ASSESSMENTS OF THE EFFECTIVENESS OF THE CROATIAN FISCAL EQUALISATION MODEL

Anto Bajo, DSc
Institute of Public Finance
and Faculty of Economics and Business, Zagreb

Mihaela Bronić, MSc
Institute of Public Finance, Zagreb

Article*
UDC 336.2
JEL H73, H72, H74

Abstract

No detailed analysis of the fiscal and economic inequalities of local units (at the municipality and city level) in Croatia has ever been published. The Government and the Finance Ministry have endeavoured by tax sharing, allocations of current grants and personal income tax refunds to palliate the differences in the fiscal capacities of local units. However, at the same time the fiscal capacities have not been properly calculated, because during the definition of the criteria for horizontal fiscal equalisation no care has been paid to the economic inequalities nor has there been proper establishment of the way local units belong to a special financing system. The paper, then, tests out the hypothesis that the existing Croatian model of horizontal fiscal equalisation is ineffective, for the Government and the Finance Ministry do not, with their poorly targeted financial instruments (personal income tax sharing, current grants and personal income tax refunds), manage to bring about palliation of the differences among the fiscal capacities of the local units, on the contrary, they tend to increase them.

Key words: fiscal equalisation, tax sharing, personal income tax, personal income tax refund, fiscal capacity, Croatia

1 Introduction

Since acquiring independence, Croatia has not worked out detailed analyses of the fiscal and economic inequalities of local units, nor has it established a proper model of fiscal

* *Received*: December 8, 2006.
Accepted: February 15, 2007.

equalisation. From 1995 to 2007, 275 local government units obtained special status in the financing system. These are the areas of special national concern (areas/categories I, II and III), the hill and mountain areas, and some of the islands with the special status obtained from their being willing jointly to finance capital projects. The Government and the Ministry of Finance have mostly used tax sharing and personal income tax refunds as the main instrument for palliating horizontal inequalities and rarely allocating current grants from the central government budget. However, because of the lack of good criteria and annual analyses of changes in the financial positions of local units the Government, the Finance Ministry and the Ministry of the Sea, Transportation, Development and Tourism do not determine their real degree of fiscal capacity each year, or the level of fiscal and economic inequalities and the justification of retaining the special status in financing.

The main proposition of this work is that the Government and Finance Ministry by sharing personal income tax, allocating current grants and personal income tax refunds do not actually significantly contribute to alleviation of horizontal fiscal inequalities. After the introduction, in the second part of the paper the problems in fiscal equalisation are explained. The third part analyses the existing model of fiscal equalisation, which is based on personal income tax sharing, the allocation of current grants and the refund of personal income tax. In the fourth part, on a sample of 546 municipalities and cities, horizontal fiscal inequalities are assessed for 2004 and the question of whether the government actually induces a growth in fiscal inqualites is answered. Part five contains conclusions, proposals and recommendations.

2 Problems in fiscal equalisation

From 1993 to 2007 the system of financing local government units was marked by the establishment of areas of special national concern, hill and mountain areas, local units on the islands that have entered into agreements to finance capital projects and the so-called decentralisation of the financing of local government units. However, the basic issues were not settled: a clear distribution of responsibilities and authorities for the financing of given functions and a distribution of revenue between central government and the local units. In the financing of some of the functions there are elements of dualism. The Government, the Finance Ministry and the line ministries have only since 2001 devolved part of the authority for the financing of elementary and secondary education, health care and fire services to the local units. Unfortunately, Croatia still does not have a well-devised strategy of regional development in which special attention is dedicated to the model of financing local units with the emphasis of aid to areas with economic difficulties in their development and problems with financing the minimum standard of public services.

There is a constant domination of an administrative and territorial decentralisation that is not accompanied by an appropriate mechanism of funding based on respect for local and regional differences in fiscal capacities, or on the capacity of local units to finance public goods and services. There is still no proper collaboration among government bodies in the devising and implementation of fiscal decentralisation. There is a shortage of individuals and well-run institutions to take over the care for harmonising measures of administrative and territorial as well as fiscal decentralisation and to take an overview of the fiscal relations of central government and the local government units. Up to now governments have paid more attention to legislative regimes and through numerous amendments to the laws concerning the areas of local units (municipalities, cities and counties) created the illusion that fiscal decentralisation exists. This kind of *status quo* has had a direct effect on deepening the disagreement about a desirable model for the financing of local units. Still unsolved is the issue of whether central government should give some productive taxes to the local units or by tax sharing and by current grants reallocate more revenue to the local units. In such conditions the question arises as whether there is actually in Croatia a trend towards decentralisation or centralisation. It seens like Croatia has determined on the domination of central government (the Government, the Finance Ministry and the line ministries) in a system of financing that is largely founded on the tax sharing (particularly personal income tax) and the allocation of current grants from the central government budget.

Problems in the redistribution of revenue to local units have been particularly perceptible since 1995, when the areas of special national concern, the hill and mountain areas and some island local units that acquired a special status in the financing system. As a result of such a situation and of political and economic lobbying, in 2007, more than half the local units are in some special financing system (Table 1).

Table 1 Local units in a special financing status in 2007

Status	Number of local units
Areas of special national concern	180
category I	50
category II	61
category III	69
Hill and mountain areas	45
Islands (with capital investment agreements)	50
Decentralised functions	53
I. Total with special status	328
II. Units with no special status	242
III. Total (I+II)	570

Note: On the areas of special national concern, hill and mountain areas and islands (with capital investment agreements) there are 275 local units.

Source: Ministarstvo financija (2001-2006)

Since 2001 in addition there has also been a special financing regime for the 53 local units that have through decentralisation taken over the obligation to finance additional functions. Two hundred and forty two local units in Croatia are outside any special system of financing, less than half of all the administrative and territorial local units. Unfortunately, the Government and the Finance Ministry have forgotten that currently the special financing systems do not contain all the local units with below-average fiscal and economic capacities that need help.

Areas of special national concern and the hill and mountain areas. In 1996, two groups of special national concern were designated, and a third group joined them in 2002 (NN 26/03). In these areas there are 180 local units (50 in the first, 61 in the second and 69 in the third). Groups I and II were set according to the degree of economic damage caused by the war. The third group consists of areas evaluated as lagging in terms of development according to four criteria: economic development, structural difficulties, demography and special criteria. It was established that the three groups together can cover up to 15% of the total population of the country. Since 2002, 45 local units have had the status of hill and mountain areas for the sake of their more rapid and even economic development. The Government and the Finance Ministry regularly give the areas of special national concern and the hill and mountain areas current grants from the central government budget and also introduced additional incentive measures. Since 2001 they have ceded almost all revenue from personal income tax and corporate income tax to the cities and municipalities in the areas of special national concern and since 2003 to the hill and mountain areas as well. Various reliefs have been introduced in the real estate transfer tax as well (Table 1, annex). The rates of corporate income tax have been reduced for some groups of taxpayers, privileges have been introduced with respect to the charge for exploiting mineral raw materials and other privileges have been given to legal entities and individuals in the areas of special national concern.

Incentive measures for the islands. For the sake of the protection of the islands and for a more rapid demographic development, in 2003 the Government incentive measures for the development of 45 island local units. These measures took the form of preferential treatment in the purchase or lease of agricultural land, the financing of capital projects related to water and water supply, physical planning and improvement of the transportation infrastructure. From 2001 to 2007 central government ceded its part of personal income tax revenue to island municipalities and cities that had entered into agreements with each other to finance capital projects. In 2007 the government and the Finance Ministry exempted these units from the obligation to pay part of the personal income tax revenue into the equalisation fund. The previous fund resources became the revenue of the island local government units meant for the financing of capital projects (Table 1, annex).

Decentralised functions. During 2001 new regulations were adopted according to which some responsibilities of the central government administration were decentralised and transferred to the local and regional self-government. Local units obtained new assignments in the area of elementary and secondary education, health care, welfare and fire services. Fifty three local units (20 counties and the city of Zagreb and 32 other cities) accepted the obligation to finance decentralised functions. The Government, Finance Ministry and the line ministries provided these units with funding by an additional share in personal income tax and equalisation grants.

We can conclude that governments to date have been concerned with the redistribution of revenue, combining instruments of tax sharing, allocation of current grants and personal income tax refunds and have left relatively little room for any real fiscal autonomy of local units in disposing of their revenues. The fiscal effects of these measures are unknown for the governments have changed the shares of the local government units in the tax revenues, the criteria for allocating current grants, and have refunded personal income tax paid irrespective of changes in the economic positions of local units that acquired a special status in the financing system.

Revenue inequalities

The question arises as to whether the Government and the Finance Ministry in the tax sharing and the allocation of current grants from the central government budget really paid attention to the existing economic inequalities of the local units. A good indicator of economic inequalities is the gross per capita personal income in the cities and municipalities. The available 2004 data show noticeable differences in the distribution of gross personal incomes in the local units that are in the special financing status (areas of special national concern, hill and mountain areas and the islands with capital investment agreements) and the other local units that do not have this status. We should look then at the total distribution of gross personal incomes of the local units.

Table 2 Distribution of gross personal income per capita of local units in 2004

Gross personal income (in kuna per capita)	Local units, total	%	Local units in areas of special national concern, hill and mountain areas and on the islands	%	Other local units	%
over 20,000	141	26	63	23	78	29
16,000-20,000	106	19	54	20	52	19
12,000-16,000	135	25	60	22	75	28
8,000-12,000	117	21	66	24	51	19
to 8,000	47	9	31	11	16	6
Total	546	100	274	100	272	100
average = 16,000						
above average	247	45	117	43	130	48
below average	299	55	157	57	142	52
75% of the average	164	30	97	35	67	25

Source: Authors calculation based on data from Tax Administration, Republic of Croatia

In 2004 the average gross per capita personal income of the local units came to about 16,000 kuna. Above average personal income was in 257 local units, and below average in 299 local units. One hundred and sixty four local units had less than 75% of the average per capita personal income, and these should be the main candidates for the Government and Finance Ministry to support more significantly via the fiscal equalisation system. However, there are certain illogicalities connected with the acquisition of a special status in the financing system.

For of the 275 local units in the special financing regime (areas of special national concern, hill and mountain areas and the islands with capital arrangements), 117 of them had above average gross per capita personal income. One hundred and fifty seven local government units had below average gross per capita personal income. However, only 97 local units had a gross personal income lower than the 75% average at the level of municipalities and cities and they are the real candidates for more active fiscal support from central government. We can conclude that some of the local units that are currently in the special financing regime do not need to be so and that there are numerous local units with lower average personal incomes that the government neither supports nor puts in a special financing system.

Thus of the 272 local units that are outside the special financing system, 130 of them have above and 142 units below average personal income. As many as 67 local units meet the requirements to obtain transfers from the central government budget because they have a gross per capita personal income below the 75% average at the level of cities and municipalities.

In the sequel we shall go on to analyse the mechanisms of redistribution of personal income tax among central government and local units via personal income tax sharing, allocation of current grants and refunds of personal income tax. On the basis of simple regression models on the basis of the 546 local units in 2004 we shall assess the fiscal effects of mentioned government transfers on the alleviation of local horizontal economic inequalities.

3 Fiscal equalisation model

Local units differ according to their degree of economic development and their abilities to collect revenue in their area. This is the result of the different natural, demographic, economic and political conditions affecting the development of the given areas. To palliate fiscal inequalities created because of the different abilities to collect revenue at the lower levels of government the mechanism of fiscal equalisation is used. There are two kinds of fiscal equalisation: vertical and horizontal. Through vertical fiscal equalisation, central government endeavours to provide resources adequate for the financing of the basic or additional (decentralised) functions of local units. The mechanism of horizontal equalisation on the other hand endeavours to soften the fiscal inequalities deriving from unequal economic development of local units, in order to provide the minimum necessary level of public services in all the local units. The basic instruments of vertical fiscal equalisation are revenue/tax sharing and of horizontal fiscal equalisation grants.

3.1 Vertical fiscal equalisation

Vertical fiscal equalisation is a mechanism for the redistribution of authorities and revenues between central and local government. It is realised by the allocation of revenues and of authorities for public services to the local units. There is no unanimity in opinion as to which sources of funding to provide for the local units. The allocation of authorities and revenues on the whole depends on the degree of democratisation of society, the constitutional system, the size of the population and, particularly, the abilities of the local units independently to provide sources of revenues and good public services. In Croatia central government has shared the more productive sources of revenue such as personal income tax, corporate income tax and real estate transfer tax with the local units. In 2007 the central government took over the whole of the corporate income tax and thus deprived the budgets of local units of a productive source of revenue. The division of the revenues from these taxes is a powerful instrument in the hands of the Government and the Finance Ministry for the palliation of unequal fiscal capacities, and is also a strategic instrument in the running of fiscal policy. By increasing or reducing the share of local units in the tax revenue, the Government and the Finance Ministry can tend to produce an equal distribution of revenues and tax burdens. For this reason the taxes that the central government shares with the local units are the main reason of fiscal equalisation.

Tax sharing

In Croatia governments to date have used tax sharing as an instrument: a) for palliating vertical inequalities arising because of the assumption of decentralised functions and b) horizontal fiscal equalisation for the sake of palliating regional economic differences arising as the result of different development of local units (due to unemployment, demographic characteristics and so on).

Tax sharing for vertical fiscal equalisation. The system for the financing of local units is very largely based on the tax sharing (particularly personal income tax) between central government and the local units. The Financing of Units of Local and Regional Self-Government Law, which governs the tax sharing is not easy to understand. From 1993 on it has changed 11 times, and in the 2001-2007 period alone it was altered six times.[1] Such frequent alterations of the Law and of the manner of personal income tax sharing create confusion from the point of view of the role and fiscal effects of the tax on the financial positions of the local units.

From 1994 to 2001 central government ceded to the counties, municipalities and cities some of the tax revenues raised in their areas (Table 3).

Table 3 Tax sharing from 1994 to 2001 (in %)

The tax	Central government	Counties	Cities and municipalities	Zagreb
Personal income	60	8	32	–
Personal income, Zagreb	60	5	–	35
Corporate income	70	10	20	–
Corporate income, Zagreb	70	–	–	30
Real estate transfer	40	–	60	–

Source: Zakon o financiranju jedinica lokalne uprave i samouprave

Local units that take on the financing of decentralised functions have been given by central government a larger share in the personal income tax since 2001 (Table 4).

[1] Zakon o financiranju jedinica lokalne uprave i samouprave, NN 117/93, 69/97, 33/00, 73/00, 127/00, 59/01, 107/01, 117/01, 150/02, 147/03 and 132/06.

Table 4 Tax sharing from 2001 to 2006 (in %)

The tax	Central government	Counties	Cities and municipalities	Decentralised functions	Equalisation fund
Personal income	25.6	10	34	10.4	21
Corporate income	70	10	20	–	–
Real estate transfer	40	–	60	–	–

Source: Zakon o financiranju jedinica lokalne uprave i samouprave

Apart from that, if they cannot finance the decentralised functions (up to the level of the established minimum financial standard) with the revenue obtained from personal income tax, the local units will receive additional resources from the equalisation fund. This fund is actually part of the personal income tax revenue that central government cedes to local government units for the funding of the decentralised functions. Only 345 local units take part in filling this fund. The remaining 225 local units are exempted for they are in a special position in the financing system (areas of special national concern and hill and mountain areas).[2]

In 2007 the Government and the Finance Ministry once again changed the percentage share of the local government units in the tax sharing (Table 5).

Table 5 Tax sharing as of 2007 (in %)

The tax	Central government	Counties	Cities and municipalities	Decentralised functions	Equalisation fund
Personal income	–	15	52	12	21
Corporate income	100	0	0	–	–
Real estate transfer	40	–	60	–	–

Source: Zakon o financiranju jedinica lokalne uprave i samouprave

Central government has taken all the corporate income tax and retained the same share of real estate transfer tax as in the previous year. Thus corporate income tax is now paid entirely into the central government budget.

3.2 Horizontal fiscal equalisation

Horizontal fiscal inequalities (differences in the abilities of local units to provide equal public services with the same tax burden) increase if there is any disharmony between the expenditures of local units and their fiscal capacities (i.e., ability to gath-

[2] Central government gave these local units a larger share of the personal income tax revenue collected in their areas. Cities and municipalities in areas of special national concern and hill and mountain areas obtain the largest part of the personal income tax raised because central government apart from its own tax has also ceded to them part of the tax that they would have to earmark for the equalisation fund for the financing of the decentralised units (Table 1, Annex).

er revenue). Before decentralisation in 2001 there were no searching analyses of the effects of the Government's measures on the palliation of the existent horizontal fiscal inequalities, and it is doubtful whether or not since 2001, because of the confusing mechanisms and criteria for the allocation of current grants from the central government budget, new inequalities have arisen. In practice the main instrument of horizontal fiscal equalisation consists of various kinds of current and capital grants. However, in Croatia instead of developing an effective mechanism for both current and capital grants, the Government and the Finance Ministry have used tax sharing as the main instrument for palliation of horizontal fiscal inequalities, irrespective of the economic indicators of local units.

Tax sharing

As well as for the palliation of vertical inequalities deriving from the assumption of the decentralised functions, Governments so far have made use of tax sharing as an instrument for horizontal fiscal equalisation i.e., as a fiscal measure for the softening of regional economic inequalities. The Government, the Finance Ministry and the competent ministries have bolstered the areas of special national concern and the hill and mountain areas and the island units that have made agreements with each other to finance capital projects by tax sharing.

Moreover the Finance Ministry and the Government regularly provide the areas of special national concern and the hill and mountain areas with grants from the central budget. Since 2001 the areas of special national concern and since 2003 the hill and mountain areas have been given additional incentives too by the Government, Finance Ministry and line ministries. They cede the municipalities and cities in these areas revenue from corporate income tax and personal income tax almost entirely. Also introduced are various forms of tax reliefs in the transfer of real estate, corporate income tax rates for certain groups of taxpayers have been cut, and other privileges for individuals and legal entities in the areas of special national concern.

Table 6 Tax sharing in the areas of special national concern and hill and mountain areas in %

The tax	Central government	Counties	Cities and municipalities in areas of special national concern
Personal income	–	10	90
Corporate income, 2003-2006	–	10	90
Corporate income, as of 2007	100	–	–

Source: Zakon o financiranju jedinica lokalne uprave i samouprave

Since as of 2007 corporate income tax is no longer shared with the local units, the Government decided to pay the areas of special national concern and hill and mountain areas aid directly from the central budget in the amount of the corporate income tax that is raised in their area. In the central government budget for 2007, for this purpose 287 million kuna was earmarked (NN 137/2006).

Tax sharing for the financing of capital projects. For the sake of protecting the islands and for their accelerated demographic development, in 2003 the Government introduced incentive measures for the development of 45 island local units. These consist of privileges in the purchase or leasing of farmland, the financing of capital projects related to water and water supply, for spatial planning and improving the transportation infrastructure. Also as of 2007 the Government and Finance Ministry have additionally exempted island units from the obligation to pay part of the personal income tax to the equalisation fund, and this has become their own additional revenue for the financing of capital project.

It is extremely clear that the Government, Finance Ministry and other competent ministries have supported the areas of special national concern, the hill and mountain areas and some island local units not because of their low fiscal capacities but for social reasons. These are more or less, we might recall, areas that were hit in the war and are inadequately developed, areas with high unemployment and adverse demographic characteristics.

Current grants from the central government budget

Up to 2005 the Government and the Finance Ministry used current grants from the central budget as an additional (and not the main) instrument for palliating horizontal fiscal inequalities. Since 2005 the Government has changed their purpose, and current grants have become capital grants from the central budget (for simplicity we call them current grants).

Current grants are allocated to financially weaker local units with below-average fiscal capacities. Unluckily, the criteria are not clear, and hence the current grants cannot be used effectively for the palliation of the existing financial inequalities of local units.

From 1994 to 2001 current grants were allocated to counties in the area of which the revenue of all the local units (i.e., the cities and municipalities), not including the city of Zagreb, was less than 75% of the national per capita personal income. It is assumed in this that all the local units have the average tax burden. Current grants could not be allocated to a county in the area of which the rate of surtax on personal income tax (surtax) was less than 1%, and the tax rates and amounts of taxes were lower than the statutorily prescribed highest rates or amounts. In a similar way, counties were able to allocate current grants to the municipalities and cities in their area. Unfortunately, however, although defined in the law, these rules were not applied in the real calculation and the definition of criteria for the allocation of current grants to local units. It is interesting that these criteria, although no longer used, are still stated in the Financing of Local and Regional Self-Government Law, and most of the EU countries also use them in determining the objectives of regional policy for selecting those areas that are lagging in development and need help.

Instead of these criteria, since 2001 the Government and Finance Ministry in their annual laws on the execution of the central government budget have laid down new criteria for the allocation of current grants, firstly directly to the counties (which then transfer them to their own municipalities and cities) and secondly the direct current grants of central government to the cities and municipalities in the areas of special national concern.

Current grants to counties

From 2002 to 2006 the criteria for the allocation of current grants to the counties were frequently altered.[3] From 2002 to 2005 these grants were meant for the adjustment of fiscal capacities and for investment in the development programmes of the counties and the cities and municipalities in their area.

Table 7 Criteria for the allocation of current grants from the central government budget to the counties

	2002	2003	2004	2005	2006
Population, 2001 census	+	+	+	+	+
Average revenue of county budget per capital at the level of the state (national average)	+	+	+	+	+
Revenue of country budget per capita of county	+	+	+	+	+
Average expenditure for capital programmes per capita at the level of the state (national average)	+	+	+	–	–
Expenditure for capital programmes per capita of the country	+	+	+	–	–
Population of Croatia (not inc. Zagreb) per square km				+	+
Population of an individual county per square km of the county				+	+

Source: Zakoni o izvršavanju državnog proračuna (2001-2006)

But from 2005 the Government changed the purpose of these current grants and provided them only for investment in development programmes of the counties and the smaller units in their areas. Thus from 2005 central government has not handed the counties any current but only capital grants. It is expressly stated in the law that the current grants must be used for investment in capital programmes (excluding the purchase of passen-

[3] From 2002 to 2006 the criteria for the allocation of grants to counties were population (2001 census), average revenue of county budget achieved two years before per capita at the state level (national average), revenue of the county budget achieved two years before per capita of the county, average expenditure for capital programmes from the county budget achieved two years ago per capita at the state level (national average) and expenditure for capital programmes from the county budge achieved two years before per capita of the county. Since 2005 the criteria for the allocation of grants to counties are no longer average expenditure for capital programmes from the county budget per capita at the level of the state (national average) and expenditure for capital programmes from the county budget per capita of the county. Instead of these expenditures, for capital programmes, additional and new criteria were introduced: population density of the whole country not including Zagreb and population density of the county.

ger cars). The counties were bound to allocate a certain percentage of the current grants to their own municipalities and cities who were not direct beneficiaries of current grants from the central government budget. This percentage changed: in 2003 it was at least 30%, in 2005 at least 50%, and in 2005 at least 75%. Thus from 2005 the counties were left with a maximum of 25% of the current grants, which was strictly earmarked and had to be used for capital expenditures, the other minimum of 75% being allocated to the cities and municipalities in the area of the given county that were not direct beneficiaries of current grants from central government budget.

Direct current grants to municipalities and cities in the areas of special national concern

As well as current grants that the central government allocates to the counties (which it in turn reallocates to cities and municipalities), there are also the current grants that central government transfers directly to the cities and municipalities in the areas of special national concern. Thus in Table 8 we give the criteria for the allocation of these direct current grants.

Table 8 Criteria for the allocation of current grants from central government to the cities and municipalities in the areas of special national concern from 2002 to 2006

	2002	2003	2004	2005	2006
Population size according to 2001 census	+	+	+	+	+
Average revenue per capita of cities and municipalities at national level	+	+	+	+	+
Average revenue per capita of the group areas of special national concern (individual cities and municipalities)	+	+	+	+	+
Expenditure for capital programmes as proportion of total expenditure	+	+	+	+	+
Rationality of execution of functions of the system (number of employees, expenditure per employee)	+	+	+	+	+
Expenditure for functions of city (less than 30,000 pop.)	+	+	+	+	+
Correction factor for gradual transition to new model for calculation of current grants	+	+	+	–	–
Balancing material expenditure (population size and per capita expenditure)		+	+	–	–
Population size per square km at level of groups I and II of areas of special national concern (group average)				+	+
Population size per square km of a given city and municipality				+	+

Source: Zakoni o izvršavanju državnog proračuna (2001-2006)

The criteria for the allocation of current grants to local government units are unclear and are too frequently modified.[4] From 2002 to 2006, current grants to cities and municipalities were meant for the correction of fiscal capacities, for inducements to investments in capital programmes and rationality in the performance of functions. But from 2005 the statute said expressly that current grants to cities and municipalities were meant only for investment in capital programmes and for the financing of material expenditures for power. Table 9 gives the cities and municipalities that allocated given current grants.

Table 9 Direct current grants to cities and municipalities in the areas of special national concern

Year	Kind of grant	Purpose of grant
2002 2003 2004	Current grants for areas of special national concern	correction of fiscal capacity of budget, inducement of investment in capital programmes and rationality of execution of functions of cities and municipalities
2005 2006	Current grants for groups I and II of the areas of special national concern	financing expenditure for material, energy and investment in capital programmes

Note: Since 2004 current grants have been given in the amount that corresponds to the difference between the estimated personal income tax refund according to the annual tax return, which are taken over by the central budget on behalf of the local unit, and current grants calculated pursuant to criteria derived from the Execution of the Central Government Budget Law for the given year.

Source: Zakoni o izvršavanju državnog proračuna (2001-2006)

Between 2002 and 2005 these current grants were meant only for the counties, cities and municipalities in the areas of special national concern (180 units). From 2005 the third group of areas of special national concern (69 units) no longer had the right to current grants and the remaining beneficiaries were the local government units in the 1st and 2nd groups of areas of special national concern (111 units).

From this analysis it is clear that the Government and the Finance Ministry did not perform a proper determination of the criteria for tax sharing and allocating current grants, because in the definition they relied on the categories of total revenue and expenditure per capita. Unfortunately, in the calculation and establishment of the criteria they did not use a

[4] Since 2002 the criteria for the allocation of these current grants are population size (2001 census), average revenue per capita of cities and municipalities at state level (national average) achieved two years before, average revenue per capita of the group of areas of special national concern (or of the given cities and municipalities), expenditure for capital programmes realised two years before as proportion of overall expenditure, rationality in execution of the functions of the system (labour force size, per employee costs), expenditure for the functions of the city (with a population smaller than 30,000) achieved two years earlier, and the correction factor for the gradual transition to the new model of calculating grants. From 2003 additional criteria were brought in for the allocation of these grants to cities and municipalities – balancing material expenditure (population size and per capita expenditure) achieved two years earlier. In 2005 this last additional criterion was abolished and new criteria were introduced: population density per square kilometre at the level of Groups I and II of areas of special national concern and population density of a given city or municipality. Apart from that, in 2005 the correction factor for gradual transition to the new method of calculating grants was abolished.

single economic indicator of fiscal capacity, such as earned personal income and profit made at the level of the local units. Another problem is that economic criteria were not used in the establishment of which local unit should belong to a special financing system. In these conditions in 2004 introduced personal income tax refunds as an additional instrument of fiscal equalisation in the areas of special national concern and hill and mountain areas.

Personal income tax refund as instrument of fiscal equalisation in the areas of special national concern and hill and mountain areas

An additional confusion in the definition of clear criteria for fiscal equalisation was introduced by the provisions of the Execution of the Central Government Budget Law (NN 31/04), in which current grants to the local units in the areas of special national concern and the hill and mountain areas were given in the amount of the difference of the estimated personal income tax refund according to the annual return for the previous year (which was to be refunded by the given local unit in the areas of special national concern or hill and mountain areas) and amounts of current grant funds calculated pursuant to criteria from Execution of the Central Government Budget Law each year. This personal income tax refund is refunded to taxpayers in the areas of special national concern and hill and mountain areas, not by the local units, but by central government from its own budget, and by this amount of refund, the amount of the current grant to the local unit was reduced. But not even then were the fiscal effects of the personal income tax refund in the areas of special national concern and hill and mountain areas known, nor data about its harmonisation with the current grant allocation mechanism.

4 Assessments of the effects of the fiscal equalisation model

The main argument of this paper is that the Government and the Finance Ministry do not manage, with the personal income tax sharing mechanism, the badly targeted current grants and with the personal income tax refunds in the areas of special national concern and hill and mountain areas, to palliate the horizontal fiscal inequalities of local government units. Hence on the basis of data from 2004 we shall determine whether in fact the Government and Finance Ministry through the allocation of personal income tax revenue, current grants and personal income tax refunds did help those local units with below-average fiscal capacities (less than the 75% average gross per capita personal income) or whether they contributed to the exacerbation of fiscal inequalities.

4.1 Models of assessing horizontal fiscal inequalities

Fiscal capacity is measured as the ability of local units to raise revenue to cover their expenditures. Gross per capita personal income is often used as a reliable measure of fiscal capacity.[5] On the basis of per capita personal income of cities and municipalities via four regression models we shall assess whether the government in its personal income tax sharing and its allocation of current grants respected the differences in fiscal capacities of the local units. Data about gross personal incomes were obtained from the Tax Adminis-

[5] For more on fiscal equalisation measures see Martinez-Vazquez and Jameson Boex (1997).

tration, on the basis of a sample which covered 5% of the population (about 120,000 people) of cities and municipalities who made incomes that according to the provisions of the Personal Income Tax Law are subject to taxation.

Model I Gross personal income and totally collected personal income tax and surtax (per capita)

In the first simple regression model we endeavour to determine the distribution of the totally collected personal income tax (before tax sharing) and gross personal income of the cities and municipalities (per capita). In this model the annual gross personal incomes are an independent and the totally collected personal income tax and surtax per capita of the local units are the dependent variable.[6] These relations are expressed in the first equation:

$$T_i = \alpha_i + \beta BD_i + u_i \tag{1}$$

where

T_i – totally collected personal income tax and surtax (before tax sharing) per capita of the local unit n
BD_i – gross personal income per capita of local unit n
i – local unit n.

If the gross personal income of a local unit is less than the average, we expect that in the area of this local unit (city or municipality) lower revenue from personal income tax will be collected. In this way we shall determine the correctness in the allocation of the burden of personal income tax before the tax sharing between the central government and the cities and municipalities.

Model II Gross personal income and revenues after sharing personal income tax and surtax (per capita)

In a second simple regression model we shall attempt to determine the relation between local revenues from personal income tax sharing and gross personal income of the cities and municipalities (per capita). In this model the annual gross personal incomes are the independent and the personal income tax and surtax (after tax sharing) in the local units are the dependent variable[7]. These relations are expressed in the second equation:

$$TD_i = \alpha_i + \beta BD_i + u_i \tag{2}$$

where

TD_i – revenue from shared personal income tax and surtax per capita of the local unit n
BD_i – gross personal income per capita of the local unit n
i – local unit n.

---

[6] It is hard analytically to separate income tax revenue from surtax revenue because there are no separate items in the account plan of the budget and in the financial reports of the budget and of budget users.

[7] The revenue from personal income tax and surtax (after sharing) includes the tax refund to cities and municipalities in areas of special national concern and hill and mountain areas that the Ministry of Finance (instead of the cities and municipalities themselves) pays out of the central government budget.

If the gross per capita personal income of a local unit is less than the average, we would expect these cities and municipalities in the tax sharing to obtain more revenue from personal income tax (per capita). In this way we can determine whether the central government has through its personal income tax sharing made some progress in palliating fiscal inequality in gross per capita personal income of the local units or not.

Model III Gross personal income and current grants (per capita)

In the third simple regression model we try to establish whether the government has through the allocations of current grants made any considerable effect on the palliation of differences in the gross per capita personal incomes of the local government units or not. In this model the annual gross personal incomes are the independent and the current grants from the central government the dependent variable (per capita of the cities and municipalities). These relations are expressed in the third equation:

$$TR_i = \alpha_i + \beta BD_i + u_i \tag{3}$$

where

TRi – current per capita grants of local unit n
BDi – gross per capita personal income of local unit n
i – local unit n.

We would expect the local units with below-average gross personal incomes to obtain a greater amount of per capita current grant.

Model IV Gross personal income and revenues from shared personal income tax and surtax, current grants and personal income tax refunds (per capita)

In the fourth simple regression model we endeavour to determine the total fiscal effect of personal income tax and surtax sharing, current grants and personal income tax refunds (in the areas of special national concern and hill and mountain areas) on the palliation of the differences in fiscal capacities (gross per capita personal income). For an evaluation of this effect, the following equation is employed:

$$PDTP_i = \alpha_i + \beta BD_i + u_i \tag{4}$$

where

PDTPi – revenue from shared personal income tax and surtax, current grants and personal income tax refund (in the areas of special national concern and hill and mountain areas) per capita of local unit n
BDi – gross per capita personal income of local unit n
i – local unit n.

We are interested in whether the local units obtained the minimum amount of personal income tax and current grants per capita (75% average) for the financing of the minimum expenditures in their areas or not.

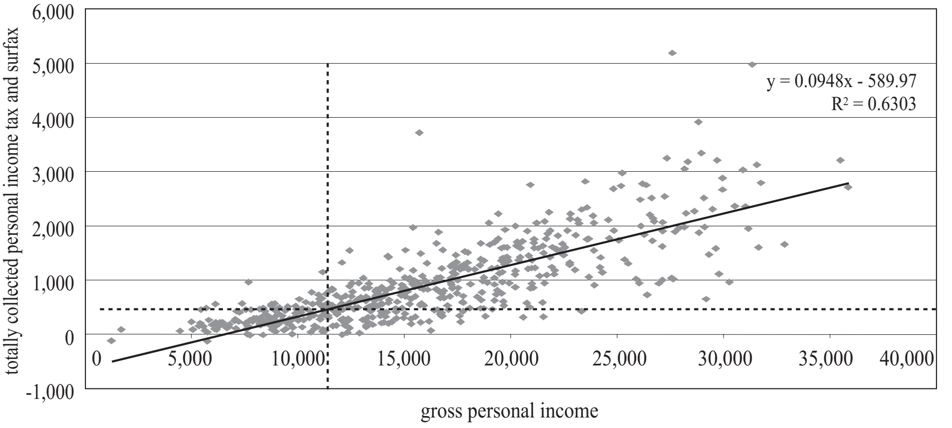
Below we show the results of the estimates of the models of the effect of the mechanisms of fiscal equalisation on the palliation of fiscal inequalities in 2004.

4.2 Results of the estimates

Model I Gross personal income and totally collected personal income tax and surtax (per capita)

On the basis of the simple regression equation with gross personal incomes as the independent and totally collected personal income tax (before tax sharing) as the dependent variable, we determined that there is a significant statistical relationship between these variables. The coefficient of determination shows that gross personal income (at 1% significance) explained 63% of the changes in the totally collected personal income tax and surtax in local units (Table 2 in the annex).

Graph 1 Gross personal income and totally collected personal income tax and surtax in 2004 (per capita in kuna)



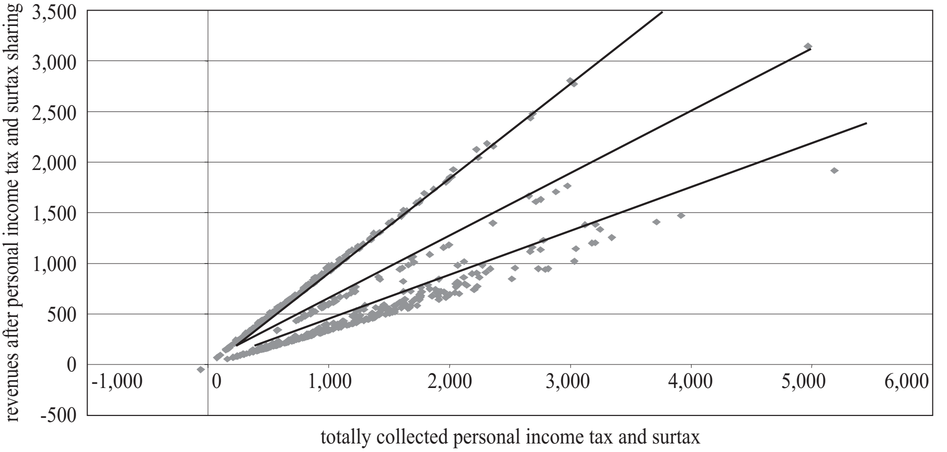
Source: authors calculation

The remaining 37% of the variations of the totally collected personal income tax and surtax should be ascribed to personal income tax allowances (reliefs and exemptions and so on). Although there are important differences in totally collected personal income tax per capita of cities and municipalities, we can say that before the tax sharing there is an equitable distribution of personal income tax burden in the local units (more tax is collected in the area of local units with greater personal incomes).[8] Possible greater differences in gross personal incomes and taxes can be the result of exemptions and reliefs built into the personal income tax system.

Effects of personal income tax sharing. By a comparison of totally collected personal income tax and surtax in the area of the local units with the legally determined tax sharing, the weakness of the governmental measures in the use of personal income tax as an instrument for palliating regional inequalities come clearly into focus.

[8] This is logical because of the progressiveness of personal income tax. The greater the incomes, the more tax is paid.

Graph 2 Personal income tax and surtax sharing between central government and the cities and municipalities in 2004 (per capita in kuna)



Source: authors calculation

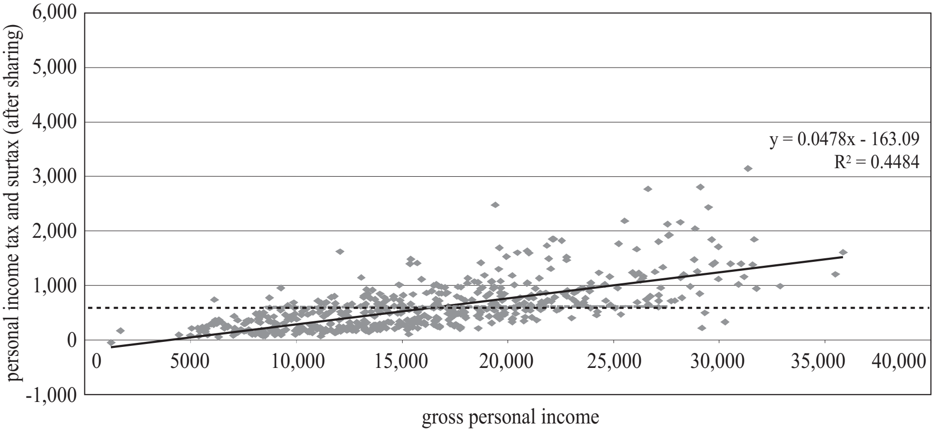
The analysis showed that local units in the areas of special national concern and hill and mountain areas were on the line closest to the *y* axis. In the centre were local units on the islands that had made agreements with each other to finance capital projects. On the line closest to the *x* axis are the local units without any special position in the financing system. This distribution of taxes shows that the government most of all helped the local units in the hill and mountain areas, the areas of special national concern and the islands with capital agreements, and least of all the local units that are not in any special financing system and yet have below-average per capita gross personal income. For example, three local units - the municipality of Marija Bistrica (not in a special regime), the city of Vis (island local unit with capital agreement) and the city of Hrvatska Kostajnica (in the areas of special national concern) totally collected per capita about 1,000 kuna from personal income tax and surtax. After personal income tax sharing, the municipality of Marija Bistrica (on the line closer to the *x* axis) received 300, the city of Vis (on the centre line) 600, and the city of Hrvatska Kostajnica (closer to the *y* axis) about 1,000 kuna per capita of personal income tax and surtax revenue.

In the sequel we shall look at the fiscal effects of the sharing of personal income tax on the fiscal capacities of the local government units (cities and municipalities).

Model II Gross personal income and revenue from sharing personal income tax and surtax (per capita)

In the second model the variable gross personal income is significant in explaining the variations of the local revenues from personal income tax and surtax sharing. However, gross personal income only 45% explains the personal income tax sharing, and the remaining 55% of the variations should be ascribed to some other factors (Table 3 in the Annex).

Graph 3 Gross personal income and revenues after sharing personal income tax and surtax in 2004 (per capita in kuna)



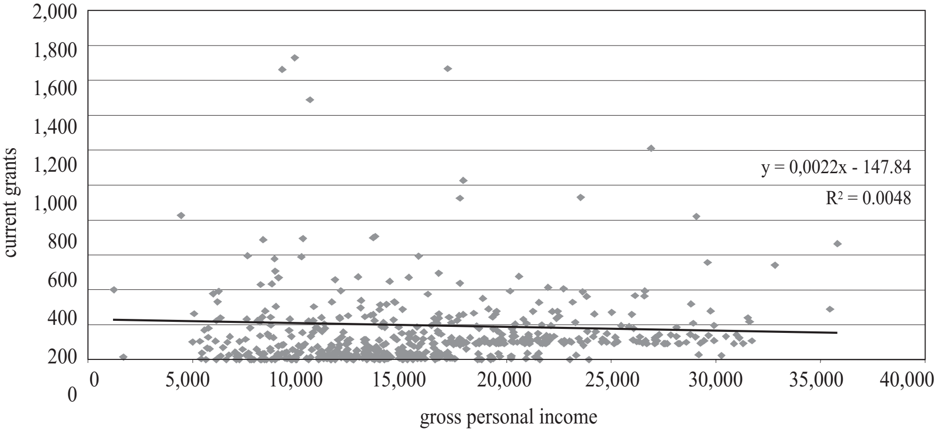
Source: authors calculation

In the personal income tax sharing, central government did not pay sufficient attention to the existing differences of gross personal incomes in the areas of the cities and municipalities. A large number of local units did not receive even 75% of the averagely shared revenue from personal income tax and surtax per capita. In Graph 3, because of the smaller positive angle of the regression line it seems that the dependence of budgetary resources on per capita gross personal income is lower than before the personal income tax sharing. However, it can be seen that after the sharing of the personal income tax and surtax revenues the cities and municipalities with greater fiscal capacity on average still have more revenue than those with smaller fiscal capacities. This shows that the existing redistribution has on average been more useful to cities and municipalities with smaller fiscal capacities, but because of the poorly determined status in the system of financing, in some cases, even greater fiscal inequalities arise. For example, the municipality of Sveta Nedelja (Zagreb County) and the city of Buzet (Istria County) have a similar per capital gross personal income, 26,500 kuna. The city of Buzet is in the hill and mountain areas, and the municipality of Sveta Nedelja is not in any special financing status. In Buzet, 3000 kuna and in Sveta Nedelja 2200 kuna per capita personal income tax and surtax were raised. After personal income tax and surtax sharing Buzet obtained 2,771 kuna (including the tax refund that is paid out by central government) and Sveta Nedelja only 742 kuna of personal income tax per capita (four times less).

Model III Gross personal income and current grants (per capita)

Has the government with its current grants managed to palliate inequalities in the gross personal incomes of the local units? We start off from the assumption that the local units with smaller gross per capita personal incomes will obtain larger current grants from central government budget, and the richer (with above-average gross per capita personal incomes) smaller. Graph 4 shows the distribution of annual gross personal income and current grants per capita of the cities and municipalities in 2004.[9]

Graph 4 Gross personal income and current grants of the cities and municipalities in 2004 (per capita in kuna)



Source: authors calculation

There is no statistical relationship between these variables (gross personal income is not significant in explaining the variations of current grants) for current grants to local units are low and wrongly targeted. The Government and the Finance Ministry in the allocation of current grants did not take into account the existent differences in gross per capita personal income of the local unit. That there is no statistical relationship is shown by the low coefficient of determination that with only 0.5% of variations in gross personal income explains the allocation of current grants (Table 4 in the Annex). As much as 99% of the variations in the allocation of current grants needs to be ascribed to factors that are not directly connected to gross personal income as the main economic indicator of the fiscal capacities of the local units. We conclude that the Government and the Finance Ministry have not paid sufficient attention to the differences in per capita gross personal income of the local units and that the current grants have been transferred according to dubious criteria.

In the sequel we shall explain the total effect of personal income tax and surtax sharing, and current grants to local units, on the palliation of differences in gross per capita personal incomes.

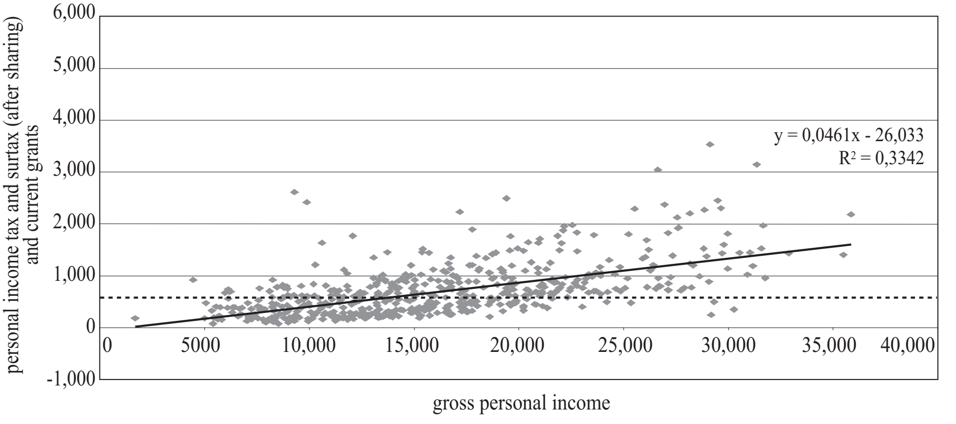
Model IV Gross personal income and revenues after sharing personal income tax and surtax and current grants (including personal income tax refunds)

We are interested in whether the local units obtained the minimum amount of current grants and revenues from personal income tax per capita (75% of the average) for enabling

[9] Data sources concerning current grants are from the Finance Ministry concerning local budgets, at http://www.mfin.hr/str/55

the financing of the minimum expenditure. In the fourth model too there is a weak statistical relationship between gross personal incomes and revenues after sharing personal income tax and surtax and current grants in the local units (Table 4 in the Annex).

Graph 5 Gross personal income and revenues after sharing personal income tax and surtax and allocation of current grants in 2004 (per capita in kuna)



Source: authors calculation

The allocated personal income tax, surtax and current grants did not depend on the gross personal incomes (fiscal capacities) of the local units. Gross personal incomes (with 1% significance) only 33% explain the variations in the amount of personal income tax after tax sharing and current grants (Table 5 in the Annex). In this case too the redistribution of personal income tax and the allocation of current grants has on average been more useful to local units with smaller gross personal incomes. However, there are examples in which horizontal fiscal inequalities are increased. For example, the municipality of Biskupija (Šibensko-kninska County), in the 2nd group of the areas of special national concern and the municipality of Davor (Brodsko-posavska County), which is not in any special financing regime, have about 10,600 kuna of gross per capita personal income. In Biskupija, 150 and in Davor 372 kuna of revenue from personal income tax per capita were collected. After personal income tax, surtax sharing and current grants (including the personal inocme tax refund for the areas of special national concern), Biskupija obtained about 1,600 kuna and Davor only 161 kuna of revenue per capita (ten times as less).

4.3 Why the Government and the Finance Ministry by the personal income tax sharing, current grants and personal income tax refunds do not palliate economic inequalities?

The Government and the Finance Ministry have helped local units in the special financing regimes (the areas of special national concern, the hill and mountain areas and the islands with capital investment agreements) with the fiscal equalisation mechanisms - personal income tax sharing, current grants and personal income tax refunds of special national concern. But local units with below-average fiscal capacities are not necessarily in the areas of special national concern, the hill and mountain areas or the islands with capital agreements. In 2004 275 local units are in the areas of special national concern, the hill and mountain areas or the islands with capital investment agreements. From all local units 166 of them have a gross per capital personal income lower than 75% of the national average. However, not all units in the special financing systems have also a below average per capital gross personal income. For of the 274 local units that have a special financing status, only 98 of them have a fiscal capacity of less than 75% of the national average, and as many as 175 have more than the 75% per capita national average.

Table 10 Local units with gross per capita personal income less than 75% of the national average in 2004

Local units	Number of local units	Percentage
Areas of special national concern, hill and mountain areas, islands with investment agreements	98	59
No special financing status	68	41
Total (a+b)	166	100

Source: calculations of the authors on the basis of Finance Ministry figures, 2007

Of the 166 local units with below-average gross per capita personal incomes (75% of the national average) almost 60% are in the areas of special national concern, hill and mountain areas or islands with capital agreements, and 40% of the local units are not in a special financing category.

Clearly there are dubious criteria for the allocation of current grants and taxes for fiscal policy to local units cannot be run by tax policies. Local units in the areas of special national concern and hill and mountain areas and island local units with capital agreements are helped with tax policy measures not only because they have low fiscal capacities but because of the social differences (the war-torn areas have a larger number of unemployed, smaller populations and so on). The primary objective of fiscal equalisation (current grant allocation and revenue/tax sharing) is to help local units to ensure the minimum financial standard for public services. The social and other developmental problems of the local units should be addressed by the Government with a proper system of specially targeted grants from the budget of central government.

The initial hypothesis, according to which the model of horizontal fiscal equalisation (which is based on tax sharing, allocation of current grants and personal income tax refunds in the areas of special national concern) is not efficient in palliating the economic inequalities of local units, has been proved to be correct. The Government and the Finance Ministry do not pay enough attention to the existing fiscal inequalities and the way local units belong to a special financing system. The existing criteria for the personal income tax sharing and the allocation of current grants need reviewing. In making decisions about fiscal equalisation criteria the Government and the Finance Ministry must take into consideration the real economic indicators as a foundation for the coordination of measures of fiscal policy for the palliation of fiscal inequalities.

5 Conclusion

The Government and the Finance Ministry have not made any substantial impact on the palliation of fiscal inequalities with personal income tax sharing, allocation of current grants and refunds of personal income tax.

The reasons for this are the weak criteria that do not take into account economic inequalities, the wrongly targeted transfers (current grants from central budget), the dubious quality and consequences of the personal income tax sharing between central government and the local units, the poorly targeted personal income tax refunds, the absence of any calculation of fiscal capacities and fiscal needs and the way in which local units can be placed in the areas of special national concern and the hill and mountain areas.

The Government and the Finance Ministry should not frequently change the provisions of the tax sharing in the law before determining the financial consequences on the fiscal capacities of the local units. In particular they should simplify the personal income tax sharing and use just one or two simple divisions that would work for all areas. They should lay down the objectives to be achieved by the distribution of personal income tax sharing and current grants. If they want to help local units with below-average financial capacities (to provide the minimum levels of public services), then it is necessary to change the manner in which personal income tax is shared and the criteria for the allocation of current grants. The areas of special national concern, hill and mountain areas and island local units should be helped with direct, targeted grants from the central budget, and not with taxation policy measures. The Government and the Finance Ministry should stop using tax sharing and special tax incentives, for example, allowing larger personal allowances to taxpayers in the areas of special national concern or the hill and mountain areas) for palliating regional economic inequalities. For improvement of the mechanism of financial equalisation, the Government and the Finance Ministry should pay attention to the economic indicators and incorporate them into the current grant allocation criteria. In particular, they need to develop a good system of targeted current and capital grants (with or without the participation of the local units, project grants and so on), taking into account the economic capacities of the local units.

REFERENCES

Bajo, A. and Bronić, M., 2004. "Fiscal decentralization in Croatia: Problems of fiscal eqvalization". *Occasional Paper Series,* No. 25. Zagreb: Institute of Public Finannce

Martinez-Vazquez, J. and Jameson Boex, L. F., 1997. *"An Analysis of Alternative Measures of Fiscal Capacity for Regions of the Russian Federation"* [online]. *Georgia State University, Andrew Young School of Policy Studies. Working Paper,* No. 97-4. Available from: [http:/ /isp-aysps.gsu.edu/papers/ispwp9704.pdf].

Ministarstvo financija. *Proračuni jedinica lokalne i regionalne (područne) samouprave* [online]. Zagreb: Ministarstvo financija. Available from: [http://www.mfin.hr/str/55/].

Ministarstvo financija, 2001-2006. *Godišnja izvješća Ministarstva financija.* Zagreb: Ministarstvo financija.

Ministry of Finance, Tax Administration, 2006. *Data on gross personal uncome of cities and municipalies*. Zagreb: Ministry of Finance.

Ott, K., Bajo, A. and Pitarević, M., 2003. *Fiskalna decentralizacija u Hrvatskoj.* Zagreb: The Fiscal Decentralization Initiative for Central and Eastern Europe : Institut za javne financije.

Rosen, S. H., 1999. *Javne financije.* Zagreb: Institut za javne financije.

Uredbe o načinu izračuna iznosa pomoći izravnanja za decentralizirane funkcije jedinica lokalne i područne (regionalne) samouprave od 2002. do 2007. godine. Zagreb: Narodne novine.

Zakon o brdsko-planinskim područjima, NN 12/02, 32/02, 117/03, 42/05 i 90/05. Zagreb: Narodne novine.

Zakon o financiranju jedinica lokalne samouprave i uprave, NN 117/93, 69/97, 33/00, 73/00, 127/00, 59/01, 107/01, 117/01, 150/02, 147/03 i 132/06. Zagreb: Narodne novine.

Zakon o lokalnoj i područnoj (regionalnoj) samoupravi, NN 33/01, NN60/01 i 129/05. Zagreb: Narodne novine.

Zakon o otocima, NN 34/99, NN 32/02, i NN 33/06. Zagreb: Narodne novine.

Zakon o područjima posebne državne skrbi, NN 26/03, 42/05 i 90/05. Zagreb: Narodne novine.

Zakon o proračunu, NN 96/03. Zagreb: Narodne novine.

Zakon o vatrogastvu, NN 139/04. Zagreb: Narodne novine.

Zakoni o izvršavanju državnog proračuna od 1999. do 2007. godine. Zagreb: Narodne novine.

Annex

Table 1 Personal income tax sharing in 2007

Personal income tax sharing	County	Cities and municipalities	Fire services, decentralised functions*	Other decentralised functions**	Equalisation fund***	Share for common financing of capital projects
the usual or standard share	15.0	52.0	1.3	10.7	21.0	–
Zagreb	–	67.0	1.3	10.7	21.0	–
areas of special national concern, hill and mountain areas	10.0	90.0	–	–	–	–
islands – joint financing of capital projects	15.0	52.0	1.3	10.7	–	21.0

* *Only for cities and municipalities that have founded and fund the regular work of public fire services.*

** *Only for those cities and municipalities that have assumed the responsibilities for funding the decentralised functions.*

*** *Transfers from central government to local units that cannot finance expenditure on decentralised functions up to the minimum financial standard from the extra share in personal income tax revenue.*

Table 2 Regression of T and BD (totally collected personal income tax and surtax as against gross personal income)

Source	SS	df	MS		
Source	202714417	1	202714417	Number of obs	= 546
Residual	118883202	544	218535	F (1, 544)	= 927.60
Total	321597619	545	590087	R-squared	= 0.6303
				Adj R-squared	= 0.6297

T	Coef.	Std. Err.	t
BD	0.0947819	0.003112	30.46
_cons	-589.5712	53.96493	-10.93

Table 3 Regression of TD and BD (revenues after sharing income tax and surtax as against gross personal income)

Source	SS	df	MS		
				Number of obs	= 546
				F (1, 544)	= 442,14
Source	51519138	1	51519138	R-squared	= .,4484
Residual	63387954	544	116522	Adj R-squared	= 0.4473
Total	114907092	545	210839		

T	Coef.	Std. Err.	t
BD	0.0477823	0.0022724	21.03
_cons	-163.0569	39.40531	-4.14

Table 4 Regression of TR and BD (current grants as against gross personal income)

Source	SS	df	MS		
				Number of obs	= 546
				F (1, 544)	= 2.61
Source	105235	1	105235	R-squared	= 0.0048
Residual	21933755	544	40319	Adj R-squared	= 0.0029
Total	220238990	545	40438		

T	Coef.	Std. Err.	t
BD	0.0021596	0.0013367	-1,62
_cons	147.831	23.1797	6.38

Table 5 Regression of PDTP and BD (revenues after sharing personal income tax and surtax, allocation of current grants and personal income tax refund as against gross personal income)

Source	SS	df	MS		
				Number of obs	= 541
				F (1, 544)	= 270.51
Source	47021928	1	47021928	R-squared	= 0.3342
Residual	93693949	539	173829	Adj R-squared	= 0.3329
Total	140715877	540	260585		

T	Coef.	Std. Err.	t
BD	0.0461406	0.0028054	16.45
_cons	-26.03342	48.82572	-0.53