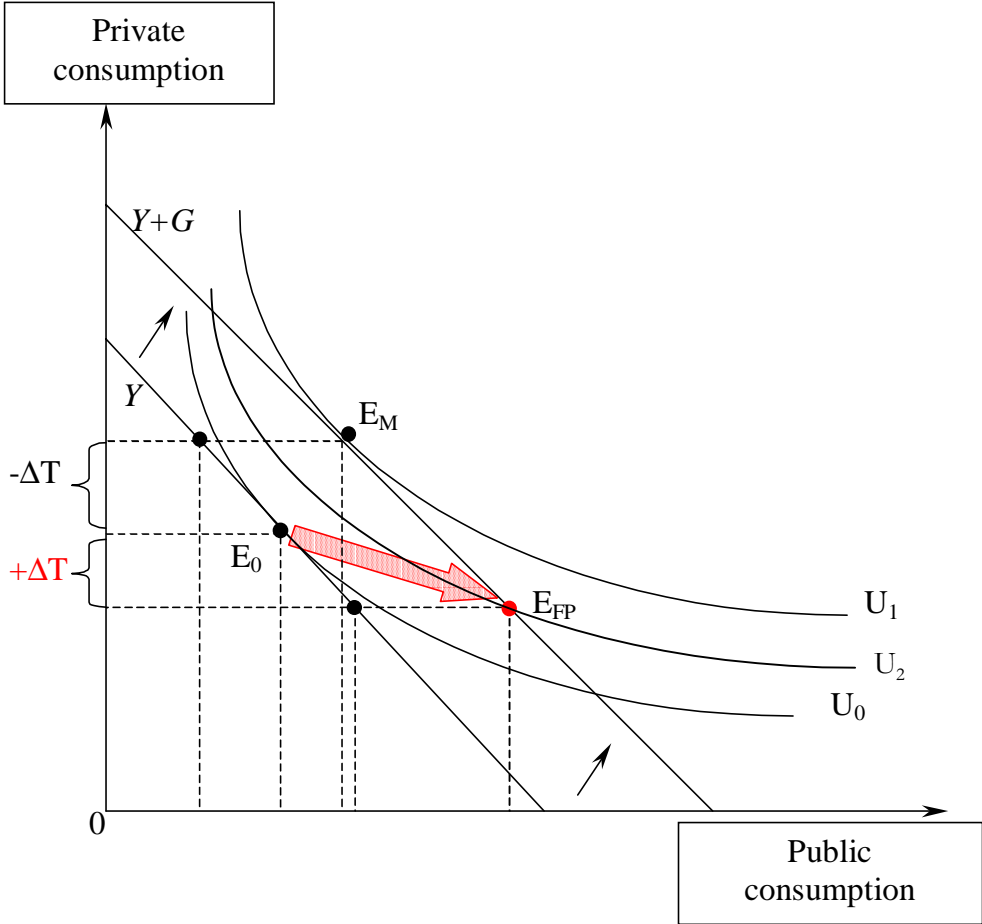
The theory of grant’s impact on the fiscal behavior

The effects of grants on local government behavior have been initially analyzed in the conventional budget-constraint/indifference-curve framework by Wilde (1971). This generic model is summarized in the Figure 1. On the axes, we have private and public consumption. The theoretical underpinning of this analysis is that a community is maximizing some notion of welfare, or utility, subject to budget constraint (lines Y and $Y+G$). Every community is considered a single individual (agent). Indifference curves (U_1, U_2, U_3) could be either those of the crucial (often median) voter or that of the community as a whole.

When the central government provides a local government with the grant G , the budget constraint of the community shifts outwards (from Y to $Y+G$). In fact, a lump-sum grant should lead to a transition from point E_0 to E_M (see Figure 1), given the fact that local public goods are normal (e.g. Borchering and Deacon, 1972)¹². Because of lump-sum grants, fiscal pressure on local tax base decreases by ΔT , while total expenditures by local government grow. One could expect that intergovernmental aid should reduce tax burden on local citizens since the local government need not raise taxes to finance satisfactory provision of public goods. This kind of analysis suggests that local governments should be indifferent between tax cuts and grants from an upper tier government.

¹² In other words, the gradient of good’s consumption on income is positive.

Figure 1. Effect of a grant.



However, economists observe an anomaly¹³. Instead of the E_M post-grant equilibrium, researchers find a point like E_{FP} characterized by growth in both taxation ($+\Delta T$) and expenditure by local government. In other words, grants stimulate the growth of local governments, and they do not substitute for tax

¹³ The first comprehensive and coherent review was provided by Gramlich (1976). In the following paragraphs, we discuss the empirical findings in detail.

revenues collected by local authorities. Note that E_{FP} is sub-optimal relative to E_M since $U_2 < U_1$. This phenomenon lays grounds for the ‘flypaper effect’ concept¹⁴.

Hamilton (1983) defines the flypaper effect as ‘... the empirical observation that unrestricted grants to localities from higher levels of government stick where they land.’ In other words, the flypaper effect identifies the fact that grants induce excessive spending by local governments. In fact, there are two definitions of the flypaper effect. The strong one is that the flypaper effect leads to excessive taxation and expenditure growth by the local government. The weak one is that the expenditure elasticity with respect to grants is much higher than the expenditure elasticity with respect to local income. This surprising effect has induced an extensive discussion among economists and, because of this debate, a few explanations for the phenomenon have been offered.

The earliest theory of the flypaper effect was developed on the grounds of Niskanen’s (1968) model. Budget maximization as a proxy for the power maximization is assumed an objective of bureaucracy. Given this assumption, goods are provided to the point where the average cost of providing a public good is equal to its price. Apparently, marginal cost exceeds price; hence, public goods are oversupplied. Grants reduce the price of public goods and induce bureaucrats to spend even more than before to maximize their budget (power).

Apart for the justification of the flypaper effect, one of the implications of the Niskanen model is that fiscal decentralization may lead to the growth of the public sector. Why? Because the local government has more information to discriminate among its citizens and, consequently, to extract more resources from the economy.

¹⁴ It is believed that Okun coined this term (King, 1984).

Such a conclusion contradicts the hypothesis that decentralization reduces the power of Leviathan state (central government).

Later in the text, we will return to this contradiction, but for the moment it is sufficient to note that conclusions drawn on testing the latter hypothesis are mixed (Oates, 1989; Nelson, 1987; Forbes and Zampelli, 1989; Zax, 1989; Raimondo, 1989). However, the empirical results and methods of these works are quite valuable since they also test the effect of grants on the size of the local/federal government.

There are a number of other explanations of the flypaper effect. Romer and Rosenthal (1979, 1980) explain grant's 'stickiness' on the ground of the so-called 'reversion level'. This model, based on direct voting for expenditures on certain public goods, uses institutions of voting to explain the flypaper effect.

Oates, as cited in King (1984), suggests that the flypaper effect could be explained by 'fiscal illusion'. By Oates, grants reduce the average costs of providing public goods, but not the marginal. However, voters confuse the average cost reduction with marginal cost reduction and, consequently, believe that the marginal costs fall. If the demand for a public good is inelastic and some other conditions hold, grants result in higher taxation of local citizens¹⁵, that is the flypaper effect.

Logan (1986) further develops Oates' hypothesis of fiscal illusion by showing how misperception could be sustained in the long run. Turnbull (1998) provides another explanation of the persistence of the misperception. The uncertainty with regard to tax price of public goods and services generates risk. This risk, in turn, generates

¹⁵ Citizens agree on higher government spending.

overspending even in the long run. In sum, Turnbull (1998) interprets fiscal illusion as imperfect information¹⁶.

The common feature of all these theories is that they explicitly or implicitly use the concept of the Leviathan state. In fact, there are two mutually exclusive fundamental approaches to the analysis of local public finance: Tiebout (Tiebout, 1956) and Leviathan. Actually, most of theoretical models for the flypaper effect employ the Leviathan approach to the state (Quigley and Rubinfeld, 1986). In brief, this approach assumes that the state has considerable market and political power controlling essential spheres of community life, e.g. control over entry, budgets and information to citizens. To emphasize the long-run sustainability of a Leviathan state, we refer to Quigley and Rubinfeld (1986, p. 133). Applying monopoly models of governments, they conclude, '... neither the possibility of repeated referenda nor the prospect of citizen migration to other jurisdictions can fully eliminate Leviathan's disproportionate power.' Thus, the flypaper effect is likely to be both a short-run and long-run phenomenon.

Another interesting explanation of the flypaper effect can be found in Hamilton (1983). He suggests that local income could be a technological input used in providing public goods. For instance, Hamilton (1983, p. 348) states that a one percent increase in household's income reduces the crime rate by half a percent, while a one percent increase in spending on police departments diminishes the crime rate by roughly one percent. Grants that raise local income, therefore, substitute for local government expenditures on, for instance, police. As a result, more resources are available for other government spending programs. Thus, local income is a '...surrogate for certain unobserved factors in the production of local

¹⁶ Turnbull, however, slightly modifies the concept of the fiscal illusion. He shows that is rather '... fiscal illusion as imperfect information...' than '...certainty misperception model of fiscal illusion...'

goods.’ (Wyckoff, 1989, p. 316). Hamilton contends that grants could be an input in providing public goods, explaining in this way the flypaper effect. The omitting of such important variable from the analysis leads to the flypaper effect. Applying simple utility maximization framework for a typical household, Hamilton finds an analytical solution that justifies the flypaper effect. However, empirical evidence appears not to support Hamilton’s explanation for the flypaper effect (Wyckoff, 1989, p. 320).

These models form the core of the modern flypaper effect theory. However, they are only a few of the rich diversity of the suggested flypaper models. An excellent review of other models is in Bailey and Connolly (1998).

One of the important issues in the analysis of the flypaper effect is the symmetry in response to rises and declines in intergovernmental aid. Standard microeconomic theory suggests that there should be no difference between responses. In other words, it does not matter whether a certain level of grants is achieved through a series of gradual increases or a series of increases and cuts in allotted sums. However, some economists (for instance, Gramlich, 1987) argue that asymmetry could be the case in local public finance. The basic premise of their argument is as follows. Assume that a grant is provided to a community for some period. During this period, a clientele of those who benefit from the grant is developed. After the grant is eliminated, the clientele starts to lobby sustaining their welfare through increase in local taxes. Thus, due to political reasons local expenditures may be insensitive to decreases in grants implying that the flypaper effect could be unidirectional (Oates, 1994, as cited in Gamkhar and Oates, 1996, p. 504).

The evidence for asymmetric response is, however, mixed. On the one hand, micro studies (Stine, 1994; Levaggi and Zanola, 1998) suggest that the flypaper effect is likely to be asymmetric. On the other, at the macro level Gamkhar and Oates

(1996) conclude that the asymmetry of response to grants is not statistically significant, and ‘... the flypaper effect operates in both directions.’ (Oates, 1996, p.1130). Although the evidence is mixed with respect to symmetry of the response, we would like to test it in the Ukrainian context.

The evidence of the flypaper effect

In the framework of the above outlined theories, many empirical studies have been conducted. Despite the voluminous studies, there is no general agreement about the existence, source and magnitude of the flypaper effect. This section surveys empirical methods and results of the previous works to incorporate their relevant features into our analysis.

The classical work by Gramlich and Galper (1973) provides a general framework for policy analysis. Apart from theoretical considerations, Gramlich and Galper (1973) provide econometric estimates (time series and pooled estimation) of grants effects on budgetary behavior on the basis of U.S. data. To be precise, they consider the effects of closed-end matching grants¹⁷ and lump-sum grants¹⁸. Gramlich and Galper (1973) also consider effects of grants that combine price and income effects. The significance of the flypaper effect is among their major empirical findings. A dollar increase in grants results in a 40 to 100 cents growth of subnational authority spending while a dollar increase in income leads only to a 10 cents growth.

A more recent study of the responsiveness of local governments to intergovernmental aid is conducted by Stine (1985) who explicitly recognizes the

¹⁷ This type induces a price effect in the provision of local public goods (i.e. the slope of the local government’s budget constraint changes).

¹⁸ Income effect.

effect of aid on fiscal behavior of subnational governments. Stine tests an explicit relationship between local revenues (or more generally tax effort) and volume of grants-in-aid. Using panel data on 57 New York county governments, he estimates the elasticities of a local revenue response to aid. Like Gramlich and Galper (1973), Stine finds a strong flypaper effect.

Further developing theoretical grounds and empirical techniques, Barnett, Levaggi and Smith (1991) test different models (conventional and flypaper) of fiscal behavior of English local governments. Although the results are mixed, the flypaper model seems to be more appropriate for analysis and prediction of the local government response to grants than the conventional microeconomic model. In addition to statistical estimates of marginal effects and elasticities, Barnett, Levaggi and Smith (1991) provide an interesting analytical framework for adequate capturing of structural changes in local government revenues.

English local governments were also studied by Cuthbertson, Foreman-Peck and Grippaios (1981). They assume that the majority party maximizes the utility¹⁹ of a typical individual, given a trade-off between consumption of private and (local) public goods. Their model has an analytical solution that predicts a sizeable flypaper effect. Testing the model on pooled data of London boroughs, they estimate that every £1 in grants (decrease in need) raises local taxation by 40 pence. Mangan and Ledward (1987) provide a more recent investigation of the flypaper effect in England. However, their results appear to contain mixed evidence with respect to the existence of the flypaper anomaly.

¹⁹ Among many alternatives they choose Stone-Geary utility function.

Evidence in favor of the flypaper effect also comes from Italy (Levaggi and Zanola, 1998). Marginal flypaper effects and model specifications are summarized in Appendix B.

According to the above studies, the flypaper effect tends to expand the size of the public sector. For example, Garand (1988) shows that intergovernmental grants can explain a large share of the US subnational government's growth. The same result, in a general equilibrium framework, is obtained by Schwallie (1989).

On the other hand, some authors find little or no flypaper effect. For instance, Slack (1980), applying welfare maximization of a politician with respect to endogenous tax rates²⁰ and grants, finds that for a panel of Ontario municipalities unconditional grants raise expenditures by less than the amount of grants. On the other hand, the expenditure response to conditional grants is *less* elastic than the expenditure response to local income. Thus, there is no flypaper effect. However, the results, especially for conditional grants, are not robust to the functional form of a politician's utility function. Similar results are provided by Zampelli (1986).

Moffitt (1984) assesses effects of closed-end grants on welfare of communities by applying piecewise-linear budget constraints of local governments. Using a panel data estimator, he shows that the flypaper effect disappears due to non-linearity in budget constraints²¹. Therefore, the magnitude of the flypaper effect appears to be very sensitive to the chosen functional form.

Ahmad (1997) surveys actual grant schemes in OECD and developing countries. Many of them result in endogeneity of grants with respect to local governments. In

²⁰ For property taxes levied by local governments.

²¹ As the output of local public increases, matching rates typically decline. For instance, closed matching grant switches from some positive matching rate to zero matching rate when the full amount of aid is used up. These changes in matching rates produce the non-linearity in budget constraints.

other words, subnational governments have incentives to pursue policies that increase the probability of obtaining ‘cheap’ resources from the central authorities. This hypothesis is tested by Islam and Choundhury (1989) on a panel of upper-tier municipalities of Ontario, Canada. In this pioneering work, they apply formal statistical tests of grant’s exogeneity in traditional flypaper models. Islam and Choundhury (1989) find that ‘weak’, ‘strong’ and ‘super’ exogeneity tests fail to reject the hypothesis that grants are determined simultaneously. They also show that grants do not stimulate the growth of own revenues but substitute for them. Put it differently, no flypaper effect is observed. Knight (2000) also shows how presumably exogenous, formula determined grants can be endogenous²². To extend the theory of endogenous nature of grants, we refer also to Schneider and Moon Ji (1990) who consider the factors affecting local governments’ decision to apply for (or seek) intergovernmental aid. In their work, grants to local governments are endogenous to the extent the governments consider it beneficial to seek grants. The implication for our study is that we should be aware of a probable endogeneity of grants.

Critical evaluation of the flypaper effect can be found in Becker (1996). She shows that the flypaper effect could be due to specification errors in econometric equations. Firstly, grants can be endogenous with an upward bias suggesting an anomaly in spending propensity induced by grants. Secondly, the magnitude of the flypaper effect is likely to depend on the functional form of an equation. In particular, a log-log regression yields no flypaper effect, while lin-lin regression finds a significant flypaper effect. Correcting for these problems, Becker (1996) shows that linear estimates of the flypaper effect are robustly three times greater than log-log estimates. In sum, Becker (1996) concludes that the flypaper effect is ‘...created by the misspecification of the estimating equations.’ This indicates to us

²² Specifically, Knight discusses the grants of the Federal Highway Aid Program.

that the correct functional form is crucial for a consistent estimate of the flypaper effect.

Implications

Theoretical and empirical analysis of the flypaper effect has a number of implications. For instance, it helps explain why governments have been rapidly growing in most countries.

Based on the presented theoretical and empirical studies, we can hypothesize that the flypaper effect tends to significantly affect the behavior of local governments stimulating their greater spending. It appears reasonable to estimate the flypaper effect at both macro and micro levels. In addition, a few important issues should be kept in mind during the empirical analysis of the flypaper effect. Firstly, the endogeneity could be a source of biased estimates. Secondly, the functional form of a regression is also important for correct estimates of the effect. Thirdly, the flypaper effect may be asymmetric.

Now let us proceed to the analysis of institutional framework in Ukraine in order to develop a correct theoretical model for the flypaper effect.

AGENTS AND INSTITUTIONS

Intergovernmental fiscal relations are a complex of numerous interrelated agents and institutions. In the following paragraphs we try to briefly describe major actors and institutions and various interconnections among them in Ukraine's intergovernmental fiscal relations. Both de jure and de facto institutional arrangements outlined.

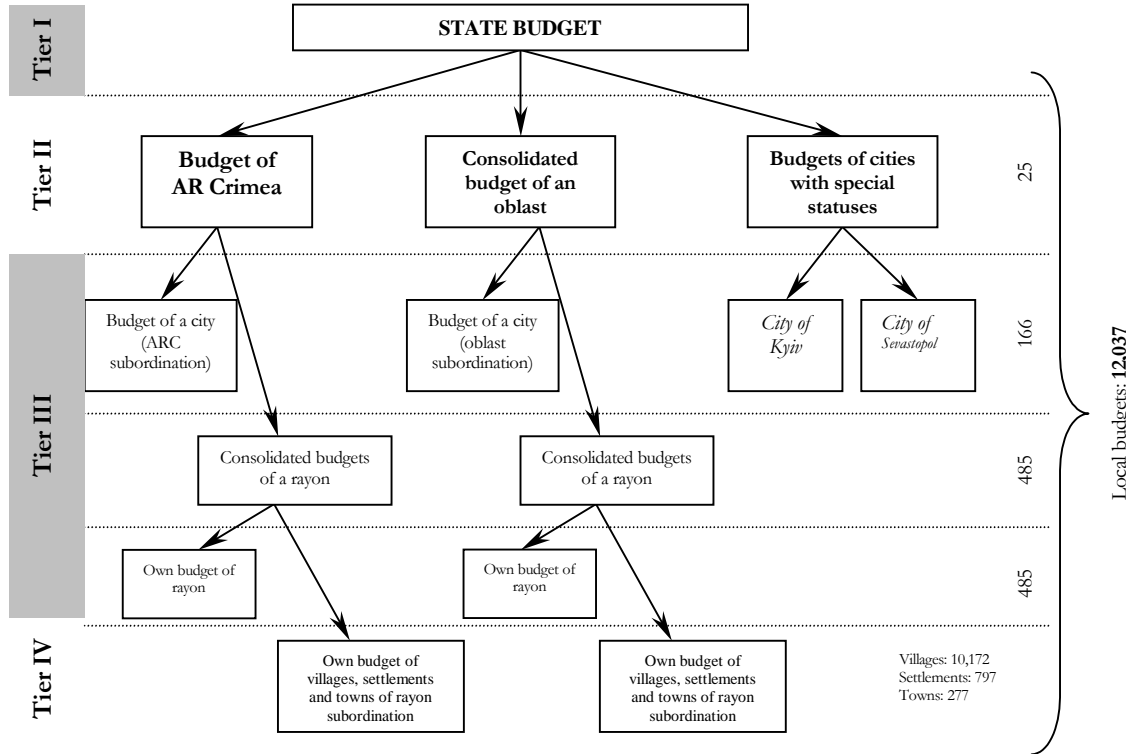
Agents

Ukraine has a four tier budgetary system (Figure 2). The highest level is the national one. The second level is the level of oblasts (25 jurisdictions²³) and two cities with special status, namely Kyiv, the capital, and Sevastopol, under a common jurisdiction with Russia. Oblasts, in turn, consist of rayons and cities of oblast significance. There are more than five hundred rayons and more than one hundred fifty cities. The lowest level is the level of cities of rayon significance²⁴, villages, settlements and other small communities. Every jurisdiction at each level has its own budget. The budget of a higher jurisdiction includes budgets of all subordinate jurisdictions. Some economists metaphorically compare Ukraine's budgetary system with *matryoshka* or pyramid (Kravchenko, 1999; Pynzenyk, 2000). At the top, Ukraine has the Consolidated budget, which incorporates the State budget (*Derzhavnyy byudzhet*) and all local budgets (*Mistsevi byudzhety*).

²³ To be more precise, there are 24 oblasts and Autonomous Republic of Crimea.

²⁴ To avoid confusion the cities of the oblast significance are called in the text 'cities', while cities of the rayon significance are called 'towns'

Figure 2. Ukraine's budgetary setup (Based on Baranovsky (2001)).



We refer to probably the widest classification of agents in this field. Major agents can be divided into two types: central authorities and local authorities. By central authorities we mean state ministries (e.g. Ministry of Finance), committees (e.g. State Securities Commission), Parliament (i.e. *Verkhovna Rada*) and other nation-level organizations. On the other hand, by local authorities we denote local councils (e.g. *rayonna rada*, or *rayrada*), executive committees (*vykonavchyy comitet*, or *vykonkom*), mayors and some other less important atomistic agents at the subnational level. Normally every jurisdiction has separate or semi-separate institutions of legislative and executive powers.

Probably the most important central government agent in intergovernmental fiscal issues is the Ministry of Finance. This Ministry develops drafts of budgetary and

fiscal laws, creates methodological foundations for accounting and framework rules for budget execution. The Ministry calculates preliminary estimates of transfers²⁵ to local authorities. At the local level, the Ministry of Finance is represented by oblast and rayon financial departments (*oblfin* and *rayfin*). It is important to note that these departments are subordinated to both the Ministry of Finance and the head of local state administration²⁶.

The Treasury is responsible for the accounting and preliminary (*poperedniy*) control of State budget execution. Despite the importance of the Treasury for efficient management of budgetary resources, it was established only in 1995 and started its activity in 1997. Before these dates, the Ministry of Finance was in charge for Treasury's responsibilities.

State Tax Administration²⁷ (STA) is a state agency that collects taxes and mandatory payments. In other words, the STA has a direct influence of economic activity in a region. The STA is not subject to the regulation by local authorities. Nevertheless, mayors and governors have substantial informal influence on STA officials. It is worth noting that there are many inter-district (*mizhrayonni*) STAs²⁸, i.e. there could be one STA for a few local jurisdictions. In this case, influence of local governments on STA officials is apparently reduced.

Among other central government bodies we should mention the Parliament Accounting Chamber (*Rakbunkova Palata*)²⁹, industry ministries, and ministries of

²⁵ There are many terms for denoting aid of a central government to local governments: subsidy, transfer grant, grant-in-aid, etc. Hereinafter, by transfer we mean any kind of central government support.

²⁶ For instance, at oblast level, *oblfin* is subordinated to the governor.

²⁷ Formerly, state tax inspections.

²⁸ The most common case for interdistrict STA is when city and nearby rayons are served by a single STA.

²⁹ The Chamber conducts a kind of audit of budget execution.

healthcare and education. These ministries provide financing for various institutions, thus often raising effective expenditures of local authorities.

In addition to formal state organizations and agencies, a few formal public non-central-government organizations represent local governments' interests and have a considerable influence on budgetary policy. Among the most powerful is the Association of Ukraine's cities³⁰. This Association is backed with the executive power of mayors and, to a lesser extent, with the legislative power of members of the Parliament³¹. The strength of the Association, especially in coordinating efforts, is enhanced by a relatively small number of major cities, e.g. Kyiv, Donetsk, Dnipropetrovsk, and Kharkiv. These large cities are the most significant contributors of revenues to budgets of all levels. Obviously, their voices decisively shape the policy towards cities. This fact explains why central authorities take into account the opinion of the Association, which acts on behalf of the cities. The Association has its own mass media, e.g. a newspaper and a web site, to affect public opinion. Interestingly, there is no formal organization of rayons. Probably they are too dispersed and diverse to cooperate efficiently.

Another group of important players in intergovernmental budgetary relations consists of oblast governors who often create a coordinated pressure on central authorities. Although Ukraine does not have any significant legal arrangement for cooperation among oblasts in the fiscal dimension, governors have often successfully achieved goals of raising oblast's legal and fiscal autonomy. Among the most recent examples of governors' power is the failure of Ministry of Finance to implement a budgetary reform. The purpose of the reform was to break the budgetary *matryoshka* and provide governments of lower levels, i.e. rayons and

³⁰ Sponsored by the Ukrainian cities

³¹ The former head of the Association Mr. Kachur used to be an advisor to the President of Ukraine.

cities, with more autonomy to raise the efficiency of public goods provision. The reform was clearly favorable for rayons and cities. The redistribution of responsibilities and powers, however, should have occurred at the expense of oblasts. Unlike rayons that failed to produce any significant collective effort to support the reform, governors as a group exercised immense political pressure on central authorities and forced them to cancel the reform.

At last, an important role is played by international organizations such as the International Monetary Fund (IMF) and the World Bank. These organizations affect the pace of budgetary and fiscal reforms through providing assistance in the case of compliance with preestablished goals. However, we should not overemphasize their influence because they do not have a direct impact on local authorities. For instance, during struggles over the New Budget Code, the voices of IMF and World Bank were largely neglected³².

Institutions

Intergovernmental fiscal relations are closely related to issues of owned, assigned and delegated revenues and responsibilities. Below we provide an overview of revenue sources and responsibilities.

According to *The Law on The Local Self-Governance in Ukraine* (Verkhovna Rada, 1998c) and *The Law on The System of Taxation* (Verkhovna Rada, 1991), local authorities are given autonomy in fiscal and legal dimensions. Local authorities can own communal property, draw their budgets, establish taxes³³, set up tax

³² See Shlinchak, Victor. 2000. "Gryadet "holodnaya voyna"?" *Segodnya*, 2 October; Yankovskiy, Olexiy. 2000. "Mizhbudgetni prystrasti na mizhnarodnomu rivni." *Ukraina-Biznes*, 5-11 October, 40; Kostyreva, Galina. 2000. "Kodeks na rasput'e." *Kievskiy telegraf*, October 21.

³³ Only a few taxes can be established by local authorities. These taxes normally constitute a small insignificant in local budget revenues.

privileges³⁴ and tax rates³⁵. Although local governments *de jure* cannot change major tax rates, local authorities can change effective tax rates by allowing delay in tax payments and different interpretation of tax laws. According to *The Law on Budgetary System of Ukraine* (Verkhovna Rada, 1990), local authorities have a legal right to a minimum share in state tax revenues³⁶. For instance, the law stipulates that 70 percent of enterprise profit tax must be left to oblasts. However, this fiscal support for local authorities is rather illusory. Every year Verkhovna Rada adopts a *The Law on State Budget of Ukraine* that violates norms of the mentioned laws. For instance, *The Law on State Budget for 1998* (Verkhovna Rada, 1998b) establishes a different formula for splitting state tax revenues. Hence, revenue sources of local governments are highly volatile.

Although expediency of sharing tax revenues is open to debate, the mentioned laws establish delineation of revenues and responsibilities only between state and local budgets. However, local budgets operate at three levels. How should revenues and responsibilities be assigned among levels of local governments? Unfortunately, Ukraine's legislative system does not provide us with an unambiguous answer³⁷. As a result, there have been continuous conflicts among levels of subnational governments for revenues and power (Kravchenko, 1999, 2000; see also footnote 2). The contradiction is aggravated by an unclear formulation and division of responsibilities among government tiers. Interestingly, in 1996 there was virtually no expenditure article that was financed by a single level of government³⁸.

³⁴ Local authorities can grant tax privileges only for local taxes. State taxes, e.g. VAT, are not subject to local regulation.

³⁵ Tax rates can be set only in the range stated in the Law.

³⁶ In more recent versions of the law (1991, 1995, 1996, 1997), the division of revenues is preserved.

³⁷ The law stipulates that the sharing rates are set up by the local council of deputies.

³⁸ Among rare exemptions were expenditures of the Pension Fund and expenditures for disarmament.

Even more nebulous is the distribution of transfers to local governments. Presently, there is no normative act that establishes criteria of eligibility and determination of transfer amounts and regulates the allocation of transfers. Laws currently in force merely establish that transfers are included into local budgets and higher level governments may provide lower levels with transfers (Verkhovna Rada, 1990, article 12, paragraphs 2 and 3). The regulation and supervision of transfers is set up by the corresponding legislative and executive bodies of the governments that provide the transfers.

It is very informative to analyze enforcement of regulation of spending transfer funds. *The Law on Budgetary System* (Verkhovna Rada, 1990) requires a local government to return transferred funds if the funds were not spent according to the stated purpose of the transfer. However, since 1990 there has been no case of finding improper use of transfers, a fact that is hard to believe.

Up to present, no law has been adopted to specify rights and responsibilities of grantors and grantees. Even budget laws, where amounts of transfers are specified, do not provide a concise and clear clause of transfer purpose. Given a grant from the Ministry of Finance, oblast authorities have virtually unrestricted discretion as to how to assign grants to rayons and cities. In fact, we observe poorly defined property rights to streams of tax and non-tax revenues.

The fiscal power of local governments in Ukraine is tightly constrained. According to Ukrainian legislation, local authorities can levy only very modest (in terms of revenues) own taxes (e.g. duty on dog owners or advertisement tax). National taxes, even those that are completely transferred to subnational governments, are not subject to regulation by subnational governments, i.e. they cannot change the tax base, tax rate, etc. However, as indicated, local authorities can change the effective

tax rate and effective tax base by, for instance, deferring tax obligation settlement or managing write-offs.

The reality of grant distribution

The very process of transfer distribution is very complicated and plagued by low fiscal discipline³⁹. On the one hand, the Ministry of Finance has been applying the normative approach used in the Soviet system (Vasylyk, 1997). Despite supposed transparency of normatives, the methodology of calculating aid evolves into complicated formulae related to various expenditure articles and sufficiency of revenues to cover planned expenditures.

Among crucial deficiencies of the current distribution system, there is the methodological reliance on existing infrastructure for providing public goods and services (*merzha*). Expenditures for local authorities are predominantly determined by the supply side, that is the presence of public pools, stadiums, transport, etc. Such an approach is not only inefficient since it perpetuates deficiencies of the Soviet past, but also unfair because it leaves no room for catch-up in the regional development.

Furthermore, the distribution is subject to rigorous political bargaining (Kravchenko, 2000). Regions often demand financial support in exchange for political or electoral support. For example, one of the major cities demanded that the Ministry of Finance grant a right to it to transfer financial resources to the State Budget on a monthly basis, while all other lower-tier budget operate on a daily basis. In exchange, this city promised to be ‘obedient’ to the central authorities.

³⁹ It has been a common practice to delay the transfer of grants to other tiers of the government. Oblasts, supposed to transfer financial resources to the State budget, rarely have done so. This money, in turn, has not been distributed to the recipients of state’s aid.

This implicit subsidy, however, was not given to the city⁴⁰. Frequently, the result of the bargaining is arbitrary normatives and tax shares for oblasts. It is not surprising to find transfers to relatively rich and politically important oblasts.

Another important characteristic of inefficient intergovernmental fiscal relations is the principle of setting plans on the basis of achieved results (the ratchet effect, see discussion in Roland (2000, p. 205-213)). If results (e.g. tax revenues) are high in an oblast, plan for the next year revenues is raised. However, planned grants for this oblast (for the next fiscal year) are reduced. If results are poor, the plan for revenues is lowered, and grants are raised. Thus, we observe so-called ‘gap-filling’ determination of grants. This ratchet effect⁴¹ leads to uncertainty in revenues and disincentives to foster local tax base, consequently, hampering the development of communities and resulting in inefficient allocation of resources. Some econometric evidence of this effect is also found in Russia (see Zhuravskaya, 1999)

In addition, the method and timing of planning revenues and expenditures creates incentives to overstate expenditures and understate revenues hence distorting signals to the Ministry of Finance. Regions (oblasts) submit to the Ministry their tentative budgets with “grounded” requests for funds to cover the costs of public goods. Following the logic of budgetary *matryoshka*, rayons and cities submit their plans to oblasts. Apparently, lower tier governments report to higher-tier governments substantially higher expenditures in comparison to the actual expenditures in the current or previous year or in terms of really needed expenditures. At the top of the pyramid, the Ministry of Finance cannot satisfy all

⁴⁰ This information is generated by confidential sources.

⁴¹ Though the concept of the ratchet effect is typically used for describing government-firm relationship in centrally planned economies, it is easily extended to Ukrainian intergovernmental fiscal relations.

demands of the local governments, and it typically divides the total grant fund roughly proportionally to the requests⁴².

In brief, it is almost impossible to trace what determines the final amount of the grant, and the distribution of transfers is performed on a case-by-case basis, or by a discretionary ('manual') regulation that encourages rent-seeking.

Apart from that, delays in adoption of the state budget automatically lead to delays in adoption of local (subnational) budgets, because local authorities do not know the final amount of a provided grant. One can also mention great uncertainty in the distribution of intergovernmental aid. Almost every year the Ministry of Finance applies new approaches and criteria for allotting grants, and the situation is worsened by a highly volatile political atmosphere. This further reduces planning horizons of local governments because officials (public servants) cannot capitalize their rents.

One of the most important features of Ukrainian intergovernmental aid distribution is almost exclusive reliance on general lump-sum grants. Normally, when this type of grants is allotted, the central authorities do not specify projects or targets for spending provided funds, i.e. healthcare or education (for instance, Verkhovna Rada, 1998a). Furthermore, this is greatly amplified by a high discretionary power of local governments and minimal enforcement of the central government's directives⁴³. One of few exceptions used to be the Road fund which

⁴² This method of the distribution creates rent-seeking incentives brilliantly described by Krueger (1974). Everybody has an incentive to overstate its expenditures. There is a striking anecdote with respect to grant seeking. In one Ukrainian city with a population of 30,000, local authorities reported that they had 10,000 pupils in secondary schools! According to Ukrainian statistics approximately 15% of population attends secondary schools. Consequently, the reported number for pupils was more than doubled. This example was found by FAO staff during the analysis of data quality provided by local governments.

⁴³ *A priori*, this feature is not 'bad' since lower-tier governments are closer to local consumers than the national government and, consequently, more efficient in the provision of local public goods..

assigned subventions (closed specific lump-sum grants) for local road funds. Local road funds, in turn, allocate resources for constructing and maintaining roads.

Although technical procedures of transferring grants are often ignored in economic analysis of intergovernmental fiscal relations, the specifics of Ukrainian budgetary system require, in our view, some consideration. Until 1999, oblasts received allotted grants quarterly or monthly according to a schedule set by the Ministry of Finance at the beginning of fiscal year. Such a system did not create incentives to transfer tax and non-tax revenues collected at the local level to the central authorities since execution of the grant schedule did not depend on the fiscal discipline of the local governments. For instance, oblast budgets-donors simply did not transfer funds to the State budget. Local authorities could also squeeze local-tax bases (e.g. land tax) at the expense of state-tax bases (e.g. enterprise profit tax).

To combat this problem, in 1999 the Ministry of Finance introduced a new procedure for transferring grants. A grant for an oblast is paid out of state taxes collected in the oblast. More technically, oblasts receiving transfers are paid by an automatic debit of the State budget accounts at the Treasury equal to a certain uniform percentage of the state revenues collected in the jurisdiction. If a region does not receive the full transfer via this mechanism, the Ministry of Finance compensates the region in the last month of the fiscal year. Consequently, regions are interested in transferring revenues to the national government if they want timely payment of their grants.

This brief description of the Ukrainian context will facilitate subsequent analysis of intergovernmental fiscal relations in Ukraine.

Chapter 4

THEORY

As we can see from Chapter 3, voters in Ukraine do not seem to play a significant role in deciding upon the size of the subnational governments and patterns of subnational government expenditures. Ukrainian citizens do not directly vote for the level of local public good provision. Consequently, models based on referenda manipulation by authorities, e.g. the reversion level model developed by Romer and Rosenthal (1980)⁴⁴, are perhaps not relevant in the Ukrainian case. This point may be quite questionable, and it needs further analysis and deeper justification in future studies of political decision making in Ukraine. However, it appears that the Niskanen model, which explicitly employs the concept of Leviathan state with power-maximizing bureaucrats, is the best approximation of fiscal behavior of local governments in Ukraine.

The Niskanen model is summarized in the following paragraphs and Figure 3 (p.34)⁴⁵. In the graph, the price charged for the public good is on the axis P_s , and the output of the public good is on the axis Q . In Ukraine, citizens rarely pay for local public goods and services in an explicit way, e.g. fee⁴⁶. 'Price' can be interpreted as an effective transfer of resources from citizens to local governments

⁴⁴ In the OECD countries, there are seldom direct votes either. Usually elected members of local governments do the voting. Thus, reversion level models may be applied to committee votes as well as votes by parliamentary committees or by legislatures. In this sense, the Niskanen model is then not the only option, since some modifications of the reversion level model could be used for Ukraine.

⁴⁵ See also King (1984) and Appendix A.

⁴⁶ The term 'price for a public good (service)' is somewhat ambiguous in the Ukrainian context. However, we should consider the price of a public good (service) in a wider sense.

in exchange for local public goods and services. Here, we consider ‘valuation’ and ‘price’ to be identical. The assumptions of the model are listed below:

- A1. The maximand of the bureaucrat is the total budget size subject to non-negative net revenue in the long run.
- A2. The bureau can perfectly discriminate⁴⁷.
- A3. The bureau is X-efficient in providing public goods and services⁴⁸.
- A4. Local citizens cannot choose other amounts of the public goods because the non-discriminating bureaucrat offers all (a certain level of public goods and services, Q) or nothing (0)⁴⁹.
- A5. Budget surpluses are completely absorbed into bureaucrat’s budget.

In Figure 3, the marginal valuation curve (MV) represents the citizen’s demand for local public goods and services. The implication of the bureaucrat’s ability to perfectly discriminate is that the average valuation (AV) of a public good paid by consumers is above the MV for this good.

By A2, a perfectly discriminating bureaucrat completely captures consumer’s surplus. The area below citizen’s MV for a public good is the total revenue of the bureaucrat. By A1 and A5, this amount is equal to the budget size. It is easy to

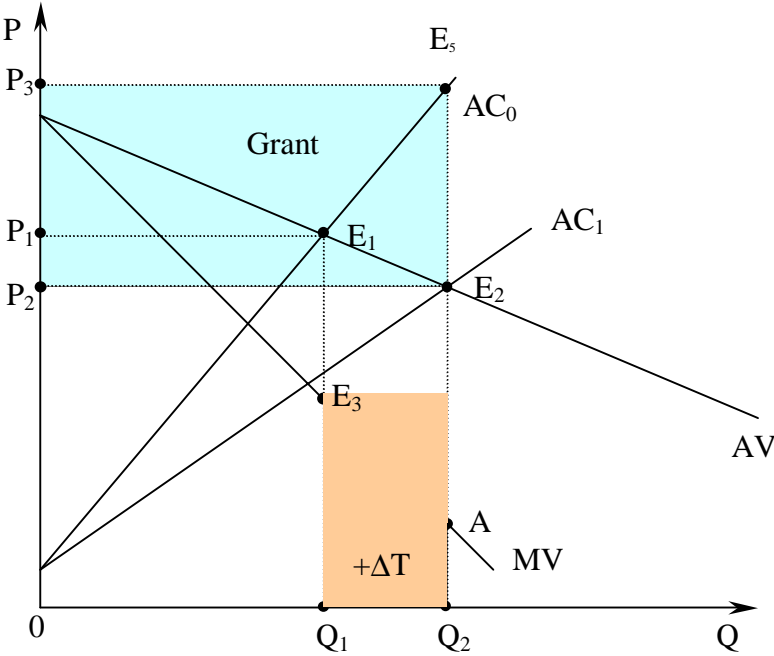
⁴⁷ This assumption is crucial for the model. In reality, it is hard to conceive a mechanism how the bureaucrat can effectively discriminate. In particular, it is unclear how he or she makes citizens reveal and then charge their true reservation prices for public goods. This is perhaps the weakest point in the model. To some extent, it is equivalent to assuming that the model is solved. However, in the case of imperfect discrimination, the results are roughly the same. Only the magnitude of the flypaper effect is changed but the effect itself is preserved. In brief, **perfect** discrimination is a simplifying tool, used to make things look nice. Only the possibility of discrimination is vital.

⁴⁸ In other words, as provision of public goods is expanded, there is no loss of (production and distribution) efficiency due to more complicated coordination of inputs and sub-units

⁴⁹ We implicitly assume that public goods and services are homogenous while in reality the whole spectrum of them is supplied. Some studies (Tullock, 1971) suggest that bureaucrats can manipulate both level and mix of public goods and services because of the voter’s free riding on bureaucrat’s decisions. Thus, it would be interesting to study how bureaucrats change the mix of provided public goods and services. This, however, is beyond the scope of the work. It is worth noting that this issue is related to the footnote 47 in a sense that the bureaucrats have to reveal not only the level but also the mix of provided public goods and services.

show that the average valuation times the supply of a public good is equal to the total revenues of the bureaucrat⁵⁰.

Figure 3. The provision of public goods in the Niskanen model.



The logic of budget maximization implies that the bureaucrat would not care about marginal costs of the public good. Only average costs matter (see Appendix A). The cost of providing public goods and services is presented by an average cost curve, AC₀.

Clearly, the bureaucrat will increase provision of a public good as long as 1) the marginal valuation for this public good is positive and 2) the price exceeds average

⁵⁰ The total revenue is equal to $TR(Q) = \int_0^Q MV(t)dt$. By definition, the average valuation is

$$AV = \left(\int_0^Q MV(t)dt \right) / Q. \text{ It is easy to note that } TR(Q) = Q \cdot AV(Q).$$

costs. If the second condition holds, but the first does not, the bureaucrat can increase its budget by providing more public goods and services. Thus, this situation is not optimal from bureaucrat's point of view. If the first condition is not satisfied, but the second is, there is a budget deficit not feasible by A1. Therefore, both requirements must be met in equilibrium.

In Figure 3, we can find that the bureaucrat's optimal point is E_1 , where the average cost curve AC_0 crosses the average valuation curve AV (see Appendix A). This point, however, is surely not socially optimal⁵¹. At E_1 , the marginal valuation $MV(Q_1)$ is non-negative. The bureaucrat cannot increase the supply of the public good further since she or he will end up with losses ($AC_0 > AV$). Given the optimal point E_1 and A4, citizens pay $OP_1E_1Q_1$ in taxes, and the budget size is equal to this amount by A1.

What happens if the national government provides an open-ended matching grant for this public good? The grant effectively pivots downward the average cost curve from AC_0 to AC_1 ⁵². New equilibrium is at E_2 , where AC_1 intersects AV . The equilibrium amount of the grant is $P_3E_5E_2P_2$.

The supply of the public good increases relative to the no-grant situation, and the (average) price paid by local consumers falls. Citizens receive more benefits (Q_2 instead of Q_1). By A2, the bureaucrat extracts more benefits for himself by capturing the consumer's surplus of citizens $Q_1E_3E_4Q_2$. Since fees for public goods and services are not common in Ukraine, we can expect that this area is

⁵¹ Firstly, a positive slope of the average cost curve implies that marginal cost curve (MC) is above the average costs curve AC. Secondly, marginal valuation curve MV is below average valuation curve AV. Consequently, we can conclude that MV intersects MC to the right of E_1 .

⁵² The new slope and intercept are determined by the conditions of a grant program. However, this is not crucial for the analysis.

expropriated with taxes. Therefore, the grant stimulates extra taxation by local authorities⁵³.

Originally, the model assumes open-end matching grants, while in the Ukrainian milieu grants are general lump-sum. However, the conclusions drawn from the model are robust to this assumption since bureaucrats do not care about marginal costs. Only average costs matter! From this perspective, it is not important how the average costs are lowered either by matching or lump-sum grants. For the case of lump-sum grants, it can be found that

$$AC_1 = \frac{TC - LSG}{Q} = \frac{TC}{Q} - \frac{LSG}{Q} = AC_0 - \frac{LSG}{Q},$$

where TC – total costs, LSG – lump-sum grant, Q – output of a public good.

Given $LSG > 0$, the average cost curve after a lump-sum grant (AC_1) lies below the original average cost curve (AC_0). Therefore, we can relax the assumption of matching grants without loss of generality.

Figure 3 depicts a partial case when grants do stimulate growth of local governments. However, in other cases, which can be found in King (1984) and Appendix A, the flypaper effect may not exist in the sense that grants do not lead to additional taxation of local citizens⁵⁴. At any rate, this model implies that grants do not substitute for local tax revenues.

This model can be augmented by the analysis of factors that affect the average cost curves and the demand curve. For instance, Fisher's (1996) review (see also Borchering and Deacon (1972) for local public goods) on the income elasticity of

⁵³ Here we implicitly assume that local governments are operating at the upward sloping part of a Laffer curve for local taxes.

⁵⁴ In brief, it may occur when the average cost is relatively elastic and the demand for a public good is relatively inelastic.

demand for public goods suggests that most public goods are normal goods. Thus, the growth in the income is likely to result in an outward shift of demand curve AV. When the demand curve AV shifts outwards, the supplied quantity of public goods is not optimal in the bureaucrat's view because the average price exceeds average costs. Consequently, the bureaucrat expands the provision of public goods. Prices for public good substitutes also matter, as long as they affect the demand curve. Technological progress can decrease the costs, shifting AC curve downwards and leading to a new equilibrium⁵⁵.

According to the developed model, an increase in intergovernmental aid should lead to an increase in own revenues of lower tier governments. Therefore, we try to falsify the theory (null hypothesis) by testing whether **1) grants ceteris paribus stimulate growth of own revenues of local governments** and **2) grants ceteris paribus stimulate growth of expenditures of local governments**. An alternative hypothesis is that **grants have the same income effect as local income: a growth in expenditures accompanied by a decline in own tax revenues**.

It is worth noting that if we slightly modify the second hypothesis we can test virtually all theories of the flypaper effect. In brief, another version of the hypothesis is: **grants ceteris paribus stimulate a higher growth in expenditures of local governments than local income does**.

⁵⁵ Learning-by-doing, as a form of technological progress, may be used to model asymmetries in response to grants.

Chapter 5

EMPIRICS OF THE FLYPAPER EFFECT

This chapter is devoted to hypotheses testing. On the basis of presented institutional arrangements and theoretical model, we develop econometric specifications and test the hypotheses stated in the previous chapter. Using both micro cross-section time series and macro time series, we statistically estimate the magnitude of the flypaper effect. The chapter opens with a discussion of data available for econometric modeling. Then we briefly discuss econometric methods employed, and then describe model specifications and obtained results.

Data

The set of data that are of potential interest to a fiscal analyst is immense. It should include revenues from all sources (tax and non-tax revenues), the type of revenues (monetary and in kind)⁵⁶, expenditures by all levels of government (oblast, rayon, city, town, etc.), data on recipients of state aid and many other items. In addition to fiscal data, we should consider other economic, social and demographic datasets. For instance, the value added of a given administrative territorial unit (ATU) may be of a particular interest for tax authorities since for many applications value added is a good approximation of tax base in the ATU. Other proxies are average wages and wage distribution, industrial output, agricultural output, services, trade, employment, capital, housing and arrears.

⁵⁶ Because of insufficient data series, in our analysis payments in cash are not separated from payments in kind.

Obviously, this list is not exhaustive, but we should balance our needs with capacities. Among social and demographic indicators we should mention the number of pensioners, students, unemployed, and the like. We are interested in these variables because they can indicate the local government's need for support from the central government. We should also mention 'infrastructural' variables such as roads, hospitals, schools and other public infrastructure, which are maintained primarily from subnational government budgets. In sum, we are interested in a huge dataset that absorbs all relevant economic, social, infrastructural and fiscal characteristics of an ATU⁵⁷.

For the microeconomic model we use data provided by the Treasury⁵⁸ (fiscal data), the Ministry of Economy (economic series), the State Statistics Committee (economic, demographic and infrastructural series), and UEPLAC/TACIS (economic series). In addition, we use the data supplied by the Ministry of Finance⁵⁹, the State Tax Administration⁶⁰ and Fiscal Analysis Office/Barents Group (FAO)⁶¹ to verify the fiscal series.

⁵⁷ It would be also interesting to have data that can reflect institutional factors. For instance, we might find it useful to look at incentive schemes for tax collectors, incentives of officials who are in charge of spending public funds, planning horizons of senior local officials, distribution of rights among different levels of the government on tax bases. Although these factors are difficult to quantify, they can greatly enhance the analysis in terms of understanding institutions. As Ludwig von Mises said, 'The economist must be familiar with everything.' Unfortunately, it seems difficult to gather these data at any bearable cost.

⁵⁸ The Treasury keeps an account of the flows of budgetary funds of the State Budget and two oblasts, Cherkaska and Dnipropetrovska. However, data aggregated at oblast level are also available at the Treasury. Naturally, it has data on every expenditure and revenue article of state and local budgets. The data are available essentially on a daily basis.

⁵⁹ The Ministry of Finance has data on virtually every aspect of fiscal analysis. Among the most valuable items are *merzha* (мережа), data on beneficiaries of public aid and local infrastructure, which is renewed every year. Since the Ministry is in charge of the execution of the state budget, it has all fiscal data (every item of revenues and expenditures) on the monthly basis. We would like to note that it is relatively reliable against the background of generally weak economic data in Ukraine. It is critical that the data from the Ministry of Finance, STA, Treasury and FAO overlap, so we can check the quality of the data. In addition, fiscal data is subject to the audit of local councils (*radas*), the Central Control Audit Department and Accounting Chamber of Verkhovna Rada.

All indicators are annual cross-section time series. The sample covers the time interval of 1995-1999, a period of a more or less stable political and economic climate in Ukraine⁶². The cross-section dimension consists of 24 oblasts and Autonomous Republic of Crimea. We exclude the cities of Kyiv and Sevastopol because they are unambiguous outliers relative to the sample of ordinary oblasts.

For macroeconometric modeling we use monthly time series aggregated at the national level. The sources of the data are those used for the microeconometric model. The sample covers 1996 – mid 2000 period. The series are presented in Appendix E.

Methods

In the last fifty years economic theory has made tremendous progress in public finance. One of the prominent features of the modern empirical public finance is the extensive use of microeconometric techniques, i.e. panel data estimators.

Panel estimation has a few advantages in these studies since it may attenuate the problem of omitted variables. For instance, we can consistently estimate parameters of a model although we do not have panel series for unobservable or non-measurable variables such as the ‘quality’ of a governor and resource endowments. However, given the assumption of invariability of these variables (e.g. land, capital, preferences, and managerial skills) or any other similar factors, we can successfully

⁶⁰ The State Tax Administration (STA) collects taxes and mandatory payments. Data from STA include series on all tax and non-tax revenues, composition of payments (monetary or in kind) for every item, which is quite important. Statistics is provided for every ATU.

⁶¹ The Fiscal Analysis Office (FAO) of Barents Group in cooperation with the USAID is a private non-profit organization involved in consulting for Ukrainian government on various fiscal issues, including intergovernmental fiscal relations. The FAO appears to be the only organization that has an integrated database of fiscal data based on official statistics and its own estimates.

⁶² Thus, we assume time invariant data generating process.

solve the problem of omitted variables by using fixed or random effects, i.e. oblasts specific effects. In addition, we may solve the problem of multicollinearity⁶³.

Because the sample exhausts the population in the cross-sectional dimension and we are interested in inference with respect to the sample, the fixed effects version of panel data estimator appears to be more appropriate in our case (Hsiao, 1986, 41-45). On the other hand, the use of random effects may be beneficial because cross-equation correlation of error terms is very likely: factors affecting a given oblast are likely to affect its neighbors. To use random effects (GLS) specification, we should perform the Hausman-Durbin-Wu specification test for the consistency of random effects.

In the literature review, we discussed the endogeneity of grants. This econometric problem could be quite acute in the Ukrainian case because local governments plan their expenditures taking into account potential grants from the higher-tier governments, and grants are related to previous spending (see Chapter 3). The ‘gap-filling’ feature of intergovernmental aid in Ukraine⁶⁴ adds to the severity of the grant’s endogeneity. In such a situation, the conventional panel data estimator is likely to yield inconsistent estimates. To tackle this problem, we suggest applying a version of two-stage (instrumental) estimators. On the first stage, we regress an endogenous variable on a set of instruments. Then, on the second stage, we use the “endogeneity-purged” estimate for endogenous variable in the final (or target) regression⁶⁵. In the end, we may use either EC2SLS (random effects) or G2SLS

⁶³ For more comprehensive list of benefits as well as costs of using paned data see Baltagi (1995, p.3-7).

⁶⁴ Roughly speaking, when own revenues of local governments fall, grants increase, and vice versa.

⁶⁵ Since the grant may take the value of zero, panel Tobit estimator is more appropriate than the simple least squares technique. However, in our case Tobit may not be applied. In panel Tobit models we are not able to identify fixed effects and, thus, test the consistency of random effects estimator. Given likely correlation between regressors and individual effects, the ‘cure’ of Tobit is worse the ‘illness’ of the least squares estimators (Stata Release 6, 1999, p.446). In sum, we use simple least squares techniques on the first stage of TSLS.

(fixed effects) (Baltagi, 1995, p.109-123; Matyas and Sevestre, 1996, p.207-211). Both procedures provide consistent estimates, though EC2SLS is more efficient.

Although panel data estimation could provide internal instruments (Verbeek, 2000, p. 309-347), in some cases we need true instruments that are exogenously determined, correlated with imprecisely measured variables (measurement error⁶⁶) or endogenous variable, and uncorrelated with the error term. Such instruments can be obtained from official statistics. For instance, authorities may distort financial and fiscal results but such indicators as employment or population are probably not subject to severe measurement error⁶⁷. It is also worth noting that the use of oblasts specific effects may attenuate the problem of endogeneity if the factors affecting the selection effects are time invariant (Frydman *et al*, 1999).

In sum, this microeconomic technique appears to be appropriate in the analysis of behavior of sub-national governments. In fact, most studies in local public finance, to greater or lesser extent, employ panel data estimator⁶⁸ (e.g. Gramlich and Galper (1973)). Subject to data constraints, it seems possible to apply panel econometric methods to analyze intergovernmental relations in Ukraine, and in particular the behavior of local governments conditional on transfers from central authorities.

In addition to microeconomic investigation of the problem, we also suggest a macro level analysis. In brief, at this level we can take into account possible substitution effects and, therefore, estimate the aggregated response of the system

⁶⁶ The issue of measurement error is especially important for the panel data fixed effects estimator, because measurement error, given very slow changes over time, can lead to grossly distorted estimates (Johnston and DiNardo, 1997, p. 399-402).

⁶⁷ See Bevan *et al* (1999) for discussion of micro level measurements. In brief, the message is that employment is less distorted than other relevant indicators.

⁶⁸ Another name of this method is cross-section time series estimator. Although the names could have somewhat different connotations, they are the same in terms of applied econometric technique.

to grants. Moreover, with aggregated data we can test the flypaper effect in the short run. A more comprehensive discussion of the methodology for the macro-level analysis is provided in the corresponding section (page 57).

Specification of the models

The Niskanen model implies that grants should lead to both higher taxation and expenditures by local governments. Thus, to falsify the Niskanen theory, it is sufficient to estimate the revenue function and determine whether grants lead to higher taxation. This, however, is not sufficient for falsifying other flypaper theories. The generic implication of these theories is that grants result in excessive expenditures by local governments, which can be accompanied with a decrease in taxation. Consequently, the expenditure function of local governments ought to be in the focus of analyzing the flypaper effect beyond the Niskanen model. Following the above logic, we estimate both expenditure and revenue function of local governments.

For Niskanen hypothesis testing, we consider real per capita revenues of local governments as a function of income (approximated by industrial and agricultural output, change in wage and inter-enterprise arrears), grants, and demographic variables. In the following paragraphs, we briefly present theoretical justification for using these variables.

In Chapter 4 we showed that grants can lead to increasing government size. In particular, the Niskanen model predicts that grants should increase own tax revenues or, at least, maintain its stable level. Therefore, the *a priori* sign for the coefficient of this variable is non-negative. Now let us discuss control variables.

Literature review and Appendix B show that one of the most important factors affecting the amount of collected taxes is local income, which could be

approximated by output. Unfortunately, estimates of regional value added are not available on an annual basis for early years of Ukraine's independence⁶⁹. To solve this problem, we suggest approximating value added, which is usually the best measure for income in a region, by industrial and agricultural outputs. The major problem with such approximation is double counting in these data. However, we assume that the oblasts are large enough to diminish the disparities in the production chains⁷⁰. We apply both agricultural output and industrial output to capture differences in major sources of income among oblasts. For instance, many Western oblasts derive income from agricultural output, while most Eastern oblasts earn on industrial output. Since effective tax bases and marginal tax rates are different for industrial and agricultural output, in the regression we introduce agricultural and industrial outputs separately. To further improve the quality of income proxy, we add oblast's average wages into the regression⁷¹. Obviously, all of these variables are anticipated to have a positive gradient.

In developed countries, wage arrears are clearly short run deviations from hard budget constraints⁷². However, in Ukraine, like in many other post-Soviet republics, wage arrears are persistent phenomena (see Earle and Sabirianova, 2000). Due to institutional arrangements⁷³, an increase in wage arrears decreases the tax base for personal income tax, which is assigned to local governments. Thus, there is an inverse relationship between wage arrears and the revenues of local governments.

⁶⁹ The State Statistics Committee started to calculate GDP at oblast level only two years ago and, consequently, we have only a short time series for regional GDP. Moreover, the regional GDP series are published with substantial lag of a year or more.

⁷⁰ Agricultural output is likely to be less sensitive to double counting; therefore, it is a better proxy for 'agricultural' value added generated in a region.

⁷¹ Since we weigh all variables by population, average wage is, in fact, a proxy for payroll in an oblast. It is worth noting that salary is the major source of income for most Ukrainians.

⁷² For the discussion of soft budget constraints see Kornai (1991). Perhaps, the culture of soft budget constraints, which proliferated in the socialist past, has survived in the form of arrears.

⁷³ In particular, the tax is paid only on the wage actually paid to a worker.

Arrears are stocks while revenues are flows. To make these variables ‘compatible’ in the model, we use a change in the stock of arrears. Since the change in the stock of arrears has not been used in the analysis of the flypaper effect in other countries, this variable may be considered as a Ukraine-specific one.

For similar reasons, we include the change in the stock of inter-enterprise arrears. This type of arrears can directly or indirectly influence the ability of enterprises to pay taxes, e.g. land tax. Overdue arrears are of special interest here because arrears in general could be a result of ‘healthy’ trade credit. Unfortunately, we do not have statistics on the overdue inter-enterprise arrears, so we use inter-enterprise payables as a proxy for overdue arrears. According to the double entry principle of accounting, there should be a strong positive relationship between the stock of receivables and the stock of payables in an oblast. The difference is mainly related to accounting procedures, which stipulate that receivables should be shown at factor cost in enterprise balance sheets, while payables are shown at final prices, which includes taxes and other charges (IMF, 1999). Therefore, it is not important whether we employ payables or receivables.

Unfortunately, we are not able to unambiguously predict the effect of inter-enterprise arrears on the revenues since there are two opposing effects. On the one hand, arrears reduce the soundness of enterprises’ balance sheets and immobilize the resources in illiquid assets. Thus, the ability of an enterprise to pay taxes diminishes. On the other, arrears play a very special role in Ukraine as well as in other CIS countries. The Ukrainian economy is characterized by high levels of trade credit and barter (Ilchuk, 1999). Arrears – a result of this practice – may indicate not illiquidity of enterprises’ assets but a high level of economic activity. The implication is that more taxes are collected from this enterprise. The net effect is thus ambiguous, though some studies (e.g. Sultan *et al*, 2000) show a positive

partial correlation between output and arrears. Like wage arrears, this variable is also Ukraine-specific.

Public goods can exhibit increasing returns to scale, and in particular downward sloping average cost curve for prolonged output intervals. Therefore, it appears reasonable to include population term to incorporate the specificity of cost curves. For the revenue side, we can suggest that the population may serve as a proxy for positive externalities that arise from high population density. In brief, our guess is that the higher population, the more revenues per capita are collected⁷⁴.

Because oblasts vary in size, we employ weighting by population to diminish the inherent heterogeneity of the series. Inflation during 1995-1999 was quite significant; thus, we use real values calculated on the basis of the implicit GDP deflator. The price level is assumed constant across oblasts. Another technical detail is the inclusion of period dummy variables to take into account period specific shocks, e.g. varying tax shares left to local governments. By assumption, only intercepts are affected. This feature means that we are using a kind of two-way error component model for panel data (Baltagi, 1995, p.27). Since virtually any function can be linearized at a point, a linear functional form is applied⁷⁵.

⁷⁴ In the analysis of institutional factors, we have emphasized a gap-filling nature of grants. In other words, in case of deficit of a local budget, central government usually stepped in and provided this budget with required financial resources. When the grants are calculated, the figure of the local budget execution is available to the policymakers. Therefore, we can predict that the lagged expenditures may have a significant effect on the current year expenditures. However, we cannot *a priori* establish the sign of the coefficient since it depends on the long-run policy of (de)centralization of the central governments. Lagged dependent variables in right hand side of panel data models are not desirable since the estimator is biased, though consistent (Greene, 2000, p.581-583). Unfortunately, the bias is quite large even for moderate T (Verbeek, 2000, 327-333). Given relatively low time span of five years and likely high-order autocorrelation of the dependent variable, we cannot use conventional internal instruments to solve this problem effectively. However, it would be interesting to investigate this 'gap-filling' feature in future studies.

⁷⁵ However, Becker (1996) argues that logarithms of variables should be applied. The use of logarithms, however, implies constant elasticities, which may not be the case for various income levels. On the other hand, the linear form allows for varying elasticities. At any rate, experiments with the functional form yield

In sum, we are going to estimate the following regression:

$$\begin{aligned}
 RPCREV_{it} = & \alpha_i + \lambda_t + \beta_1 \cdot RPCIO_{it} + \beta_2 \cdot RPCAGRO_{it} + \beta_3 \cdot RWAGE_{it} + \\
 & + \beta_4 \cdot D(RPCWA_{it}) + \beta_5 \cdot D(RPCPAY_{it}) + \beta_6 \cdot RPCGRANT_{it} + \\
 & + \beta_7 \cdot D(RPCGRANT_{it}) \cdot ASY_{it} + \beta_8 \ln(POP_{it})
 \end{aligned} \tag{Eq. 1}$$

where

- i – index for oblast,
- t – index for time period,
- $RPCREV$ – real⁷⁶ per capita (own) revenues of local governments (net of transfers, mn UAH, Treasury)⁷⁷,
- $RPCIO$ – real per capita industrial output (mn UAH, UEPLAC),
- $RPCAGRO$ – real per capita agricultural output (mn UAH, UEPLAC),
- $RWAGE$ – average wages (UAH, UEPLAC),
- $RPCWA$ – real per capita wage arrears (mn UAH, end of period, UEPLAC),
- $RPCPAY$ – real per capita inter-enterprise payables (mn UAH, end of period, UEPLAC),
- $RPCGRANT$ – real per capita grant to an oblast (mn UAH, Treasury),
- ASY – dummy variable: equals one if the amount of grant decreases relative to the previous year amount, and zero otherwise.
- POP – population of oblast (thousand people, State Statistics Committee).
- $D(\cdot)$ – difference operator.

The main purpose of this regression is to find the sign of β_6 , i.e. to determine how grants affect the tax effort of the bureaucrat. If the sign is non-positive, there is no flypaper effect according to the Niskanen model.

Another important coefficient is β_7 . If this coefficient is statistically significant, it means that grants have asymmetric effect on local tax revenues (for discussion see

roughly the same results. At any rate, approximately the same specification in logs turn out to provide qualitatively the same results.

⁷⁶ We use implicit GDP deflator, 1999=1.

⁷⁷ Revenues are both in cash and in kind.

Literature review)⁷⁸. By construction, $D(RPCGRANT_{it}) \cdot ASY_{it}$ can take only non-positive values. Given that own tax revenues should offset the reduction in grants, the ‘downward’ effect of grants should be less than the ‘upward’ one. In brief, the sign should be negative.

With the estimation of the revenue function, we should also estimate an expenditure function. The purpose of estimating an additional behavioral equation is to test the hypothesis that grants (relative to own revenues) lead to excessive increase in the expenditures of local governments. In brief, we can employ a specification close to that used in assessing grants’ effect on revenues.

Since local public goods and services are normal goods, we can expect that the gradient of income is positive. However, we should bear in mind the built-in stabilizers, which move expenditures counter-cyclically to the income. Local governments are not directly involved in macroeconomic stabilization. Thus, we anticipate positive signs for variables approximating income level in a region (income proxies).

To incorporate the specifics of changes in demographic variables, we suggest using shares of pensioners and children in population. Higher shares presumably indicate a greater need in public expenditures for kindergartens, hospitals, etc. We expect a decreasing average cost curve and, therefore, a negative coefficient for population variable.

Obviously, one of the determinants of local expenditures is a grant from the higher-tier government. The coefficient of this variable is of particular interest for us since it signifies the existence and the magnitude of the flypaper effect. *A priori*, grants stimulate expenditures.

⁷⁸ In a sense, this variable captures path dependence feature in intergovernmental fiscal relations.

In sum, we are going to estimate the following equation:

$$\begin{aligned}
 RPCEXP_{it} = & \alpha_i + \lambda_t + \beta_1 \cdot RPCIO_{it} + \beta_2 \cdot RPCAGRO_{it} + \beta_3 \cdot RWAGE_{it} + \\
 & + \beta_4 \cdot PTWR_{it} + \beta_5 \cdot YTWR_{it} + \beta_6 \cdot RPCGRANT_{it} + \\
 & + \beta_7 \cdot D(RPCGRANT_{it}) \cdot ASY_{it} + \beta_8 \ln(POP_{it})
 \end{aligned}
 \tag{Eq. 2}$$

where

- i – index for an oblast,
- t – index for a time period,
- $RPCEXP$ – real per capital expenditures of local governments (mn UAH, Treasury),
- $RPCIO$ – real per capita industrial output (mn UAH, UEPLAC),
- $RPCAGRO$ – real per capita agricultural output (mn UAH, UEPLAC),
- $RWAGE$ – average wages (UAH, UEPLAC),
- $RPCGRANT$ – real per capita grant to an oblast (mn UAH, UEPLAC),
- ASY – dummy variable: equals one if the amount of grant decreases relative to the previous year amount, and zero otherwise.
- POP – population of oblast (thousand people, State Statistics Committee),
- $PTWR$ – share of pensioners ($age_{man} > 60$, $age_{women} > 55$) in population (State Statistics Committee),
- $YTWR$ – share of children ($age < 16$) in population (State Statistics Committee).

As in Eq. 1., we are interested in the sign and magnitude of the coefficient of grant variable $RPCGRANT$. It is very likely that it is positive (most studies document this, see Appendix B), but ‘the devil’ is in the magnitude. The question is whether grants induce more expenditure than local income. Dummy ASY is used to test the symmetry of response to grants. According to our considerations, the sign should be negative. Now let us proceed to the results.

Results

Cross section weighted⁷⁹ (GLS) panel data estimates for parameters of the presented regression (Eq. 1) generally correspond to the expected results (Table 2, the second column from the left). However, these results should be taken cautiously because of likely endogeneity of grants. We have to perform the Hausman test⁸⁰. Real per capita grant is regressed on oblast's real average wages, real per capita industrial output, real per capita agricultural output, population, time trend and some other variables⁸¹. We do not include 'political' variables, e.g. the number of parliamentarians from a region, into the set of instruments, because other studies (see UEPLAC, 1998) suggest that these variables are highly correlated with economic variables, e.g. average wages⁸². Then we plug in the estimated residual in the final regression and estimate it (Pindyck and Rubinfeld, 1991, p. 303-304). It turns out that the coefficient of this estimated error term is statistically

⁷⁹ This estimator is similar to random effects GLS estimator, but it does not allow for cross section correlation of residuals. Thus, unlike GLS weighting matrix, this weighting matrix has zero values for non-diagonal cells. However, like GLS, this estimator should be tested for consistency. The standard Durbin-Hausman-Wu test is applicable for this purpose.

⁸⁰ What we need is to plug the "endogeneity-purified" variable and the error term from the first-step regression into the final regression. If the coefficient of the error term is statistically significantly different from zero, we may not apply the "raw" grant variable in the final regression and should run panel data 3SLS. Otherwise, we can apply the "raw" grant variable to obtain more efficient estimates of the regression parameters.

⁸¹ The size of grants should be determined, at least in part, by the age-sex structure of oblast population because the Ministry of Finance heavily relies on this kind of data. In other words, oblasts with a high share of children and aged people are likely to receive larger grants. Apparently, the age-sex structure of population varies across oblasts, consequently we suggest employing cross-section specific slopes for population variable. Because we consider relatively short time period (1995-1999), we can assume that many other factors that affect the decision on the grant amounts are time invariant. For instance, road length or the number of hospitals is unlikely to dramatically change within a few years. Consequently, the cumulative effect of these variables could be absorbed by fixed effects. In sum, we use population variable in addition to the exogenous variables of the final regression. Population variables have cross-section specific slopes. Fixed effect GLS panel data estimator is applied. Dummy variables for 1997, 1998, and 1999 are included. In general, results of the technical first-step regression have expected signs and significance.

⁸² In addition, the number of parliamentarians from a region is strictly proportional to population: one member of parliament for approximately 50,000 people. At any rate, any persistent deviation from this proportion should be captured with oblast specific intercepts.

different from zero at the two-percent significance level. Therefore, we should apply the “endogeneity-purged” grants variable.

Table 2. Estimation output for panel data (standard errors in the parentheses)⁸³

Regressors	Regressand: Real per capita revenues (Eq. 1)		Regressand: Real per capita expenditures Eq. 2
	OLS CSW FE	Instrumented CSW FE	Instrumented CSW FE
RPCAGRO	-36.67** (16,58)	-39.04** (19,15)	-49.53** (27,26)
RPCIO	-22.77* (12,85)	-12,164 (13,77)	-17,509 (12,95)
RWAGE	0.907*** (,276)	1.125*** (,324)	1.553*** (,448)
D(RPCWA)	-793*** (248,9)	-767*** (250,3)	-1576** (472,1)
D(RPCPAY)	25.24*** (9,113)	29.88*** (10,387)	38.68*** (12,852)
RPCGRANT	-0.666*** (,135)	-0.697*** (,099)	0,099 (,181)
D(RPCGRANT)*ASY	-0,199 (,135)	-0.420*** (,099)	0,175 (,181)
Log(POP)	2280*** (423)	2301*** (449)	3063*** (752)
Other variables	+	+	+
R2	0,843	0,843	0,707
Adjusted R2	0,779	0,778	0,577
Durbin-Watson	2,346	2,323	2,186
F-statistic	220,0	222,7	235,1
p(Overidentifying restrictions test χ^2)	-	0,487	0,352
Effective sample	1995:1999	1995:2000	1995:1999
N (cross-section)	25	25	25
Adj. number of obserations	125	125	125

*** -- significant at 1%
 ** -- significant at 5%
 * -- significant at 10%

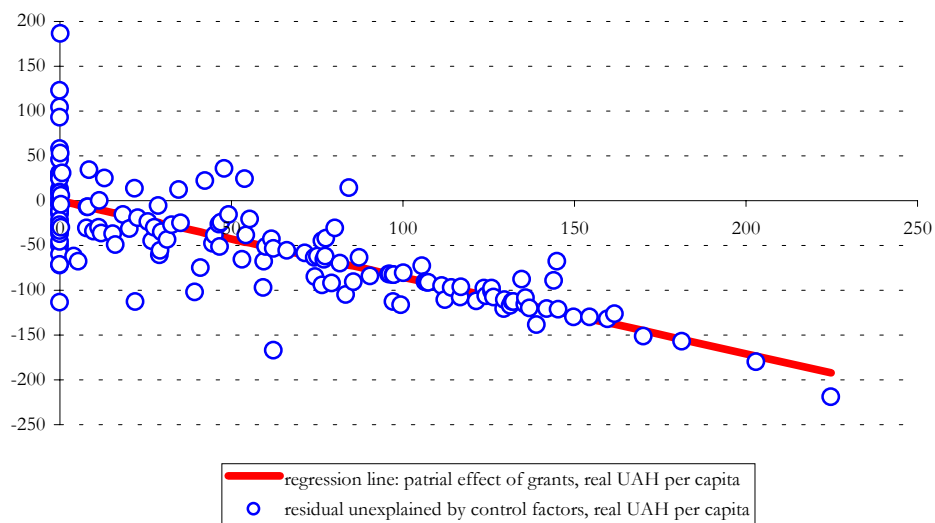
The results are in Table 2 (the third column). The high R-square and F-statistic imply that the model is statistically significant at any reasonable confidence level.

⁸³ CSW — cross section weights; FE — fixed effects.

The Durbin-Watson statistic is close to 2; thus, we cannot infer autocorrelation of residuals⁸⁴. The overidentifying restrictions test (Verbeek, 2000, p.137-138) suggests that instruments are appropriate.

The estimate for the grant variable *RPCGRANT* is statistically significantly different from zero at any reasonable confidence level. A hryvnya increase in grants leads to a **reduction** of own revenues by **0.697** hryvnya (see partial effect at Figure 4). This estimate clearly contradicts the implications of the theoretical model of the flypaper effect. Thus, we do not observe the flypaper effect: a grant does substitute for own revenues of local governments.

Figure 4. Partial effect of grants on total own tax revenues of local governments.



When the amount of grants drops relative to the previous year amount, the marginal effect of grants on local tax revenues is -0.277 (a standard effect of -0.697)

⁸⁴ The Hausman-Durbin-Wu test rejects the appropriateness of random effects estimator under 5% confidence level. The same test, however, does not reject the appropriateness of the cross section weighted panel data estimator at 10% significance level.

plus⁸⁵ an asymmetric component of .420). The difference between the ‘upward’ and ‘downward’ marginal effects of grants is statistically and economically significant. Thus, we can conclude that the flypaper effect is asymmetric with respect to the revenue function of local governments.

Other variables also appear to significantly contribute to explaining the variation in the dependent variable. For instance, a regional average wage *RWAGE* appears to be a good proxy for regional income. In particular, a real hryvnya increase in average wages leads to a 1.125 hryvnya increase in tax receipts of local governments. The coefficient is statistically significant at any reasonable confidence level.

Ex ante, we have not unambiguously predicted the sign of the inter-enterprise arrears’ coefficient, but it turns out to be positive (significant at 1%). Put differently, the growth of inter-enterprise arrears leads to the growth of tax revenues. This corresponds to the results of other studies (e.g. Sultan *et al*, 2000). We can explain such outcome by two factors. Firstly, a sizeable share of economic activity involves barter and mutual write-offs, major sources of arrears. Therefore, arrears as a measure of economic activity dominate arrears as a measure of enterprises illiquidity. Secondly, according to the reports of STA, local governments are more prone to exchange local budget debts for tax liabilities of enterprises. Obviously, such a phenomenon needs further analysis and clarification in future studies.

Changes in wage arrears also seem to be an important factor in explaining the variance of local own revenues: a million increase in wage arrears stimulates a 0.767 million decrease in tax revenues. The estimate is highly statistically significant.

⁸⁵ We add asymmetric effect because the value of the variable is negative by construction

Estimates for population variables, included to take into account the form of cost curve, correspond to expectations presented in the specification section. Specifically, local tax revenues are an increasing concave function of population.

Industrial output turns out to have a negative sign. However, we cannot reject the hypothesis that the coefficient is statistically different from zero. Thus we cannot rule out that taxes that depend on the level of economic activity of industrial enterprises do not influence the revenues collected by local governments⁸⁶. On the other hand, agricultural output has a statistically significant effect. The coefficient is negative indicating that agricultural enterprises are rather net recipients than net donors to local governments⁸⁷.

Closing the discussion of the revenue function, we would like to note that oblast specific effects are very important in explaining the revenues' variation: the F-test rejects common intercept hypothesis at any reasonable significance level. Considerable variation in oblast specific constants suggests that oblasts are heterogeneous in terms of unobserved factors⁸⁸. Unfortunately, we cannot interpret this result meaningfully because even the list of these factors is not known by assumption. The purpose of oblast specific effects is to eliminate omission bias because of unobserved heterogeneity.

Now we should test whether grants result in a higher level of expenditures and to what extent (the second hypothesis of the thesis). Formal tests⁸⁹ of the regression

⁸⁶ The insignificance can be partially attributed to multicollinearity with regard to industrial and agricultural output, since coefficient of correlation between the variables, and especially with population, is quite high.

⁸⁷ This finding is not surprising since more than 70% of agricultural enterprises are in losses.

⁸⁸ In a sense, this can be interpreted as the fact that oblasts differ in terms of initial conditions.

⁸⁹ For instance, the *Durbin-Watson*, *F*, and overidentifying restrictions tests. The Hausman-Durbin-Wu test reject the consistency of random effects estimator at 10% significance level, though it does not reject the appropriateness of the cross section weighed panel data estimator at 10% (p-value is above .5).

quality show that the expenditure equation (Eq. 2) is an adequate representation of the population regression line (Table 2, the fourth column). Results of estimating the expenditure function are generally consistent with our predictions stated in the specification section.

Only average wages appear to play a role in determining the expenditure level. *Ceteris paribus*, a hryvnya growth in *RWAGE* stimulates roughly a 1.5 hryvnya increase in local government expenditures⁹⁰. Neither industrial output nor agricultural output has coefficients statistically significantly different from zero.

A positive and statistically significant coefficient for the natural logarithm of population indicates that economies of scale probably do not exist. However, the positive coefficient may indicate the power of a region in terms of votes rather than the cost curves for local public goods. Estimates for shares of dependents in population are statistically insignificant.

We noted in the Literature review that the flypaper effect is characterized by an implication that the spending propensity from grants is considerably higher than that from own revenues (resources). We do not have an explicit measure of income in our analysis. Thus, we can only make a crude estimate of local governments' expenditure elasticity with respect to income. At mean real per capita industrial and agricultural outputs and real average wage, the elasticity of the expenditures is roughly equal to 0.42⁹¹. On the other hand, the elasticity of the expenditures with

⁹⁰ The coefficient is higher than one, indicating that marginal tax rate is roughly 150%. However, we should correct this figure by multiplying by the number of employed and dividing by the population. we will get a figure that is 'correct'. Since the ratio of employed (excl. farms) to population is rarely above 30%, we can get a marginal tax rate around .30 to .40.

⁹¹ This estimate for income elasticity is calculated in the following way.

$$e_y = \delta_{ID} \frac{RPCIO}{RPCEXP} + \delta_{AGRO} \frac{RPCAGRO}{RPCEXP} + \delta_{RWAGE} \frac{RWAGE}{RPCEXP} = -1.50 \cdot \frac{1.737}{457.50} - 49.53 \cdot \frac{1.044}{457.50} + 1.1125 \cdot \frac{260.19}{457.50} = 0.4221$$

The income elasticity of the expenditures at the medians is equal to 0.4703. The grant elasticity of the expenditures at medians is 0.01187. If we include arrears as a proxy for income, the results are qualitatively the same.

respect to grants is close to 0.01. Although we are not able to test the statistical difference between these values, they are at least the same in terms of economic significance (McCloskey, 1985). Our estimates evidently contradict one of the fundamental features of the flypaper effect: we do not observe an ‘excessive’ spending propensity from grants.

The very coefficient of the grants variable is very small: less than 0.1. Moreover, it is not statistically different from zero. Thus, it is likely to be zero. This finding supports the gap-filling feature of grants in Ukraine. A hryvnya increase in revenues is crowded out by an equal hryvnya decrease in grants, and *vice versa*. Thus, the net effect of increase in local tax revenues is zero for local governments. Obviously, the effect on expenditures is zero since local governments do not gain new resources from harder tax effort. Unlike the revenue function, the expenditure function does not exhibit asymmetry of the response to grants. This can also be explained by the gap-filling feature of grants in Ukraine. In a sense, these results suggest that local governments have been not residual claimants on both local and national taxes collected in the jurisdiction!

The econometric results of the estimated regressions unambiguously suggest that the flypaper effect does not exist in Ukraine. Grants induce higher expenditures but also substitute for local taxes. In addition, grant elasticity of expenditures is not greater than the local income elasticity of expenditures. Similar results can be found in Zax (1989), and less persuasively in Forbes and Zampelli (1989) and Nelson (1987). Despite empirical support for the absence of the flypaper effect, we should be careful in conclusions for many reasons: data quality, possible specification errors, etc. Furthermore, the flypaper effect should be tested at macro level to get more evidence against or in favor of our tentative conclusion.

Macroeconometric analysis of the flypaper effect

The flypaper effect hypothesis should be tested at the macro level to take into account possible substitution effects ignored during the micro level analysis. Although we cannot control for a number of important but unobservable variables as in panel data models, the analysis of time series at the macro level provides a clear estimation of the magnitude of the flypaper effect in a more general framework. At the macro level, we can also estimate short and long term flypaper effects. Our guess is that, if the flypaper effect hypothesis is rejected at the micro level, it should be rejected at the macroeconomic level too.

According to the specification developed for the microeconometric analysis, we should regress aggregate own revenues of local governments on aggregate transfers to local governments controlling for other variables such as proxies for income and other tax-base related variables.

Unfortunately, we cannot use the measures of economies of scale and structure of population at the macro level. However, we can approximate such changes by a time trend.

Testing the asymmetry of the response in the macro context is somewhat tricky. For annual data the reference period is obvious. We simply look at the difference between grants in the current and previous years. For monthly data the answer is not so clear. Should it be the previous month? Or the same period last year? The solution appears to be in the use of a dummy variable for 1999 when grants to local governments decreased in both nominal and real terms. The coefficient presumably shows the asymmetry of the response, though we cannot separate it from other factors. Thus, we can just control for it but cannot test it.

Since the number of workers varies, we have to introduce a variable that captures these changes so that we get a finer estimate for generated income. Although Ukrainian economic statistics are subject to deserved criticism, we use the official rate of unemployment as a variable that captures changes in employment. Presumably, the sign is negative for local revenues. However, it could be positive for the grant equation indicating that the central government increases expenditures to reduce unemployment via local expenditures.

To take into account changes in policy with respect to fiscal decentralization, we also introduce dummy variables for each year⁹² to take into account changes in incentive schemes, the list of assigned taxes, etc. In brief, we are going to apply the following specification:

$$RAOG_t = \alpha + \beta_1 \cdot RGDP_t + \beta_2 \cdot RWAGE_t + \beta_3 \cdot D(RWA_t) + \beta_4 \cdot D(RPAY_t) + \beta_5 \cdot RU_t + \beta_6 \cdot RGRANT_t + \beta_7 \cdot TREND_t + DUMMY \quad (\text{Eq. 3})$$

where

- RAOG* – real aggregated own revenues of local governments (before transfers; mn UAH; the Treasury),
- RGDP* – real gross domestic product, (before transfers, bn UAH, UEPLAC/TACIS),
- RWAGE* – real average wages (UAH, UEPLAC/TACIS),
- RWA* – real wage arrears (mn UAH, end of period, UEPLAC/TACIS),
- RPAY* – real inter-enterprise payables (mn UAH, end of period, UEPLAC/TACIS),
- RU* – rate of unemployment (% of economically active population, UEPLAC/TACIS),
- RGRANT* – real grant to oblasts (mn UAH, the Treasury),
- TREND* – time trend,
- DUMMY* – vector of dummy variables for years ‘97-‘00 and for Dec.
- D(·)* – difference operator.

⁹² For benchmark 1996 year we do not introduce a dummy variable.

A few technical details, regarding macroeconomic time series analysis, merit special attention and treatment.

Firstly, time series require stationarity, that is a constant dispersion and mean over time period. However, as most empirical studies suggest⁹³, economic time series are typically nonstationary, implying that OLS is likely to yield spurious correlations. To solve this problem, we can employ a few approaches: 1) apply OLS to the differences of a required order for reaching stationarity; 2) estimate a vector autoregressive model (VAR); 3) develop an error correction model (ECM). From this list, we use ECM that, unlike VAR and regression on differences, takes into account (and separates) both long-term and short-term relationships and allows for the application of economic theory.

Secondly, if we are going to apply ECM, we have to remove seasonality in data (see Franses (1998)). The reason is as follows. On the one hand, most tests of stationarity (e.g. Augmented Dickey-Fuller, **ADF**; Pierce-Perron, **PP**) and cointegration (e.g. Johansen) have low power, especially for short time series. On the other, seasonal fluctuations “mislead” these tests with fluctuations around some trend. Therefore, the series may falsely appear to be converging to some stationary level, and consequently the probability of type II error increases. In addition, seasonality in data raises a question of the relevant number of lags. Thus, unless seasonal unit roots are tested, deseasonalization should be applied. From the above suggestions, we use a multiplicative seasonal filter⁹⁴. Unfortunately, deseasonalization may lead to the loss of information and distortion of series. For instance, if at some point in time there is a discrete change from one data

⁹³ For a brief review see Campbell and Perron (1991).

⁹⁴ Ratio to moving average.

generating process to another, deseasonalization is likely to attenuate this transition or even eliminate it. As a result, the data are obviously distorted.

Thirdly, in testing stationarity and cointegration, we follow Campbell and Perron (1991) and always include a time trend to avoid specification errors in these tests. Despite obvious shortcomings of the OLS estimation, we provide it as a benchmark.

The simple correlation of own revenues (*RAOG*) of local governments and grants (*RGRANT*) to local governments is positive (*0.102*) but significant only at a 50% level. Obviously, the correlation does not control for other factors, but this preliminary result does not correspond to our findings at the micro level. Now let us estimate the partial effect of grants on local expenditures and local own revenues.

OLS estimates of Eq. 3 (Table 3) have predicted signs and values. A growth in income (real *GDP* and real average wages) leads to a growth in own revenues of local governments, while an increase in arrears operates in the opposite direction. Although statistically insignificant, the unemployment rate is slightly stimulating the growth of own revenues of local governments. However, what is important is a negative and significant coefficient of real grants to subnational governments. *Ceteris paribus*, a hryvnya increase in grants results in a 0.43 hryvnya decrease in own revenues of local governments.

Nevertheless, as the Breusch-Godfrey LM serial correlation test suggests, there is autocorrelation of residuals. Therefore, although we get unbiased estimates for the coefficients, the standard errors are likely to be distorted. The inferences should be taken with a grain of salt. It is worth noting that the magnitude of the effect in

macroeconometric study is of the same order as the magnitude in the microeconometric study.

Table 3. Estimation output for macro time series (standard errors in the parentheses).

Regressors	OLS (Eq. 3)		TSLS (Eq. 3)	
	not seasonally adjusted series	seasonally adjusted series	not seasonally adjusted series	seasonally adjusted series
RGDP	0,037 (,031)	0,047 (,039)	0,059 (,036)	0.117** (,056)
RWAGE	8.991*** (3,117)	2,802 (3,686)	9.592*** (4,338)	-1,408 (5,643)
RU	0,001 (,001)	0,000 (,001)	0,001 (,001)	-0,001 (,001)
D(RWA)	-0.213* (,124)	-0.259* (,113)	-0,186 (,126)	-0.233* (,123)
D(RPAY)	-0.011*** (,004)	-0,001 (,007)	-0,010 (,005)	0,004 (,009)
RGRANT	-0.427*** (,159)	-0.274** (,155)	-0.787*** (,269)	-1.529*** (,456)
Other variables	+	+	+	+
R2	0,887	0,737	0,878	0,474
Adjusted R2	0,853	0,656	0,842	0,311
p(Breush-Godfrey (lags=2))	0,012	0,150	0,249	0,014
p(RESET (2))	0,244	0,138	0,065	0,413
F-statistic	25,971	9,054	24,300	4,872
N	57	56	57	56
Effective sample	1996:01-2000:09	1996:02-2000:09	1996:01-2000:09	1996:02-2000:09
p(Overidentifying restrictions test χ^2)	-	-	0,856	0,954

*** -- significant at 1% level

** -- significant at 5% level

* -- significant at 10% level

In the microeconometric analysis we have shown that grants are likely to be endogenous. If grants are endogenous in partial equilibrium analysis, they are necessarily endogenous in general equilibrium analysis since grants are the part of the fiscal system as a whole. Therefore, we should look for instruments that are likely to affect grants but not to influence local revenues/expenditures. The candidates for such variables are State Budget deficit, revenues of major state taxes

(value-added tax, enterprise profit tax, oil-gas extraction/transportation rent revenues, etc.), and change in monetary base, which are unlikely to be affected by subnational governments. Given this specification of instrumental variables, the Hausman test of endogeneity for real aggregated grants rejects the null hypothesis of exogeneity at 4% significance level. Thus, we should consider TSLS as an appropriate estimator for Eq. 3.

The TSLS estimate for the partial effect of grants on fiscal behavior of local governments is less than the OLS estimate thus suggesting that OLS is, not surprisingly, biased upwards. Partial effects of other variables, except changes in real payables, do not change much in comparison to the OLS estimates.

As we stated before, economic time series are likely to be nonstationary. The ADF test for most series indicates that the order of integration is equal to one, that is I(1). Series that represent stocks, e.g. arrears, are I(2). Following the methodology of Granger and Engle (Gujarati, 1995, p. 726), we first estimate the cointegration equation given the fact that OLS (TSLS) provides unbiased estimates for the long-run relationship between variables. Let us use the TSLS estimates⁹⁵ for the cointegration equation. Residuals of this regression are stationary at any reasonable level of statistical significance for all relevant tests (ADF, PP, Engle-Granger (Gujarati, 1995, p. 727)). Then we regress the difference of real own revenues of local governments on the one period lagged discrepancy of *RAOG* from the long-run trend and current and lagged differences of exogenous variables that enter the cointegration equation. The specification is summarized below:

⁹⁵ For seasonally adjusted series.

$$\begin{aligned}
D(RAOG_t) = & \alpha + \beta \cdot (Discrepancy_{t-1}) + \sum_{i=0}^4 \gamma_{i+1}^{(1)} D(RGDP_{t-i}) + \sum_{i=0}^4 \gamma_{i+1}^{(2)} D(RWAGE_{t-i}) + \\
& + \sum_{i=0}^4 \gamma_{i+1}^{(3)} D^2(RWA_{t-i}) + \sum_{i=0}^4 \gamma_{i+1}^{(4)} D^2(RPAY_{t-i}) + \sum_{i=0}^4 \gamma_{i+1}^{(5)} D(RU_{t-i}) \\
& + \sum_{i=0}^4 \gamma_{i+1}^{(6)} D(RGRANT_{t-i}) + \sum_{i=0}^4 \gamma_{i+1}^{(7)} D(DUMMY_{t-i})
\end{aligned} \quad . \quad (Eq. 4)$$

where *Discrepancy* is the deviation of the own revenues of local governments (*RAOG*) from its long-run relationship with fundamentals.

After estimating the extended version of this specification (Eq. 4), we eliminate lagged differences with insignificant parameters to make the model parsimonious. The technical parameters of the model are satisfactory: $p(Breusch-Godfrey(2))=0.47$, $p(RESET)=0.87$, $F-statistic=83$ (for details see APPENDIX C). It is estimated that $\beta = -0.79$ implying that the system is stable and rapidly converging to an equilibrium. Although short run effects are of limited use in most studies, it is important to note that the cumulative short run effect of grants is equal to -0.05 . Therefore, we can conclude that, despite the fact that grants crowd out own revenues in the long run (roughly .80 UAH per 1 UAH in grants), in the short run the substitution is quite small.

The same specifications are applied to models with seasonally adjusted (SA) series. We have anticipated that seasonal filters can eliminate valuable variation in data or even distort it. Although the comparison of the models for SA series and non-SA series confirms our prediction, the general inference is the same: the flypaper effect is not observed in the long run. However, in estimates of ECM models with SA series, we find that the short run cumulative effect of grants on own revenues of local governments are positive, thus implying the flypaper effect in the short run.

Unfortunately, the limitation of macro and micro studies is their limited forecasting power. An extensive use of dummy variables to capture time specific effects greatly reduces our ability to estimate future dynamics. *Ex ante* we cannot estimate the

magnitude and sign of such an effect. Nevertheless, we can make some general conclusions and provide '*ceteris paribus*' predictions.

Discussion of results

The empirical evidence suggests that the flypaper effect is not likely to occur in Ukraine. Both macro- and microeconomic results tend to show that the expenditure elasticity with respect to grants is not greater than the expenditure elasticity with respect to local income. This implies that the growth in grants allocated to local governments in Ukraine should not have led to the growth of the local and, perhaps, general⁹⁶ government. This study does not explain the reasons for the absence of the flypaper effect. However, a few points regarding the specifics of Ukraine may be suggested.

Firstly, the government, at least at the local level, may be already a mature Leviathan. If this is true, then it becomes sub-optimal for the Leviathan to expand further. In other words, a marginal increase in grants does not result in excessive growth of government expenditures because the Leviathan is already constrained in its ability to raise more taxes. To a certain extent, it may mean that the local government starts operating on the downward sloping part of the Laffer curve. Thus, it is not optimal for the Leviathan to expand because further enlargement reduces its power, i.e. budget.

This argument may imply that the ratio of local government expenditures to local value added should be high relative to the ratio of countries where the flypaper effect is observed⁹⁷. Appendix D presents the ratios for Ukrainian oblasts in 1997.

⁹⁶ Local plus national.

⁹⁷ One can argue that the Leviathan can be 'satisfied' at a lower level of government expenditures in low income countries since the economy cannot sustain a parasitical government. Indeed, government expenditures per

On average, the ratio is equal to 24%. For OECD countries, the ratio varies from 28% in Canada to 10% in France and 11% in the United Kingdom (OECD, 1999, p. 276-277). Federal OECD countries on average have roughly 20%, while unitary OECD countries – 13%. The discrepancy between Ukraine’s ratio and the average ratio of unitary OECD countries⁹⁸ suggests that the Leviathan argument may contribute to explaining the absence of the flypaper effect.

Secondly, the absence of the flypaper effect may be explained by the institutional arrangements of intergovernmental fiscal relations in Ukraine. For instance, the ‘gap-filling’ feature, which is a combination of soft budget constraint and the ratchet effect, may play a role. If a local government is explicitly or implicitly guaranteed a certain level of revenues, disincentives to collect taxes⁹⁹ because of this soft budget constraint and the ratchet effect may outweigh the incentives implied by the flypaper effect theories (e.g. Niskanen’s objective to maximize budget-power).

We can support this argument with the results of the macroeconometric study. In the short run, when the ratchet effect is disabled, we do observe the flypaper effect. During this relatively short period of 3-4 months, the central government cannot revise grant amounts, and local governments tend to expand their budgets¹⁰⁰.

capita may be less in Ukraine than in OECD countries. However, the share of government expenditures in GDP for Ukraine should not be strikingly different from that of developed countries.

⁹⁸ Ukraine is a unitary country by Constitution.

⁹⁹ Largely, the disincentives are determined by the fact that the local governments are not residual claimants on the taxes collected in their jurisdictions: the ratchet effects, left from the Soviet time, is still working in Ukrainian intergovernmental fiscal relations.

¹⁰⁰ However, Italy, which is also characterized by gap-filling grants (Ahmad, 1997), appears to have the flypaper effect (Levaggi and Zanola, 1998). This fact, nevertheless, does not reject the argument since, unlike Ukraine, Italy has matching grants with the gap-filling feature. Moreover, in Italy gap-filling grants cover only a part of aid to local governments.

Thirdly, tightly constrained fiscal power of local governments in Ukraine could also explain why we do not observe the flypaper effect. Given the limited legal ability of local governments in Ukraine to levy taxes, the Leviathan cannot legally increase its power. Thus, bribes to local bureaucracy and other illegal mechanisms may be involved. In transition economies like Ukraine, where property rights over tax flows are poorly delineated among the government levels, illegal or other implicit forms of extracting resources from the economy on behalf of bureaucrats may be really important. In a sense, the flypaper effect may be latent or crowded out into shadow activities: unobserved according to official statistics, but present de facto. Unfortunately, we are not able to test this hypothesis because this kind of data is not available in Ukraine.

The Ukrainian system of intergovernmental fiscal relations is largely a legacy of the Soviet past characterized by a large government size, soft budget constraints, the ratchet effect, and a high centralization of fiscal powers. According to these considerations, we can expect that the flypaper effect is not likely to happen in the countries of the former Soviet Union or, more generally, former Soviet block with fiscal systems similar to the Ukrainian one.

One of this study's goals is to predict changes induced by the budgetary reform in Ukraine. In brief, the reform is aimed at the decentralization of fiscal powers and public decision-making. The features of the reform are delineation of tax bases and revenues and extensive use of lump-sum grants. The grants are calculated according to complicated formulas based on per capita standards adjusted for special groups (e.g. the number of disabled children)¹⁰¹.

¹⁰¹ More details in Verkhovna Rada (2001)

We tend to be careful in predicting the likely outcomes of the reform, since it alters the institutional framework. For instance, ‘reformed’ local governments are likely to get rid of the ratchet effect in the short run. In addition, they eventually become residual claimants on some fiscally significant taxes, e.g. land tax, that are not taken into account during grant allotting. This further diminishes the strength of the ratchet effect. On the other hand, local governments still do not have legal power to set tax rates and define tax bases; local government’s soft budget constraint is still an issue. The ratchet effect, probably, persists in the medium run since the parameters of the formula are revised every three years¹⁰². As we see, some changes may stimulate the flypaper effect, yet there are a number of Soviet-type factors constraining the flypaper effect. In sum, the results of this study, indicating no flypaper effect for lump sum grants in the Ukrainian history of intergovernmental fiscal relations, seem to suggest that the new system of grants should not lead to an excessive growth of local governments.

¹⁰² Given the complicatedness of the formulas and the Ukrainian fiscal experience, the very commitment not to revise formulas does not appear credible.

CONCLUSIONS

The flypaper effect appears to play a significant role in the intergovernmental fiscal relations in many developed countries. Although its nature and mechanism are not completely understood yet and the very existence of the flypaper effect is debated, this anomaly has important policy implications for Ukrainian intergovernmental fiscal relations in the face of coming budgetary reforms. Thus, the study of the likely outcomes of these reforms is essential.

In this work, we have tried to analyze how general lump-sum grants – the core of the new approach to the intergovernmental fiscal relations in Ukraine – affect the fiscal behavior of local governments. In particular, based on a Western world experience, we have expected that these grants may lead to an excessive growth of subnational governments, that is the flypaper effect. However, our analysis at both macro and micro levels unambiguously rejects the hypothesis of the significant flypaper effect.

There are a few plausible explanations of such a finding. Firstly, we may observe no flypaper effect because the Leviathan is already mature. Secondly, local governments have a limited ability to levy own taxes of any fiscal significance. Thus, the legal ability of a local government to grow is tightly constrained, and the flypaper effect could be crowded out in shadow. Thirdly, the ‘gap-filling’ feature of grants may attenuate incentives to raise additional taxes. These points, however, are no more than informed speculations. Further research in this field is required.

The value of this work, from the positive economics' point of view, seems to be in pointing out that the flypaper effect, i.e. an excessive growth of the government, is not inherent to all institutional arrangements of intergovernmental fiscal relations.

As for policy implications, this study indicates that the coming reform of intergovernmental fiscal relations should not lead to excessive growth of local governments. The obtained results may also contribute to the explanation why the government in Ukraine has not been increasing during the independence.

As Figure 1 suggests, the absence of the flypaper effect is rather good than bad. It indicates that the government intervention is not excessive, and the welfare of a community is improved relative to the flypaper effect presence. However, we would not like to claim in policy implications that the constrained taxing power of local governments and 'gap-filling' grants are necessarily good in intergovernmental fiscal relations. Costs of these measures (e.g. the disincentives to collect taxes when the revenues to a local government are guaranteed by the central government) may outweigh the benefits of the 'no-flypaper effect' world. Only disinterested cost-benefit analysis can determine the expediency of these policy steps.

In sum, we would like to consider the results of this study as the first step in the comprehensive analysis of the grant's effects on the fiscal behavior of local governments in Ukraine.

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APPENDIX A

Bureaucrat's budget maximization¹⁰³

Denote Q as a quantity of supplied local public good. Let $P(Q, X)$ be a inverse demand function for a local public good, where X is a vector of all other relevant variables, e.g. income. This function has a negative first derivative with respect to Q . Since the bureaucrat perfectly discriminates, the total revenues is the area below the $P(Q, X)$. Thus, the revenue is equal to

$$TR(Q, X) = \int_0^Q P(t, X) \cdot dt = Q \cdot P^*(Q, X)$$

where $P^*(Q, X)$ is the average price for a public good.

Assume that a bureaucrat faces a cost function $C(Q)$ such that $\frac{\partial C(Q)}{\partial Q} > 0$. The

bureaucrat is not allowed to have losses so that his or her own revenues plus grant G should be equal to or greater than total costs. By assumption, the bureaucrat maximizes budget size. In brief, the model could be written in the following way.

$$\begin{aligned} & P^*(Q, X) \cdot Q \xrightarrow{Q} \max \\ \text{s.t. } & P^*(Q, X)Q + G \geq C(Q) \end{aligned}$$

Thus, we have constrained maximization.

$$L = P^*(Q, X)Q + \lambda(P^*(Q, X)Q + G - C(Q))$$

First order condition (FOC):

¹⁰³ This appendix is based on Niskanen (1968) and King (1984).

$$\frac{\partial L}{\partial Q} = P'_Q(Q, X)Q + P^*(Q, X) + \lambda(P'_Q(Q, X)Q + P^*(Q, X) - C'_Q(Q)) \leq 0$$

$$Q \frac{\partial L}{\partial Q} = 0, \quad Q \geq 0$$

$$\frac{\partial L}{\partial \lambda} = P^*(Q, X)Q + G - C(Q) \leq 0$$

$$\lambda \frac{\partial L}{\partial \lambda} = 0, \quad \lambda \geq 0$$

Since the target function has a positive derivative with respect to Q , we can expect that Q is strictly greater than zero unless effective¹⁰⁴ average cost curve is always above demand. Intuitively, the FOC suggests the following. If the constraint is not binding, the grant perfectly substitutes bureaucrat's own revenues, thus not stimulating additional taxation. If the constraint is binding, then the supply of local public goods is completely determined by the constraint and grants do stimulate excessive taxation by the bureaucrat. The analytical solution, obviously, depends on the functional forms of the cost and inverse demand functions.

¹⁰⁴ That is corrected for subsidies from the upper-tier government.

APPENDIX B

Survey of the flypaper effect: representative estimates of marginal propensities to consume public services¹⁰⁵

Author	Sample	MPC from income	MPC from grants	Other covariates
Inman (1971)	State grants to 41 cities, 1967	0.04	1.34	None
Weicher (1972)	State grants to 106 municipal governments, 1962	0.02	0.91	Total population, employment rate, population growth, population density, housing characteristics, retail sales, manufacturing establishments, central city population and manufacturing percent of population, percentage of population: school-aged, <age 21, nonwhite, foreign
Weicher (1972)	State grants to 106 school districts, 1962	0.02	0.59	See above
Gramlich, Galper (1973)	Federal grants to state and local governments, quarterly, 1954-1972 (time series)	0.1	0.43	Relative price of capital, proportion of school-aged, female headed families, robbery rate
Gramlich, Galper (1973)	Federal and state aid to 10 large urban governments, 1962-1970	0.05	0.25	Grant price effects, robbery rate, suburban taxes
Bowman (1974)	Federal education grants to 55 west Virginia school districts, 1970	N/A	1.06	Non-local assessed value population growth, local assessed value, percent of families with income >\$15K, percent of families with children < age 18
Bowman (1974)	State grants to 55 West Virginia school districts, 1970	N/A	0.50	Non-local assessed value population growth, local assessed value, percent of families with income >\$15K, percent of families with children < age 18
Winer (1983)	Federal grants to Canadian provinces, 1952-1969 (panel)	N/A	1.20	Population, province fixed effects
Feldstein (1975)	State education grants to 105 Massachusetts towns, 1970	N/A	0.60	Wealth, match rate, tax base, private school pupils per capita, public school pupils per capita, growth in pupils

(continued)

¹⁰⁵ Based on Knight, 2000, p. 37

Author	Sample	MPC from income	MPC from grants	Other covariates
Grossman (1990)	State and federal grants to 136 Virginia local governments, 1981	0.01	1.70	Median voter tax price, urban population, black population
Olmsted, Denzau, Roberts (1993)	State and federal grants to 344 Missouri school districts, 1980	0.05	0.58-1.15	Tax price, number of students in private school, number pupils, % population: urban, poor, black, homeowners
Case, Hines, Rosen (1993)	Federal grants to states, 1970-1985 (panel)	0.11-0.17	0.65-1.04	Population density, % population >65, % population 5-17, % population black
Becker (1994)	Federal grants to state and local governments, 1977-1986 (panel)	0.06	0.61	Tax price, lagged expenditures
Gamkhar, Oates (1996)	Federal grants to state governments, 1953-1991 (time series)	0.11	0.62	Unemployment, share of population school-aged, percent of population urban.

APPENDIX C

Estimation output for ECM model (series are not seasonally adjusted).

Dependent Variable: D(RAOG)
 Method: Least Squares
 Sample(adjusted): 1996:05 2000:09
 Included observations: 53 after adjusting endpoints
 Newey-West HAC Standard Errors & Covariance (lag truncation=3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.000219	9.42E-05	-2.325813	0.0263
Discrepancy	-0.791523	0.110054	-7.192110	0.0000
D(RWAGE)	4.924185	3.229605	1.524702	0.1369
D(RGDP)	0.058203	0.033802	1.721847	0.0945
D(RGDP(-4))	-0.042160	0.014364	-2.935079	0.0060
D(RWA,2)	-0.280416	0.111738	-2.509581	0.0172
D(RWA(-3),2)	0.220283	0.071417	3.084470	0.0041
D(RGRANT)	-0.316639	0.077597	-4.080562	0.0003
D(RGRANT(-4))	0.265085	0.073241	3.619372	0.0010
D(RPAY,2)	-0.013684	0.001987	-6.887918	0.0000
D(RPAY(-4),2)	0.007238	0.002039	3.549729	0.0012
D(DUMMY97)	-0.007437	0.000489	-15.20925	0.0000
D(DUMMY98)	-0.010638	0.000880	-12.09599	0.0000
D(DUMMY99)	-0.013266	0.001078	-12.31102	0.0000
D(DUMMY00)	-0.015670	0.001394	-11.24482	0.0000
DUMMY12	0.000910	8.05E-05	11.29883	0.0000
DUMMY12*TREND	-8.95E-06	9.83E-07	-9.110372	0.0000
D(RU)	0.002756	0.001122	2.455862	0.0195
D(RU(-2))	-0.003461	0.000610	-5.676688	0.0000
D(RU(-3))	0.002925	0.000618	4.735728	0.0000
R-squared	0.979456	Mean dependent var		-3.95E-05
Adjusted R-squared	0.967628	S.D. dependent var		0.002126
S.E. of regression	0.000382	Akaike info criterion		-12.61898
Sum squared resid	4.83E-06	Schwarz criterion		-11.87547
Log likelihood	354.4029	F-statistic		82.80554
Durbin-Watson stat	1.872554	Prob(F-statistic)		0.000000
Breusch-Godfrey Serial Correlation LM Test (2):				
F-statistic	0.768485	Probability		0.472347
Obs*R-squared	2.503596	Probability		0.285990
Ramsey RESET Test:				
F-statistic	0.015461	Probability		0.901822
Log likelihood ratio	0.025601	Probability		0.872878
White Heteroskedasticity Test:				
F-statistic	1.013882	Probability		0.501302
Obs*R-squared	33.80373	Probability		0.428516

APPENDIX D

Ratio of local government expenditures to local value added, 1997.

Region	Value added, mn UAH	Total local government expenditures, mn UAH	Local expenditures/ local value added, %
AR Crimea	2 437	714	29.3
Vinnitska	2 298	552	24.0
Volynska	1 096	373	34.0
Dnipropetrovska	7 048	1 929	27.4
Donetska	9 165	1 818	19.8
Zhytomyrska	1 827	617	33.8
Zakarpatska	1 025	454	44.3
Zaporizhska	4 247	673	15.8
Ivano-Frankivska	1 600	454	28.3
Kyivska	3 278	618	18.8
Kirovogradska	1 353	380	28.1
Luganska	3 784	768	20.3
Lvivska	3 132	716	22.9
Mykolayivska	1 891	508	26.9
Odeska	3 997	743	18.6
Poltavska	3 322	766	23.1
Rivenska	1 501	369	24.6
Sumska	2 099	449	21.4
Ternopil'ska	1 147	379	33.0
Kharkivska	4 893	1 430	29.2
Khersonska	1 612	405	25.1
Khmelnitska	2 010	463	23.0
Cherkaska	2 205	616	28.0
Chernivetska	918	333	36.3
Chernigivska	1 837	460	25.1
Kyiv	7 541	1 732	23.0
Sevastopol	387	140	36.1
Ukraine	77 650	18 860	24.3

Source: Treasury, State Statistics Committee

APPENDIX E

Data series

Table 1. Population, thousand

Region	1995	1996	1997	1998	1999
AR Crimea	2 192.0	2 177.2	2 150.6	2 129.3	2 106.3
Vinnitska	1 877.0	1 864.2	1 850.4	1 835.3	1 819.7
Volynska	1 075.0	1 072.4	1 069.0	1 065.1	1 061.1
Dnipropetrovska	3 877.0	3 840.6	3 799.8	3 764.0	3 733.6
Donetska	5 246.0	5 177.9	5 104.8	5 043.8	4 987.3
Zhytomyrska	1 485.0	1 472.8	1 460.1	1 449.3	1 437.7
Zakarpatska	1 281.0	1 281.4	1 281.9	1 281.5	1 280.7
Zaporizhska	2 087.0	2 070.0	2 051.4	2 034.7	2 016.0
Ivano-Frankivska	1 456.0	1 456.8	1 455.3	1 453.3	1 450.3
Kyivska	1 906.0	1 890.2	1 874.8	1 858.4	1 844.0
Kirovogradska	1 224.0	1 213.5	1 199.9	1 186.5	1 172.5
Luganska	2 821.0	2 782.8	2 737.3	2 700.7	2 668.1
Lvivska	2 750.0	2 741.2	2 730.3	2 719.3	2 708.3
Mykolayivska	1 349.0	1 341.0	1 329.8	1 320.2	1 307.6
Odeska	2 588.0	2 568.1	2 548.4	2 529.4	2 510.2
Poltavska	1 748.0	1 734.8	1 719.6	1 704.0	1 688.8
Rivenska	1 189.0	1 188.8	1 187.1	1 186.8	1 184.9
Sumska	1 405.0	1 392.7	1 379.1	1 364.6	1 349.3
Ternopil'ska	1 172.0	1 170.5	1 167.4	1 163.5	1 159.0
Kharkivska	3 103.0	3 068.1	3 034.8	3 004.1	2 977.6
Khersonska	1 272.0	1 262.7	1 252.1	1 243.8	1 234.1
Khmelnitska	1 511.0	1 503.2	1 492.8	1 480.1	1 468.4
Cherkaska	1 513.0	1 500.4	1 486.9	1 474.5	1 459.5
Chernivetska	948.0	946.4	943.6	941.3	938.2
Chernigivska	1 364.0	1 346.4	1 330.3	1 315.4	1 299.8
mean	1 937.6	1 922.6	1 905.5	1 890.0	1 874.5
st.deviation	981.2	967.4	952.7	940.5	930.0
coef. of variation	0.506	0.503	0.500	0.498	0.496

Source: State Statistics Committee

Table 2. Industrial output, mn UAH

Region	1995	1996	1997	1998	1999
AR Crimea	1 134.5	1 305.0	1 188.0	1 255.0	1 657.4
Vinnitska	1 179.3	1 492.0	1 497.0	1 491.6	1 877.8
Volynska	346.5	407.0	427.0	436.4	565.9
Dnipropetrovska	8 221.3	10 555.0	11 066.0	12 640.4	16 700.8
Donetska	11 725.5	13 399.0	13 424.0	14 905.2	19 920.9
Zhytomyrska	782.4	961.0	902.0	899.1	1 113.8
Zakarpatska	262.7	309.0	305.0	292.5	426.4
Zaporizhska	4 672.3	5 835.0	6 060.0	6 669.5	8 804.6
Ivano-Frankivska	1 592.8	1 454.0	1 406.0	1 455.4	1 637.8
Kyivska	1 827.6	2 487.0	2 047.0	2 464.3	2 979.8
Kirovogradska	575.7	643.0	596.0	608.2	819.1
Luganska	4 873.5	5 127.0	4 495.0	4 646.6	6 598.7
Lvivska	1 833.2	2 063.0	2 052.0	2 088.0	2 801.0
Mykolayivska	1 536.9	1 595.0	1 658.0	1 691.8	1 996.9
Odeska	1 291.0	1 655.0	1 379.0	1 762.9	2 138.4
Poltavska	2 403.2	2 917.0	3 084.0	4 160.6	5 144.3
Rivenska	871.9	1 340.0	1 423.0	1 292.9	1 645.1
Sumska	1 313.4	1 719.0	1 871.0	1 876.1	2 548.8
Ternopiiska	435.9	563.0	552.0	459.8	550.0
Kharkivska	2 626.8	3 404.0	4 014.0	4 721.2	6 370.0
Khersonska	665.1	593.0	543.0	568.2	640.3
Khmelnitska	1 078.7	1 293.0	1 341.0	1 321.8	1 609.4
Cherkaska	1 084.2	1 230.0	1 264.0	1 382.3	1 809.8
Chernivetska	335.3	377.0	390.0	383.5	424.8
Chernigivska	860.7	1 099.0	1 092.0	1 100.3	1 427.0
mean	2 141.2	2 552.9	2 563.0	2 822.9	3 688.4
st.deviation	2 623.7	3 109.7	3 174.7	3 593.9	4 810.1
coef. of variation	1.225	1.218	1.239	1.273	1.304

Source: State Statistics Committee, UEPLAC/TACIS

Table 3. Agricultural output, mn UAH

Region	1995	1996	1997	1998	1999
AR Crimea	1 163.0	1 027.0	1 004.0	912.7	829.6
Vinnitska	1 987.0	1 912.0	1 846.0	1 643.1	1 431.1
Volynska	896.0	922.0	790.0	779.5	784.2
Dnipropetrovska	1 823.0	1 543.0	1 584.0	1 410.7	1 265.4
Donetska	1 580.0	1 293.0	1 332.0	1 085.8	1 153.1
Zhytomyrska	1 302.0	1 231.0	1 092.0	998.8	951.9
Zakarpatska	606.0	610.0	596.0	541.9	569.5
Zaporizhska	1 180.0	894.0	1 026.0	892.9	925.9
Ivano-Frankivska	826.0	820.0	795.0	648.7	677.2
Kyivska	2 055.0	1 890.0	1 670.0	1 609.6	1 402.0
Kirovogradska	1 176.0	876.0	1 033.0	959.9	822.6
Luganska	933.0	796.0	829.0	710.4	733.1
Lvivska	1 292.0	1 289.0	1 226.0	1 153.3	1 178.7
Mykolayivska	938.0	736.0	860.0	731.6	711.1
Odeska	1 278.0	1 138.0	1 518.0	1 221.5	1 243.5
Poltavska	1 724.0	1 507.0	1 464.0	1 273.7	1 099.2
Rivenska	926.0	932.0	811.0	758.2	759.0
Sumska	1 200.0	1 151.0	1 021.0	963.4	806.4
Ternopiiska	1 085.0	1 061.0	945.0	807.2	786.2
Kharkivska	1 670.0	1 452.0	1 547.0	1 294.5	1 216.8
Khersonska	929.0	835.0	1 019.0	950.8	874.7
Khmelnitska	1 467.0	1 379.0	1 297.0	1 116.3	1 086.2
Cherkaska	1 474.0	1 375.0	1 331.0	1 245.4	1 077.3
Chernivetska	623.0	549.0	572.0	485.5	490.8
Chernigivska	1 501.0	1 425.0	1 213.0	1 165.9	1 035.3
mean	1 265.4	1 145.7	1 136.8	1 014.4	956.4
st.deviation	387.6	354.8	332.0	297.6	247.5
coef. of variation	0.306	0.310	0.292	0.293	0.259

Source: State Statistics Committee, UEPLAC/TACIS

Table 4. Inter-enterprise payables (end of period), mn UAH

Region	1995	1996	1997	1998	1999
AR Crimea	438.0	1 121.1	1 276.7	2 715.0	3 198.4
Vinnitska	434.0	644.1	1 020.6	2 642.0	2 890.1
Volynska	136.0	320.6	491.4	1 086.0	1 582.0
Dnipropetrovska	2 263.0	8 593.5	11 625.5	17 400.0	25 955.7
Donetska	4 134.0	7 049.3	10 395.6	21 562.0	29 551.3
Zhytomyrska	273.0	474.5	595.8	1 427.0	1 607.3
Zakarpatska	64.0	309.1	400.8	714.0	896.0
Zaporizhska	990.0	2 361.5	3 690.1	6 724.0	10 297.7
Ivano-Frankivska	709.0	1 066.3	1 320.1	1 824.0	2 642.7
Kyivska	536.0	1 624.3	1 980.6	4 038.0	5 171.5
Kirovogradska	203.0	532.3	801.3	1 714.0	3 037.7
Luganska	1 588.0	2 955.1	3 739.7	8 664.0	11 232.5
Lvivska	1 434.0	3 076.3	3 925.6	5 923.0	7 389.2
Mykolayivska	561.0	1 047.1	1 424.4	2 707.0	3 663.4
Odeska	505.0	1 602.3	1 213.3	2 764.0	4 472.7
Poltavska	656.0	1 455.9	2 683.1	4 008.0	4 060.1
Rivenska	318.0	697.9	1 049.8	1 853.0	2 732.9
Sumska	346.0	767.5	1 156.7	2 468.0	4 156.0
Ternopiiska	133.0	328.1	485.2	1 302.0	1 681.4
Kharkivska	1 676.0	3 820.0	5 304.5	9 363.0	8 606.5
Khersonska	270.0	649.5	914.2	2 030.0	2 637.2
Khmelnitska	317.0	734.0	1 104.0	2 109.0	2 441.2
Cherkaska	395.0	826.3	1 311.6	2 141.0	2 389.1
Chernivetska	125.0	273.7	398.7	715.0	833.4
Chernigivska	277.0	575.5	622.3	1 393.0	1 664.3
mean	751.2	1 716.2	2 357.3	4 371.4	5 791.6
st.deviation	881.8	2 034.1	2 848.8	5 025.8	7 032.2
coef. of variation	1.174	1.185	1.209	1.150	1.214

Source: State Statistics Committee, UEPLAC/TACIS

Table 5. Wage arrears (end of period), mn UAH

Region	1995	1996	1997	1998	1999
AR Crimea	12.5	152.3	173.5	262.8	180.8
Vinnitska	35.9	128.5	155.2	202.7	219.3
Volynska	18.3	87.1	109.2	136.2	112.2
Dnipropetrovska	65.6	370.8	510.4	614.0	578.1
Donetska	88.4	514.8	737.0	923.5	984.7
Zhytomyrska	16.3	106.3	127.7	174.5	162.1
Zakarpatska	3.4	34.7	35.5	54.5	48.6
Zaporizhska	26.7	169.4	201.3	241.7	239.0
Ivano-Frankivska	9.1	89.0	113.8	137.8	123.6
Kyivska	18.2	218.2	303.2	399.9	224.4
Kirovogradska	18.4	96.7	142.0	192.2	190.0
Luganska	65.7	272.1	431.4	595.3	578.2
Lvivska	3.6	165.5	210.3	288.4	219.5
Mykolayivska	14.6	96.3	121.7	188.8	204.9
Odeska	0.5	137.1	146.3	196.6	206.8
Poltavska	16.6	108.0	152.0	234.0	238.7
Rivenska	16.0	98.0	120.6	138.5	126.8
Sumska	29.5	114.2	155.4	201.6	207.0
Ternopiiska	15.8	93.9	115.3	147.6	162.6
Kharkivska	45.6	261.6	264.3	364.7	434.1
Khersonska	0.9	83.0	117.3	165.8	173.3
Khmelnitska	20.0	104.0	143.7	194.1	196.7
Cherkaska	13.7	96.1	127.0	193.3	210.5
Chernivetska	6.1	53.8	70.2	89.1	73.5
Chernigivska	14.1	87.3	123.6	176.5	157.0
mean	23.0	149.5	196.3	260.6	250.1
st.deviation	21.4	104.9	151.2	188.9	196.2
coef. of variation	0.931	0.702	0.770	0.725	0.784

Source: State Statistics Committee, UEPLAC/TACIS

Table 6. Average wages, UAH

Region	1995	1996	1997	1998	1999
AR Crimea	51.3	133.8	153.3	154.8	165.8
Vinnitska	47.4	119.7	130.6	126.6	127.4
Volynska	43.7	107.4	122.1	114.1	115.3
Dnipropetrovska	65.4	172.5	194.2	198.6	204.0
Donetska	69.0	171.6	190.9	202.0	217.1
Zhytomyrska	49.0	121.9	130.8	128.5	130.5
Zakarpatska	38.5	97.6	110.6	116.5	127.6
Zaporizhska	61.7	164.6	178.8	194.4	210.0
Ivano-Frankivska	45.7	118.4	130.1	128.4	139.0
Kyivska	60.8	158.0	176.7	173.1	184.6
Kirovogradska	47.8	124.5	133.6	129.7	134.2
Luganska	58.5	143.2	161.7	167.7	181.8
Lvivska	46.2	118.6	135.7	141.0	149.0
Mykolayivska	54.0	136.5	150.4	154.7	167.0
Odeska	52.0	141.8	159.7	156.9	173.6
Poltavska	54.5	147.2	161.2	160.5	169.2
Rivenska	50.1	127.0	138.1	129.1	133.6
Sumska	51.5	132.1	143.5	140.6	146.8
Ternopiiska	43.3	105.9	117.9	115.1	111.0
Kharkivska	53.0	136.2	161.2	168.5	179.2
Khersonska	45.7	118.5	134.7	134.6	140.5
Khmelnitska	47.5	117.5	128.0	125.3	122.7
Cherkaska	50.6	129.7	139.4	139.7	146.1
Chernivetska	49.8	113.3	124.4	118.1	120.5
Chernigivska	44.8	131.6	142.0	132.7	139.1
mean	51.3	131.6	146.0	146.1	153.4
st.deviation	7.1	19.3	21.9	25.6	29.6
coef. of variation	0.138	0.147	0.150	0.176	0.193

Source: State Statistics Committee, UEPLAC/TACIS

Table 7. Expenditures of local governments, thousand UAH

Region	1995	1996	1997	1998	1999
AR Crimea	516 460.8	604 680.0	713 971.0	660 444.5	1 058 494.0
Vinnitska	252 938.8	388 714.0	552 058.0	543 762.3	744 409.9
Volynska	169 012.3	202 746.0	372 724.0	356 388.4	636 837.2
Dnipropetrovska	857 428.6	909 035.0	1 929 103.0	1 316 053.6	1 845 385.5
Donetska	994 918.4	1 129 231.0	1 817 541.0	1 880 199.5	2 245 188.5
Zhytomyrska	305 768.7	373 228.0	617 122.0	640 185.6	776 036.7
Zakarpatska	172 532.8	239 287.0	453 722.0	427 080.2	756 328.3
Zaporizhska	393 366.8	435 370.0	672 760.0	790 242.9	1 112 351.3
Ivano-Frankivska	263 795.7	313 002.0	453 543.0	520 424.4	910 390.0
Kyivska	354 953.3	449 258.0	617 847.0	729 382.9	1 852 049.3
Kirovogradska	219 843.0	295 536.0	380 461.0	383 693.8	683 861.0
Luganska	420 683.2	602 009.0	768 150.0	982 904.1	1 388 858.6
Lvivska	584 352.0	544 598.0	716 181.0	773 182.7	1 626 652.3
Mykolayivska	243 163.4	298 444.0	507 769.0	566 540.7	557 975.4
Odeska	386 903.0	511 799.0	743 219.0	741 869.1	936 425.4
Poltavska	311 403.0	407 016.0	766 477.0	969 332.3	925 692.9
Rivenska	173 242.7	212 554.0	369 227.0	450 570.6	776 099.9
Sumska	236 837.0	322 728.0	448 651.0	438 282.9	495 270.9
Ternopiiska	158 497.0	216 707.0	378 925.0	361 774.1	616 086.9
Kharkivska	680 924.0	835 986.0	1 430 475.0	1 530 577.1	1 473 192.8
Khersonska	186 341.0	308 186.0	405 130.0	393 081.0	550 710.4
Khmelnitska	235 775.0	347 103.0	462 659.0	498 091.5	684 734.3
Cherkaska	320 110.0	337 538.0	616 381.0	641 911.8	827 932.6
Chernivetska	130 528.0	177 188.0	332 879.0	320 154.9	332 478.4
Chernigivska	223 697.0	299 345.0	460 431.0	396 757.5	676 300.9
mean	351 739.0	430 451.5	679 496.2	692 515.5	979 589.7
st.deviation	216 536.7	229 923.3	415 499.3	380 601.8	478 237.4
coef. of variation	0.616	0.534	0.611	0.550	0.488

Source: Treasury, Ministry of Finance, Fiscal Analysis Office

Table 8. Own revenues of local governments, thousand UAH

Region	1995	1996	1997	1998	1999
AR Crimea	479 926.1	577 799.0	399 975.0	414 170.4	615 998.9
Vinnitska	226 430.0	310 322.0	243 589.0	233 592.0	271 661.2
Volynska	110 400.7	133 660.0	116 158.0	125 418.1	145 686.3
Dnipropetrovska	730 125.6	833 976.0	1 253 850.0	1 122 557.3	975 057.2
Donetska	911 526.8	1 108 725.0	1 459 721.0	1 518 409.6	1 259 846.1
Zhytomyrska	193 068.8	261 508.0	187 234.0	196 692.3	244 968.5
Zakarpatska	106 794.3	160 876.0	113 792.0	150 403.1	223 022.3
Zaporizhska	363 803.8	429 248.0	571 538.0	657 943.5	597 421.1
Ivano-Frankivska	241 617.2	301 636.0	237 573.0	270 324.9	363 212.5
Kyivska	300 330.7	417 810.0	319 571.0	552 317.2	784 949.5
Kirovogradska	151 424.5	222 322.0	159 292.0	150 217.9	191 411.6
Luganska	378 248.8	542 626.0	554 722.0	520 215.4	645 722.7
Lvivska	585 300.3	492 531.0	509 138.0	571 168.4	727 482.2
Mykolayivska	211 656.0	284 413.0	301 859.0	373 018.0	334 423.5
Odeska	380 804.9	504 223.0	608 192.0	628 104.3	698 183.7
Poltavska	286 521.9	401 229.0	588 899.0	800 995.3	556 293.7
Rivenska	153 192.6	189 117.0	182 787.0	200 065.9	397 715.9
Sumska	228 957.1	297 151.0	303 038.0	295 284.8	320 018.1
Ternopiiska	125 929.0	155 735.0	125 167.0	115 371.7	143 647.7
Kharkivska	657 147.6	807 849.0	989 421.0	1 120 094.4	754 582.8
Khersonska	143 207.0	210 399.0	186 237.0	180 434.4	195 413.3
Khmelnitska	197 055.3	276 570.0	214 510.0	233 670.3	278 765.7
Cherkaska	268 942.4	325 780.0	321 503.0	303 016.9	406 240.5
Chernivetska	98 177.9	127 040.0	114 867.0	129 878.0	142 950.2
Chernigivska	213 963.3	283 685.0	242 321.0	209 580.8	284 229.2
mean	309 782.1	386 249.2	412 198.2	442 917.8	462 356.2
st.deviation	207 788.5	236 150.9	346 251.3	358 052.7	283 350.2
coef. of variation	0.671	0.611	0.840	0.808	0.613

Source: Treasury, Ministry of Finance, Fiscal Analysis Office

Table 9. Grants to local governments, thousand UAH

Region	1995	1996	1997	1998	1999
AR Crimea	0.0	0.0	33 393.0	100 361.7	74 186.9
Vinnitska	0.0	55 176.0	177 148.0	170 321.6	140 226.6
Volynska	41 478.0	48 282.0	128 211.0	130 689.9	145 301.0
Dnipropetrovska	0.0	0.0	0.0	1 189.0	20 407.5
Donetska	0.0	0.0	0.0	1 376.0	39 230.3
Zhytomyrska	92 622.0	72 053.0	231 234.0	233 707.1	215 472.6
Zakarpatska	49 067.6	64 053.0	163 873.0	147 971.9	185 594.1
Zaporizhska	0.0	0.0	0.0	1 132.4	22 896.9
Ivano-Frankivska	4 805.0	0.0	85 445.0	85 952.4	96 018.9
Kyivska	8 959.0	0.0	82 201.0	62 512.3	155 583.5
Kirovogradska	25 057.0	58 517.0	120 046.0	122 028.9	147 670.0
Luganska	0.0	0.0	66 999.0	95 716.3	58 065.6
Lvivska	0.0	0.0	78 859.0	63 094.3	74 889.1
Mykolayivska	10 535.0	8 300.0	72 623.0	56 606.7	21 323.2
Odeska	0.0	0.0	0.0	23 156.5	32 901.8
Poltavska	0.0	0.0	0.0	313.0	622.7
Rivenska	13 611.0	20 148.0	81 304.0	105 829.8	56 880.9
Sumska	0.0	0.0	27 916.0	50 611.5	20 938.6
Ternopiiska	11 671.0	45 567.0	131 376.0	128 403.2	143 336.9
Kharkivska	0.0	0.0	0.0	326.0	12 479.8
Khersonska	19 345.0	63 813.0	127 122.0	115 633.9	111 749.0
Khmelnitska	18 274.0	44 004.0	138 138.0	147 975.7	110 517.5
Cherkaska	28 751.0	0.0	89 795.0	142 202.1	80 827.3
Chernivetska	21 754.8	32 345.0	89 601.0	78 888.7	27 341.7
Chernigivska	0.0	0.0	81 798.0	79 872.0	42 441.1
mean	13 837.2	20 490.3	80 283.3	85 834.9	81 476.1
st.deviation	21 063.6	26 232.6	61 724.3	59 967.1	59 188.7
coef. of variation	1.522	1.280	0.769	0.699	0.726

Source: Treasury, Ministry of Finance, Fiscal Analysis Office

Table 10. Aged population (above pension age: men 60, women 55), thousand

Region	1995	1996	1997	1998	1999
AR Crimea	438.9	444.3	450.1	455.8	454.4
Vinnitska	498.4	495.8	494.2	494.9	491.9
Volynska	236.9	237.1	236.6	235.3	233.1
Dnipropetrovska	845.9	851.0	858.8	867.2	868.2
Donetska	1 227.9	1 230.8	1 234.6	1 236.5	1 228.9
Zhytomyrska	367.9	366.7	366.4	366.8	364.2
Zakarpatska	218.2	220.7	222.7	223.8	223.8
Zaporizhska	448.4	451.4	456.1	461.3	462.0
Ivano-Frankivska	301.9	305.4	307.2	307.0	306.1
Kyivska	437.6	437.9	439.9	442.4	441.5
Kirovogradska	297.6	295.9	295.0	295.3	293.7
Luganska	653.1	656.9	658.0	657.5	652.5
Lvivska	573.6	578.0	580.9	581.1	579.7
Mykolayivska	274.2	275.2	277.1	279.5	279.4
Odeska	532.8	533.5	539.3	543.0	543.9
Poltavska	446.3	447.5	447.0	448.1	446.8
Rivenska	239.7	241.3	242.1	242.1	240.8
Sumska	362.3	360.9	360.6	359.0	354.8
Ternopiiska	285.0	286.5	286.6	285.2	282.9
Kharkivska	709.3	707.7	709.8	710.7	706.8
Khersonska	248.6	250.6	253.3	256.8	257.3
Khmelnitska	380.6	379.2	377.6	376.7	373.9
Cherkaska	387.3	386.6	386.7	387.8	386.0
Chernivetska	201.2	201.8	203.1	203.5	203.3
Chernigivska	399.5	395.8	393.5	390.4	385.0
mean	440.5	441.5	443.1	444.3	442.4
st.deviation	225.2	225.8	227.0	227.9	226.9
coef. of variation	0.511	0.511	0.512	0.513	0.513

Source: State Statistics Committee, UEPLAC/TACIS

Table 11. Children (age less than 16), thousand

Region	1995	1996	1997	1998	1999
AR Crimea	496.2	481.9	463.2	445.0	424.2
Vinnitska	394.9	390.1	384.2	378.0	369.3
Volynska	270.3	266.1	261.4	256.9	251.6
Dnipropetrovska	827.1	803.8	776.8	751.0	723.0
Donetska	1 070.1	1 031.4	986.8	946.4	903.7
Zhytomyrska	331.6	325.4	319.3	313.1	305.2
Zakarpatska	340.4	335.2	329.2	323.4	316.1
Zaporizhska	446.5	433.8	419.7	406.2	389.8
Ivano-Frankivska	361.2	357.4	351.6	345.3	337.1
Kyivska	416.9	407.2	396.7	386.3	373.6
Kirovogradska	264.2	259.5	253.3	246.7	239.0
Luganska	596.1	574.5	549.4	525.9	500.8
Lvivska	640.6	630.7	618.1	605.5	591.0
Mykolayivska	311.4	304.3	296.2	287.9	277.0
Odeska	567.5	555.2	541.1	526.1	509.3
Poltavska	357.1	350.0	341.6	333.3	323.1
Rivenska	308.7	305.4	301.1	297.1	291.6
Sumska	289.1	282.0	273.7	265.6	256.1
Ternopiiska	272.6	269.2	265.2	260.9	255.3
Kharkivska	623.5	604.1	582.7	561.8	539.6
Khersonska	299.8	293.1	284.9	277.1	267.8
Khmelnitska	331.3	326.2	320.3	314.1	306.3
Cherkaska	318.0	312.3	305.4	299.0	290.2
Chernivetska	227.3	224.3	220.7	217.2	212.8
Chernigivska	267.2	259.8	252.6	245.3	236.9
mean	425.2	415.3	403.8	392.6	379.6
st.deviation	196.2	188.6	179.9	171.9	163.8
coef. of variation	0.461	0.454	0.445	0.438	0.431

Source: State Statistics Committee, UEPLAC/TACIS

Table 12. Selected aggregated fiscal series

year	month	Own revenues of local governments, mn UAH, Ministry of Finance	Expenditures by local governments, mn UAH, Ministry of Finance	Grants to local governments, mn UAH, Ministry of Finance
1996	1	639.2	685.0	45.8
1996	2	831.4	891.2	59.9
1996	3	825.9	860.1	34.1
1996	4	855.8	888.5	32.8
1996	5	756.0	782.0	26.0
1996	6	716.1	855.7	139.6
1996	7	1 068.0	1 326.1	258.0
1996	8	860.6	920.1	59.4
1996	9	810.6	888.1	77.6
1996	10	1 099.8	1 111.1	11.3
1996	11	774.6	965.4	190.8
1996	12	1 714.4	1 965.4	251.0
1997	1	639.2	685.0	45.8
1997	2	831.4	891.2	59.9
1997	3	825.9	860.1	34.1
1997	4	855.8	888.5	32.8
1997	5	756.0	782.0	26.0
1997	6	716.1	855.7	139.6
1997	7	1 068.0	1 326.1	258.0
1997	8	860.6	920.1	59.4
1997	9	810.6	888.1	77.6
1997	10	1 099.8	1 111.1	11.3
1997	11	774.6	965.4	190.8
1997	12	1 714.4	1 965.4	251.0
1998	1	991.1	1 026.9	35.8
1998	2	806.5	870.0	63.6
1998	3	1 090.2	1 320.2	230.0
1998	4	1 014.0	1 057.3	43.3
1998	5	856.4	947.2	90.9
1998	6	968.7	1 148.8	180.2
1998	7	1 084.5	1 184.6	100.1
1998	8	993.9	1 080.3	86.4
1998	9	1 064.8	1 164.8	99.9
1998	10	1 300.9	1 423.2	122.3
1998	11	1 106.3	1 238.2	132.0
1998	12	1 776.7	2 535.9	759.3

(continued)

year	month	Own revenues of local governments, mn UAH, Ministry of Finance	Expenditures by local governments, mn UAH, Ministry of Finance	Grants to local governments, mn UAH, Ministry of Finance
1999	1	897.0	930.1	33.1
1999	2	793.0	902.6	109.5
1999	3	817.5	1 182.5	365.0
1999	4	1 164.3	1 300.6	136.3
1999	5	1 105.4	1 305.7	200.3
1999	6	1 029.6	1 245.0	215.4
1999	7	1 165.8	1 395.9	230.2
1999	8	951.2	1 383.5	432.3
1999	9	1 089.0	1 357.7	268.7
1999	10	1 207.7	1 445.1	237.4
1999	11	1 017.1	1 297.7	280.5
1999	12	1 914.9	2 348.5	433.6
2000	1	1 049.5	1 123.5	74.0
2000	2	1 050.1	1 189.2	139.1
2000	3	550.1	1 436.4	886.3
2000	4	1 136.3	1 527.0	390.7
2000	5	1 027.7	1 353.2	325.5
2000	6	1 148.8	1 496.4	347.6
2000	7	1 319.2	1 667.2	348.0
2000	8	1 202.5	1 651.3	448.7
2000	9	1 214.0	1 692.0	478.1
2000	10	NA	NA	NA
2000	11	NA	NA	NA
2000	12	NA	NA	NA