The Design and Effects of Intergovernmental Transfers:

The Case of Turkish Municipalities

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by

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Dedicated to my family, my wife Yoko, and Fenerbahçe...

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Abstract

In this thesis, we test the effect of intergovernmental grants on municipal spending in Turkey. In our analysis, we incorporate Turkey's institutional features in modelling local authority behaviour. We give evidence on the results of incorporating dynamic elements into the expenditure equation in order to explain the variation in municipal expenditure. Our findings also throw light on the existence of the flypaper effect in the dynamic estimation. In our analysis, by using the method of the error correction mechanism (ECM), we also measure how quickly local government expenditure adjusts to its long-run growth path following a disturbance. We find that the past year's expenditure has a significant impact on current local expenditure. Our result in this respect contributes to the existing literature which seems to ignore the significant impact of previous expenditure on current local expenditure while estimating the demand for (or determinant of) local expenditure.

While identifying avenues for further theoretical and empirical research in the flypaper effect, Bailey and Connolly (1998) suggested that one of the most obvious avenues is the inclusion of dynamic elements into the exclusively static approach. This is in order to take account of time lags in adjusting the supply of local government services to the current demand conditions. An important contribution of this thesis is to satisfy Bailey and Connoly (1998)'s request by including the lagged municipal expenditure as an explanatory variable.

We also analyse the grant allocation in Turkey. We test empirically whether central government transfers to the municipalities are made on the basis of economic criteria, or in accordance with the political interest of politicians, and hence the coalition government. We find that equity and efficiency considerations do not appear to motivate the politicians, but neither is grant allocation apparently motivated by the desire to secure re-election.

Therefore, we attempt to develop an alternative grant distribution formula that considers objective criteria, efficiency and equity principles, and analyse the effect of the present and the hypothetical grant allocation formula on inequality in interregional income distribution.

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CHAPTER I

INTRODUCTION

Municipal governments constitute the lowest tier of government in Turkey. Legislatively, they are held responsible for the provision of those basic services such as garbage collection and disposal, water supply, drainage and sewerage, roads, street planning, lighting, fire fighting, and transportation which have direct and vital bearing on the quality of life for the local people. However, in practice, local governments perform a limited role in these services in regard to the smaller cities, and the developing and rural parts of the country. Financial and constitutional constraints are mainly highlighted as causes of the failure of local government institutions to perform their assigned responsibilities.

Historically, the state of local service provision in Turkey has been dominated by: first, pressures created by the growing population and immigration to urban areas; second, the increasing need for provision of infrastructure services, and the constraints on local government expenditure due to fiscal shortages. As basic services are mainly provided by municipal governments, it has become very important to strengthen their management of the infrastructure as well as to improve their financial and technical capacity, and their administrative efficiency. The argument is further strengthened by the fact that municipal governments in Turkey obtain their revenue essentially from central government.

The last two decades have been periods when substantial emphasis has been given to decentralisation and deregulation in countries all over the world. In Turkey, substantial steps have been taken to enhance local government financial autonomy. However, overlapping and duplication of local government functions need to be eliminated, and their activities should be enhanced for the process of decentralisation to be complete. In fact, during the last two decades, important steps have been taken by the central government in order to achieve local responsibility. However, one issue still in need of improvement is the distribution of the main local revenue sources – intergovernmental transfers.

In short, a greatly enhanced role is envisaged for municipal government in Turkey for the next few decades. For this to be achieved in an effective and meaningful manner, the state of knowledge about municipal government institutions, in particular their financial aspects, needs to be improved. Much of the structure, patterns and trends in municipal government revenues and expenditures, and the major issues confronting them, are not adequately known in the country or in the international literature. Surely, the first step towards assessing the performance and capability of local government and the central influences on municipalities is to gain an adequate understanding of the state of local government practice, and that of the municipalities in particular. The purpose of this thesis is, therefore, to

- undertake a detailed legislative and fiscal analysis of the role of local governments in Turkey in order to shed light on issues that need to be resolved in the organisation of municipal institutions;

- test the effect of intergovernmental grants on municipal spending across the country. Undertaking a time-series cross-sectional (panel) econometric study of municipal government in each province will enable us to develop an exploratory model of the process of municipal expenditures in Turkey. The theoretical model will enable us to analyse the factors which determine the differences in expenditure levels across municipalities, and, hence, to have information on factors that affect the demand for municipal goods in Turkey;

- test whether central government transfers to the municipalities are made on the basis of economic criteria or in accordance with the political interest of politicians, and hence central government;

- develop an alternative grant distribution formula that considers objective criteria, efficiency and equity principles, and analyse the effect of the present and the hypothetical grant allocation formula on inequality in interregional income distribution.

Why Turkey?

The choice of Turkey as a case study can be rationalised as follows. There are no studies being undertaken to study the effect of Turkish intergovernmental grant to local authorities. Models of interstate /interregional local expenditure differences have largely been restricted to developed countries (the USA, the UK and Australia). There is a need to extend analysis to developing countries because of the differences in characteristics and structure of local governments between developed and developing countries. It is hoped that the results of our study will contribute to the local public finance literature and go some way to exposing the nature of Turkish local government financing which is so different from that of other countries which have been studied in the literature.

One of the differences that distinguishes Turkey from other countries is the nature of its administration. It is a unitary country as compared with the countries where the literature is focused. In Turkey, the power of central government to levy local taxes derives from the constitution. Thus, measures to reassign taxation require changes to the constitution. The literature is mainly concentrated on countries where local governments to some extent have been given local autonomy over taxation. This surely changes interpretation of the results from a specific country in which the empirical study is undertaken. The results from these countries cannot be generalised to countries like Turkey. Tax relief, for example, can be mainly applied to developed and/or federal countries where local autonomy is largely present.

In Turkey, local governments can only affect their non-tax revenue in order to increase their expenditure. If local expenditure is not implemented simultaneously with local demand, a lagged effect is inevitable. The supply adjustment required to adjust to the current demand conditions will take years because of bureaucratic sluggishness and the dynamic process. Thus, there is a need for a dynamic econometric analysis of local government expenditure in Turkey.

We will give further evidence on the validity of the political approach to central government grant determination. Existing studies in the literature have not arrived at

an unequivocal conclusion regarding the validity of this approach. As Turkish grant allocation is not clearly designed by law, and, hence, open to manipulations by politicians, our results on this issue may offer useful further insights. Also, we want to propose a model for systematic grant allocation to the Turkish government, which has itself been searching for a new formula for grant allocation to adopt. Our findings may also be useful for countries that display similar characteristics to Turkey.

The thesis is organised into five main chapters in accordance with the following plan:

Chapter 2 undertakes a review of literature related to the studies which concern the main purpose of this thesis. We briefly discuss the arguments for assigning the various economic roles to the sub-central levels of government and explain why central government may intervene in local provision. The fiscal equalisation process is described and then issues related to an assessment of local expenditure needs and revenue capacity is explained. Following the explanation of the grant types, the theory of grants' effect is analysed with the aid of standard economic theory. The empirical determinant studies of local expenditure are reviewed for many studies have explored the effects of grants. We also intend to learn more from expenditure determinant studies which explain what systematic patterns of influence are likely to be built into such an approach to fiscal equalisation grants. The empirical literature over the last two decades has analysed the grant effect in the median voter model framework. The empirical review of the grant effects is almost equivalent to reviewing the empirical test of the flypaper effect. Thus, our literature review is expanded into the literature of the flypaper effect to draw a consistent conclusion on the effect of intergovernmental grants.

Chapter 3 will discuss Turkish fiscal federalism in detail. It is a background to our study. We will first present the local government structure giving a brief historical development of local government and the functions assigned to them. A description of local government revenue is presented and municipal finance is analysed. We highlight the pattern and level of municipal expenditure to bridge, partially, the gap in public finance research in Turkey.

In Chapter 4, we will model local government budgetary reactions to central government finance in the context of standard economic theory. This is partly because of the desire to assess the economic behaviour of local authorities on the one hand and partly because of the need to obtain information on the general grant system as a policy instrument on the other. We also test the existence of the flypaper effect hypothesis in the Turkish context incorporating dynamic elements in the analysis of local government behaviour.

In Chapter 5, we apply a public choice model and a conventional economic model to the empirical analysis of grant determination in Turkish local public finance. Intergovernmental grants have basically been assumed to be justified on efficiency and equity grounds. One of their purposes is to reduce fiscal imbalance - i.e., the imbalance between an authority's revenue raising capacity and its expenditure levels. However, some justifications of grant allocations fail to explain the real situation in the political arena. It is clear that a grant provides the recipient with many advantages. For example, the recipient can provide more local services without relying on new taxes or raising existing tax rates, and local government can even reduce its own tax rates without reducing local spending. Thus, the question to be faced is the gain that politicians at central government can obtain by transferring resources to local government. The purpose of this chapter is to subject the economic theory of political behaviour to an empirical test, using data on central government grants to local governments. This will be done by empirically analysing the determinants of grant allocation to municipalities in Turkey under coalition government, and testing for the validity of the political dimension in this process.

Chapter 6 will explore the possibility of a grant allocation proposal in Turkey where no systematic approach to grant design is in place. Turkey's search for a systematic grant design makes it a most suitable case for study. We attempt to analyse how effective the current grant system can be made in compensating for the horizontal differences in fiscal capacity and/or income, and the needs between municipalities. Fiscal resources are generally distributed unevenly across the regions in developing countries. This may lead to several undesirable consequences in terms of the distribution of local merit goods and services, and thus incomes. As a result, poorer

regions will not be able to provide the same level and/or quality of local goods and services, and of employment opportunities, as the wealthier jurisdictions. The result is less scope for interpersonal redistribution of incomes and opportunity via merit goods and services.

When we have scarce resources to distribute among municipalities, identifying high need municipalities and allocating the available funds to those municipalities with greatest needs becomes an important policy issue. 'Needs' can be defined as factors that give rise to the local public expenditure per head which would be necessary to provide an average standard of provision. The need for municipal services and their unit costs of provision may vary from one municipality to another. The horizontal equity principle requires that individuals of similar means living in different municipal boundaries should be equally well off and not disadvantaged because of location preferences. To ease or completely remove the inequity which is created by interregional disparities in regional spending needs, some sort of equalisation grant is required from central government. By using statistical data, this chapter will analyse the hypothesis that intergovernmental grants may advance interregional equity. Even though taxes are other sources of local government finance, and, hence, could be considered as alternative public policy means to grants, they have to possess some common characteristics, otherwise fiscal disparities across jurisdiction would widen rather than narrow. It is not the prime objective of this thesis to discuss the efficiency or optimality of local taxation. Thus, we will not consider issues related to the efficiency and optimality of local taxation as being of our concern.

CHAPTER II
INTERGOVERNMENTAL GRANTS: THEORY AND EVIDENCE

2.1. Introduction

Federalism is defined as the division of powers between general and regional authorities.[1] This approach rationalises a political study of federalism, since political scientists are interested in the division and use of political power. The problem of federalism, however, is quite different from the economist's viewpoint. Economists are concerned with the allocation of resources and income distribution within the economic system. From this perspective, the importance of decentralisation of the public sector is that it provides a mechanism through which the provision of certain public goods and services is made in accordance with the tastes and preferences of geographical subsets of the population.

Oates's decentralisation theorem makes the case for providing Pareto-efficient allocation of resources via local governments:

> "For a public good, the consumption of which is defined over geographical subsets of the total population, and for which the costs of providing each level of output of the good in each jurisdiction are the same for the central or the respective local government, it will always be more efficient (or at least as efficient) for local governments to provide the Pareto-efficient levels of output for their respective jurisdictions than for the central government to provide any specified and uniform level of output across all jurisdictions."(1972, p35)

The importance of this theorem is its assertion that welfare is maximised if each local government provides the Pareto-efficient output for its citizens. The assignment of functions and of fiscal instruments to the appropriate levels of government is an important issue of fiscal federalism. Contrary to the political-theoretical view of federalism, it is difficult to find a federal country which has a tier of authorities that are fully independent. For example, independence from central government requires independence in revenue collecting: if so, why is there a consideration of the question

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[1] See Wheare (1963).

of grants? In Australia, Canada and the US, so-called federal countries, there are no lower-tier authorities with wholly independent revenue-raising ability and freedom of spending decision.

Therefore, for economists, federalism is not to be understood in a narrow constitutional sense. In economic terms, all governmental systems are more or less federal. Even in a formally unitary system, as Oates (1977, p4) emphasises, there is typically a considerable extent of de facto fiscal discretion of decentralised levels. Instead of being dichotomously federal or central, governments vary along some multidimensional spectrum in the degree to which fiscal decision making is decentralised.

The plan of this chapter is to present initially, in section 2.2, a brief review of the arguments for assigning the various economic roles to the sub-central levels of government. We will then consider in section 2.3 why, from the society's viewpoint, the localities might fail to carry out efficiently the functions assigned to them. Public finance economists have paid great attention to questions such as the rational justifications for different types of grant, analysis of the lower-government budgetary response to higher government grants, and finding a rational criteria to justify how grants should be allocated to different areas and types of government. Therefore, in section 2.4, after explaining different types of grant, their impacts on recipient behaviour are explained. Equalisation grants and their mechanism are discussed in section 2.5. The review of studies on a local government expenditure determinant is presented in section 2.6. Section 2.7 explores the empirical review of grant effect. Section 2.8 concludes this chapter.

2.2. Local Provision of Public Goods and Services

Local governments are generally seen as having a part to play in resource allocation by producing local public goods and services (see Oates (1968, 1972, 1977, 1991, 1999), King (1984) and Wellisch (2000))[2]. It has been generally accepted that central

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[2] There are three government economic functions suggested by Musgrave and Musgrave (1989): allocation, distribution and stabilisation.

government should take responsibility for macroeconomic stabilisation policies and for the redistribution of income. This does not mean that local governments in the aggregate have no impact on total demand or distribution of income, but rather that the constraints on an individual local government leave it very little scope for an effective stabilisation or redistribution policy within its jurisdiction (see Oates 1991, p23). Local governments usually have little control over macroeconomic policies as they have a highly 'open' economy. Their attempt to control the local economy will be dissipated by the action of other agents interacting with other local governments. Also, the ease of mobility among jurisdictions makes it difficult to implement redistribution policies.

The presence or absence of external benefits to the citizens in other jurisdictions plays an important role in deciding which levels of authority should provide public goods. It is generally agreed that if the benefits from the provision of public good are to be confined to local citizens, the sub-central authority should undertake such action. Examples are street lighting, parks, recruitment, public transportation, fire protection, police services, garbage collection, refuse disposal and education. On the other hand, if the benefits from the provision of public goods are available to citizens in other jurisdictions as well, such provision should be undertaken by the central government – as with, e.g., motorway maintenance.

It is commonly agreed that sub-central governments can produce public goods and service in accordance with the tastes of residents within their jurisdiction. Decentralisation allows for a variation in output that is necessary for matching differences in tastes. If such goods and services were provided by central government, it is possible that the outcome would not take adequate account of regional differences in tastes.

Politicians at the local level are likely to have a better knowledge of local preferences than politicians elected to central government (Stigler 1957). Politicians discuss different issues at local government and national government elections. At the local government election level, the debate is concentrated on local issues. At the national election level, the debate focuses on national policy issues. As a result, local

authorities are likely to get closer to the local people than the central government. This provides another reason why locally provided public goods can be achieved more efficiently: representatives may have more knowledge of the cost and benefits from the provisions of public goods and services. Therefore, they are in a better position to compare benefits to costs than central government.

'Decentralisation' is a natural mechanism by which central government responds to social needs by moving decision-making responsibilities away from the centre and closer to the people they serve. But, left to their own devices, local government would fail to achieve an optimal allocation of society's resources. Now we will consider the reason why the central government may intervene on local provision.

2.3. Justifications for Intergovernmental Grants

Intergovernmental grants[3] are transfers of funds from one governmental unit to another: in the fiscal federalism literature, it is from a higher level government (central/federal) to a lower-level government (e.g. states, municipalities). Generally, intergovernmental grants are justified on economic grounds (Gramlich 1977, Break 1980, and Shah 1994). We can extend the underlying economic rationales for grants by adding a public choice rationale.

2.3.1. The economic rationale

In general, governments supply uniform levels of provision within their jurisdiction areas. If preferences for a good are not uniform across society, central provision on a uniform basis is inefficient. Here in economic theory lies the reason for the presence of local government. Left with their own instruments, local governments would fail to achieve an optimal allocation of society's resources. This is so for four broad reasons[4] which would require central government intervention. *Firstly*, to take account of externalities. *Secondly*, to ensure a minimum level of public services in each local

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[3] It is sometimes called grant-in-aid, intergovernmental transfers.
[4] See Oates (1972), Break (1980), Boadway and Wildasin (1984), King (1984), Shah (1994), and Jha (1998).

authority is attained. *Thirdly*, to correct vertical fiscal imbalance. *Lastly*, to correct horizontal fiscal inequity. We now discuss each in turn.

2.3.1.1. Inter-jurisdictional spillover

A spillover may exist when there is an imperfect correspondence between the area of the jurisdictional unit providing the good and the areas that receive benefit from the good. Many of the benefits derived from the public goods provided by local governments extend beyond jurisdictional boundaries; e.g. non-residents enjoy the benefits from services like air and water pollution control, parks, recreation, culture and transport. The locality bears the full costs but only receives a fraction of the benefit. If each locality acts independently, it will take into account only the benefits accruing to its own community and hence will equate these total benefits with the cost of its provision.

In turn, the quantity of locally-supplied goods will, in aggregate, fall short of that which is optimal for the nation as a whole because the benefits accruing to members of other local communities are ignored. Consequently, central government is interested in raising the average level of provision of any local public good for which there is not a satisfactory correspondence between the providing area and the recipient area of benefits.

2.3.1.2. Grants to enforce grantor preferences

For a number of reasons, central government gives grant to local government. These reasons can be enumerated as follows:

a) Minimum standards: It is generally agreed that grants are often given to ensure the attainment of national minimum standards. The case for the public provision of education and health care rests primarily on equity objectives. These services are considered as redistribution in kind. Hence, these services should be provided on a uniform basis. Redistribution by the tax system, or direct cash transfers, is supported by the relative importance of expenditure on health, education and social services.

Local government provision of such services may create difficulties in fulfilling central government equity objectives under the influence of factor mobility and tax competition among the jurisdictions. These may lead lower-level governments to under-provide such services and hence restrict the poor or the elderly accessing them. Also, there appears a need for co-ordinating services, such as roads and railways, among local authorities because, if one authority ignores its task/functions, another must spend more. To finance this extra burden, central government allocates grant to that authority.

b) Macroeconomic reasons: There are macroeconomic reasons related to grantor preferences: (i) the overall level of demand in the economy is another explanation for grants from central to local government. To increase the public demand and hence final output in the economy (which results in reducing unemployment levels), central government may use local authorities as a means of enforcing its macroeconomic policy;

(ii) To achieve regional development, local government may be given a role in development policy. While the central government prepares for formulating and implementing development, it could finance the regional government through grants according to the weight given to regional development.

(iii) Grants are given to ensure common minimum standards for public services across different jurisdictions which assist in reducing inter-regional barriers to factors and goods mobility, thereby contributing to efficiency gains.

(iv) Intergovernmental grants might be used to achieve economic stabilisation objectives in a business cycle. Grants could be decreased while the economy is in a boom period and increased in the depression period to stimulate economic activity. The same thing could be achieved by varying tax rates in the business cycle but politicians do not favour increasing tax rates in boom periods.

2.3.1.3. Grants to correct for fiscal imbalance

The third economic justification for grants is *fiscal imbalance*. Fiscal imbalance in general refers to *vertical imbalance*. Vertical imbalance is a mismatch between local government expenditure needs and tax revenues (or between central government required expenditure levels for local government and local government tax revenue). The fiscal imbalances arise from a number of sources. Firstly, the central government may set the expenditure and tax assignment inappropriately. Secondly, local government may be directed toward limited or unproductive tax bases. Thirdly, in the presence of tax competition between localities, their anxiety about the possibility of losing capital, labour and business, means they do not impose an efficient business tax to exploit revenue potentials and hence they provide lower levels of public services. Finally, central government taxation limits the local government ability to raise revenue. Grants are one way of compensating local governments for any mismatch between expenditure needs and tax generating capacity.

2.3.1.4. Horizontal equalisation (Grants to reduce horizontal fiscal disparities)

We now discuss the fourth argument for imposing a measure of responsibility for local provision on central government: equalisation considerations. An equalisation objective is due to two reasons. First is the efficiency case for equalisation grants. In some cases, migration does not change the efficiency and social gains to the society. Migration could happen because equilibrium wages, need and cost index may differ between regions. If the migration does not bring the efficiency increase and net social gains to the society, there appears a case for equalisation grants to remove the incentives to move.

Second is the equity argument for equalisation grants. It means that each locality should be enabled to satisfy the same proportion of its needs as any other locality. There is a need for correcting any differences that may arise either in tax sources or

expenditure needs among local governments[5]. Net fiscal benefits (i.e. the difference between the benefits from the range of local services and the taxes paid for them), which Buchanan (1950) terms 'fiscal residuum', vary across localities for a number of reasons. First of all, as Shah (1994) pointed out, some localities have more valuable natural resources and hence more scope to raise taxation. Secondly, some localities have relatively higher incomes and hence can raise more revenues from their own tax base. Lastly, some cost disability factors such as low thresholds for scale economies are inherent in localities or there are higher need factors such as a higher proportion of young, old and poor, in the localities.

The low-income region, for example, would provide deficient educational standards largely because of its fiscal plight; grants play a great role in achieving equity objectives by broadening the functions. Although two municipalities, for example, may have the same per capita tax base, each region may differ in service levels which could be the minimum required service by the central government. That is people in each area would have a different fiscal residuum. Inequality arises as a result of the same per capita taxes being paid but unequal benefit being received from local governments due to cost and need variations.

2.3.2. Political choice

While a grant may be made on the basis of economics, some argue that such central assistance is sometimes provided for political reasons. Intergovernmental grants are part of the relationship between money spending and votes at an election [see Faith (1979), Holcombe and Zardkoohi (1981), Alperovich (1984), Grossman (1987, 1989, 1994, 1996), Rich (1989) and Bungey et al (1991)]. The traditional view of economic policy making assumes a benevolent government which is typically associated with Pigou (1970). The efficient and equalisation grant model which is associated with a benevolent government essentially seeks to answer the normative question of why grants should be made. However, the public choice approach presents a positive

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[5] See capitalisation alternatives for Barnett and Topham (1980 and 1982) and argument against this King (1981, 1984). For benefit taxation alternative, see Musgrave (1977), Buchanan (1977), and King (1982, 1984).

approach to grant analysis. It argues that efficiency and equity objectives are not of concern in the determination of grants. Grants are applied in so far as they assist in furthering the power of government agents, e.g. by raising the probability of re-election (Bungey et al. 1991). In the public choice approach, any temporary increase in intergovernmental aids may not be viewed as a rational response of central governments to a mounting local fiscal crisis such as a declining tax base and an increasing cost of local public services except insofar as this affects the government's electoral prospects.

The role of politics in the distribution of central government grants has become well-suited for study by political scientists. In general, the results of these studies have been mixed. Grossman (1994, 1996, 1987) Alperovich (1984), Holcombe and Zardkoohi (1981), and Rich (1989) found some evidence supportive of the hypothesis. Bungey et al (1991), Pereira (1996), Luksetich (1983), and Gist and Hill (1984) found no evidence to support the role of political influence in the distribution process. Worthington and Dollery (1998) and Treisman (1996) found mixed results.

Although the influence of politics is measured in a number of different ways, a treatment common to all of the cited papers in Table 2.1 is to measure the impact of politics by comparing party affiliations between central (federal) and local government (see Grossman (1987, 1994, 1996), Alperovich (1984), Bungey et al (1991), Worthington and Dollery (1998), Holcombe and Zardkoohi (1981)). Other measures of political influence include: size of congress delegation (Holcombe and Zardkoohi (1981), Luksetich (1983)); time served at the Congress (seniority) (Holcombe and Zardkoohi); percentage of votes cast for the central government's political party in a locality i (Alperovich (1984), Pereiara (1996)); the number of votes cast for the central government (Treisman (1996)); and the percentage of seats held in a parliament by the central government (Grossman (1994, 1996), Holcombe and Zardkoohi (1981), and Luksetich (1983)).

Table 2.1: Literature Review (Public choice approach to grant allocation)

Authors-sample-estimation method		Models (variables with the expected signs are given in parenthesis)	Remarks and conclusions
Bungey, Grossman and Kenyon (1991) Six Australian States 1956-1986; GLS-J-tests.	Economic	Unemployment rate (+), taxable income per capita (-), rural population density (+), population (-), school pupils (+), dummy for ideological differences between political parties (?)	J-test used to choose between two computing models.
	Political	REP (-): Percentage of representative seats held by the federal government, REP squared (+), LIKE (+): dummy variable if the federal and state governments are of the same political party, MARG (+): the percentage of House of Representatives seats held with less than a 5% two party preferred vote in state i. NGPOP(+): non-government school pupils as a percentage of total school pupils in state i, UPOP(+): urban population as a percentage of total population in state i.	Public choice theory has nothing to offer in explaining federal-state relations in Australia.
Worthington and Dollery (1998) six states in Australia, 1981-1991/92; J-tests - LSDV.	Economic	Cross-sectional dummy for each state (+/-), education, health and social security and welfare disability ratios for the j-th state (+).	They found mixed results for the grant determination process. In many cases the political variables were statistically insignificant and carried unexpected signs.
	Political	Stat (+/-): cross sectional dummy variable for each state. SEAT (+/-): number of federal seats in the j-th state. SHP(-): proportion of seats in j-th state held by federal government (in states where the federal government is strong the need to buy votes is low. However, in states where the federal government is not well represented, the purchase of political support is paramount, ELS (+): dummy for state election held, SAME (+); dummy if state and federal government of the same party. ELF(-) dummy for federal election held. MARP(+): proportion of marginal federal seats in j-th state. PREFP(-): proportion of federal seats decided on preferences in j-th state.	
	Hybrid	Full regression combines both various public choice and equity/efficiency variables.	
Grossman (1994) 49 states in America, 1974-1977-1980-1983; OLS.	Hybrid	Dependent variable is per capita total federal grants. Independent variables include six political variables and one equity and/or efficiency variable. Two measure the influence of state and local political parties and their leaders. DGOVMAJ (+) percentage of total votes cast for a Democrat governor in the gubernatorial election. Dlegmaj (+) percentage of seats held by the democrats in the state house of representatives. Interest group variables (Bureau (+) and Union (+)) are proxies the political capital interest groups can use to trade for federal grants. The larger and well organised an interest group, the more political capital at its command. POP (?), POPSQ (?) population squared) to measure the cost to federal politicians of trading for a state's political capital.	In both studies (1994 and 1996), Grossman found that similarity of party affiliation between federal and state legislature increases the per capita dollar amount of grants made to a sate. Overtime, the importance of interest groups (bureau and unions) has increased relative to political groups (state politicians).
Grossman (1996)		Dependent variable is defined in terms of per capita grant (excluding Medicaid, AFDC, and interstate Highway grant), and total grants (per capita total grant), independent variables are as same as above.	
Grossman (1987) 48 US states; 1976-777; OLS.	Political	POL is a dummy variable. If the majority of state's House of Representatives contingent is of the same political party as the state's governor, POL takes a value of 1. If the majority is of a different party or neither party comprises a majority, POL takes a value of 0.	The results for the multiple regression offer more support for the public choice hypothesis. When other factors effecting the level of grants are included, the influence of POL increases considerably. Similar party affiliations will result in greater intergovernmental transfers than if party affiliations differ.
	Hybrid	U (the percentage of state's population residing in SMSA's) is intended to determine if the grant tends to be more oriented to alleviating urban problems or rural problems. No prior expectations of the sign of U are held.	

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Alperovich (1984) 52 local authorities in Israel for 1976 and 1978; OLS.	Hybrid	The estimated relationship describing the government behaviour in allocating grants to local authorities is of the following form: PCG= f(POP (-), POL (+), DEP(+), DEF(+)) Population (POP), percentage of residents of locality i who voted for parties which formed the government (POL), DEP (the ratio of number of people 65 years old or above and 14 years old or below to the number of people aged 19 to 65), DEF (per capita annual deficit in i). Since no justification was provided for any form of the equation, various forms (in linear, logarithmic and exponential) have been estimated	Allocation includes factors represented by objective criteria describing the needs of the populations and by political factors representing the desire for re-election. One percent increase in government's grant will increase the support to its management by 0.31% and 0.28% respectively.
Holcombe and Zardkoohi (1981) 1976 US data, OLS. Sample size was not reported.	Hybrid	Larger grants going to the states with the most powerful representatives in Congress, Senate (+) (average length of time served by the state's two senators, House (+) (percentage of congressmen in the House who are members of the majority party). Comm (+) (a dummy variable, 1 if for states with members on the senate finance committee or the House Ways and Means Committee, 0 for all other states. Poverty (+), per capita income (-), Metro (+) urbanisation), Pop(+) (population).	The data strongly suggest that political influences overwhelmingly determine the allocation of federal grants while none of the variables reflecting the stated criteria is significant.
Pereira (1996) 186 communities in Portugal; OLS.	Hybrid	Population, tax base (revenue sharing aim). P (proportion of votes in local elections for the political party which form the government). If the central government can reward its political supporters, the coefficient of P would be positive. If the central government may buy votes from its opponents, it would be negative. If P considers the proportion of voters and not the total number of voters, the central government may buy votes from its opponents in which case the coefficient would be negative.	He found negative coefficient on political variable but it is not statistically significant
Rich (1989) 310-380 American citie; various time period between 1950 and 1984; OLS-Logit.	Economic	Composite need index, population change, poverty, median family income, net change in median family income, unemployment rate, aged housing for 280 cities with urban renewal and model experience all have positive coefficients.	The political representation variables were most frequently found to be statistically significant during the initial years of a programme. Analyses were based on separate categories of grants and political and economic influences are analysed separately
	Political	The distribution of federal funds for community is a function of three factors: the political influence of city representatives and senators, the level of need within communities, and the demand (number of grant applications) and capacity (prior experience of local governments e.g. number of programmes in which cities were participants).	
	Hybrid	no	
Gist and Hill (1984) 623 small and 592 metropolitan cities in America; Logit / Tobit.		Dummy (PARTY) (+) which has the value of one for projects located in Congressional districts represented by Democrats, the majority party during the period investigated, and zero for those in districts represented by Republicans; they expect the effect of this variable to be positive. Committee membership, whether the representative of district in which a project is located holds membership on a committee (+), Population (+), Jobs (+), distress (age of houses, poverty and population growth lag) (-).	For both groups of cities, party and committee variables are not significant in determining whether a project receives federal funds.
Treishman (1996) 72 administrative regions in Russia; OLS.	Hybrid	Electoral objectives: regions deputies were members of key parliamentary committee and commissions (+), region's level of support for Yeltsin in 1992 (+), parliamentary over-representation (the number of the congress that the region had per million habitats), lobbying capacity of regional government (visits by senior officials to different regions) (+), having permanent representative in Moscow (+), bargaining power (strikes) (+) and separatist behaviour of States (+). Underdevelopment of regions social infrastructure index (-), profits per capita (profits from more profitable enterprise and regions to less profitable ones) (-), urbanisation (urban areas may also have special needs associated with congestion, pollution, and urban blight) (+). A significant positive regression coefficient would suggest that net transfers alleviate special urban problems. A significant negative coefficient would suggest they alleviate rural problems.	Economic variables played very little role in determining grant. Regions voted against Yeltsin, and those regions that cleverly manipulated the weapons of early sovereignty declaration, and where the population was ready to back up demands with strikes, managed to extract more than those that were more domicile.
Lucsetich (1983) 50 American states in 1976.	Hybrid	Same as Holcombe and Zardkoohi's (H-Z) model and variables but he criticises the erroneous specification of committee variable in H-Z estimation and redefines the committee variable.	Political influences do not strongly determine the allocation of federal grants among the states.

Grants are the main subject of the local public finance economist because they are viewed as disbursements by which countries, either unitary or federal, can increase public services and equalise incomes among jurisdictions. While analysing the lower-government budgetary response to upper government grants, Gramlich (1969,1977) argues that there was no consensus from the results of the early empirical study of grant effects because the state and local government behaviour were not understood and the effects of different types of grants were confused. Therefore, in attempting an economic evaluation of intergovernmental transfers, it is instructive to review their type and effects.

2.4. Theoretical Analysis of Intergovernmental Grants: Their Type and Effects

Careful analysis and evaluation of grant types and effects can contribute much to the design of a grant system within the country, and, hence, to predict the lower government budgetary response to central government grants. Thus, we will explain the different types and meaning of the intergovernmental grants. Then their effects are considered.

2.4.1. Taxonomy of intergovernmental grants

In the local government literature, grants are most commonly classified into two main groups[6]: specific and general. A general grant has sometimes been termed a block grant, an unconditional grant, a non-selective grant, and a revenue-sharing grant. This type of grant is offered without restrictions and allocated by a formula that may include either factors outside of the direct control of the recipient, such as population (used in almost all countries), per capita income, or factors that can be controlled by the recipient, such as tax effort or tax collection. If the amount of grant is fixed, the term 'lump-sum general grant' is used to describe the grant type[7].

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[6] See Wilde (1968, 1971), King (1984), Brown and Jackson (1990), Cullis and Jones (1992), Fisher (1996), Shah (1994), Jha (1998) and others.

[7] If the grantor ties the grants to the revenue of a local authority received from its own sources, the phrase is termed 'effort related grant' as it considers the recipient's revenue effort. The difference between the matching specific grant and effort related grant is that the former is given on the basis of spending requirement whereas the latter is given on the basis of revenue requirement.

A specific grant is given by the higher level of government to the lower level in order to induce certain activities. This type is termed a conditional grant in the local public finance literature (because there are some conditions on how the grant is to be spent) and as a selective grant (because the higher level of government - generally called donor or grantor - determines the primary purposes). Specific grants[8] can be further sub-classified into two groups, lump-sum specific and matching specific grants. The grantee government receives the total amount of the grant in the form of a fixed amount of money (lump sum) in order to obtain the required service. A lump-sum specific grant is also called a non-matching grant since its amount cannot be altered by fiscal decisions of the recipient government. The only difference between the general-purpose grant and the non-matching grant is that in the former, the grant is a pure lump sum to the recipient. In the latter, the grant can be offered to specific services. Specific matching grants, conversely, are given to the grantee provided that it achieves requirements set by the grantor such as that some percentage of the spending should be matched by the grantee's own revenue so that the amount varies according to the matching requirement. The grantor offers to match each pound of recipient expenditure on a specific service with s grant pounds. The simple formula for the grantor share is given by m;

$$m = \frac{s}{(1+s)}$$

One of the fundamental concepts in local public finance is this matching rate which attempts to predict the effect of matching grants. In effect, the matching rate (s) reduces the price of additional amounts of the granted (subsidised/aided) service to the recipient government. That is, the actual cost of aided service to the recipient government declines with the matching rate[9].

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[8] Specific grants can be either very narrow based (e.g. grants on education of fire engineers) or broad based such as grants on fire protection. In the latter case, the term is sometimes used for block grants. Using this term may cause confusion because block grants are also used for general grants as well. In the former, the term "categorical grants" has sometimes been used to describe the narrow cases. Shah (1991, 1994) uses this term instead of the specific grants.

[9] We can explain this as follows. If the matching rate (s) is equal to 1; m = ½, then the grant-in-aid finances half of total expenditures on aided service. Increasing the expenditures on aided service by one pound costs recipient 0.50 pound. Thus, the general formula for local tax price (p) of an additional spending on specific service is defined as $P=1-m = 1/(1+s)$. If s = 2, each pound of additional service costs local government (or local taxpayer) 0.33 pound.

Specific matching grants can also be sub-divided into two groups: open-ended (or open) grants and closed-ended (or closed) grants. In the open-ended type, there is no limit set on the amount of grant. For example, it can be set as a percentage of selected spending, say, 10 % of selected spending. In this type, because there is no ceiling on the amount received, the amount of grant can be increased in accordance with increasing the granted spending. However, closed-ended grants cannot be increased beyond a pre-set limit as granted spending increases[10].

2.4.2. The impact of different types of grants

This section serves as a framework for making qualitative judgements on the design of grants and predicting the general direction of effect that intergovernmental grants may have on the recipient government's behaviour. Standard indifference-curve theory[11] is generally applied to show the impact of different types of grants on the recipient government's budget. In this model, the indifference curve reflects a graphical representation of a set of different combination of units of one or more grantee functions and of residual income to be spent on other goods. These indifference curves have a different meaning in the intergovernmental grant literature. Indifference curves have sometimes been used to express the decisive median-voter's preferences (Romer and Rosenthal, 1979, 1980) in the community. They have sometimes been used to express the recipient government's preferences (Wilde 1968. 1971) so that the model gives an easy understanding of grant effects. However. this model still resembles the median voter model below because local governments are likely to take account of local voter preferences (King 1984). Indifference maps for

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[10] This is because there is a ceiling on the grant: e.g. within the first £1,000,000, expenditure receives a 10 percent grant. The upper limit of £100,000 is given at most but if the expenditure exceeds one million, say, £1,500,000, the amount received does not increase. It stays constant and becomes regressive: £100,000 for £1,500,000 spending. The effective rate becomes 6.5 percent.

[11] It is assumed that indifference curves reflect community preferences and are convex: the quantity purchase of the grantee government does not alter the prices of its services, taxes in their jurisdictions are assumed to be borne by their own residents, recipient government provides goods and services alone, and does not receive subsidies. If the grantee increases taxes, resident income will decline to respond to the tax increase, and there is no demonstration effect assumed - i.e. any sort of grant does not alter tastes in the direction of recipient functions. (see Wilde 1968, 1971, and King 1984).

the community and for the individual are assumed to be identical in that they have the same patterns of responses to price and income changes (Wilde, 1971, p.144).

There are two types of effects that intergovernmental grants may have upon recipient fiscal decisions. These are an income effect and a price effect. In the former, grants increase the local resources available to provide local services. The price effect occurs as the grant reduces the marginal costs of additional aided service while increasing the resources. If the political process works with voting, then the effect of the grant on the government's decision is determined by the effect of the grant on the decisive voter's demand.

We can show the effect of intergovernmental grants with the aid of the indifference curve and budget lines as those in the conventional consumer theory analysis. In Figure 2.1 below, the representative individual's budget constraint is defined by the budget line AB that shows any combination of choices between local government good Q, and composite good X, which represents the expenditure on all other goods. The slope of the budget line gives the individual's tax price. The individual maximises his utility at H where he chooses OQ_1 of local good and OX_0 of composite good (we assume the composite good is taken as numeraire with price normalised to 1).

If central government subsidises the local government with an open-ended matching grant (having matching rate s), as is discussed above, this type of grant will reduce the price (cost) of local provision, and hence reduce the tax price of local taxpayers. An individual in a new situation has the budget constraint AD for choosing between the given goods. As the price of good Q declines with matching grants, an individual can afford more units of good Q. An individual can buy OD of good Q with his initial income. An individual can choose more of both goods and his utility maximising choice will be at K where he can consume OQ_2 of local good Q and spend the rest of his income on OX_2 of the composite good.

Figure 2.1
A comparison of matching versus lump-sum grant

Good X

C

A

X_1

X_2

X_0

K'

K

I_2

I_1

H

I_0

0   Q_1 Q_3 Q_2 B   E   D   Good Q
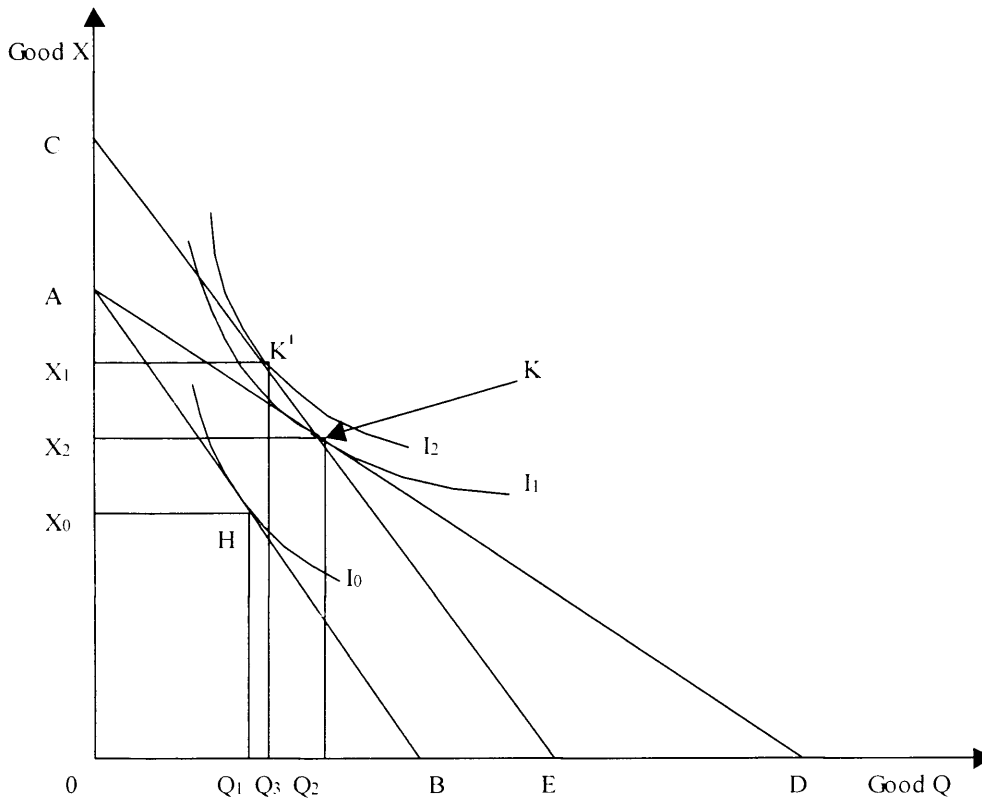
The lump sum grant is considered next: the grantor's grant-in-aid in the form of a lump sum aid (explained numerically in Appendix A1.) is just a large enough amount to allow this consumer to select the bundle K (i.e. the same bundle with matching grant). Therefore, the new budget line goes through the bundle K. With this lump-sum grant, an individual's budget constraint shifts out parallel (as the prices are unchanged) to CE. The consumer maximises his utility at K^1 where he can consume OQ_3 of good Q and OX_1 of composite good.[12]

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[12] and hence increase grantee spending on the public good unless it is a Giffen good.

The consumer increases his consumption of good Q by a smaller amount with a lump-sum grant than with a matching grant because there is no substitution (relative price) effect, only an income effect. Because the indifference curves (I) are assumed to be convex, the optimal bundle chosen by this individual occurs at the left side of bundle K. The left side of bundle K gives higher satisfaction to the individual and this higher utility is attained by spending relatively less amount than Q_2, but requires greater spending on composite goods. As there is no price reduction with a lump-sum grant, fewer resources from the income increase is allocated to good Q. It can be shown that the equivalent amount of a lump sum grant will increase the expenditure on a specific service (good Q) less than the open-ended matching grant. This explains why an open-ended matching grant is preferred to an equal amount of lump-sum grant by the grantor government, if the government wants a certain level of specific service Q to be provided.

In the case of a closed-ended matching grant received by an individual's jurisdiction, the individual faces the budget line depending on the ceiling point. The matching rate is similar to the open-ended grant type up to the spending level of Q_2, and beyond the units of Q_2 there is no matching grant offered ($s=0$): the individual's budget constraint is shifted to AKE. Point K is at kink point that shows the closure point (ceiling) beyond which no additional grant is payable, and for extra spending on good Q, the tax price for the consumer is the same as before. Beyond the bundle K, the budget constraint is parallel to the original budget constraint with no grant. On the left of point K, the individual does not benefit from the closed-ended matching grant at its maximum, and hence utility-maximising quantity is less than Q_2. If the utility maximising bundle is on the right of closure point K, or greater than the amount of Q_2, then the grant has the characteristic of a lump-sum grant.

The effect of grants (G) on the recipient local government's spending (E) depends on whether intergovernmental grants alter only the income constraint or that plus the relative prices of public goods. Prior to empirical research, it is expected that price changes (via open-ended matching grant) will stimulate greater changes in consumption (government expenditure) than equivalent changes in income (or equal

size lump sum grant[13]). The only firm prediction of the model is that for any particular type of good, the expenditure effect of grant, $\partial E/\partial G$, will be greatest for open-ended specific matching grants, less for closed ended specific grants, and smallest for general lump sum grants.

We now turn to explain the design of a system of intergovernmental government grants. Our main concern here is with the design of a grant to achieve fiscal equalisation aimed by the central governments to make sure citizens in different regions and localities have access to a certain minimum/the same level of publicly provided services. To this end, we will explain the equalisation process in the following section.

2.5. The Equalisation Process

Equalisation transfers are intergovernmental transfers whose purpose is to reduce horizontal and vertical fiscal imbalance (disparities), partially or fully, within a country. There is a clear difference between horizontal imbalance and vertical imbalance. A vertical imbalance occurs where the revenues and expenditures of different levels of government (municipalities and central government) within a country are unequal. A horizontal imbalance occurs when the fiscal capacities and expenditure needs of different subnational governments of the same level, such as municipalities in a unitary country, or states in a federal country, differ. Central government corrects these imbalances by using grants. A grant should cover the gap between the objectively assessed locality's expenditure needs and revenue capacities. The first part of the following section gives an analytical description of the equalisation process. Then the second section takes up the issues related to assessment of local expenditure need and revenue capacity.

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[13] Where equal size is defined to mean a lump-sum grant large enough to allow the government the same expenditure as selected with matching grant (see Fisher 1996).

2.5.1. A general formulation of equalisation grant

The implications of an equalisation grant system can be examined within a general framework for the assessment of grants. Early literature on the equalisation of local governments' fiscal positions includes Musgrave (1977), LeGrand (1971, 1975), King (1980, 1984), Mathews (1974, 1980). The recent literature includes Dahlby and Wilson (1994), Ladd and Yinger (1994), Srivastava and Aggarwal (1994), Ahmad and Thomas (1997), and Duncombe and Yinger (1998). If central government's underlying objective for the intergovernmental transfer mechanism is to provide an equal access to local provision at a similar level of revenue raising capacity, then the objective of a grant to local units would be to address any imbalance between the locality's expenditure needs and revenue capacities. Let G_i be the grant for local unit i, E_i the standardised expenditure for locality i, and R_i the standardised revenue for locality i. Then,

$$G_i = E_i - R_i \qquad\qquad i = 1,2,\ldots,n \qquad\qquad (2.1)$$

R_i is a measure of the potential revenue of locality i given the J tax bases (B) assigned to it. If N_i is locality i's population, B^j_i is the jth per capita tax base for locality i, and t^{*j} is the desired tax rate for base j, then, the potential revenue of locality i is:

$$R_i = N_i \sum_{j=1}^{J} t^{*j} B_i^j \qquad\qquad (2.2)$$

E_i could be obtained by adjusting the desired level of per capita consumption (the equalisation standard) in each expenditure category k, $(c^k Q^k)$, for needs (γ) and cost (δ) factors:

$$E_i = N_i \sum_{k=1}^{K} \gamma_i^k \delta_i^k c^k Q^k \qquad\qquad (2.3)$$

Here Q^k is the desired level of per capita provision of category k, c^k is the unit cost of category k. Suppose there are F need factors. Let $f^i \equiv (f_1^i,\ldots,f_F^i)$ indicate individual i's levels of need with respect to these factors. Then, the adjustment of demand factors to desired levels of expenditure needs ($c^k Q^k$) could take the following general form:

$$\gamma_i^k = \gamma^k\left(f_1^i,....,f_F^i\right)$$

Here, γ_i^k is the ith local unit's relative needs factor disability from the average need factor disability measured for category k; and $\delta_i^k = \delta^k\left(h_1^i,...., h_H^i\right)$ i.e. relative cost factor disability from the average cost factor disability in expenditure category k, and h is H-number of cost factors used to evaluate disability for kth expenditure category. We also assume that $\dfrac{\left(\sum_i^n \gamma_i^k\right)}{n} = 1$ and $\dfrac{\left(\sum_i^n \delta_i^k\right)}{n} = 1$. For example in Australia, the factor-based approach (FAM) is an approach where the standardised expenditure for state i for category k is calculated by applying its disability factors (γ and δ) to the Australian average (or standard) expenditure. The state or local expenditure disability factor is assumed to correct for the disadvantages that some states may face in the provision of public services. FAM is used to incorporate 'independent' demand or cost elements. For example in hospital services, there could be two demand factors: f_1 is the percent of teenage boys and f_2 is the percent of female patients. Also, there is a requirement for obtaining the data to attach relative weights to each subgroup. For example, we could let ω_1 and ω_2 represent the number of bed nights per year per thousand teenage boys and female patients (Ahmad and Thomas 1997). In this case, adjustments for demand factors for ith-state become:

$$\gamma_i^{hospital} = \frac{\left(\omega_1^i f_1^i + \omega_2^i f_2^i\right)}{\varpi} \text{ and } \varpi = \frac{\sum_i^n\left(\omega_1^i f_1^i + \omega_2^i f_2^i\right)}{n}$$

Here γ_i, therefore, represents a state's relative factor disability from the average disability for hospital services. A grant to close vertical and horizontal gaps (i.e. full equalisation grant) can be found by subsequent substitution of (2.2) and (2.3) into (2.1), which gives us the following lump sum transfer to correct for the differences in both revenue capacity and need between localities:

$$G_i = N_i\left(\sum_{k=1}^{K} \gamma_i^k \delta_i^k c^k Q^k - \sum_{i=1}^{J} t^{*j} B_i^j\right) \tag{2.4}$$

The first term in the RHS of equation indicates the desired level of per capita local expenditure. The desired level could be the national average of per capita expenditures. The second term is the desired per capita revenue-capacity of a locality, which can be obtained by applying a uniform tax rate (t^{*j}) to the actual tax base of the locality. If a locality's expenditure and revenue are equal to the central government desired level of local expenditure, a locality's entitlement for an equalisation grant is zero, given the average need and cost disability factors. In the formula above, we could end up with negative grants where $E_i < R_i$. Applying the desired tax rate to the actual tax base of a locality, which has a per capita tax base above the national standard, results in revenue that is greater than the standardised expenditure. However, in reality, the use of a negative grant (or penalty system) is not practically applicable.

Suppose that there are some choices available to local government with respect to the level of service (Q_i) and level of tax effort required. In this case, for category k, per capita actual expenditures of the locality $(c^k Q^k_i)$ will deviate from the uniform per capita expenditure $(c^k Q^k)$. Assume that a locality can influence its tax system, and it can vary the rate t^j_i on base j. Any remaining deviations[14] from the standardised expenditure have to be financed from the locality's own revenue. If the locality's tax effort is lower, so its demand for a deviation from the average expenditure will also be lower.

2.5.2. Practical issues

A full equalisation procedure involves three steps: (i) assessing the overall revenue raising capacities of municipalities (the second term in equation (2.4)); (ii) the assessment of the expenditure needs (the first term in equation (2.4)); (iii) the calculation of the total amount of transfers to local authorities (left hand side of equation (2.4)). Partial equalisation uses only one of the first two steps because the amount of grant to allocate is fixed ex-ante.

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[14] i.e. locally preferred provision

To define and calculate the concept of 'local fiscal capacity', or revenue-raising capacity, is the first variant of the problem in designing a proper system of equalisation in order to reduce (or to target) horizontal fiscal capacity differential. For example, in the US, fiscal capacity is defined by the Advisory Commission on Intergovernmental Relations (ACIR) as the capability of a governmental unit to finance its public services (see ACIR 1982, 1990). The local fiscal capacity is generally defined as the amount of revenue generated from the locality's own tax bases by applying the given local tax rate (or average tax rate). There are various issues discussed in the equalisation process: revenue coverage and range of revenues (i.e. are all taxes to be included or not?); revenue classification (if all revenue sources are chosen, a separate source for each kind of tax would allow us to show each locality's entitlement for each type of tax); and tax base definition. If the tax base is the same for all local government, because it is centrally administered at a common rate, there should not be a problem with using it (Clark, 1997).

Equalisation is usually put into effect through a differential per capita distribution of unconditional funds from the central government to the local governments. In the case of equalisation in expenditure needs, the distribution could be based on the calculation of demand and cost disability measures, as in Australia. The needs can be defined as factors that give rise to different levels of per capita expenditure to achieve the same objective. There are two influences on the needs: the demand influences and cost influences. The potential problem with the use of these influences on needs is the availability of information to measure the needs. In practice, the indicators for measuring demand needs are possibly more easier to obtain than that for measuring cost needs.

In the "demand" approach to needs, the outcome of the assessment process is based on a per capita relativity relating to the whole population of localities. In this approach, the relevant population should be identified for each service assessed. This is, in a sense, similar to the client group approach used in England. Here the relevant population refers to the number of units able to demand service. The composition of the population, such as different age and sex distributions, may influence the expenditure needs.

In the "cost-based" approach to needs, there are some factors which may affect the relative costs of local government's specific service (e.g. sparsity of population, input cost, administrative scale and demographic factors). Typically, the fuel cost of a fire engine is higher in a more dispersed population. Factors that are outside the control of local government unit, it is suggested, may be taken as a need factor (see LeGrand (1975) and Bradbury et al (1984)) since they (the uncontrollable or involuntary factors) result in a requirement for different levels of per capita local expenditure to achieve the same objective.

The first step toward setting up an equalisation system is to define which local services are to be equalised. In principle, the equalisation mechanism should cover the full range of activities of the relevant levels of government, as in England. However, the main limitation of such a comprehensive equalisation is due to practical considerations such as lack of the necessary statistics. One alternative to assess the expenditure needs is an equal per capita method, which is applied because of the lack of information. The basic assumption is that the costs of service provision do not vary between localities. Hence, there are no differential needs for the local service. The assessment system relates the standard (country average) per capita expenditure to each locality's per capita expenditure. The resulting gap between average per capita expenditure and a locality's per capita expenditure is equalised by a system of a grant.

Another alternative is the actual per capita method. It considers the locality's actual spending on the local service as an accurate reflection of its relative needs. This method assumes that there are no policy or efficiency differences between the localities, and disabilities are the only reason for differences in actual revenue or expenditure (see Rye and Searle, 1997a,b). Standardised expenditure for each local government is equated to its actual expenditure[15]. So, the gap between actual revenue and expenditure is equalised by a grant. There are two major problems with this method.[16] The first of these relates to the efficiency of the municipalities. That is,

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[15] Note that past expenditure level serves a proxy for relative needs.
[16] See Davey (1983).

even if all municipalities aim to provide similar levels of service, actual municipal spending may still vary because of the differences in efficiency. As a result, the same amount of expenditure would not necessarily provide the same level or quality of service. Secondly, the current level of expenditure varies widely across municipalities because of historical developments, and /or because of differences in the fiscal capacity of the regions, rather than because of any objective assessment or comparison of local needs. There are, thus, some inherited differences in the spending levels of local governments which create a problem in identifying the real needy municipalities. An allocation system which is based on this method, would, in the long run, create further imbalances and even widen the existing disparities. This method can easily be dismissed because it does not differentiate between objective spending needs and those caused by political choices, historical factors and efficiency differences.

It is difficult to implement a comprehensive system of expenditure needs assessments in a short time. For example, such a comprehensive system took more than 60 years for Australia, and hence an approach that is more modest could be applied at first (Rye and Searle 1997a). One alternative approach could be the use of major need categories. Major needs categories are identified at first and combined in a formula, with weight attached to them in the distribution of grants among local governments. Another partial equalisation includes the equalisation to only poorer municipalities. This method targets only localities facing particular fiscal difficulties, or where public services fall well short of national standards. In this case, a standard set could be based on the fiscal conditions in the richer localities. For example, the standard spending level can be defined as the level of spending for services provided by the more prosperous local governments.

There are some other practical problems, such as institutional and data problems, that are related to assess the extent of equalising grant. The institutional arrangements of an equalisation system vary with the design of the grant programme. There are two sequential aspects of any fiscal equalisation programme. One is the determination of *how much* is to be transferred and the second one is *how* to distribute the total among the recipients. In the Turkish case, the amount to be distributed is agreed ex-ante.

Thus, we cannot achieve full equalisation. How to distribute is related to the collection of the data. Depending upon the design of the grant system, such as revenue equalising and/or needs-based equalisation, we need the data on the actual expenditures and actual revenue.

Rye and Searle (1997a) argue that the available data can be used in the assessment process as long as they are relevant, comparable, reliable and free of differential influence. We can have some idea of what cost influences are operating in local service provision but usually we do not have the data to measure the impact of such cost influences as population density (ratio of population to area size)[17] and diseconomies of scale. Therefore, data on differences in cost structure are much more difficult to obtain than data on differences in demand. Hence, cost disability factors are more difficult to assess as compared with demand needs factors.

One of the objectives with the design of the grant system is that the development of the equalisation system should ensure that it is policy-neutral. Grant design inefficiency arises if the grant programmes allow the recipient to manipulate grant shares by changing policies. This grant design inefficiency partly explains the use of neutral measures of expenditure needs that are uncontrollable by the recipients. In the next section, we examine the studies of local government expenditure determination.

2.6. The Determinants of Local Expenditure

This section is devoted to the review of literature on the determinants of local government expenditure. It also addresses the empirical works that have explored any systematic patterns of relationship between local expenditure and economic, financial, social, administrative and other factors such as demographic factors. Studies of determinants of local expenditure are relevant to this thesis because, at first, many studies explored the empirical effect of grants. Secondly, they were concerned with theories or models of local government choice, and hence the predictions from these studies are directly relevant to the design of grant systems to

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[17] or population sparsity (ratio of area size to population).

achieve specified ends. Also, although there was not a clear definition of the term 'standard' service/expenditure, it was based on the actual expenditures of local governments. This explains partly the intention for learning from expenditure determinants studies which explain what systematic patterns of influence are likely to be built into such an approach to fiscal equalisation grants.

The difficulty in finding data on both the output and the price per unit of the public goods has prevented the wide-scale use of the supply relationships in empirical work. Research on public sector costs, therefore, has lagged behind demand studies (with a few exceptions: for instance, the recent studies by Baum (1986) and Craig (1987)). The literature on public sector costs tries to shed light on issues such as metropolitan consolidation, the impact of public union on expenditures, and socio-economic factors affecting public production costs (Duncombe 1996, p45).

It is worth noting that there are important distinctions for many public services between the direct output (i.e. activities of government) and the final output. Government activities are an intermediate output in the production of the final output to the public. The distinction between the two is important because exogenous 'environmental' factors influence the transformation of intermediate output into the final output. For example, two municipalities of the same size may use the same technology and level of resources for fire protection, but experience significant differences in property losses and casualties owing to differences in the building conditions and population density.

Owing to data problems, the use of local expenditures[18] as a proxy for demand for public services has been widely used (with a few exceptions)[19]. Economies of scale, particularly, received great attention in the area of public cost research because, as

[18] Government expenditure is, in fact, an evaluation of the intermediate inputs used to produce the desired outputs.

[19] An alternative to the expenditure proxy for output is public employment. For instance, Bahl et al (1980) and Ehrenberg (1973) used data on public employees, while Baum (1986) estimated the demand for test scores to represent the demand for the final service provided by public education. Chapman, Hirsch and Sonenblum (1975) estimated the determinants of a crime function as a proxy for the demand for police services. While population was used as a proxy for output by early cost studies, it ignored quality differences across governments and the important role of socio-economic factors (environmental factors) on costs.

Duncombe (1996, p42) pointed out, the existence of economies of scale has been used as evidence in the debate over metropolitan consolidation and service reorganisation. Several studies have examined the relationship between costs and some measure of the intermediate government outputs[20]. The earliest research on economies of scale used a simple linear cost function with a quadratic term to allow for a U-shaped average cost curve (Hirsch 1965). More recently, studies have employed more flexible cost functions (e.g. translog function) that place fewer restrictions on the nature of production technology (see Jimenez 1986). Empirical estimates of economies of scale have been carried out for garbage (Hirsch 1965 and Stevens 1978); police (Walzer 1972 and Gyimah-Brempong 1987), rural roads (Deller et al 1988), hospitals (Cowing and Holtzman 1983), fire (Ahlbrandt, 1973), Duncombe and Yinger, 1993), water (Kim and Clarke 1987, 1988) and education (Fox 1981; Kumar 1983; Jimenez 1986 and Duncombe et al 1995). The results of these studies are mixed. Even for the same public service, some studies found constant scale and some a U-shaped cost function. There is, however, some evidence of economies of scale for low levels of output for garbage collection, police, fire and non-residential water services.

The consideration of the influence of socio-economic characteristics (or environmental factors) on the cost of public services is one of the crucial differences between public and private sector production. In public sector cost models, the framework of Bradford et al (1969) has consistently been adopted by systematically including environmental variables in cost variables. The impact of environmental factors on costs has been empirically researched with respect to the police (Gyimah-Brempong, 1989), fire protection (Duncombe (1992) and Duncombe and Yinger 1993), and education (Gyimah-Brempong and Gyapong 1991 and Downes and Pogue 1994). Ladd and Yinger (1989) analysed environmental factors affecting expenditure for the fire, police and general municipal services. The results indicate that building conditions, industrial property and population density have an important impact on fire protection costs.

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[20] We might expect technical economies of scale for public utilities, such as water and sewer system,

2.6.1. Local Collective Choice

To analyse the grant effect on local expenditure, the problem of collective choice, which is also the crucial stage in constructing models for local government expenditure or service outputs, needs to be addressed. Four main approaches to local collective choices were addressed in the literature (see Bahl et al (1980) and Bramley (1990)): (i) voting models, particularly the 'median voter'; (ii) dominant party (or interest group) models; (iii) bureaucratic preference /politics models; (iv) passive response to 'need as demand'.

Voting models in general, and the median voter in particular, derive from Black (1948) through Downs (1957), and Buchanan and Tullock (1962). Local government expenditure studies were begun by Barr and Davies (1966) and continued with Bradford and Oates (1971), Borcherding and Deacon (1972), and Bergstrom and Goodman (1973). In the model, individual preferences are linked straightforwardly to collective choice. For a single issue,[21] individual voters are assumed to have a preferred value, based on utility maximisation subject to budget constraint. Accordingly, under the ideal conditions of democracy and perfect information, individual preferred values can be ranked and the local government budgetary proposal to secure a majority vote will correspond to the preferences of the median voter. However, the median voter model would fail if allowances are made for multiple issues and logrolling. In general, local governments decide over a wide range of issues simultaneously. Moreover, there are several methodological problems in using the model with the objective of estimating 'tax-price' and income elasticities of demand for local public goods. The main problems are the identification of the median voter, the use of expenditures as a proxy for the quantity of good demanded, and the specification of the tax-price variable. Most importantly, the institutional

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since they require a large fixed capital investment.

[21] e.g. the level of spending on education (i.e. the majority of data used for since local governments in the U.S. and other federal countries are obliged to provide education service) and individual's tax share/ tax rate.

framework within which most local governments behave is far from the assumptions of the model (see Romer and Rosenthal (1979a,b, 1980)).

The alternative to voting models is the dominant party model (Inman, 1979) or group model (Gramlich and Galper 1973). In dominant party models, it is assumed that policy is determined by a stable coalition of interests which are held together by patronage, ideology or other factors, which could also include the potential economic and social power of key groups (Lukes, 1974; Bachrach and Baraz, 1970). As far as the dominant group holds the power, decisions may be expected to be consistent and could be modelled 'as if' there was single decision-maker with a particular set of preferences (as in Wilde, 1968). This model, however, may exert biases relative to real (median) individuals' preferences: for example, in favour of higher expenditure (Inman, 1979). When the dominant group changes (e.g. after elections) or differs between localities, modelling procedure needs a little care for labelling the dominant groups by, for example in an empirical estimation, a variable for political party control or a share of politicians' seats in regression models (Ashford et al. 1976; Jackman and Sellars, 1977; Jackman and Pappadachi, 1981).

In the bureaucratic behaviour model put forward by Niskanen (1968, 1971, 1972) and developed by Breton and Wintrobe (1975), local government bureaucracy is regarded as the permanent dominant group. The bureaucratic preference model stems from the fact that the output of local government is more than voter expectations. The model assumes that the bureaucracy exploits its monopoly position through the selective use of information and then produces public services in pursuit of 'budget maximisation', to an extent greater than voters would otherwise have wanted (Wyckoff 1988a,b, 1991). According to Niskanen, the bureau expands the size of the budget up to the point where marginal benefits are less than marginal costs. As a consequence, the general effect of bureaucratic behaviour would be an increase in the overall size of the public budget. While Niskanen's model may be too simplistic (Jackson, 1982), few would deny that bureaucracies influence decision-making.

'Need as demand' is a different approach to local choice. It treats local government as a passive responder to local people's needs (Bramley, 1990). This model is implicit in

some of the work stressing environmental influences, and, more especially, the direct use of expenditure determinant models as the basis for the grant distribution to local governments (Jackman and Sellars, 1977; Rhodes and Bailey, 1979). One outcome from the expressed demand is that it is a sound basis for normative need judgements. Another outcome is that it is translated into service provision and expenditure. In the 'need as demand' approach, the number of eligible clients presenting themselves has to be accepted simultaneously as a measure of need and a measure of effective demand (e.g. compulsory education, housing benefit).

2.6.2. Statistical modelling issues

It follows from the discussion above that statistical models of local expenditure are open to a variety of interpretations. Economic approaches to local government behaviour tend to involve the maximisation of utility, whether of an individual voter or collective. But there is a variation in the form of utility function used. This is partly because of the need to avoid restrictions incompatible with the underlying theory. The Cobb-Douglas function is convenient if restrictive, and is employed by Borcherding and Deacon (1972) and Bergstrom and Goodman (1973) and other derivative papers (e.g. Pack and Pack 1976; Clotfelter 1976, Deacon (1978), Pommerehne and Frey (1976), Pommerehne (1978), Turnbull (1985), Turnbull and Djoundourian (1992), Heyndels and Solders (1994), and Ahmed and Greene (2000)[22] among others). The Stone-Geary function has also been used by many analysts as a way of recognising 'committed expenditures' (i.e. incrementalism) following the development of Eastwood's (1978) 'linear expenditure system' and features in Jackman and Pappadachi (1981), Cuthberson et al. 1981, Bennett (1984), Barnett et al (1991), and Duncan and Smith (1995).

Wildasky (1974) argued that budgeting decisions are incremental to the extent that they result in marginal changes in expenditure. The budgetary decision in public sector is dominated by incrementalism. It suggests that policy makers use 'rules of

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[22] Ahmed and Greene (2000) test the power of the median model against the respective strength of other alternate models based on redistributive, political-institutional, and interest group theories in explaining the demand for public spending in New York State counties. They found that the influence of interest groups could indeed be important in explaining the size of local governments.

thumb' in order to deal with the technical and political complexity of expenditure decisions. Ehrenberg (1973), Danziger (1978), Alt (1977), Hoggart (1983), Sharpe and Newton (1984), and Boyne and et al (2000) have studied the role of incrementalism in local expenditure decisions.

The 'determinants' study of local-government expenditures has been a concern of empirical researches in which the typical determinants study uses regression models to explain lower-level government expenditures. In these studies[23], generally based on US data, population density, urbanisation and federal grants have been used as independent variables. The budgetary effect of intergovernmental grants has been initiated by early determinant studies as a subject for empirical research. Much of the local government expenditure studies are cross sectional: one fundamental reason for this method is ready availability of a large data set. Also, cross-sectional analysis is more appropriate in terms of picking up the effects of variation in needs, in wealth, in environmental factors, and in some types of political influences.

2.6.3. Empirical Results and Types of Influence

In the literature, many types of influence on local government expenditure are related to politics, income/wealth, demographic factors, need, costs, the tax base, tax price, and intergovernmental grants. The literature on political science and environmental traditions, led by Dye (1976), argues that politics do not have much independent effect. Bramley argues that Dye's conclusion seemed to be more valid for the U.S than for Britain because, in Britain, politics have a sharper division along class and ideological lines. For example, Boaden (1971), Newton and Sharpe (1977), Jackman and Sellars (1977), and Sharpe (1981) found that Labour councils spend more on education and housing (but less on other services like roads and police) and Conservative councils are generally more strongly associated with service expenditures. Duncan and Smith (1995) also found the Labour Party is an important element of local expenditure. Hansen (1981) found that political variables exert a

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[23] Since Brazer (1959) and Kurnow (1963), the econometric studies of grant effect in determining state or local expenditures have been explored in the literature. See Fisher (1964), Sacks and Harris (1964), Adams (1966), Bahl and Saunder's (1965), Osman's (1966), Sharkansky (1967), Smith (1968), Pogue and Sgontz (1968), Henderson (1968) for early determinant studies.

direct independent impact on policy output (i.e. expenditure) in Norwegian municipalities.

Almost all studies have found a positive and significant influence of income /wealth on local expenditures. Exceptions include Pack and Pack (1978), Bennett (1984), Hewitt (1987), Islam and Choudhury (1989, 1990), Islam (1998), and Baker et al (1999). The income coefficient from the log-linear regression results is related to the income elasticity of demand for a particular local service or total local expenditure. Tax price is constructed as the median (mean) voter's house value over total house value within the locality, assuming proportional property taxation. Some authors used the ratio of tax revenue to total tax revenue as a tax price (e.g. McMillan et al (1981)). The coefficient of this variable is related to the price effect on consumer (voter) demand for the local public good, which is generally found to be price inelastic.

Another of the most common variables is related to the demographic factors such as population and/or composition of population. It is a basic need factor increasing the local expenditure requirement for a given service - i.e., more output/a higher service level is required to meet the local needs. However, population size is also used to estimate the scale economies. As a matter of fact, an increase in population leads to a decrease in the local taxpayers' share of the tax price. This is the 'group size' effect discussed by Litvack and Oates (1970). As a result, a negative coefficient on the population variable indicates that a possible price reduction will be embodied in the population variable. This is interpreted as saying that an increase in city size will result in a reduction in the tax price of the individual and, hence, a decrease in the local expenditure on public goods, assuming that demand is price inelastic. On the other hand, for local goods, a densely populated area will face the congestion cost: i.e. at some point the congestion cost will offset the reduction in tax price and, hence, cause an increase in cost and the level of local expenditure (assuming that the demand for the local publicly provided good is price inelastic). This leads us to expect a positive coefficient for the population variable.

In the literature, empirical studies have assumed constant returns to scale in local provision. The classical median voter model used a decreasing marginal congestion

specification and reached a 'privateness' result about the characteristics of the local good. For example, studies by Bergstrom and Goodman (1973), Borcherding and Deacon (1972), and Pack and Pack (1978) (among others) stress the effect of a congestion parameter on the local good that varies with the degree of publicness. Technology has been embodied in the production of good (q) by assuming publicness or privateness characteristics of local public good Q: $q = Q/N^{\gamma}$ where γ defines the publicness/ privateness characteristics of good, or it is a crowding (congestion) parameter. N is local people sharing the good[24].

The composition of the population (demographic factors) is included in the expenditure analysis because the need category is measured by including social indicators such as the composition of children and the elderly. These are often referred to as an age-based potential client group for a particular local service. The estimated coefficients of need variables, included in determining local expenditure, have been used for a grant distribution formula as a weight factor (e.g. in England prior to the Rate Support Grant system introduced in 1980-1981, a regression based estimate of distribution was used).

Geographical variables such as population density have been used for picking up the effect of cost differentials. However, these variables are not explained in detail in many studies. The most difficult variable to include in the local expenditure studies is that of cost. It is difficult to include in the estimations given the lack of such data. In the determinants of the cost of local government, the scale factor, geography, input prices, the available capital stock and efficiency all play important roles. Scale is correlated with jurisdiction /local authority size, city size (population), density/intensity of settlement at the jurisdiction level. The ease of administration and co-ordination, and the use of specialised staff at the jurisdiction level may lead to

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[24] The parameter γ measures the existence of substantial scale economies provided that its value approaches zero, because, in larger cities, municipal costs could be shared among more residents. If the value of the parameter were nearly one, the benefit from public goods could decline because of congestion, and this may even balance the earned gains from cost reduction. If $\gamma \geq 1$, sharing the public services among more residents countervails the advantage of sharing the cost of local public goods and services among more residents. See Brueckner (1981), Craig (1987) and Edwards (1990) for alternative methods for estimating the 'publicness' of local public services.

scale economies even though these account for a small part of total outlay. City size may relate to diseconomies of scale in that a large city may be more congested (technical diseconomy) or have better infrastructure (technical economy), higher wages and property values or lower prices for goods and services. Thus, it is hard to give an *a priori* sign on this variable. Density is generally interrelated with local population size and in some services (e.g. schools) with unit size. Thus, while picking up the effect of density/sparsity on cost, great care is needed in interpreting the regression results. The next section reviews the empirical literature of the effect of intergovernmental grants on local government spending.

2.7. The Empirical Literature on Grant Effect

The vast body of the local expenditure determinant studies has studied the effects of grants on local government expenditures. Grant effects have been analysed in the context of local decision making process. The studies by Scott (1952), Wilde (1968), Bradford and Oates (1971) and Oates (1972) have taken the initiative in the development of modelling grant response. The distinction between lump-sum grant and matching grants has been stressed. As the previous section explains, lump sum grants are seen as having only an income effect and may result in lowering local taxes and /or be spent on other services. Matching grants, on the other hand, alter the price of the good that is being subsidised and encourage local government spending on the grant-related services. Later, empirical analyses concentrated on the grant effect in the flypaper effect framework. Next section will focus on the issue of flypaper effect.

2.7.1. Empirical analysis of the flypaper effect

Early writers in the theory of public choice illustrated the relationship between the outcome of the electoral process and the demands of the median voter (see Black (1948) and Bowen (1944)). Later empirical analysts suggested that there is a significant relationship between a local government expenditure and its constituents' incomes and tax prices without considering intergovernmental grants (see Bergstrom and Goodman (1973), Borcherding and Deacon (1972)). At the same time, Bradford and Oates (1971) made the link between the approaches and soon the

intergovernmental grant literature was driven into the median voter framework. Later Gramlich and Galper (1973) developed an empirical approach to grants in a non-median voter framework. However, one prediction of the median voter model, derived by Bradford and Oates (1971), is rejected by Gramlich and Galper's empirical results. This prediction is that, under certain conditions of local decision making, a lump sum grant to a local government should have the same effect on local expenditure as a set of lump sum intergovernmental grants given to the individuals of the jurisdiction.

Suppose that residents of a local government receive a lump-sum grant, unaccompanied by any significant change in taxes or spending. This grant is equivalent to the same amount of income increase. Their consumption of local goods and services out of this increase "should be equivalent to the marginal propensity of local governments to spend out of income" (Hines and Thaler, 1995, p.218) see also Inman (1979), Fisher (1982) and Wyckoff (1988).

However, the reviews of the empirical literature by Gramlich (1977), Fisher (1982) Hines and Thaler (1995), and Bailey and Connoly (1998) indicate that lump-sum grants given to local government tend to stimulate a greater increase in local government expenditure than an equivalent increase in the personal income of the individuals who are part of the local community[25]. The empirical estimations unanimously concluded that the estimated effects of grant are not 5 to 10 per cent[26]. It was rather closer to 100 percent varying between 0.25 to 1.00[27]. This is termed as the flypaper effect: "Money sticks where it hits", namely, that even lump-sum grants tend to stick in the pocket of local government in the form of higher spending rather than being passed to the electorates in the form of lower taxes. In this aspect, the flypaper effect is essentially one additional and strong argument against the main prediction of the median voter model.

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[25] See also our literature review in Table 2.2 in Appendix A2.

[26] I.e. magnitudes of income effect.

[27] These were the earliest findings of Gramlich and Galper (1973) who studied the response of local government to federal grants basing their analysis on a budgetary model of behaviour. They found the grant coefficients 0.25 and 0.43. The coefficients on income (i.e. the current expenditure responses of an extra dollar of private income) were 0.049 and 0.1.

Numerous studies have investigated the actual effect of various types of intergovernmental grants to local governments in federalist countries. These studies were based on state, local government and smaller local government units such as school districts expenditure[28]. In unitary countries, the investigations focused on municipal government or country-specific local governments such as district-borough-provincial government[29]. We should emphasise that the results differ from each other in that some of them apply to different countries, which exert different institutional features and use different data and techniques. The majority of empirical studies rely on cross-sectional variation in grants received by different lower level governments (mainly state and local government)[30]. In the following section, we will state the possible explanations for the flypaper effect. These explanations can be categorised into two groups: individual confusion and analyst error, and they have been pursued in the empirical analysis of the flypaper effect. Grants, as one of the independent variables, have been used for different purpose in the estimations and, hence, the coefficient estimates are interpreted differently depending on the modelling.

2.7.2. Individual Confusions

The individual confusion approach is based on the public choice perspective and it utilises the median voter framework. Individual confusion occurs due to the voter's misperception of the tax price. Different types of confusion are hypothesised in the literature. These are explained as follows:

Fiscal illusion (price illusion): This approach is pursued by Courant et al (1979) and Oates (1979). Their main development is to show that a lump-sum grant given to a local authority might be expected to increase spending more than that predicted by conventional local fiscal theory. The argument is that the equivalence theorem is predicted not to hold because of fiscal illusion. They argue that grants reduce the

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[28] Almost all articles are based on America, Canada and Australia.

[29] See Cuthbertson et al (1981), Barnett et al (1991), and Preston and Ridge (1993, 1995) have done studies for England, Slack and Bird (1983) for Colombia.

[30] As can be seen from the summary of literature review, Table 2.2 Appendix A2, 10 out of 23 studies used the cross section data. 3 out of 23 used time-series data. One study used data generation and the remaining 9 studies combined cross-section and time series data.

average price of local public goods, and that the median voters in different localities base their decisions on this price rather than on the marginal tax price. One possibility for explaining the flypaper effect is that the voters make an error in the grant-receiving jurisdiction while calculating their income and the price of public goods. Voters (individuals) may confuse the actual and perceived effects of unconditional grants, and this confusion is responsible for the flypaper phenomenon. An unconditional lump-sum grant changes the average cost of local government spending, leaving marginal cost unaffected. However, if the voters believe that their marginal tax price is reduced, they react to unconditional grants by significantly increasing their demand for local government expenditure at this post grant, perceived to be lower, price.[31] Wyckoff (1991) empirically tested this model but did not find support.

Winer (1983) pursued the approach that grants might lead the voters to believe that their tax burden is being financed by other fiscal jurisdictions. Fiscal illusion occurs because of the separation of taxing (by federal government) and spending (by recipient) introduced by intergovernmental grants. Grants-in-aid (either conditional or unconditional) would reduce the tax price (the cost of additional local public services) in a way that the residents believe other localities finance some parts of the cost of local public services. For example, in the past, if the federal government collected 25% of its revenue within a recipient's jurisdiction, then each $1 of additional recipient expenditure (equally financed by unconditional grants) might have appeared to cost its own residents no more than $0.25. Thus, an increase in unconditional grants relative to its own tax revenues might result in a reduction in marginal tax prices and, hence, residents would demand more local public services at this new perceived price. This, in turn, results in increased public expenditure. Actually, the illusion occurs when voters do not see the fact that they are also being taxed to finance the grantor's aid to other local governments, which results in income decline. While income is reduced, the relative prices of goods are perceived to be lower (i.e. in the end, both effects leave income unchanged). Once again, income remains constant, but the demand for recipient government expenditure increases and the flypaper effect is explained. As empirical evidence to his hypothesis, Winer (1983) found

[31] See Barnett (1985) and Fisher (1996) for simple explanation of their model.

positive coefficients on grant variable in all estimations. He concluded that the separation created by federal grants reduced perceived-tax prices of grantor and increased provincial expenditures in Canada.

The general version of fiscal illusion that can explain the flypaper effect is found in Logan's (1986) work. Logan argues that although voters have incomplete information about federal tax and spending, they are still rational and perceive that federal taxes are rising but federal services are not, and, meantime, they perceive that state taxes are falling but state services increasing. Consequently, this misperceived tax price because of the grant would cause an upward bias of recipient expenditure, and a downward bias for non-aid federal government expenditures.

The voters do not see the link between the increase in federal taxes (to finance the grant) and the increase in state and local services. Instead, they perceive an increase in the price of federal services and a decrease in the price of the recipient government. This may cause voters to perceive their localities' services are cheaper, and, hence, increase the demand for local expenditures, whereas voters reduce their demand for federal government services because they become more expensive. Logan's suggestion is to include the finance side of the grant into the model. If there is fiscal illusion, federal non-aid expenditure will be negatively correlated with grant. That proves the reduction in recipient tax price. Because voters think that grant reduces local tax price, they demand more local public goods- giving rise to overspending by the recipient government. This explains why grant stimulates more local expenditure than expected. Hence, the flypaper effect is explained. Logan found a negative coefficient on the grant variable, −1.53 (in regression of per capita federal non-aid direct expenditure on per capita total federal aid). This result supported his hypothesis that the grant, while reducing perceived price of recipient government expenditure, also increases the price of grantor government expenditure and, hence, reduces federal direct expenditures.

In the same vein as Logan's argument, Hewitt (1986), Hammes and Wills (1987, for Canada) used an identical analysis[32] to detect the existence of the flypaper effect and found that there is a price illusory effect as the coefficient on grant aid (G) is negative, −1.93 and -1.33 for these two respective studies. A slightly different but similar argument embodied in the latest empirical studies and evidence is given by Dollery and Worthington (1995 for Australia) and Islam (1998 for Canada).

Grossman (1990) used a similar version of the fiscal illusion theory and argued that the federal grant will increase the demand for local expenditure more than a state grant increase because residents of the recipient government easily foresee the finance of state grants. That is, he expects that the impact of federal grants will be higher than state grants. Because of the higher coefficient of the federal grant variable than of the state grant variable, he concludes that the fiscal illusion effect is greater for federal grants than for state grants. This leads taxpayers to underestimate the cost of the intergovernmental grant, which is, in turn, a support for fiscal illusion.

Bureaucratic Approach: Voter ignorance may be accentuated by supply-side factors i.e. bureaucrat behaviour causes unexpected results (Romer and Rosenthal, (1979b); Filimon, Romer and Rosenthal, (1982); Dougon and Kenyon (1988); Wyckoff (1988b, 1989, 1991). The flypaper effect is consistent with the bureaucratic model of political decision making. In general, when institutional factors are taken into account, the impact of intergovernmental grants is different from the median voter model predictions.

Niskanen's model assumes that price elasticity of demand is greater than unity because the voter is assumed to be faced with an all-or-nothing choice. Firstly, because of this elastic demand, the budget maximising bureaucrats will reduce the price down to the level of costs and will want to maximise output. Secondly, a one dollar increase in a lump-sum grant will cause more than a one dollar increase in expenditure (see Wyckoff 1988a,b), King (1984, p107), Cullis and Jones (1998, p322)). If there is a misperception by voters that the receipt of a grant by local

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[32] They used similar reduced form expenditure function for grantor government. Parameters and variables are same as Logan's but in different notations.

government reduces the price of locally provided goods, bureaux have an incentive to engage in collaborative action to increase overall public expenditure i.e. bureaucrats exploit the fiscal illusion of voters to expand the budget (see Jones and Cullis (1994, p446), Cullis et al (1991)). Niskanen's theory suggests that a grant could lead a local government's budget to rise by the value of the grant or even by more. For this theory to explain the flypaper effect, it is sufficient to show that the effect of a rise in citizens' incomes could increase the budget by less than that rise (King (1984, p107) and Cullis and Jones (1998, p322)).

Wyckoff (1988b) finds evidence of the flypaper effect from a bureaucratic approach for capital expenditure. But in another attempt, he fails to find evidence for Filimon et al's argument. That is, if the intergovernmental grant must be eliminated from the price and income terms of the estimating equation, then \$1 of a grant increases the expenditure by \$1. However, as the grant coefficient is found to be less than 1, Wyckoff (1991) concluded that Flimon et al's specification is unlikely to occur. Heyndels and Smolders (1994) adopted the median voter model presented by Wyckoff (1988b, 1991) and ended up with support for the flypaper effect and against the view that the composition of income between grants and private income should not matter.

Preston and Ridge (1993, 1995) also argued that if the grant is invisible to tax payers, then the perception of marginal tax prices might be based on the average tax burden. If this is so, then a larger grant may lead to greater under-perception and larger effects on demand than can be accounted for solely in terms of an income effect (1995, p648). They preferred to separate out the two components of effective income (income and grant share) as ordinary individuals would have scant awareness of the extent of grant. They found the grant effect is positive and well above income effect. Thus, their finding supports a possible explanation of the flypaper effect, i.e. high grants obscure tax prices by reducing average tax prices and thereby lead individuals to underestimate marginal tax prices (1993, p13).

2.7.3. Analyst Error

Analyst error occurs due to a specification error made upon the budget constraint, variable misspecification (endogeneity), and a difference in functional form used in the expenditure equation. The argument here is that the actual result of money sticking where it hits is just an appearance. It would not be seen, if specification errors that researchers are making were controlled. Local governments, whose marginal propensity of spending is high, find themselves beyond the limited cap of matching grants. It is unlikely that additional spending would trigger matching grants, because the upper grant limit is already exhausted. One mistake continuously made is treating these situations as if the government in question receives unconditional grants, because the price of the matched public goods is unaffected at the margin (e.g. Gramlich and Galper (1973)). The problem with the treatment of these types of grants is that only high-spending governments will be considered as receiving lump-sum (unconditional) grants. For the other communities, there will still be a price effect as well as an income effect. The connection between greater spending and a lump-sum grant might be a result of this misspecification (Lankford 1987, Megdal 1987b).

The explanations by Moffitt (1984) and Megdal (1987b) of the cause of the flypaper effects are based on the econometric misspecification[33]. In an econometric estimation, analysts make a mistake while specifying the budget constraint, when it is essential to employ a non-linear estimation model while a linear estimation model is present. Moffitt (1984, 1986) argues that the flypaper effect in the AFDC programs (Aid to Families with Dependent Children) disappears when the econometrics are treated differently (i.e. make use of econometric technique that accounts for non-convexity in the programme)[34], and piece-wise budget constraint is included. Megdal (1987b) also concluded that OLS estimates lead to erroneous conclusions regarding the existence

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[33] In many areas a kinked budget constraint occurs, such as with progressive income tax, welfare programmes (which create a kink at the income eligibility point), federal grant-in-aid to states and localities (such matching grants are distributed according to the subsidy rates based on expenditure and revenue of recipient government). These constraints raise difficult estimation problems because the resulting consumer demand functions are themselves non-linear, changing abruptly at certain points (see Moffitt 1984, 1986) and Megdal (1987a,b).

[34] When he uses non-linear model of AFDC subsidy, the flypaper effect disappears as its parameter is almost equal to zero (1984, p295).

of the flypaper effect. Studies employing this technique, such as Wyckoff's (1991) found that the correction of econometric issues does not significantly alter the results and does not appear to 'fix' the flypaper effect. In fact, the coefficient on income variable increased from 1.3 to 2.7.

Moffit (1984, 1986) and Megdal (1987a,b) rightly pointed out the theoretically correct way to estimate the demand functions in the face of a closed-ended matching grant (piece-wise linear budget constraint), but their correction does not explain the flypaper effect. In addition, these authors are mistaken about the flypaper effect through a failure to recognise an important feature of the problem. That is, it is the lump-sum grant that is the cause of the flypaper effect not the closed-ended matching grant.

This so-called correct specification of the budget constraint has also been taken into account by Barnett, Levaggi and Smith (1991) while studying the flypaper effect in England. They have tested two rival models, the conventional model and 'the flypaper' model[35], using English data for the metropolitan district and shire county councils except London. Their results show that, in the majority of cases, the flypaper model outperforms the conventional model in its ability to explain the expenditure levels in any given fiscal year, and to predict future expenditure levels. Duncan and Smith (1995), while modelling local government budgetary choices under expenditure limitations in England, treated the grant as an endogenous variable and found that the level of central government grant is an important determinant of expenditure levels. They also noted that there is clear evidence of the flypaper effect, as the impact of central government grant on local government spending (0.596) appears to be greater than the impact of private income (0.014).

There are other misspecifications reported in the literature. These include failure to address simultaneous determination of grants and local spending (See Chernick, 1979 and Islam and Choudhury, 1989, 1990). Chernick (1979) concerns himself with the nature of the government grant process, and finds that the amount of aid received by

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[35] The conventional model emanates from Wilde (1968,1971). In the flypaper model, a piecewise linear budget constraint is specified instead of linear budget constraint.

localities depends on their tax effort and, presumably, on their expenditure because state and local governments would pursue a high expenditure level to qualify for receiving certain types of federal grant which are allocated on a discretionary basis. This suggests that the level of recipient expenditures influences the level of grants: another source of bias in estimating the flypaper effect because of the simultaneity of local expenditure and federal grants making decisions. Although this results in higher spending, it does not relate to the flypaper effect of unconditional grants like the federal revenue sharing grant.

Although there have been many econometric studies of local government fiscal response to intergovernmental grants in industrialised countries, there are, nevertheless, a few exceptions, such as Bahl and Pillai (1976), seeking to explain the local response to the grants in less developed countries (see Slack and Bird, 1983). Other exceptions include Slack and Bird (1983) who attempted to overcome the endogeneity of the grant system in their empirical estimation[36]. In the same line of research, Islam and Choudhury (1989, 1990) confirm that the failure to control for the endogeneity of grants yields an overestimate of the marginal expenditure effect of grants, suggesting a positive effect of local spending on grants. Their estimates[37] provide strong evidence in support of the flypaper effect of unconditional grants.

One type of specification error might arise due to the omission of important socio-economic variables such as education in the determinant of the local authority's expenditure function (or the demand equation) (Hamilton, 1983). The flypaper effect persists although population characteristics such as education levels are controlled for the purpose of estimation. For example, Wyckoff (1991) took account of Hamilton's suggestions, and included education levels as well as other variables such as sex, race, and unemployment level in the regression equation. However, the addition of socio-economic variables does not help to explain the flypaper effect because with the

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[36]They estimated following system of demand equations in general form for Colombia: $E=E(T,SF,GR,OR,P_a)$ assuming that tax allowance grants (SF) are endogenous to the model. They did not test the flypaper effect.

[37] Grants are considered endogenous in the municipal budgetary decision-making model so that they used 2SLS technique to obtain the consistent estimates of grant.

addition of the other variables in the model, the coefficient on the income variable has increased[38], not reduced. Hence, the model is unable to explain the flypaper effect.

Another category of specification error concerns the difference in expenditure equation which is derived from a different utility function such as the Stone-Geary, Translog, and the Cobb-Douglas. Slack (1980) tests the grant response of the budgetary decision of state and local government in Canada, using the Stone-Geary utility function and the Translog indirect utility function, which are used to derive expenditure demand equations. In both of the model estimations, a one-dollar increase in grant resulted in an increase in expenditure but by an amount substantively less than the amount of the grant. However, other parameters of the model (income and price elasticities), and the conditional grant are unclear depending on the choice of functional form. This supports Slack's argument that the lack of consensus in the literature on the expenditure response to grants results from the difference in the functional form used. In a similar vein, Becker (1996) estimated the expenditure equation in linear and logarithmic form, giving reference to the work of McGuire (1978) and Zampelli (1986) whose studies are similar except for differences in functional form[39]. McGuire, using a linear expenditure system, finds a significant flypaper effect while Zampelli, using a logarithmic expenditure system, finds no flypaper effect. Becker's specification tests indicated that the logarithmic form fits the data better than the linear form. She suggested that misspecification of the local expenditure equation is a source of the flypaper effect. The estimation of a functional form that is more linear than the true form yields inflated estimates of parameters. However, in both of the estimates, the grant effect is higher than the income effect even though functional differences inflate the bias.

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[38] The coefficient was first 1.491 and then by including extra variables it became 2.079.

[39] Originally, McGuire (1975, 1978) developed a model of local expenditure decisions where local officials are able to convert some fraction of conditional grant into pure fungible resources, and redefine budget categories. An unknown fraction of a conditional grant into fungible resources is approximated empirically. While McGuire estimates 70% of education aid to large US cities converted into fungible resources, Zampelli estimated that 40% -70% of federal grant for social and urban support services is converted into fungible resources.

2.8. Conclusion

Decentralisation is a mechanism by which the provision of certain public goods and services is made in accordance with the tastes and preferences of local people. But, left to their own instruments, local governments would fail to achieve an optimal allocation of society's resources. One way in which central government intervenes in local government expenditure is by intergovernmental grants which are transfers of funds from a higher level to a lower level of government. While grants are given to achieve certain government economic goals, some argue that they are given for political reasons. Grants are generally aimed at improving the distribution of welfare between areas. Because resources are distributed unevenly across regions in the country, each locality may not be able to satisfy the same proportion of its needs. The horizontal equity principle requires that individuals of similar means living in different local boundaries should be equally well off and not disadvantaged because of location preferences. Thus, one justification for grants is that they are given to achieve horizontal equalisation. A fiscal equalisation grant should take account of such factors as needs and fiscal capacity in order to reduce horizontal fiscal imbalances.

Early local expenditure studies analysed the grant effect within the framework of the determinant of local fiscal behaviour by using linear regression analysis. Studies of determinants of local expenditure are relevant to this thesis because the predictions from these studies are directly relevant to the design of grant systems to achieve government goals. It addresses the systematic patterns of influence which are likely to be built into such an approach to fiscal equalisation grants. Later, grant effects have been analysed in the context of local decision making. In attempting an economic evaluation of intergovernmental transfers, it has been instructive to review their type and effects because it helps to predict the lower government budgetary response to central government transfers. Hence, it can contribute much to the design of a grant system within the country. Moreover, distinction between lump sum grant and matching grant has been stressed.

The empirical literature in last two decades has analysed the grant effect in the median voter model framework. The empirical review of the grant effects is almost equivalent to a review of the empirical test of the flypaper effect. The flypaper effect will remain one of the strong arguments against the median voter model. In general, those who believe in the political process of decision making tend to believe that the flypaper effect must be due to the technical problems, not the deficiency of the model. However, if real life were as in the bureaucratic model, the flypaper effect would be compatible with the model of budget maximising bureau decision making (i.e. emphasising the importance of the bureau in the decision making process). The literature generally assumed that local government implements the policy formulated by the representative individual instantly. Time lags in adjusting the supply of local government services to the current demand conditions have been ignored in the previous studies. However, in reality, the supply response required to adjust the current demand conditions may take years because of bureaucratic sluggishness and the dynamic behaviour of local government expenditure. This issue will be examined in chapter 4 and the evidence from a dynamic estimation will be provided.

The next chapter will discuss fiscal federalism in Turkey. We will undertake a detailed legislative and fiscal analysis of the role of local government in Turkey. The importance of central government grant in the development of local government expenditure and in a decentralisation process is stressed. The next chapter provides a background to our empirical studies. It highlights the issues that justify the innovations which it is necessary to adopt in our empirical applications.

CHAPTER III
LOCAL GOVERNMENT SYSTEM IN TURKEY: BACKGROUND

In this chapter, we will discuss the Turkish fiscal federalism in detail. We will first present the local government structure in section 3.1. Section 3.2 gives a brief historical development of local government. In section 3.3, the functions assigned to municipal governments will be explained. In section 3.4, revenues of different level of governments are briefly presented. Section 3.5 considers a description of local government revenues and presents an analysis of municipal finances. Section 3.6 analyses the pattern and level of municipal expenditure. Section 3.7 concludes this chapter.

3.1. Structure of Government in Turkey

From the point of view of administrative division, Turkey can be regarded as a unitary country. For purposes of local government, it is divided into sixty-seven provinces (later 76 provinces), and further municipalities, special provincial administrations and villages.

A municipality is a local government unit that provides services related to local needs. It is local government in a modern sense in that the municipalities have local responsibility for expenditure and local people elect the governing bodies, the municipal council, the municipal executive committee and the mayor. Municipalities are further divided into three types of municipalities: metropolitan, ordinary and district. Depending upon the size of the population, each province may have a metropolitan municipality that has two-tier local governments consisting of a metropolitan municipality and zones with ordinary district municipal governments. For example, the larger cities like Istanbul, Ankara and Izmir have metropolitan municipalities. Each province is divided into zones called districts, each with their own municipal government.

Each province has a special provincial administration (SPA). A governor is the head of an SPA. He is responsible for the function of general public affairs within a province and is an agent of the central government. There are two other governing

bodies of the SPA: the provincial corporation and the permanent council of a province. The relations between central and SPAs stem from their formal constitutional position. In law, the duty of provincial councils is to administer policies, which are sometimes obligatory and sometimes discretionary. It might appear from this aspect that SPAs are simply the spending agents of the central government, and that discussion of local 'responsibility' for expenditures is irrelevant for them.

3.2. History of Local Governments in Turkey

After the republic of Turkey was proclaimed, new legislation for municipal revenue was passed in the parliament in 1924. The essence of this law was the introduction of income taxation. This practice, however, was abolished in 1929. The comprehensive municipality law dates back to 1930, but the law of Municipal Revenues, which came into effect in 1948, was the basis for the municipal revenues and expenditures.

The 1930s and 1940s were a one party administration period. Different political opinion and different priorities in the administration were almost non-existent. With the transition to a multi-party democracy in 1950, municipalities have played a pivotal role in local provision and their expenditures and revenues have grown parallel to population growth until 1960, even though this development was not apparent in all urban areas. Central government assistance to municipalities was an important factor in this development process. While the changes were taking place, municipalities faced inevitable problems with the new legislation in order to deliver basic municipal services after the1950s. Sometimes, due to the rapid change, these problems appeared with the old law in practice. As a result, neither system met the needs and demands of society or of the municipality.

After the 1950s, population concentrated in certain urban centres began to increase as a result of the Truman doctrine[1] and Marshall aid[2] to all developing countries.

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[1] The Truman doctrine was an American policy devised in order to gain allies for the West against the perceived threat from the Iron Curtain Countries.
[2] Marshall aid was a recovery plan after world war two by the US Secretary of State, developed under General Marshall, to regenerate WW2 ravaged societies and economies.

These changes in the international political arena led the population to migrate to urban areas being developed as a consequence of this foreign aid. This led to various and increased local demands for public goods, and hence accelerated municipal expenditure on communal services.

After 10 years of multiparty administration, democracy was interrupted by a military coup in 1960. As a result, urban development slowed down and municipal revenues per capita fell by 20% (Ersoy, 1992, p332). The new constitution, proclaimed in 1961, extended human rights and freedoms in general. In 1961, the State Planning Institute was established and, thereafter, the state entered the stage of economic planning. The period between 1960 and 1973 was a politically stable period. There was no political conflict at central and local levels because the same parties were in power at both levels. However, after 1973, different political parties held power at both central and local levels. This led central government to exert more control over local government.

Existing rules and regulations regarding municipal functions and revenues did not change much until 1980. No attempt was made to increase local autonomy both in the politics and in the financing of municipal services in order to increase the quantity and quality of services. Even though amendments to the property tax were attempted in order to increase municipal finance, they made no headway because central government continued to impose and collect property tax. It exerted control over municipalities and continued to allocate shares from these taxes in increasing amounts.

Turkey's democratic process was once again interrupted with the 1980 military coup. The military government replaced all elected municipal governing bodies, their mayors and the municipal councils. Many mayors were replaced by army officers. Local systems were restructured on strict bureaucratic and hierarchical lines. Although new legislation took account of municipal revenue shortages, it further helped the central government to exert more pressure on local government.

The characteristics of the new municipal legislation, implemented under the military regime until the election of the new municipal organs in 1984, can be described as

follows. The former municipality share of centrally collected taxes was replaced by an allocation of 5.5 % of the gross tax revenue. 80 % of this revenue was distributed to the municipalities according to the size of their populations. The remaining 20 % was given to the Ministry for Reconstruction and Resettlements and the Ministry for Internal Affairs. These became responsible for the apportionment of that share. This revenue system still exists but the tariffs have been increased. Municipalities were classified into five categories according to their population and stage of socio-economic development. Different tariff rates are applied to municipalities that are in different categories. Classification is the responsibility of the government, and so can be politicised at the discretion and interest of the political party in power.

Another aspect of the new legislation was the assignment of the basic infrastructure services such as electricity and national water supply to specialised government agencies. Tekeli, I (1982) argued that this amendment had a negative influence on low-income groups. Because a major source of municipality revenue came from electricity charges, this new law took away a major source of municipal revenue and prevented the financing of deficits created by public services such as mass transportation, which was heavily used by lower income groups.

After a three-year military administration, a general election was held in 1983 and local governments election in 1984. Some of the party leaders and Prime Minister were not allowed to enter the election by the military regime. Therefore, both elections ended with the victory of the Motherland Party (ANAP) that had been established in a short time by a group of politicians and bureaucrats. The ANAP united the right wing, democratic left, nationalist and liberal opinions under the policy of 'One Party Four Inclinations'. Its understanding of liberalism has turned Turkey towards the West, led export-led growth with trade liberalisation, and established a free market structure in the whole country. During 1984-1996, when a political vacuum existed in the country, local elected representatives were called upon to play an increasingly important role both in delivering civic services and in the development of their jurisdiction. ANAP was committed to the process of devolution of government functions in Turkey during its period in office from 1983 to 1991.

In 1984, new legislation increased the municipalities' share of central government tax revenue to 10.3 per cent. Furthermore, 3 % of the tax revenues collected in the provincial centre of the municipality were allotted to the metropolitan municipalities.[3] Figure 3.1 shows that, in real terms, municipal revenue increased by 50 per cent in 1985. In the same year, user-charge tariffs were increased almost ten-fold, with a new freedom to vary these charges. With the aim of reducing municipal dependence on central government transfers and of expanding the municipalities' own revenues, the collection of property taxation was also given to municipalities in 1985. In Figure 3.1, the further rises in total municipal revenues (Cons Rev) in real terms starting from 1985 can be seen. As a result, municipal spending in real terms (Cons Exp) has increased approximately four times between 1984 and 1996.

Figure 3.1
Municipal Expenditure and Revenue Growth
by Final Accounts 1980-1996
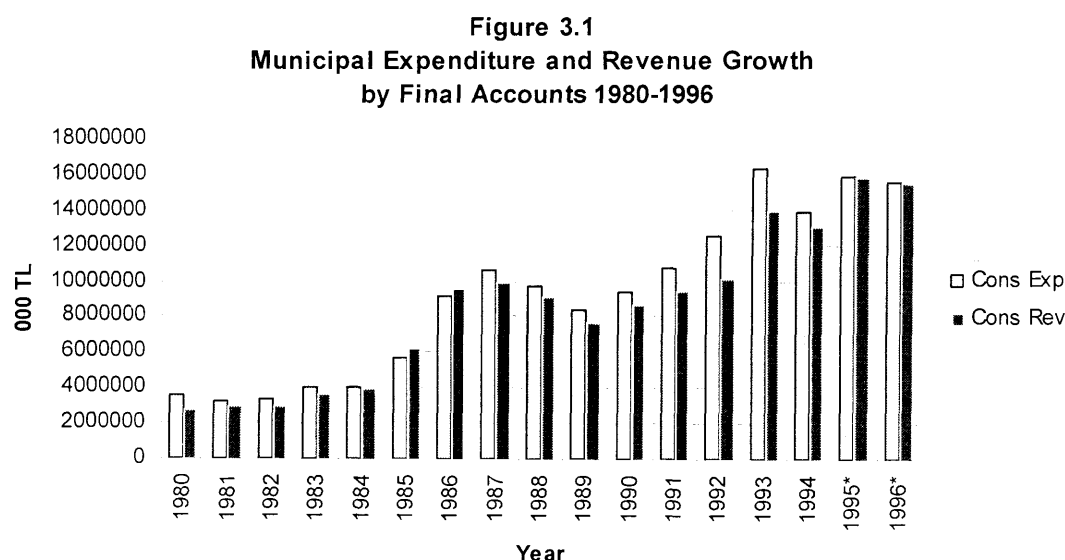
Recent attempts to strengthen local government in respect of its financial policies has been done by assigning new taxation powers to municipalities within their boundaries. Although the collection of an Environment Tax (ENT) has been given to them, there was no relaxation in the strict control of the central government in that the central government was authorised to set the amount of ENT.

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[3] Later this rate was increased to 5%.

The main pressure for decentralisation was driven by population growth, particularly in the cities (see Table 3.1). After 1980, there was a remarkable change in the urbanisation ratio. In 10 years, it increased from 43.9% to 59%. The rising population in the urban areas generated a demand for local public services that had been previously satisfied by central government, e.g. street lighting. Moreover, a change in political structure in urban areas (such as competition between political parties over governing a municipality) led local people to reveal their preferences for local public goods and services not merely in terms of their quantity but in order of the value they attached to them (e.g. choosing between transportation and a frequent waste collection service).

Table 3.1 Population Growth

Census year	Urbanisation (%)	Urban Population Growth Rate %	Rural Pop. Share	Rural Population Growth Rate (%)
1927	24.2	-	75.8	-
1935	23.5	1.7	76.5	2.2
1940	24.4	2.7	75.6	1.7
1945	24.9	1.5	75.1	0.9
1950	25.0	2.2	75.0	2.1
1955	28.8	5.6	71.2	1.7
1960	31.9	4.9	68.1	2.0
1965	34.4	4.0	65.6	1.7
1970	38.5	4.7	61.5	1.3
1975	41.8	4.2	58.2	1.4
1980	43.9	3.0	56.1	1.3
1985	53.0	6.3	47.0	-1.1
1990	59.0	4.3	41.0	-0.6

Source: Prepared from SIS (1994), *Statistical Indicators*, 1923-1992.

3.3. Legislative Allocation of Functions

We now turn to a detailed description of the functional responsibilities of local government under the present legislation. A comprehensive list of functions and responsibilities of mayors and municipal councils is included in the municipal ordinance. All municipal councils are supposed to provide civic amenities to the local citizens and are thus given fiscal powers to affect them. In the present system, the provincial and municipal governments essentially operate independently of each other even though there may be a possibility of overlapping functions.

Legislatively there is a formal allocation of functions among the different levels of government. Functions performed by municipal government in larger cities are extensive (see Table 3.2, and for metropolitan municipalities, see Table 3.2A in Appendix A3). These include such basic civic services as waste collection, water supply, sewerage, drainage, intra-city roads, street lighting, public transportation, fire fighting, parks and playgrounds, fruit markets etc. In the case of the smaller cities, the role of the municipalities is limited due to the more binding financial and institutional constraints. For example, some rural areas cannot perform social and cultural functions such as the provision of heritage protection, occupation courses, sport fields, assistance to the elderly and the young, and libraries.

Table 3.2 Legislative allocation of functions

Services	Installation	Maintenance and renew	Service responsibility
Basic Communal infrastructure services			
Roads and avenues	M	M	...
Sewerage	M(C)	M	...
Parks and cemeteries	M	M	M
Water supply	M,C,B	M,C,B	M,B
Electricity supply	C,B	C,B	C,B
Gas	M,B	M,B	M,B
Telephone	C,B	C,B	C,B
Basic Civic services			
Solid waste collection	M	M	M
Street cleaning	M	M	M
Fire protection	M	M	M
General police	...	...	C(M)
Traffic	C, B	M(C)	M.C
Public transportation	M,B	M.B	M,B
Cleaning and control	...	...	M
Construction services			
Master plan	...	...	M,C
Detailed plans	...	...	M(C)
Plan changes	...	...	M(C)
Construction licences	...	...	M(C)
Construction controls	...	...	M(C)
Construction programmes	...	...	M(C)
Economic services			
Fruit markets	M	M	...
Slaughter houses	M	M	M
Markets	M	M	...
Industrial areas	C,M,B	M,C,B	...
Constructing/renting of hotels/shops	M	M	...
Chambers of commerce	...	...	M,C
Social and cultural services			
Heritage protection, museums, libraries and occupation courses	C(M)	C(M)	C(M)
Sports fields	M, C	M,C	M,C
Assistance to elderly and children (e.g. housing)	M,C M,C	M,C M,C	... ...
Financial and by law services			
Local taxation	...	...	M,C
Municipal fines	...	...	M
Expropriations	...	...	M,C

Source: Tekeli and Guloksuz (1976). M: Municipality, C: Central Government, B: Companies, Letter in parenthesis shows the lack of interest by the responsible government unit. For example, the provision of heritage protection, museums and library services are assigned to both lower and higher level of governments-municipality and Ministries of Tourism and Culture. The lack of sufficient revenue to deliver such services at municipal level resulted in their provision by the ministries in some part of the country.

In short, there is a relationship between the size of a city and the level and range of functions delivered by local governments. Municipalities in large cities have also undertaken optional functions. On the whole, the total expenditure on local services amounted to TL (Turkish Lira) 161.330 billion in 1983 and 219,988.8 billion in 1995. This is equivalent to about 5.5% and 11.3% of the total public expenditure in the economy in 1983 and 1995 respectively. It is equal to 1.4% and 2.8% of the gross domestic product (GDP) in the country. The final accounts of three-tier local governments[4] in 1994 show the importance of municipal governments in local provision: that municipal governments undertake the bulk of local government expenditure on local services (94.8 %). 3.8% of local expenditure was incurred by SPAs and only 1.3% by village administration.

3.4. Revenues of Different Levels of Government

We now turn to an analysis of the shares of different levels of the government in total revenue generated in the country. The striking dominance of the central government is revealed in Table 3.3. In 1980, 96.7 % of all tax revenues generated accrued to the central government. The share of municipal government in total government tax revenues shows a remarkable increase from 3.3 per cent in 1980 to 10.7 per cent in 1986, before decreasing to 8.6 per cent in 1992.

Table 3.3 Component of Total Tax Revenue, 1980-1992.

Years	% of municipal government	% of Central government
1980	**3.3%**	**96.7%**
1981	3.7%	96.3%
1982	3.7%	96.3%
1983	4.8%	95.2%
1984	6.2%	93.8%
1985	8.6%	91.4%
1986	**10.7%**	**89.3%**
1987	9.6%	90.4%
1988	9.4%	90.6%
1989	6.4%	93.6%
1990	8.8%	91.2%
1991	8.7%	91.3%
1992	**8.6%**	**91.4%**

Source: Prepared from State Institute of Statistics (1996),
Local Governments Final Accounts and Budgets 1993 and Statistical Indicators 1923-1992.

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[4] See State Institute of Statistics (1997), 'Final Accounts of Municipalities, Special Provincial Administration and Villages - 1994'.

The municipal government, as the lower tier of government in Turkey, is legislatively responsible for, and is involved in, the provision of important public services. The SPAs' role as an agent of the central government has been insignificant over the period under review. Nonetheless, the share of local government in public sector activity is between 8% - 9 %. This figure is likely to increase because of the new taxes allotted to municipal government as a result of the pressure for fiscal decentralisation.

3.5. The Structure of Municipal Finance in Turkey

The previous section highlighted the fact that municipal government plays a pivotal role in the delivery of basic civic and infrastructure services. Since the level and quality of these services depends on the financial capacity of municipal government, in this section, we analyse the levels and patterns of finance by municipal governments

3.5.1. Composition of revenues

We now present detailed descriptions of some of the important municipal taxes in terms of their coverage, rates and structure. SPAs do not collect any taxes. They work as government agencies. Their main revenue source is their share of the general budget tax revenues of the central government, dues and fees, enterprise revenue, fines and others. A village administration has two main kinds of revenues: 'Salma' and 'Imece'. Salma (village tax) is a local rate levied on villagers. 'Imece' (Co-operative activity) is the work done by the villagers for the community. It is not a direct revenue but a saving at the dispensation of the local administration.

Municipal governments, which are the concern of this thesis, derive their revenues from the various tax and non-tax sources as prescribed by the Municipal Ordinance (MO). Municipal revenues can be classified into three main categories[5]:

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[5] Before 1981, municipalities were sharing these taxes (share rate is given in the parentheses): 1-) Income and Corporation Tax (5%), and Real Estate Tax (RET) (45%), 2-) Tariffs (15%), 3-) Announcer Tax (1-1.5%), 4-) Oil Consumption Tax (OCT) (8%), 5-) Excise Tax (2%), 6-) Motor Vehicle Tax (11%). All these shares were applied until 1981 and central government forwarded to the Bank of Provinces. 20 % of the total amount was allocated to the Municipal Fund and again allocated to municipalities according to their population.

a) Own revenues,

b) State aids to municipalities,

c) Shares from Central government tax revenues.

3.5.1.1. Own revenues

Revenue which can be raised by a municipality itself is legislated by the Municipal Revenue Law. It includes general own taxes, duties, contributions and non-tax revenues. Municipalities are allowed to collect six taxes: a) announcements and advertisements tax, b) entertainment tax, c) communications tax, d) electricity and gas consumption tax, e) fire insurance tax, and most importantly f) real estate tax and environment tax. Because the power to tax is only given to the government by the constitution, the law only specifies the procedure for the collection of tax and the maximum and minimum rates, or the amount. Thus, municipalities have a limited tax freedom. The law only allows them to collect taxes within predetermined limits.

Municipal collection of the Oil Consumption Tax (OCT) was abolished in November 1984 and the Profession Tax (5%) was abolished in December 1987. On the other hand collection of the Real Estate Tax (RET) was left with the municipalities in 1985 provided that they allocated 15 % of RET revenues to the SPAs. Originally the RET was collected departmentally by the Inland Revenue but later the municipalities become responsible for its assessment and collection. It is collected from lands and buildings located within the municipal boundaries and payable by owners. The tax base is the assessed value of land and buildings, which was re-valued every four years based on the taxpayer's self-assessment. The assessment by a municipal council varies according to plot size/building size, locality and the quality aspects of the property. The tax rates, which are set by the central government, are 0.4 % on the dwellings, 0.5 % on work-sites, 0.6 % on plots in the cities and 0.3 % on land owned in towns and villages. With effect from 1998, each year the assessment of property is increased by half of the revaluation rate, which is determined yearly by the Ministry of Finance taking annual inflation rate into account.

A municipality cannot amend tax rates but the Municipal Council determines the estate values according to socio-economic differences between locations within the municipal jurisdiction. Thus, while the owner of the estate announces its estates' type and characteristics (i.e. self-assessment), the assessment must lie within the range of valuations set by the municipality. If there is a difference in valuation, the municipality increases the taxpayer's assessment up to that set by the Municipal Council.

The Environment Tax (ENT) was introduced in 1994. It is called the 'garbage tax' by taxpayers. It is levied on dwellings and work-sites which are within the municipal boundaries and municipal neighbourhood areas. Taxpayers then enjoy the benefit of the municipality's garbage collection service. The taxpayer who uses or owns these buildings calculates his liability according to the band in which his building falls. Tax liability is increased by half of the revaluation rate. This rate is assessed every year by the government. The ENT is calculated by applying the tariffs, which are determined by the Cabinet according to building groups and classifications. Buildings are divided into seven groups (each group defines a threshold for the class size definition e.g., 750-500, 499-250,..., less than 20). In accordance with criteria set by the government (e.g. number of beds for hotels, number of workers/personnel, usage size (square feet), student numbers, number of seats for cinemas), the municipality subdivides each group into five classes. The classification of buildings is adjusted and announced by the municipality.

Municipality Duties (fees): These are charged for particular municipal service benefits including 'building construction fees', 'slaughterhouse control and inspection fees', and 'licence to run business fees'.

Contribution to Expenditures: If the municipality provides road, drainage, and water supply areas, one third of the cost of these services is taken from those residents who benefit from these local services.

Revenues other than taxes: The municipality can charge for water disposal as well as the water rate. Although the municipality has a legal power to announce the disposal tariffs for different building groups and classes, since 1994 the charges cannot

exceed the water rate set by government regulations. They are imposed when the water rate is charged, and 10% of the collected amount of tax is allotted to the Environment Pollution Prevention Fund. Major revenue sources for municipalities also include revenues from enterprises/institutions, which provide water supply and transportation, offer technical advice on building development, offer construction work and rubble removal, or which rent out municipal vehicles such as trucks and buses. They may also sell or lease their properties such as warehouse and stores that they may own.

3.5.1.2. State aid

The Ministry of Construction and Housing gives grant-in-aid to municipalities from the Dwelling Funds to help city planning. The Bank of Provinces also gives aid by using its own 'municipality common fund' in order to help municipalities prepare new construction plans. In addition, there is an important fund, called Local Government Fund (LGF) (i.e. State aid), allocated to municipalities from the Ministry for Internal Affairs' budget in 1984. The grant amounts to 0.25% of the General Budget Tax Revenues. In addition, 0.30% of the General Budget Tax Revenues is allocated for the SPAs in LGF (total amount reaches 0.55%). 0.15 % of the overall LGF is used by the Ministry of Construction and Housing for mapping out municipal dwelling areas. The remaining 0.40 % funds is used by the Ministry of Internal Affairs in accordance with criteria, mentioned below, for local governments.

State aid is a conditional grant since it is tied to conditions. For example, to benefit, a municipality's population has to be under 50,000 (district municipalities mainly benefit from this aid). A project must also conform to selected categories- e.g., a public market, a car park, a coach station etc. It is also limited for such grants have a ceiling. In 1990, if the project did not exceed TL 100 million, 70 % of the total project cost was granted from this particular fund. If the project's cost exceeded TL 100 million, only TL 100 million of the cost was granted from this fund and municipality must have guaranteed that it could finance the excess amount. In the last case, the grant is a typical example of a closed-ended conditional grant. In 1993, the limit was increased to TL 150 millions, and in 1994, because of high inflation,

decisions on such projects have been delegated to the Ministry of Internal Affairs and the 70 % rate has since been applied.

3.5.1.3. Municipal shares from the central government total tax revenues

This revenue source has various names in the intergovernmental transfer literature such as an unconditional grant or lump sum grant. Since 1981, new regulations have been undertaken in order to increase municipalities' revenue sources. One of the important regulations has amended the law of the municipal and private provincial administrations' share of the General Budget Tax Revenues. Legislation was enacted in 1981 that 5.5 % of the General Budget Tax Revenues should be allocated to municipalities on the basis of population criteria. This was increased in 1984 to 10.30 %. However, in 1985, the rate was reduced to 9.25% but not implemented. In 1985, the ratio was applied at 8.15 %, and since 1986, at 8.55 % of the General Budget Tax Revenues. Between 1980 and 1986, the rate was increased by double to triple then stabilised. It is worthy of analysis. This is another justification for why we are studying the impact of grant on local expenditure. The government attempted to include both objective and economic factors such as regional income levels and socio-economic factors. However, they were little known outside the group of ministers[6] responsible for distributing grants. Nadaroglu and Keles (1991) argued that those criteria are subjective and unclear. This issue is also worthy of further empirical investigation. We will examine the general characteristics of central grant allocation to municipalities in Chapter 5.

3.5.2. Analysis of municipal revenues

The general position of municipal finance can be seen from Figure 3.2. The high level of contribution of grants to the total receipts is an important feature of local government finance in Turkey. During the period 1980-1996, municipal income came partly from local revenue and partly from a system of central government grants. Both the size and character of grant-in-aid have changed since 1980 in ways

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[6]Responsible ministries are Ministry of Internal Affairs, Ministry of Finance, and Ministry of Construction and Housing.

that are important for local autonomy. Broadly speaking, grant-in-aid is made available to meet any local authority expenses.

Figure 3.2
Municipal Revenues by Types
(* for budget values)
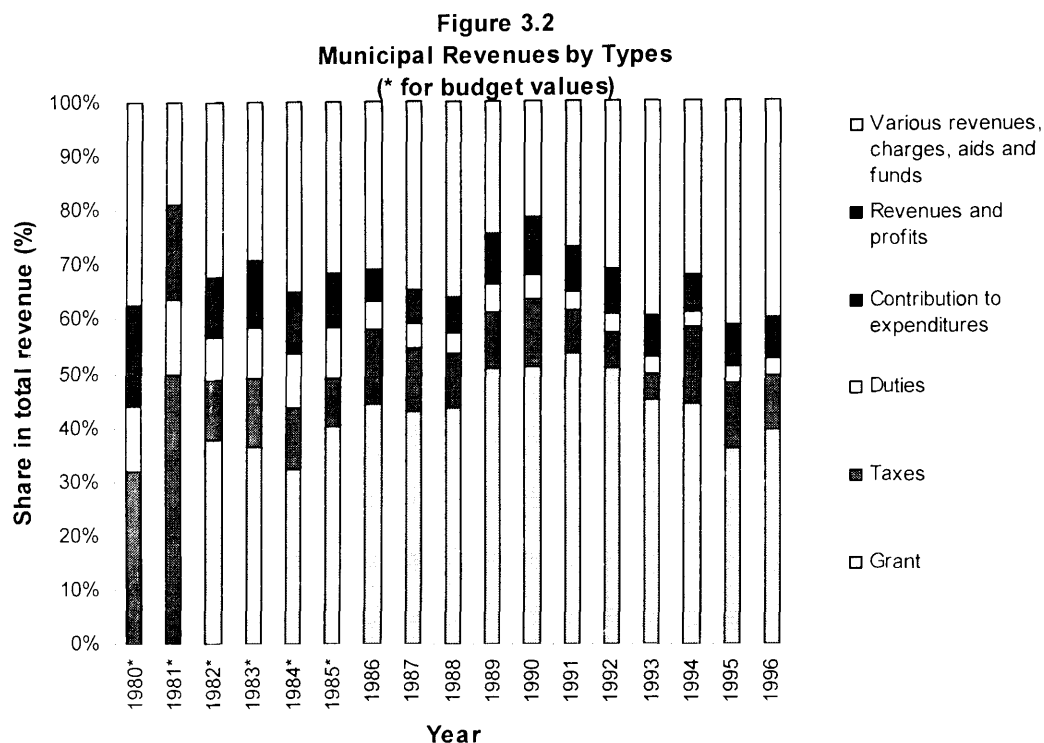
Since its introduction in 1981 and at the times when it was increased in 1985 and 1986, grant-in-aid has been of great importance (see Figure 3.2). By 1980, only 56% of revenue was coming from taxation[7]. The overall contribution of grant to the total receipts of municipalities was more than 40 % between 1985 and 1994. Grant as a whole provided for a steadily increasing proportion of municipal revenue until 1990s. In 1995, more than four fifth of expenditure was financed by means other than fiscal taxation. The decline in the relative importance of local tax revenue has inevitably been associated with the growth in local dependence upon central government grants. It was partly intended to make up for the losses incurred by local government caused by reduced tax revenues, when central government started to collect the RET and other taxes. More recently, unconditional grant has declined in importance relative to total municipal income as a consequence of further changes in the local tax system between 1993 and 1995.

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[7] Note that the grant was surprisingly called as a tax revenue in the municipal account.

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The relevant statistics of the changes in the municipal revenues during our period are given in Table 3.4. The RET and other local income have grown over this period. The first major contributor to municipal government revenues among taxes is a Real Estate Tax. Its contribution to the total revenue has increased from 3.7 % in 1992 to 4.8 % in 1995. Other municipal taxes such as advertisement and announcement taxes make only a marginal revenue contribution to the total revenue generated. Local tax revenue of municipalities contributes around 8-14% of total revenue. This was around 17% in 1994 because the RET was reassessed and the Environment Tax was first introduced in 1994. Later the real value of the RET declined but other taxes (including the ENT) remained constant. This was because assessment for the ENT is done every year. However, we should expect revenue for the RET to be constant after 1998 because the new law requires an annual reassessment of real estates.

Such an independent source of income serves as an important means for maintaining the freedom of action of municipalities, and its existence for municipalities raises a further argument against the view that local authorities are simply agents of the central government on expenditure matters. However, as the system of property taxation is based on self-assessment by tax-payers (the characteristics of the building is declared by the taxpayer), and as the value of property is classified into groups every four years. it is hard to regard this tax as efficient because the assessed values are eroded by the high inflation rate. It appears that property related taxes yield higher revenues in the big, and especially the metropolitan, cities.

Table 3.4. The Municipal Revenue Sources[8]

Year /revenue sources	1992	1993	1994	1995	1996
Grant	51%	45%	44%	47%	50%
Real Estate Taxes	3.7%	2%	7%	4.8%	2%
Other municipal taxes [a]	4%	3%	7%	7%	6%
Municipal fees	3%	3%	3%	3%	3%
Contributions to spending	1%	2%	1%	1%	1%
Revenues obtained from institutions and enterprise	7%	5%	6%	7%	6%
Revenues from municipal properties	13%	8%	8%	9%	10%
Charges	2%	2%	2%	3%	3%
Fines	1%	1%	2%	2%	3%
Various revenues [b]	12%	25%	17%	11%	12%
Special aids	2%	3%	2%	4%	4%
Special funds	1%	1%	1%	0%	0%

a) E.g. Environment Tax, Advertisement tax, b) Various revenues include borrowings and other various revenues that are not specifically explained in the account.

The introduction of the RET gave significant sources of income to municipalities. However, it did not accrue to all municipalities but only to those whose weighted rateable values of houses. estates. buildings for business and factories are above the national average such as Kocaeli, Istanbul, and Izmir which have significant concentrations of businesses and population. For example, in Appendix A3, municipal data on two large cities and two small poor cities are documented (see Table 3.4A). We can see that the proportion of the RET revenue within the total municipal revenue is higher for the Metropolitan of Ankara and Istanbul Municipalities compared with the other poorer ordinary municipalities.

The second major source of revenue comes from the municipalities' properties, which was about 13 per cent of the total revenue in 1992. Municipal various revenues are also one of the major revenue types, which sometimes become the secondary major revenue source for municipalities. Within the various revenues, external borrowings are important especially for metropolitan municipalities. For ordinary municipalities, domestic borrowings are routine borrowing sources. One of the striking points about the municipalities' total borrowing, which is included in the various revenues. is that it increased sharply from 1992 to 1993 about twofold. The reason for this may have been the local election in 1994. Before election, in 1993, the central government may have given loans to municipalities, which were

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[8] For details of these revenue types, see detailed final account of the Municipality of Kutahya, Table 3.5A in Appendix A3.

governed by the recipient mayors being of the same political line as the government. These loans may have been used for more services and expenditures to buy more votes for the present mayor and his political party. For example, more investment expenditure may have been financed by loans. Investment expenditure increased from 18% in 1991 to 24% in 1993 (see Table 3.9, p76).

Revenues from municipal enterprises and institutions are also important revenue sources for municipalities. They accounted for 5-7% of the total revenue during 1992-1996. The other revenue sources continue to make a minor contribution to total municipality revenue.

An examination of the final accounts, which shows true accrued expenditure and revenues, of an ordinary municipality, the municipality of Kutahya, will give us very detailed information about its municipal revenue and expenditure types, even though this data source is not published[9]. In the final accounts, all revenue sources and expenditure items are shown by the types, parts, sections and articles (see Appendix A3 Table 3.5A). The municipal tax revenues are divided into three types: tax revenues, revenues other than taxes, and special aids and funds. The municipality law surprisingly classifies the grant, the share from general budget tax revenue, under the name of the tax revenues. This is actually not the municipality's own tax revenue, so we should not count it as tax revenue. We call it a central government grant. Revenue from municipal taxes and municipal fees, which are explained above, are grouped under tax revenues. The second type of revenue, revenue other than taxes, includes the contribution to municipal spending, other shares paid to the municipality, the yield from institutions and enterprises, profits from their enterprises, revenues from municipal properties, charges, fines and various other revenues.

The central government grant comprises 39 % of the total municipality revenue for Kutahya. As compared with other municipalities, it is lower than the average central

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[9] This data can only be obtained from the Department of Local Government at Ministry of Interior. However, as we were told it is not legal to provide such data to the public, we have obtained one particular municipality's final account book from the Exchequer and Audit Department with special permission to view the book. Our thanks go to the inspectors working there.

government grant to municipalities. Within the municipal taxes, overall 11% of total revenues, there are three important taxes: the real estate tax, the electricity and consumption tax, and the environment tax (see Appendix A3 Table 3.5A). The Environment Tax contributes almost half of the municipality tax revenues. The other two taxes contribute 25% and 22% of municipality taxes, respectively. Revenues from municipal properties and revenues from municipal institutions and enterprises are two main sources of this type of revenue (i.e. revenues other than taxes) (See Table 3.5).

Table 3.5
The Municipality of Kutahya's Revenue Composition (%)

Grant	39
Taxes	11
Fees	2
Contributions to spending	3
Other shares paid to municipality	1
Revenues from institutions and enterprises	20
Revenues from municipal properties	15
Charges	3
Fines	3
Various revenues	4
Special aids and funds	0.2

Source: Prepared from Final Accounts of Municipality of Kutahya 1995

Transportation and Prosperity Yields contribute 88% of the total yield of institution and enterprise revenues, which amount to 20% of the overall municipal revenue. The water rate is included in this revenue type. Water disposal rate makes up 57 % of municipality charges which makes 3% of total revenue (see Appendix A3 Table 3.5A). For this particular municipality, various revenues, which are approximately 4 % of total sum. play a minor role in the total revenue determination. Unlike other municipalities, special aids and funds, 0.2 % for this particular municipality, were an unimportant revenue source within total revenue in 1995.

With the introduction of budget share, the increased dependence of municipalities upon central government grants strengthened public opinion that local autonomy had diminished during our period. But the introduction of the ENT intervened in this diminution of autonomy and increased local income to some extent. We can say that half of municipal total revenue comes from central government grants, special aids and funds which are also source from central government revenue. The remaining

revenue is raised by the municipality itself. Mainly it is generated from the municipality's independent activities such as yield from municipal corporations and enterprises, and revenues from municipality properties. Municipalities can determine the fees provided that they set the tariffs within the lower and upper limits, authorised by the government. Because of the binding constraint on the fees and tax tariffs[10], the scope for local governments to exert a power lies in the area of non-tax revenues, rather than in the area of taxes in the traditional sense. The municipalities also sell and rent properties to third parties and can determine the contract period. The Municipal Council has been given legal power to set its own charges, transportation fees and water rate.

As compared with British local government, Turkish municipalities, in general, have more scope to determine budgetary behaviour. Approximately 75 percent of UK local government revenue[11] is obtained from the central government. Duncan and Smith (1995) argued that approximately 79 percent of local expenditure was effectively financed by central government grant in its attempt to reduce poll tax levels and abolish the local business rate in 1990-91. The Council Tax, for example, collected by Leicester City Council[12] was 20 % of its total local revenue in 2000. In Turkey, on average, municipalities can control 15-22% of municipal revenues (see Table 3.4) and in particular, Kutahya can control 38 % of its revenue (see Table 3.5, in 1995).

So far, we have information only about the financial aspects of municipal expenditures. We turn now to an analysis of the level and pattern of municipal expenditure on local services. Statistics on local government expenditures presented in the subsequent section, in particular by municipalities, provide further understanding of the decentralisation process.

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[10] The government does not change the maximum rates every year but because of the high inflation rate, the municipalities set the maximum tariffs and fees. That explains the binding constraints on the municipalities.
[11] See IMF international Finance Statistical Yearbook 1995, the latest figures included are for 1992.
[12] See Leicester's best value performance plan, 2001-2, Leicester City Council, p10.

3.6. Municipal Expenditures

Here, the statistics of expenditures by municipalities are presented. The emphasis in this section is upon the development of municipal expenditures as local authority activities. Among other things, we are interested in the decentralisation process. This is most simply understood by consideration of the changes in local expenditures and responsibilities. The following analysis shows the relationship between local expenditure and its components with total government spending and GDP.

The evolution of municipal expenditure compared with GDP and total government spending during our period brings out sharply the interrelationship between central and local autonomy in Turkey. The growth of municipal expenditures in real terms can be seen from Table 3.6 and Table 3.8 (Local government expenditure as a percentage of GDP and total government expenditure). Over the period as a whole in which there was almost a twofold growth, municipal government expenditure has taken an increasing proportion of GDP: 1.4 per cent in 1983, and 3 per cent in 1987, 2.8 per cent in 1995. The importance of this change can be illustrated to the importance of the change in general grant system in 1985. This is another justification for why we are studying the impact of grant on local expenditure.

Table 3.6. Government Spending as a Percentage of GDP

year	Central Government	Municipal Government
1983	24.2%	**1.4%**
1984	24.9%	1.3%
1985	25.0%	1.8%
1986	21.1%	2.7%
1987	21.9%	**3.0%**
1988	21.2%	2.7%
1989	23.2%	2.3%
1990	24.2%	2.5%
1991	21.0%	2.1%
1992	20.6%	2.4%
1993	24.4%	2.9%
1994	22.9%	2.6%
1995	22.2%	**2.8%**

Compared with other OECD countries, Turkey's local expenditure as a percentage of GDP is quite low. It is more than 3 times lower than the OECD averages (see

Table 3.7). However, this rate might still be higher if one compares it with other developing countries. The centralisation ratio (ratio of central government expenditure to overall government expenditure)[13] is 6 percent above the OECD average (i.e. 82%), while local expenditure[14] is 12% which is less than the average level (18%).

Table 3.7. OECD Statistics (1992)
(25 Member countries in 1994)

Countries	Local Expenditure/GDP	Government Expenditure	
		By Central Government	By Local Government
Australia	9.5%	94.6%	5.4%
Austria	10%	83%	17%
Belgium	6%	89%	11%
Canada	2.6%	84%	16%
Denmark	33%	56%	44%
Finland	2%	94%	6%
France	9%	83%	17%
Germany	8.5%	84.1%	15.9%
Greece	6.8%	87%	13%
Iceland	10%	77%	23%
Ireland	12.5%	77%	23%
Italy	13%	80%	20%
Japan	6.8%	76%	24%
Luxembourg	10%	84%	16%
Mexico	2.5%	92.4%	7.6%
Netherlands	18%	75%	25%
New Zealand	4%	90.6%	9.4%
Norway	20%	70%	30%
Portugal	4%	92.2%	7.8%
Spain	5.9%	88.3%	11.7%
Sweden	27%	63%	37%
Switzerland	9.8%	78%	22%
Turkey	**3%**	**88%**	**12%**
UK	13%	76%	24%
USA	9.2%	80%	20%
OECD Averages	**10.63%**	**81.69%**	**18.31%**

Source: Prepared from IMF Government Finance Statistic Yearbook 1994-1995.

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[13] It should be noted that there is no satisfactory measure of a decentralisation ratio. We took this ratio because economists usually use some ratio of central government expenditure (and/or revenues) to overall government expenditure (and/or revenues) (e.g. Litvack and Oates (1970), Wallis and Oates (1988), and Moesen and Cauwenberge (2000)). Actually, to make such aggregate cross country comparisons may present several methodological problems (e.g. countries differ in population size and area size, there are differences in the administrative and political structure of the different countries). Not only are the functional responsibilities differently assigned to local authorities, but the degree of central government control over local government's own expenditure and revenues differs between OECD countries. We included only local governments. State governments in federalist countries are included with the federal government.

[14] Local expenditure includes expenditure by municipalities, SPAs, and villages.

The share of municipal governments in total government spending increased from 5.5 per cent in 1980 to 11.3 per cent in 1995 (see Table 3.8). Municipality spending as share of total government spending was doubled between 1983 and 1995. We have here the first indication of the existence and nature of a decentralisation process in Turkish public expenditure. It could be said that this expansion of local activities over the period did not occur by restricting central government activities and responsibilities as far as municipal spending as a percentage of GDP and as a percentage of total government expenditure is concerned. In fact, it has slightly increased. The impact of intergovernmental government grant on municipal spending is worth measuring. It has been significantly growing over the period.

Table 3.8. Percentage Distribution of Total Government Expenditure, by spending Authority, 1983-1995

year	Central Gov. exp.(TL)	Municipal Exp.(TL)
1983	94.5%	5.5%
1984	95.0%	5.0%
1985	93.2%	6.8%
1986	88.5%	11.5%
1987	88.0%	12.0%
1988	88.6%	11.4%
1989	91.0%	9.0%
1990	90.7%	9.3%
1991	91.1%	8.9%
1992	89.5%	10.5%
1993	89.5%	10.5%
1994	89.9%	10.1%
1995	88.7%	11.3%

We now discuss expenditures on goods and services, transfers, and current and capital accounts. As it is not possible to find published data based on the allocation of execution and maintenance responsibilities, we are not able to show figures on local expenditures by allocated functions. Unfortunately, we are not able to show the expenditure on public health, infrastructure, water supply, transport, and fire protection. We can only talk about municipal expenditure by such economic functions as investment expenditure, transfer expenditure and current expenditure. The first point of interest suggested by Table 3.9 is the relative importance of current local expenditure. It includes personnel costs[15], purchasing for services,

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[15] Personnel costs include salaries, compensation, allowances etc. of the staffs in municipal administration.

consumption goods and materials, furnishings and other expenditures. These account for more than one third of total municipal expenditure. Municipalities have devoted a major portion of their revenues to expenditures of a recurring nature (e.g. in 1980, 56 % on personnel, and 16% on the maintenance and operation of existing facilities).

Table 3.9. Municipal Expenditures by Economic Functions

Years (* is for Budget value)	Investment Expenditures	Transfer Expenditures	Current Expenditure		Total
			Personnel Expenditure	Other Current	
1980*	18%	9%	56%	16%	100%
1981*	21%	12%	60%	7%	100%
1982*	22%	15%	53%	10%	100%
1983*	25%	13%	49%	13%	100%
1984*	26%	12%	43%	19%	100%
1985*	31%	17%	34%	18%	100%
1986	39%	23%	22%	16%	100%
1987	41%	20%	22%	17%	100%
1988	41%	20%	23%	16%	100%
1989	22%	22%	35%	22%	100%
1990	17%	18%	46%	19%	100%
1991	18%	21%	45%	15%	100%
1992	23%	22%	43%	12%	100%
1993	24%	24%	41%	11%	100%
1994	23%	29%	36%	13%	100%
1995	24%	30%	33%	14%	100%
1996	30%	23%	31%	15%	100%

Source: Prepared from State Institute of Statistics, 'Final Accounts of Municipalities, Special Provincial Administration and Villages'

Transfer payments have never accounted for much more than a quarter of all municipal expenditures until 1994, and the proportion was more or less constant. Local authorities have always been providers of local communal services rather than mere re-distributors of income, as the statistics and the component of transfer expenditures reflect. Nevertheless, local transfer payments have become slightly more important over the period because of debt repayment and interest payment as a financial transfer. The nature of transfer payments has also changed in a way that explains the changing character of local responsibilities. Scrutiny of municipal accounts shows that the main local transfers were financial transfers (interest payment), but social transfers were of little importance during this period[16]. All

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[16] See State Institute of Statistics (1997), 'Final Accounts of Municipalities, Special Provincial Administration and Villages 1994'.

important relief activities like health and old age insurance, and most medical care, have been the responsibility of the central government and its institutions. Also, unlike the position in most developed and federalist countries, education expenditure is not within the responsibility of local government.

The breakdown of expenditure by current transfer and investment outlays in Table 3.9 informs us about other aspects of the evolution of municipal expenditure. Investment expenditure includes the purchasing of vehicles (e.g. means of transportation and trucks), purchases of machinery and equipment, spending on building, installation and large repairs. The proportion of investment spending in total municipal spending was higher in two years, reaching two fifths of all local government spending in the period 1986 – 1988, a period when the ANAP party was governing Turkey. These fluctuations are parallel to increases in municipal revenues, which increased by 50% in 1985 and further increases followed in 1986 and 1987 (see Table 3.1 in section 3.2). After 1988, capital expenditure never returned to its highest level.

It could be argued that the basic compulsory functions of such primary municipal services as garbage collection, health control, water supply, street cleaning, intra-city roads, fire protection, and parks and play grounds are the most important concerns of the current budget. Because these services are largely associated with labour intensive provision, constant returns to scale are seen to be valid for this type of services. In practice, spending on the water supply and sewerage service constitute the largest component of investment spending. The maintenance of these services consumes a constant proportion of current and other personnel spending. These may explain the increase in the relative importance of personnel expenditure in the budget allocation compared with the reduction in investment expenditures since 1989.

Expenditure on the construction of drainage systems is also a high priority in the big cities. The share of expenditure devoted to roads is expected to be high in the case of big cities as their boundaries encompass large areas. It is of interest to note that municipalities in larger cities are expected to spend more on maintaining local services in relation to their population (e.g. roads and public transportation, water

supply, and sewerage). This also explains why the level of service is predicted to be higher in the larger urban areas where a more diversified set of functions are undertaken by municipalities.

A number of other influences have also affected the scope of municipal government during the period under review. First, the nature of the environment in which municipalities operate has changed since 1980. Municipal governments have been particularly affected by rising standards of living and by the ease, speed and convenience of transportation. For example, local people now demand greater expenditure on sanitary and transportation services within their locality. The same is true for waste collection and disposal services. Once the size of a community increases as a consequence of urbanisation, people demand more of their municipality in terms of more frequent waste collection, improved punctuality and frequency of public transportation, cleaner water etc. In Turkey, at the same time, major and inescapable problems of urban life have been understood and remedies have been attempted. This has resulted in the growing pattern of municipal expenditure over the period, leaving municipalities with the relatively less onerous task of maintaining established standards. This, also, explains the reduction in the relative importance of investment spending after 1988.

3.7. Conclusions

Considerable changes have occurred in the relative importance and broad responsibilities of municipalities during the period under review. These changes have been revealed in many ways in the statistics. In particular the statistics show that growth in municipal spending and hence local autonomy, has, on the whole, increased rather faster than central government expenditure. The decentralisation process can also be seen as a victory for local authorities, for these municipalities have increased their revenues over the period.

The conclusion of this highly condensed survey of municipal revenues could be summarised as follows. We have indeed seen that the loss by municipal governments of control over particular taxes has been associated with an increasing dependence on central assistance in the form of central grants-in-aid. However, increasing central assistance is also associated with a process of greater

decentralisation with the aid of new tax sources such as the Real Estate Tax and the Environment Tax. Although the sources of these two taxes vary with the characteristics of local government, they give the municipalities greater local autonomy to spend.

The centralised structures of the Turkish local fiscal system methodologically implies that there is no need for a model of local government fiscal behaviour to determine overall local expenditure, because it is set by central government. Demand approaches are somewhat meaningless, because what happens in centralised fiscal structures is that local governments supply local services under an exogenous financial constraint. Because municipalities are constrained in their ability to change tax rates, their degree of discretion in setting their own tax rates is rather limited. This contrasts with the situation in fully decentralised governments where demand factors might have a place in explaining the level of local taxes. However, because of various discretion over the determination of non-tax revenue, a model is still needed to explain the composition of municipality expenditure. Demand factors may still be in place in explaining the levels of other sources of revenues, such as charges and institution and enterprise revenues. The next chapter will be focused on the effect of intergovernmental transfers on municipal spending in Turkey and on the modelling of demand for municipal provisions. Here we have shown that there is considerable speed in the growth of municipal expenditure over the period. It is worth studying the factors which have a significant impact on the determination of municipal spending. We will analyse a theoretical model that enables us to explain the factors which determine the differences in expenditure levels across municipalities. The dynamic behaviour of municipalities seems to be a more appropriate form to use to explain local government expenditure because the municipalities will plan their next year's budget in the light of the demand conditions experienced in the current year. We may expect, therefore, supply adjustments to become apparent in the quest to satisfy local demand.

CHAPTER IV

EMPIRICAL ANALYSIS OF GRANT EFFECTS IN TURKEY

4.1. Introduction

A review of the literature on cross-section and time-series models of state and local behaviour reveals the presence of some common features in almost all previous empirical work. Firstly, models of interstate/local differences have largely been restricted to developed countries (mainly the USA, the UK and Australia). There is a need to extend the analysis to developing countries because of the differences in characteristics and structure of local governments between developed and developing economies. Secondly, analysis has generally been carried out at the state level by an aggregation of all local government expenditures within the state boundaries. Thus few studies have been undertaken at the 'local' level. Thirdly, few studies have considered the financial and administrative structure of local government. Most studies focused on the expenditure/tax decisions of local government, whilst other local revenue sources generated have been omitted. In contrast, when central government exerts considerable power and uses taxation as a means of political power, the only option left to local governments is their non-centrally controlled economic activity and their entrepreneurial role within the region.

In this chapter, we will analyse the inter-jurisdictional differences in municipal government expenditure in Turkey. This necessitates the development of a behavioural model of municipal expenditures in the country incorporating a model of the demand for municipal goods and services. Some of the innovations in our analyses which we wish to highlight are the following. First, because of institutional features of the Turkish local system explained in the previous chapter, there is fairly considerable restriction on the scope of local behaviour. Local governments can only affect their non-tax revenue in order to meet the increasing local demand and/or expenditure. In our analysis, we incorporate Turkey's institutional features in modelling local authority behaviour. A second major innovation of this thesis is the

incorporation of dynamic adjustment elements in the analysis of local government behaviour. We incorporate dynamics (of local government) in the empirical estimation of local expenditure determination. It is generally assumed that local government implements the policy formulated by the representative individual instantly. However, in reality, the supply response required to adjust the current demand conditions may take years because of bureaucratic sluggishness. Thus, we include the lagged dependent variable to capture dynamic adjustments in an economic relationship.

Thirdly, in our analysis we also measure how quickly local government expenditure adjusts to its long run growth path following a disturbance. This requires the method of the error correction mechanism (ECM), which is a technique of reconciling the short-run behaviour of an economic variable with its long-run behaviour.[1] For the first time in the local expenditure literature, to the best of our knowledge, we use the ECM to incorporate both economic theory relating to the long-run relationship between variables and short run disequilibrium behaviour.

The structure of this chapter is as follows. Section 4.2 details the derivation of local authority expenditure functions from a constrained optimisation model. Section 4.3, is devoted to a discussion of the econometric method to be used to estimate local expenditure determination, and a description of data sources. Section 4.4 presents the results of the basic empirical analysis. Section 4.5 extends this to incorporate the error correction mechanism (ECM). Section 4.6 summarises the main findings.

4.2. An Analysis of Municipal Expenditure in Turkey

Using linear regression analysis, the literature on the determinants of local fiscal behaviour in federal countries has concluded that states or cities with higher per capita income, larger fiscal bases, greater unemployment ratios, a greater percentage of ethnic minorities, more extensive urbanisation, and higher state plus federal aid (or higher central government grant), generally spend more on public services (see Inman (p274, 1979)). A typical determinant study employs the following

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[1] See Sargan (1964) and Engel and Granger (1987).

expenditure equation:

$$E = \beta_0 + \beta_1 y + \beta_2 g + \beta_3 SEC + u$$

Here local expenditure (E) is hypothesised as a linear function of per capita income (y), per capita intergovernmental grant (g), and socio-economic characteristics (SEC). There is little agreement on the grant effect, β_2. Some studies have found this coefficient to be greater than 1 whilst some found it less than one. The reasons for confusion in interpreting the effect of grants on local expenditure were either the lack of use of a theory (e.g. the use of different grant types such as "specific grant" and "lump-sum grant")[2] or a difference in statistical methods and data. Consequently, there is little consensus even on a basic estimation of the partial derivative of expenditures with respect to grants (see Gramlich (1969, 1977) and Inman (1979)).

To specify demand functions for expenditure on goods and services by local authorities, we can proceed in two ways. In the first place, an approximate system may be directly specified and estimated. Alternatively, a utility function can be specified and explicit demand functions derived from it.

The standard approach is to calculate the median voter's tax price. The tax price formulation, however, is not relevant in Turkey where municipal government tax revenues are largely exogenous. Although we follow the assumptions for the general median voter model (MV)[3], we divert from the literature on the MV model by assuming that residents decide on local expenditure by responding to the changes in municipal charges (collected from municipal sovereign activities and/or discretionary behaviour). This incorporates Turkey's institutional system. Simply assuming the classical MV hypothesis would not make sense in the case of Turkey because municipal governments do not solely determine local taxes and fees. The only way local governments can exert power is via their charges and other institution and property revenues, which can be varied depending on local expenditure requirements.

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[2] see chapter 2 for the difference between the impact of these two grant types on local expenditure.

Here the analysis is developed in terms of a social welfare function, implying that local authorities make decisions on behalf of their residents. In this context, we can take the local authority as being a maximiser of the representative individual's utility. We assume that the individual's utility is a function of the local authority's supply of public goods (Q), consumption of a private good (x), and of a municipal enterprise good (w):

$$U = U(Q, x, w) \qquad (4.1)$$

We can specify the representative individual's budget constraint as:

$$y = tb + x + pw \qquad (4.2)$$

Here, b is the individual's tax base (i.e. the value of his/her property), t is local government tax rate (e.g. Real Estate Tax rate), the price of private good is taken as the numeraire with price normalised to 1, w is the enterprise good the individual consumes, and p is the unit price of enterprise good. The individual's gross income, y, is equal to the tax he pays on his properties plus his private consumption (x) and his expenditure on the municipal enterprise good.

The government of a municipality is constrained by the following budget constraint:

$$E = tB + G + (p - d)W \qquad (4.3)$$

Here, E is total municipal government expenditure, G is total central government grant, B is total residential tax base (i.e. total value of properties), W is the total enterprise good provided by a municipality, and d is the unit cost of government enterprise. The municipal government maximises the representative individual's utility subject to (4.3).

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[3] See Bergstrom and Goodman (1973) and Borcherding and Deacon (1972)

The modelling takes into account the centralised system of financing in the Turkish institutional context[4]. A municipality may change the price of enterprise goods to finance extra expenditure. A central government grant to municipalities is a lump sum revenue source. The basic principle of the grant system is that grants are independent of local spending decisions, and hence they are exogenous to the system. As the local tax rate is set by the central government and municipalities have little control over the determination of local tax base, they are exogenous to the system.

Public good production is at constant unit cost (c):

$$E = cQ \tag{4.4}$$

Using equation (4.3) and (4.4) gives us the local government's budget constraint:

$$cQ = tB + G + (p - d)W \tag{4.5}$$

We can now write the price of the enterprise good as:

$$p = \frac{cQ - tB - G}{W} + d \tag{4.6}$$

Substituting equation (4.6) into equation (4.2) gives:

$$y = tb + x + \left[\left(\frac{cQ - tB - G}{W} \right) + d \right] w \tag{4.7}$$

Rearranging this yields the constraint:

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[4] More than 70 % of local revenue follows from centrally controlled tax revenue and grants. Property taxes, ENT and fees amount to less than 15% of total revenue and are regulated by national law. The local authorities charge fees and they all use the maximum fees and tax tariffs allowed. Thus, the binding constraints on local taxation and fees lead municipalities to increase the charges and prices of the enterprise goods.

$$y + \frac{w}{W}G = tb + x + \frac{w}{W}cQ - tB\frac{w}{W} + dw \qquad (4.8)$$

Let θ define the representative individual's share of consumption of the local enterprise good:

$$\theta = \frac{w}{W} \qquad (4.9)$$

We can rewrite equation (4.8) as;

$$y + \theta G + tb(\frac{\theta}{\tau} - 1) = x + \theta cQ + dw \qquad (4.10)$$

Here τ is the representative individual's share of the local tax base:

$$\tau = b/B \qquad (4.11)$$

and equation (4.10) represents the representative individual's long run budget constraint. Thus, θc, 1 and d are the effective prices of Q, x and w, and y + θG + tb(θ/τ-1) is effective income. Thus, maximising (4.1) subject to (4.10) gives the representative individual's demand for Q as:

$$Q = f(\theta c, d, y + \theta G + tb(\frac{\theta}{\tau} - 1)) \qquad (4.12)$$

from (4.4), total municipal expenditure becomes:

$$E = cf(\theta c, d, y + \theta G + tb(\frac{\theta}{\tau} - 1)) \qquad (4.13)$$

Thus, municipal total expenditure will be a function of total grant (G), representative individual's income (y), and the representative individual's shares in consumption of the enterprise good (θ) and tax base (τ):

$$E = \psi(G, y, \theta, \tau) \qquad\qquad (4.14)$$

where θ and τ are functions of population (N) and ψ is the function defined by the right hand side of (4.13) where we have left implicit the dependence on B, p, d, and t. Differentiating (4.13) with respect to G and y yields:

$$\frac{\partial E}{\partial G} = c\theta \frac{\partial f}{\partial y} \qquad\qquad (4.15)$$

$$\frac{\partial E}{\partial y} = c \frac{\partial f}{\partial y} \qquad\qquad (4.16)$$

In the literature, the flypaper effect is said to exist when the response of local expenditure to the lump-sum grant exceeds its response to aggregate private income (see Fisher (1982), Megdal (1987b), Zampelli (1986), Islam and Choudhury (1989, 1990), Duncan and Smith (1995), Strumpf (1998, p398-406), and Worthington and Dollery (1999, p7)). Define Y as aggregate private income. The relationship between the income of the representative individual and aggregate income can be approximated as $y \approx \theta Y$ and hence $\partial E/\partial Y \approx c\theta\partial f/\partial y = \partial E/\partial G$. Thus the model essentially predicts the absence of a flypaper effect.

The above theoretical analysis is static. Empirical analysis of local government behaviour is also dominated by static models investigating price and income elasticities. A serious weakness of such models is the lack of attention paid to implementation problems. It is assumed that the policy formulated by the representative individual is executed instantly. While identifying avenues for further theoretical and empirical research in the flypaper effect, Bailey and Connolly (1998, p357) suggested that one of the most obvious avenues is to "*incorporate dynamic elements into the exclusively static approach, for example, by taking account of time lags in adjusting the supply of local government services to the current demand conditions...*". Therefore, in empirical estimation, by including the lagged dependent variable (municipal expenditure) as an explanatory variable, we can capture the adjustment of the supply of local government services to the current

demand conditions.

For dynamic panel estimation, the equation below is employed to explain the variations in municipality expenditures: the log linear specification has generally been adopted in the demand for local goods literature because it is simple and the interpretation of the coefficients is straightforward.

$$LnE_{it} = \beta_0 + \beta_1 LnE_{it-1} + \beta_2 Lny_{it} + \beta_3 LnG_{it} + \beta_4 LnN_{it} + \varepsilon_{it} \qquad (4.17)$$

Here subscript i refers to the municipality and t refers to time period. ε is a stochastic disturbance term, representing the net effect of all other omitted variables, e.g. various urban problems and the technical capacity of municipal bureaucrats[5]. Other socio-economic variables could also be employed in the equation to capture the effect of different tastes from the remainder of the population (e.g. the unemployed, the number of students). Different tastes can be characterised by, for example, the number of students, for their demand will be different from others for items such as playgrounds, parks, sports fields and school transport. However, data for the socio-economic characteristics of regions is not available. Thus, we did not include the socio-economic variables in our estimations.

Equations (4.14) and (4.17) can be interpreted as the long run and the short run demand functions, respectively. LnE_{t-1} represents the perception of need for expenditure in each municipal government. The adjustment coefficient β_1 indicates the sluggishness of the municipal government responses to changing local demand. A high value of the coefficient means that only a small fraction of the desired demand for municipality spending is implemented in the first year (i.e. the speed of adjustment is weak). A small lag coefficient means very rapid adjustment.

4.3. Econometric Specification

Panel data are widely used in many branches of economics (see Balestra and Nerlove (1966), Baltagi and Griffin (1983), Maddala (1971), Nerlove (1971),

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[5] see Islam 1998

Anderson and Hsiao (1981), Hsiao (1985, 1986)). However, estimation of dynamic demand functions using panel data is not commonly encountered in the area of local public finance. We will now address the econometric method we use.

4.3.1. Dynamic panel estimation

Dynamic adjustments in economic relationships can be characterised by the inclusion of the lagged dependent variable, such as:

$$LnE_{it} = \beta_1 Ln E_{i,t-1} + \beta X_{it} + \alpha_i + \lambda_t + v_{it} \qquad i = 1,...n \ and \ t = 2,...,T \quad (4.18)$$

Here, LnE_{it} is a dependent variable (total municipal expenditure), X_{it} are $K \times 1$ vector of explanatory variables (variables are in logarithmic form), including the constant term and β denotes a $K \times 1$ vector of coefficients. α_i is an unobserved time-invariant individual effect, and captures any municipality-specific effect that is not included among the regressors. The α_i may represent the unobservable administrative efficiency of the bureaucracy, and/or the geographical location of the municipality. λ_t denotes a time effect which is individual invariant, and v_{it} represents the remainder disturbance capturing the effect of unobserved variables that vary over municipalities and time. Assume that α_i and λ_t stay constant for given i over t and for given t over i, respectively. Further assume that $Ev_{it} = 0$ and $Ev_{it}v_{js} = \sigma^2_v$ if i=j and t=s and $Ev_{it}v_{js} = 0$ otherwise. Then assume v_{it} are independently and identically distributed random variables with mean zero and variance σ^2_v, and $E(\alpha_i|X_i) \neq 0$.

In our sample, there are n = 52 cross-section units (municipalities) and only T = 10 time periods. Consequently, we use standard panel data methods motivated by theory asymptotic in N with T fixed. We assume that there are no random variations in coefficients across local authorities. Thus, we do not pursue the approach of Pesaran and Smith (1995) who studied heterogeneous models in long time-series panels. We also assume the ECM specification directly rather than testing for unit roots and cointegration.

We assume that individual and time effects, α_i and λ_t, should be treated as fixed for a linear statistic model. This is done so as to avoid bias due to the omission of relevant individual characteristics that are correlated with the exogenous variables. The fixed-effects, within-group estimates, do not suffer from this problem. However, if the model includes the lagged dependent variable as an explanatory variable, then the Within estimator is no longer consistent in the typical situation in which the panel involves a large number of individual units but a short time period. This is the case with the panel data we are using. Since the dependent variable (LnE_{it}) is a function of α_i, the inclusion of the lagged dependent variable ($LnE_{i,t-1}$) as a regressor makes also $LnE_{i,t-1}$ a function of α_i. Thus, as an explanatory variable, it is correlated with the error term.

Under the fixed-effects assumption, the Within transformation (the deviation from the time mean) wipes out the individual effects (α_i), but the regressor

$LnE_{i,t-1} - Ln\overline{E}_{i,-1}$ where $Ln\overline{E}_{i,-1} = \dfrac{\sum_{t=2}^{T} LnE_{i,t-1}}{(T-1)}$ is the time mean of individual i,

will still be correlated with $(v_{it} - \overline{v}_{i.})$ because $LnE_{i,t-1}$ is correlated with $\overline{v}_{i.}$, which contains $v_{i,t-1}$ which is a component of $LnE_{i,t-1}$. Therefore, for a typical panel data set with large n and small T, the Within estimator is inconsistent. The Within estimator of β_1 and β will be consistent only if T→∞ (see Nickell, 1981, Baltagi 1995).

In the choice of estimation method, we try to obtain proper estimates of the coefficients of the lagged endogenous variables by using the methods chosen by Anderson and Hsiao (1981), Arellano and Bond (1988, 1991) and Blundell and Bond (1998). Anderson and Hsiao (A-H) (1981, p79) suggest that a simple consistent estimator can be obtained by noting that if we take first difference of (4.18), we have

$$LnE_{it} - LnE_{i,t-1} = \beta_1 (LnE_{i,t-1} - LnE_{i,t-2}) + \beta(X_{it} - X_{i,t-1}) + (v_{it} - v_{i,t-1}) \qquad (4.19)$$

In this way, we first eliminate the individual effect, and then we may use either $LnE_{i,t-2}$ or $\Delta LnE_{i,t-2} = (LnE_{i,t-2} - LnE_{i,t-3})$ as a valid instrument for $LnE_{i,t-1} - LnE_{i,t-2}$, which is $\Delta LnE_{i,t-1}$, because they are correlated with $(LnE_{i,t-1} - LnE_{i,t-2})$ but not correlated with $(v_{it} - v_{i,t-1})$ as long as v_{it} themselves are not correlated; and we may estimate β and β_1 by the instrumental variable method. The instrumental variable method (IV) estimators of $\hat{\beta}_{1_{II}}$ and $\hat{\beta}_{II}$ are consistent when n→∞ or T→∞ or both, and are independent of initial condition (see Anderson and Hsiao (1981)).

We also use the Generalised Method of Moment estimator, GMM1 (one-step) and GMM2 (two-step) estimation, which is suggested by Arellano and Bond (1991). The GMM one step estimator requires no knowledge concerning the initial conditions or the distribution of v_i and α_i (see Baltagi 1995, p128). The T_i-1 equations for individual i can be written in general form by stacking data for an individual according to time:

$$LnE_i = W_i\delta + \iota_i\alpha_i + v_i \qquad (4.20)$$

Here, ι_i is a $(T_i -1) \times 1$ vector of ones, δ is a parameter vector including β_1 and the β's and the λ's, W_i is a $(T_i -1) \times (k+1)$ data matrix containing the time series of the lagged dependent variable, the X's and the time dummies. We use the programme DPD to compute various linear GMM estimators of δ with the general form (see Arellano, Bond and Doornik (1997)):

$$\hat{\delta} = \left[\left(\sum_i \Delta W_i' Z_i\right)A_n\left(Z_i'\Delta W_i\right)\right]^{-1}\left[\left(\sum_i \Delta W_i' Z_i\right)A_n\left(Z_i'\Delta LnE_i\right)\right] \qquad (4.21)$$

here $A_n = \left(\frac{1}{n}\sum_i Z_i' H_i Z_i\right)^{-1}$

and ΔW_i and ΔLnE_i denote first difference transformation of W_i and LnE_i. Z_i is a matrix of instrumental variables, and H_i is a possibly individual-specific weighting matrix. When estimating dynamic models, GMM is concerned with transformation

that allows the use of lagged endogenous variables as instruments in the transformed equation. Efficient GMM estimators will typically exploit different numbers of instruments in each time period. Estimators of this type are discussed in Arellano (1988), Arellano and Bond (1991) and Blundell and Bond (1998). Arellano and Bond found that, for simple dynamic error components models, the estimator that uses differences $\Delta LnE_{i,t-2}$, rather than levels $LnE_{i,t-2}$, for instruments, has a singularity point and very large variances over a significant range of parameter values. In contrast, the estimator that uses instruments in levels, i.e. $LnE_{i,t-2}$, has no singularities and much smaller variances and is therefore recommended (see Baltagi (1995, p126), and Arellano and Bond 1991).

Where there are no instruments available that are uncorrelated with the individual effect, α_i, the transformation must eliminate this component of error term. The first difference is one example of transformations that eliminate α from the transformed error term, without at the same time introducing all lagged values of the disturbances v_{it} into the transformed error term (see Doornik et al (1999)).

The one step estimator $\hat{\delta}_1$ (GMM1) uses some known matrix as the choice for H_i where H is a (T-2) x (T-2) matrix, which has twos in the main diagonal, minus one in the first subdiagonals and zeros elsewhere. If the v_{it} are heteroskedastic, a two step estimator (GMM2) which uses $H_i = \Delta \hat{v}_i \Delta \hat{v}_i'$, where $\Delta \hat{v}_i$ are some consistent estimates of one step residuals, is more efficient. If the X_{it} are strictly exogenous, i.e. ($E(x_{it}v_{is}) = 0$) for all t and s but where all the X_{it} are correlated with α_i then all the X are valid instruments for the first differenced equation of (4.20) and the diagonal of the instrument matrix Z_i, where Z is a N(T-2) × k matrix, takes the form:

$$Z_{is} = LnE_{i1} \dots LnE_{is} X'_{i1} \dots X'_{iT} , \qquad (s = 1,2,\dots, T-2) \qquad (4.22)$$

Table 4A documents the form of the basic instruments used in the estimates (see Doornik et. al 1999, p13):

Table 4A. The Estimators and Instruments

Estimator	Transformation	regressors	instruments	estimation
OLS	None	$LnE_{i,t-1}$, X_{it}, 1	None	1-step
Within	Within	$LnE_{i,t-1}$, X_{it}, 1	None	1-step
GMM1	Δ	$\Delta LnE_{i,t-1}$, ΔX_{it}, 1	$(LnE_{i,t-3}LnE_{i,t-2})$, ΔX_{it}, 1	1-step
GMM2	Δ	As GMM1	As GMM1	2-step
AHD	Δ	As GMM1	$\Delta LnE_{i,t-2}$,ΔX_{it},1	1-step
AHL	Δ	As GMM1	$LnE_{i,t-2}$, ΔX_{it},1	1-step

Here, X_{it} is the vector of exogenous variables included in the estimations and LnE_{it} is the dependent variable.

4.3.2. Measurement of variables and data sources

The principal data source used is the published final accounts of 52 province-municipalities for which we have 10 observations during the period 1987-1996. The panel is balanced in the sense that we have the same observations on all municipalities. Our expenditure variable is total municipality spending in a given year. We use population (LnN), per capita income (Lny), total lump sum grant (LnG), and past expenditure level as explanatory variables for local public spending.

Most of the financial data used in the estimation of the expenditure functions are obtained from the DIE (State Institute of Statistics (SIS)), and publications of the various government departments obtained via Internet sites. For instance, data on income obtained from DIE regional income distribution is the average income[6]. As data on personal income does not exist, we proxied per capita income by per capita gross regional domestic product.

Data on municipal government total expenditures and total grants are obtained from the final accounts of municipal, special provincial, and village administrations (published by SIS) which cover the period from 1987 to 1996 for 52 ordinary municipalities. We derived the population of provinces by dividing the total regional gross domestic product (1987 prices) by per capita regional gross domestic product within a province.

4.4. Estimates of the Simple Dynamic Model

Table 4.1 presents the estimates derived from the GMM and other estimations. The first point to note is that, in many cases, the coefficients seem to imply a reasonable degree of precision in estimation: i.e. the standard errors tend to be small relative to the estimated coefficients. Secondly, in some cases (AHL and AHD), the signs on the lagged effect are contrary to a priori expectations. Nevertheless, many of the parameters do exhibit the correct signs.

In Table (4.1)[7], we report GMM estimates of the dynamic demand equation. We begin by including current-dated variables and the unrestricted lag structure. Column 1 (GMM1 estimate) and column 2 (GMM2) present the one-step and two-step estimation results respectively for the most general dynamic specification that we have considered for the demand for municipal provisions.

One cross-section is lost in constructing lags and one for taking first differences of data, so that the estimation period reduces to 1989-1996 with 416 useable observations. Here all independent variables other than lagged dependent variables are assumed to be exogenous. Comparing column (1) and (2) shows that the estimated coefficients are quite similar in both cases. The asymptotic standard errors associated with the two-step estimates are generally around four times lower than those associated with the one-step estimates, with the discrepancy being even larger for lagged dependent variable.

In Table 4.1, we present alternative estimates of the same model for comparison. Columns 3 and 4 report two instrumental variable estimates of the differenced equation using simple instrument sets of the Anderson-Hsiao type. Column 3 is a Hsiao type -IV estimator (AHL), which uses all regressors in differences and $LnE_{i(t-3)}$ in levels (i.e. untransformed instruments). Column 4 is a Hsiao type -IV estimator which uses AHD type instruments. AHD type instruments contains

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[6] Internet site is http://www.die.government.tr
[7] Estimation has been done using DPD for Ox written by Arellano et al (1997) and Doornik et al (1999).

$\Delta LnE_{i(t-3)}$ in addition to the regressors in differences. In column 4, we use the first difference $\Delta LnE_{i(t-3)}$ to instrument $\Delta LnE_{i(t-1)}$, while in column 3, we use the level $LnE_{i(t-3)}$ as an instrument. In both cases, the coefficient estimates are poorly determined, indicating a loss in efficiency compared with the GMM1 and GMM2 estimators in this application. As standard errors for AH type estimates in equation are very high except estimate of LnG, they render the estimates statistically insignificant.

Table 4.1

Expenditure equation

GMM and AH estimates

Dependent variable: LnE_{it}

Sample period: 1987-1996

Effective sample period: 1989-1996

52 ordinary municipalities

Explanatory variables	1 GMM1	2 GMM2	3 AHL	4 AHD
LnE(-1)	0.17 (0.15)	0.16 (0.02)*	-0.081 (0.06)	-0.085 (0.05)
Lny	0.55 (0.13)*	0.53 (0.02)*	0.76 (0.99)	0.77 (0.85)
LnG	0.40 (0.13)*	0.43 (0.03)*	0.87 (0.16)*	0.86 (0.17)*
LnN	0.33 (0.09)*	0.38 0.02)*	0.63 (0.93)	0.66 (0.65)
Wald (joint)	277.0 (0.000)**	2855.0 (0.000)**	41.3 0.000)**	55.76 0.000)**
Wald (dummy)	81.89 (0.000)**	852.3 (0.000)**	30.02 0.000)**	32.25 0.000)**
Wald (time)	72.4 (0.000)**	711.4 (0.000)**	30.02 0.000)**	32.25 0.000)**
AR(1) (N(0,1))	-3.195 (0.001)**	-2.7 (0.007)**	-1.96 (0.05)*	-3.3 0.001)**
AR(2) (N(0,1))	0.212 (0.832)	0.17 (0.863)	-0.89 (0.370)	-0.761 (0.447)
Sargan		35.99 (0.42) [df=35]		1.029 (0.96) [df=5]

Notes:(i) Asymptotic standard errors are robust to general cross section and time series heteroskedasticity are reported in parenthesis. * is significant at the one percent level and ** is significant at the five percent level.

(ii) AR (2) and Wald tests are asymptotically robust to general heteroskedasticity.

(iii) In column 1, one step GMM , in column 2 two- step GMM estimates are reported. AHD and AHL report Anderson and Hsiao type estimation of the equation in first differences: $\Delta LnE_{i(t-1)}$ is treated as endogenous and the additional instruments are used $\Delta LnE_{i(t-3)}$ in AHD (i.e. $\Delta LnE_{i(t-3)}$ to instrument $\Delta LnE_{i(t-1)}$), and we use level $LnE_{i(t-3)}$ as an additional instrument in AHL.

(iv) Time dummies are included in all specifications

(v) Sargan test of over identification restrictions is reported in the parenthesis. It is asymptotically distributed as chi-squares χ^2_k under the null hypothesis of validity of instruments with degrees of freedom given by df.

(vi) The Wald$_{(joint)}$ statistic is a test of the joint significance of the independent variables asymptotically distributed as chi-squares under the null hypothesis of no relationship. The Wald$_{(time)}$ statistic is a test of the significance of the time dummies. The Wald$_{(dummy)}$ statistic is a test of the significance of the dummies (time and constant).

In Table 4.2, column 2, we report the OLS estimates of the dynamic expenditure equation in levels where the effective sample period becomes 1988-1996. In this case, all observations are available and the longer estimation period has been used (here the number of observations is 468). The estimated coefficients of the lagged dependent variables are sensitive to the choice of estimation method. Compared to the GMM estimates there is a serious upward bias on the lagged dependent variable, which suggests the presence of municipal-specific effects. Thus, when OLS estimation is applied, the speed of the adjustment process $(1-\beta_1)$ is likely to be underestimated due to municipality-specific omitted variables. Column 3 presents the Least Squares Dummy Variable estimates (or Within group estimates). These are OLS estimates of the expenditure equation in deviation from group means. Compared with the GMM estimates there is a significant downward bias on the lagged dependent variable. LSDV overestimates the adjustment speed. These estimates are in agreement with the theoretical results in the econometric literature: that is, the OLS estimate of coefficient of lagged dependent variable is biased upward and LSDV estimate is biased downward (see Nickell, 1981, Anderson and Hsiao (1981 and 1986)).

Table 4.2

Expenditure equation

Alternative estimates

Dependent variable: LnE_{it} Sample period: 1987-1996
Effective Sample period: 1988-1996
52 ordinary municipalities

1	2	3
Explanatory variables	OLS	LSDV (Within group)
LnE(-1)	0.44 (0.03)*	0.08 (0.03)**
Lny	0.17 (0.02)*	0.07 (0.08)
LnG	0.47 (0.03)*	0.65 (0.03)*
LnN	0.11 (0.03)*	0.28 (0.08)*
Constant	-1.36 (0.34)	-
Wald(joint)	726 0.000**	642 0.000**
Wald(dummy)	76.25 0.000**	56.67 0.000**
Wald(time)	57.99 0.000**	56.67 0.000**
AR(1) test (N(0,1))	0.74 0.457	0.7151 (0.475)
AR(2) test N(0,1)	3.74 0.000**	-1.113 0.266
R^2	0.94	0.80

Note: Column 2 reports the OLS estimates of the equation in levels, no transformation is used and the effective sample period becomes 1988-1996. Column 3 reports Least Square Dummy Variable estimates (LSDV or within-groups). LSDV estimates are OLS estimates of the equation in deviations from group means.

We now highlight the policy implications of these results. The short run estimates suggest that the elasticity of the lump sum grant[8] varies between 0.40 to 0.43 in the GMM1 and GMM2 estimation, respectively. The standard errors are very low and the estimates are significant at the one per cent level. The implication of this is that an increase in lump-sum grant of one TL, other things being equal, will on average, lead to an increase in 0.96 (GMM1) TL to 1.04 (GMM2) in total municipal

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[8] The 'grant elasticity of expenditure' is the responsiveness of local government spending to changes in grants received from central government. In a log-linear model, it is given by the relevant regression coefficient.

expenditure (evaluated at the sample mean values[9]) in the short run. The slope coefficient β_3 (in equation 4.17) measures the elasticity of E with respect to G: that is, the percentage change in E for a small change in G:

$$\beta_3 = \frac{\partial E}{\partial G} \frac{G}{E}$$

The marginal effect of the grant (the derivative of expenditure E with respect to grant G) is often computed at the sample mean values of E and G. That is $\frac{\Delta E}{\Delta G} = \beta_3 \frac{\overline{E}}{\overline{G}}$ where $\overline{E}$ and $\overline{G}$ are the sample mean values. $\frac{\Delta E}{\Delta G}$ is an approximation of $\frac{\partial E}{\partial G}$.

The significant positive coefficients imply that intergovernmental grants tend to stimulate spending by municipal governments and do not substitute for local revenue, as indicated by the numerically greater than one values of the estimated propensities. The absence of the tax substitution is compatible with the institutional framework because municipalities do not have the legal power to amend tax rates which are set by central government. If we think that the marginal propensity of the grant effect is 0.96 (GMM1), we may think of a little tax cut (by 0.04 TL) as a reduction in other levies and charges in the short run. The result in GMM2 estimation suggests that we do not have a tax cut as the marginal propensity of grant effect is greater than one i.e. 1.04.

The coefficients on other independent variables have the a priori anticipated signs in all estimates except for the coefficient on the lagged dependent variable in the AH-type estimator. Otherwise, the elasticity of expenditure with respect to lagged expenditure varies between 0.16 and 0.44. Dynamic estimation shows that current expenditures are positively related to the lagged expenditure variable. Given the consistent estimator is GMM, we may conclude that the speed of local supply to

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[9] Mean total expenditure is 0.55189 Million TL, mean total grant is 0.22806 Million TL.

meet the desired demand for local spending is very high. The speed of adjustment, which is equal to $1-\beta_1$, is about 85 % per year in the simpler dynamic model.

The per capita income elasticity is found to be statistically significant and positive: the short run income elasticity varies between 0.53 (GMM1) and 0.55 (GMM2). A 1% increase in per capita income in the region will yield a 0.55 % increase in total municipal spending. These short run income elasticities are within the range of elasticities found in the literature of the static demand for local expenditure. In order to compare this estimate with the aggregate grant effect we have to convert per capita propensity into aggregate income propensity. The marginal propensity of aggregate income is around 0.01, evaluated at the mean values[10] by using

$$\frac{\Delta E}{\Delta Y} = \frac{\partial E}{\partial y}\frac{1}{N} \text{ and } \frac{\partial E}{\partial y} = \beta_2 \frac{\overline{E}}{\overline{y}} \text{ where Y = Ny is aggregate income.}$$

The elasticity of total expenditure with respect to population is statistically significant and positive. In the short-run, it varies between 0.33 (in GMM1 estimate) and 0.38 (in GMM2 estimate). It could be said that the short-run elasticity of expenditure with respect to population is approximately 0.38 (GMM2). A 1 % increase in a municipality's population leads to a 0.38 % increase in the total municipal spending.

Table 4.3

Long Run Coefficients ($\tilde{\beta}_k = \dfrac{\beta_k}{(1-\beta_1)}$) under different estimators

Estimators	Lny	LnN	LnG
GMM1	0.66	0.41	0.49
GMM2	0.62	0.45	0.51
AHL	0.70	0.58	0.80
AHD	0.71	0.61	0.79
OLS	0.30	0.20	0.84
Within	0.08	0.30	0.71

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[10] Mean income is 0.0000565 Million TL and mean population is 509,824.

Table 4.3 documents the long-run elasticities of variables under different estimations by using $\widetilde{\beta}_k = \dfrac{\beta_k}{(1-\beta_1)}$, where β_k is the estimated coefficient of variable k, β_1 is an autoregressive coefficient, $\widetilde{\beta}_k$ is the corresponding long-run coefficient of the exogenous variables.

The long run estimates suggest that the elasticity of expenditure with respect to the lump sum grant is 0.49 (GMM1) and 0.51 (GMM2). As explained earlier, we calculate the marginal effect of the grant at the sample mean values of the variables: An increase in lump sum grant of one TL, other things being equal, will on average lead to an increase in 1.18 TL (GMM1) and 1.23 (GMM2) in total municipal expenditure in the long run. Our results indicate that, in the long run, we do not have a tax substitution which is generally referred to as the grant being a veil for a tax cut. A possible tax cut disappears in the long run.

The per capita income elasticity is 0.66 (GMM1) and 0.62 (GMM2) in the long run. Evaluated at the mean values of data, we calculate the marginal propensity of aggregate income 0.012 (GMM1) and 0.011 (GMM2). An increase in aggregate income of one TL, other things being equal, will lead on average to an increase in 0.011 to 0.012 TL in municipal total expenditure. If there is an increase in the general level of incomes in the locality, the demand for local expenditure will increase by a very small amount. The differences in per capita income between the regions will have a very little impact on the inter-jurisdictional differences in total municipal expenditure across the country.

The long-run elasticity of expenditure with respect to population is found to be between 0.41 and 0.45 in our preferred GMM estimates. Preston and Ridge (1993, 1995) argue that evidence on price elasticities can be obtained mainly by observing the correlations between demand and both authority size and costs, because the tax price clearly ought to vary in a systematic way with both population and costs. Thus, to obtain evidence on the price elasticity, they looked first at the effects of the population and cost terms. The positive and typically significant effect of local population on desired spending is compatible with the view that there is a degree of

nonrivalry in consumption of the publicly provided goods so that a higher population reduces the tax price. The fact that the impact is positive (between 0.013 and 1.3) would also suggest that demand is price elastic.[11]

Therefore, we may assume that an increase in N leads to a decrease in the individual's share of the local enterprise good (θ) which is a measure of the price of local provision (in equation 4.10) with the unit cost of local public goods (c). This results in an expansion in the efficient level of output, unless the publicly provided good is a Giffen good. In addition, the expenditure on the good at the efficient level of output will rise if individual demands for the publicly provided good are price elastic. The expenditure on the good at the efficient level of output will fall if the demands of individuals for the good are price inelastic. We conclude that the demand for local public goods is price elastic.

4.5. The Error Correction Mechanism

The error correction model (ECM) relates changes in a variable to changes in other variables as well as the past levels of the explanatory variables[12]. The formulation is based on an underlying long run relationship between the variables included in the model. In the short run, however, there may be disequilibrium. With the ECM, a proportion of the disequilibrium in one period is corrected in the next period:

$$\Delta LnE_{it} = \alpha_1 \Delta Lny_{it} + \alpha_2 \Delta LnG_{it} + \alpha_3 \Delta LnN_{it} + \beta_1 LnE_{it-1} + \beta_2 Lny_{it-1} + \beta_3 LnG_{it-1} + \beta_4 LnN_{it-1} + \mu + f_i + \varepsilon_{it} \quad (4.23)$$

where μ is constant, f_i and ε are fixed effect and error terms, respectively. β_1 is short-run disequilibrium adjustment term. The value of the term is expected to be between zero and minus one i.e. $-1 < \beta_1 < 0$.

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[11] Preston and Ridge also found the impact of higher wages (i.e. cost variables) in the locality seems to depress demand. But the effect is not significant and may reflect the poor quality of the cost information.

[12] see Charemza and Deadman (1992), Engel and Granger (1987).

Regression (4.23) relates the change in total municipal expenditure to the change in per capita income, total grant, population, and the 'equilibrium' error in the previous period. In this regression, Δ captures the short-run disturbances in explanatory variables whereas the error correction term β_1 captures the adjustment toward the long-run equilibrium. If β_1 is statistically significant, it tells us what proportion of the disequilibrium in total municipal expenditure in one period is corrected in the next period. Using the data given earlier, we obtained the following results:

Table 4.4
Expenditure equation
Error Correction Mechanism
Dependent variable: LnE_{it} sample period: 1987-1996

52 ordinary municipalities

Explanatory variables	1 GMM1	2 GMM2
ΔLny	0.30 (0.43)	0.45 (0.17)*
ΔLnG	0.56 (0.14)*	0.57 (0.05)*
ΔLnN	0.20 (0.44)	0.34 (0.16)**
$LnE(-1)$	-0.68 (0.08)*	-0.65 (0.03)*
$Lny(-1)$	0.43 (0.12)*	0.38 (0.05)*
$LnG(-1)$	0.33 (0.10)*	0.30 (0.03)*
$LnN(-1)$	(0.37) (0.08)*	(0.32) (0.03)*
Wald (joint)	153.3 (0.000)**	890.7 (0.000)**
Wald (dummy)	61.70 (0.000)**	259.8 (0.000)**
Wald (time)	60.81 (0.000)**	259.2 (0.000)**
AR(1) test (N(0,1))	-3.44 (0.00)**	-3.046 (0.002)*
AR(2) test (N(0,1))	1.79 (0.073)	1.32 (0.187)
Sargan test		33.29 (1.00) [df=74]

Note: see the table notes in Table 4.1 for explanations

Results for the ECM are tabulated in Table 4.4. As we can see from the table, the significance of the disequilibrium adjustment term is high. It is approximately 0.65 to 0.68. These results show that short-run changes in explanatory variables have positive effects on municipal spending and that about 0.65 to 0.68 of the discrepancy between the actual and the long run, or equilibrium value of municipal expenditure is eliminated or corrected each year. Our results suggest that there is a positive relationship between municipal expenditure and explanatory variables, and that municipal expenditure adjusts to its long-run growth path quickly following a disturbance.

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Standard errors of short-run effects in the ECM are generally higher in one step GMM estimates than in simpler dynamic estimates. The GMM2 estimates of short run effects of explanatory variables are statistically significant. We prefer the ECM model to a simple dynamic model because the inclusion of explanatory variables in difference and their lags are statistically significant for explaining the change in total municipal expenditure. Moreover, the adjustment term in the ECM is more realistic considering the institutional features of municipal governments and bureaucratic sluggishness. We have found that the adjustment term is lower than simple dynamic estimates.

The long run equilibrium coefficient for the income effect, for example, is captured by:

$$\tilde{\beta}_j = \frac{-\beta_j}{\beta_1} \qquad j = 2...k$$

Then, *the long run* coefficients related to explanatory variables are as follows:

Table 4.5
Long-run elasticities of the ECM

	Lny	LnN	LnG
GMM1 ECM	0.63	0.54	0.49
GMM2 ECM	0.58	0.49	0.46

Evaluated at the means of variables, the long run propensity of aggregate income is around 0.012 in GMM1 and 0.011 in GMM2 estimator. The corresponding long run propensity of grant is 1.18 in GMM1 and 1.11 in GMM2 estimates respectively. These empirical results for the ECM suggest that lump sum grants are not a veil for tax cuts but the grant propensity (1.18) is much higher than the aggregate income propensity (0.012). In the literature, an estimated unconditional lump-sum aid propensity much larger than the income propensity has been interpreted as evidence of the flypaper effect (see Fisher (1982), Megdal (1987b), Zampelli (1986), Islam and Choudhury (1989, 1990), Duncan and Smith (1995), Strumpf (1998, p398-406), and Worthington and Dollery (1999, p7).

Our findings also support the results in our theoretical model where we have argued that, in order to have a flypaper effect, the marginal effect of grant on total expenditure (equation (4.15)) will need to be greater than the total income effect (in equation (4.16)). Our results suggest that the aggregate income effect is less than the aggregate grant effect. We conclude that there is a flypaper effect suggesting that the lump-sum grant has a greater impact on expenditure than does private income. This result leads us to conclude there are flypaper effects in both the short-run and the long-run dynamic estimation in Turkey.

4.6. Conclusions

We have developed a dynamic explanatory model of municipal expenditure for the first time in Turkey. The analysis has been undertaken at the province level for the year 1987-1996, using the revenue and expenditure data of 52 ordinary municipalities in the country. Most of the results presented in this chapter have been arrived at for the first time in the context of developing countries as well as for the developed countries. We have estimated elasticities to quantify formally the impact on total local government expenditure of changes in the exogenous variables such as per capita income, total lump-sum grant and population. The empirical analyses are largely consistent with the theoretical framework and provide a number of useful insights into the pattern of local finances in Turkey. Results of the empirical model of municipality behaviour suggest that major determinants of local government expenditure include the income level within a jurisdiction, the size of the municipality (measured in terms of population), grants, and past expenditure levels (i.e. supply adjustment to past years' demand for local public goods and services).

In this chapter, we attempted partly to assess the economic behaviour of local authorities on the one hand and on the other partly to obtain information on the general grant system as a policy instrument. By modelling local government budgetary reactions to central government financial transfers in the context of standard economic theory, we have found that certain economic responses are in place. A careful study of our estimates presented in the tables leads to a number of useful insights into local government expenditure patterns. The level of past

expenditure level has a major impact on local government expenditure (see Table 4.1). We would expect the decision making process described in section 4.2 to hold in the longer run and that pre-set municipal plans and bureaucratic speed would obstruct short-run adjustment. We, however, found that the municipal governments are implementing the desired spending at a considerable speed.

Transfer receipts of local government, which are lump-sums grant from a higher level of government and are exogenous to local government finances, have a stimulatory impact on local government expenditure. It may be noticed that the coefficient for grant-in-aid is less than unity in both the short run and long run. However, evaluated at mean values, in the long run the propensity is greater than unity (1.18 in the ECM), implying that an increase in such revenue source leads to a slightly more than equivalent increase in expenditure. Our result is consistent with the institutional framework, where it was argued that higher intergovernmental transfers are likely to be translated only into higher expenditure but not into a reduction of own fiscal effort. While we give evidence on the results of incorporating dynamic elements into the expenditure equation in order to explain the variation in the municipal expenditure, our findings also throw light on the existence of the flypaper effect in the dynamic estimation. Given the wide-spread results from static private demand studies, the dynamic and static estimation of Turkish municipal government expenditure show that we have a flypaper effect as the grant effect is greater than that of the income effect on local expenditure.

CHAPTER V. PUBLIC CHOICE APPROACH TO DETERMINATION OF INTERGOVERNMENTAL GRANTS

5.1. Introduction

The purpose of this chapter is to subject the economic theory of political behaviour to an empirical test, using data on central government grants to local governments. This will be done by empirically analysing the determinants of grant allocation to municipalities in Turkey under coalition government and testing for the validity of the political dimension in this process.

Although the amount of central government grant has changed substantially over the period under review, the government changed the process of determining intergovernmental transfers by announcing the inclusion of economic and regional factors in the grant allocation to arrive at a rational basis for it to achieve fiscal equalisation goals and a minimum provision of publicly provided goods and services. However, failing to arrive at the application of equitable grant allocation formulae, and deficiencies in institutional arrangements such as publishing the guidelines for how to allocate the grant monies, may enable political factors, particularly those stressed in the public choice approach to intergovernmental transfers, to determine the size and the direction of central government grants.

There were twelve political parties running for the national election held in 1995. The political division of the parties is not sharp as in England. Indeed, although there are some minor differences among the parties of the centre right and centre left, others are ideologically almost identical. As a result, Turkey's current political situation makes it difficult for one party to be sufficiently dominant to gain an outright victory. The result is that Turkey is governed by coalitions. By their very nature, they do not allow partners to act against one another explicitly. It is worth testing, therefore, whether such government acts as a cohesive unit or splits into party factions in the allocation of funding to the various municipalities. Our results will, also, highlight this issue. In this chapter, on the one hand, we analyse the Turkish grant system, on the other hand our findings give further insight into the

newly developing literature by testing the political behaviour empirically in a coalition government.

By empirically testing the presumed rationales on the grant allocation, our results show that the Turkish government is far from achieving its objectives. Thus, we see the scope for the redesign of grant allocation to achieve certain government goals such as fiscal equalisation and minimum provision of public goods and services. This will further support our hypothesis that we can improve the income distribution between regions by redesigning the grant programme. This is arrived at through the application of formulae that will not open any door to political factors and will be obtained by pursuing a process to achieve the government's goals.

In the following section, the theoretical grounds for the two competing models for intergovernmental transfers will be explained. In section 5.3, econometric issues are discussed and in 5.4 data are presented for the purpose of estimation. Section 5.5 presents the estimation result from two competing models. In section 5.6, we examine the role of political influence on the distribution of grant to municipalities by using a hybrid model that combines the equity/efficiency and the public choice approach in the grant allocation. Section 5.7 presents the estimation result for the hybrid model. Section 5.8 concludes this chapter.

5.2. Explaining intergovernmental grants

Alperovich (1984) asserted that a body of literature has developed which attempts to establish links between government behaviour and the assumption of rational behaviour which is central to modern economic theories. This approach assumes that actions taken by the government in a democratic society can be explained in terms of its attempts to maximise its own utility function. This includes the prospects for re-election as an important variable, subject to various constraints. This approach is central to the economic theory of politics which was developed and elaborated by Downs (1957). Rich (1989) argues that one theory of the distribution of government benefits promotes the notion of a political-business cycle in which government benefits tend to peak during those periods immediately preceding national elections.

While studies found a relationship between elections and economic performance in areas such as inflation, unemployment and interest rates (e.g., Beck 1987; Hibbs 1977; Nordhaus 1975), it was also shown that increases in such transfer payments as social security and veterans' benefits also fluctuate with the electoral cycle (Tufte 1978). Works by Wright (1974), Silberban and Durden (1976), Abrams (977), Danielsen and Rubin (1977), Frey and Schneider (1978) and Gist and Hill (1981) are a few examples which demonstrate the validity of the approach. Recent evidence is provided by Limosani and Navarra (2001). They found that, in national election dates, local administrators increased public investment spending which raises the re-election chances of their party leaders.

The empirical estimation of these theories has often faced difficulties in that many policies interact with other competing policies; hence it is difficult to identify the affected and affecting parties (Alperovich, 1984). Another difficulty results from the lack of data which makes it difficult to do empirical analysis. Despite these difficulties, the intergovernmental grant allocation has become a popular field for the empirical analysis of the link between government behaviour and the assumption of rational behaviour. There are two competing theories of the determinants of grants in a local public system. We now will explain them in turn.

5.2.1. Efficiency and Equalisation Model (Model M1)

The first theory is based on the assumption that grants to local government are made on efficiency and equity grounds. The efficiency and equalisation model treats intergovernmental grants as a policy tool of benevolent government. Benevolent government seeking to maximise the welfare of its citizens will employ policy instruments such as the public provision of goods which are not within the province of the private sector. This removes the distortions in the allocation of resources due to externalities. Also, the necessity of intergovernmental grants as tools of benevolent government is inevitable once the government functions are divided between different level of governments.

Unmet expenditure need can arise due to a vertical and/or horizontal imbalances. Vertical imbalance arises when assigned local expenditure is not matched with assigned local own revenues. Horizontal imbalance arises when different local governments have varying fiscal disparities due to differences in tax capacities, differences in needs, and differences in the costs of local provision. Low-income regions will have lower levels of public expenditures, further impinging on social and economic opportunities, already limited by low income, available to their residents. This horizontal imbalance further increases the income disparity between regions. Efficient and equitable performance of fiscal operations often requires so-called intergovernmental transfers between the level of governments (Oates, 1972). The economic justification of grant assumes that central government may attempt to close the gaps between the revenue raising capacities of cities and the cost differentials in the provision of publicly provided goods and services. In turn, closing these gaps helps central government to achieve a minimum level of services across municipalities.

If intergovernmental aids have been allocated to municipalities most in need of grant, and they have been effective in removing fiscal disparities, as well as being based on objective criteria, we can capture such features of the grant design by formulating an empirical model (where prior expectations in respect of the coefficient signs are given in parenthesis), which assumes the grant is a function of variables that can be argued *a priori* to be relevant:

$$LnG_i = \beta_0 + \beta_1 LnY_i + \beta_2 LnN_i + \beta_3 LnUE_i + \beta_4 LnMV_i + \beta_5 LnD_i + \beta_6 LnU_i + \beta_7 LnHS_i + \beta_8 LnH_i + \upsilon_i \tag{5.1}$$

Here all variables are in logs and defined as

G: central budgetary allocation to the municipality i (in per capita)

Y(-):   per capita gross regional domestic product (RGDP) in the municipality i,

N (+/-): population of the municipality i,

UE (+): the number of unemployed per thousand people in the municipality i,

MV(+): the number of motor vehicles per thousand people within the municipality i

D (-):   population density measured as persons per square kilometre,

U (+/-): proportion of people living in the urban area,

HS (+): the number of high-school students per thousand people enrolled within the municipal jurisdiction i,

H (+): the number of houses per thousand people in the jurisdiction of the municipality i,

We can justify the inclusion of these explanatory variables as follows: the unemployment rate (UE) is included to capture the regional differentials in a counter-cyclical fiscal policy. This variable has two features. First, it is assumed that central government will transfer funds to the needy provinces where the level of unemployment is relatively high. Second, this variable may also act as a proxy for a locality's tax base: revenue-raising capacity will be lower for those municipalities that have a higher level of unemployment. Therefore, *a priori* we expect a positive sign on the coefficient of UE. However, this variable may not be the best proxy for fiscal capacity. Even though it has a higher ratio of unemployed people, a city could still be richer than other cities that have relatively low unemployment. For this purpose, the Y variable would be the best one for explaining the differentials in horizontal fiscal imbalances.

Income (Y) is included to capture the equalisation effect of a grant programme. The per capita regional income is employed to proxy the per capita relative fiscal capacity of municipalities in Turkey.[1] It is difficult to choose a factor which perfectly reflects the resources. The conceptual basis for the income approach to the measurement of fiscal capacity for a grant programme is that, for the nation as a whole, aggregate national income represents the total resources available to meet both public and private sector demands for goods and services. We expect the sign on the coefficient of the income variable to be negative. We would expect that, for the purpose of an equalisation scheme, if the distributional pattern of the grant follows the horizontal inequity principle, a municipality with low fiscal capacity (or low tax resources) should receive more grants than a municipality with high fiscal capacity (high local tax resources). In other words, if the grant has a redistributive

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[1] We can define regional fiscal capacity as the ability of a government unit to raise revenue for financing current expenditures.

characteristic (and is aimed at reducing income inequality across regions), a municipality which falls in the low fiscal capacity category should receive above average per capita grants, and vice-versa.

The following variables are chosen as needs indicators. N, the population size, measured in millions, is generally hypothesised to contribute to increased local government expenditure. So, if the population reflects the need factor in municipal spending, its coefficient should take a positive sign. An increase in the regional population brings a greater demand for local goods and services. There have been some contradictory hypotheses and empirical evidence suggesting that N should be correlated negatively with government expenditure (see Grossman (1987, 1989)). The argument is that public goods are subject to decreasing costs and thereby permit reduced expenditures (i.e. the scale economies in the locality providing public goods and services). Lacking any decisive evidence to support either hypothesis, Grossman (1987), for example, holds no a priori sign regarding the relationship between N and the grant.

D is included to capture the effect of cost differentials across jurisdictions. The costs of municipal services vary between regions due to a variety of environmental factors, scale economies and other economic factors. Broadly speaking, there are at least two factors which cause the differences in costs. The first factor is the input price, such as the cost of labour or of essential materials. These may differ quite significantly across regions. To some extent, these may balance out. Wages may be lower in a remote area, offsetting heavier transport costs for the materials. The second factor is the location problem. This is because the geographic nature of the locality (for example, mountains or islands) can affect the cost of providing services. As distance to raw materials (produced or imported) increases the transportation costs, some regions have to allocate more resources in order to achieve the same level of services. This cost differential may be added as another factor of spending needs.

Parks, refuse collection, other public health bodies, and fire protection are clearly seen to be related to population density - i.e. greater expenditure per head being

required to maintain a given level of service in rural areas and low population density areas. These variations in the cost of provision are largely involuntary. Low-density areas often attract proportionately higher allocations because of the greater per capita costs of providing services to a scattered population. Refuse collection, for example, may require extra expenditure due to a high element of transportation costs.

Local goods and services may be under provided by the municipalities with higher rural population densities. If the population density is low in one jurisdiction, it may have to provide local goods and services with a higher marginal cost. This may cause under-provision of such services. The efficiency argument requires that these municipalities may be subsidised through intergovernmental transfers to achieve minimum provision of such goods and services across the regions. Therefore, D captures one factor which may lead to intergovernmental grants for the purpose of horizontal fiscal equalisation, and lead central government grants, designed to reduce the relative price to the municipality of (under) providing this good, to increase the level of provision. The prior expectation of sign on the coefficient of D is negative.

The U variable is included to capture the role of grant in compensating for the need and cost differentials between municipalities. A high-density urban settlement is occasionally recognised as generating above average expenditure needs. We would expect that more urbanised jurisdictions would provide a wider range of local public services, and the solution of urban problems requires higher expenditure. However, there are conflicting hypotheses as to the relationship between the urbanisation ratio (U) and municipal expenditure. Three features stand out with urbanisation as important: greater needs, diseconomies of scale (management and administrative inefficiency), and the impact on costs of the scarce resource of space (i.e. congestion). In general, and in practice, all of these tend to increase the municipal expenditure requirements in the more urbanised city, the so called 'inner city'. Many indicators of social need can be shown empirically to be concentrated in urban areas. It seems reasonable to argue that highly intensive city land use increases costs, including land and building costs (if they are used by municipalities their costs will

increase), and possibly travel costs (e.g. bus operating costs). Increased urbanisation may lead to a greater need for municipal goods due to the increased demands and problems of large cities: congestion and pollution. However, a concentrated population should permit greater exploitation of scale economies in the provision of local public goods. Therefore, *a priori*, no particular sign is expected regarding the relationship between urbanisation and the grant.

We included MV because it reflects the need for expenditure. Secondly, it reflects the cost of local provision. Factors that may also give rise to higher costs of provision (or require higher municipal expenditure) may include the number of motor vehicles (MV). The number of motor vehicles, for example, is assumed to increase traffic congestion. Traffic congestion may indeed increase the running costs of public transportation. On the other hand, MV is not a pure cost factor. It is a need factor which is led by demand (i.e. increasing demand for street/road maintenance, new road construction, and parking lots etc). Therefore, the expected sign on its coefficient is positive.

H and HS variables are included to see the effect of the need variables in the grant design. An increase in a region's relative number of high-school students (HS) can increase the demand for local transportation, and, hence, municipal expenditure on public transportation (buying new transportation vehicles and/or increasing the service schedule). Moreover, subsidised students bus fares makes public transportation costly for local government. The expected sign on its coefficient is positive. The number of houses (H) may be an indicator (demand oriented) that gives rise to water supply services, as it increases the expenditure on the maintenance of water pipe lines and constructing new lines. The expected sign on its coefficient is positive.

5.1.2. The Public choice approach (Model M2)

The process of grant allocation can be explained at least partially by factors associated with political interests (see Faith 1979, p317), forming the second view based on the public choice approach. Bungey et al. (1991, p659) noted that "the

public choice approach argues that utility-maximising politicians will use intergovernmental grants to maximise the probability of staying in power." In this approach, the importance of the possibility of vote trading and bargaining in the political market place is stressed (see Grossman 1987 and 1989).

It is clear that a grant can provide the recipient with many advantages. For example, the recipient can provide more local services without relying on new taxes or raising existing tax rates and local government can even reduce its own tax rates without reducing local spending. But what is the gain that politicians at central government can obtain by transferring resources to local government?

It has been argued that the behaviour of government in the democratic process is the result of an effort to maximise the probability of re-election. The distinction between this approach and the previous model has been asserted by Bungey et al (1991) as: 'the efficiency and equalisation model essentially seeks to answer the normative question of why grants should be made. The public choice model seeks to answer the positive question of why grants would be made.' This approach uses the utility-maximising politician model based on Down's earlier work. The government is assumed to maximise its own interests and this is not explicitly included in the equalisation/efficiency model. Of course, governments, in pursuit of their own interest, may inadvertently achieve the maximisation of social welfare. However, efficiency and equity are now irrelevant unless they are tools for increasing the probability of re-election. Based on the Grossman (1987, 1989) approach. we can show the development of the public choice approach to the intergovernmental grant. The basic assumptions of the model are:

1. In the country, there is more than one political party. These political parties involve politicians who compete for votes to be elected. In a manifesto, each party has to propose a budget in which expenditure/tax categories are ranked according to their vote generating/ or vote losing capability. A vote maximising politician's budget proposal will be the one that generates more votes (i.e. higher expenditure level and the least harmful taxes).

2. At the end of each period, in the absence of grants, the budget must be balanced i.e., total expenditures must equal total taxes. If there are transfers to local government, the central government's budget should balance the expenditure and grants by taxes, and local governments should equate total local expenditures to local tax revenue and grants obtained from central government.

3. As the sole aim of the politicians is to maximise votes at election, their utilities are a function of votes generated (V_t^i).

The notation is as follows:

E_t^i : own purpose expenditure by level of government (i) within the country, at time t. In our case i = central(c) or local government (l), and t = 0,1

T_t^i : own tax revenue of central and local government,

G : intergovernmental grants from central to local governments,

V_t^i : votes generated,

P_c^L : the political capital, which a local politician has to offer to a central politician in exchange for G. Political capital is a support for and favour of a local politician (e.g. a mayor). A mayor delivers the support of local people (special interest groups) in exchange for a grant.

$$G = G(P_c^L)$$ (5.2)

Assumption 2 implies that

$$E_0^i = T_0^i$$ (5.3)

Introducing a grant after a time period, say 1, we have

$$T_1^c = E_1^c + G$$ (5.4)

i.e. central government has to finance the intergovernmental grant, and local government expenditure has to be equal to its own revenue and grants from the central government:

$$T_1^l = E_1^l - G \tag{5.5}$$

In the absence of grants, the only policy tools for generating votes are taxes and expenditures. The politician's objective function for vote maximisation is:

$$V_t^i = v(E_t^i, T_t^i) \tag{5.6}$$

Here plausible assumptions are $V_E \rangle 0, V_T \langle 0$. Equation (5.6) is maximised subject to

$$E_t^i = T_t^i \tag{5.7}$$

Therefore, $V_E + V_T = 0$ (5.8)

At the optimum, we can see that the marginal vote gain from an additional expenditure equals the marginal vote loss from extra tax revenue. In this formula, the effects of interest groups and grants are omitted. If we introduce special interest groups (voters) into the model, politicians running for election will compete for the support of these groups. In return for these vote-generating grants, the local politician, as a representative of a specific locality's voters, provides the central politician with his political endorsement and the votes of his local supporters. This political endorsement and its attendant votes may more than offset the vote loss arising from increased taxation (to the central politician). Politicians will propose a budget that satisfies most of these interest groups. They will rank expenditures in order to generate more votes, while ranking taxes in order to minimise the vote loss.

If we take account of grants, we need to make a comparison between the utility loss and gain to the politicians[2]. While, on the one hand, a grant can generate more votes, on the other, it can cause a loss of votes owing to the need to raise taxes to finance it. We can reformulate the central politician's objective function and extend his constraint:

$$V^c_t = V(E^c_t, T^c_t, G) \qquad (5.9)$$

subject to $\qquad T^c_t = E^c_t + G \qquad (5.10)$

In order to be re-elected, the central politician will anticipate the votes (V), which are a function of: expenditure (E); of the taxes (T) he imposes to finance[3] these expenditures; and of the intergovernmental grants (G) that s/he gives the local politicians to generate more political capital (P_c^L). There is a direct relationship assumed between grant and political capital variable in equation (5.2).

By substitution, the objective function becomes

$$\underset{E^c_t, G}{Max} \qquad V^c_t = V(E^c_t, E^c_t + G, G) \qquad (5.11)$$

Therefore, the first order condition will yield:

$$V_E = V_G = -V_T \qquad (5.12)$$

Equation (5.12) implies that, at the margin, a dollar of central government expenditure should have same effect on votes as a dollar of grant. Also, each dollar of grant should exactly offset votes lost through raising each extra dollar in taxes. In attempting to estimate the effect of the political variable in the grant distribution, we should expect political capital in exchange for grant to determine the amount of grant to be distributed to the locality. The model acknowledges that the direct

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[2] Such that to finance the grant they either levy new taxes (or increase the tax rates) or reduce the central government own expenditures.
[3] Degree of severity of taxes also affects the outcome.

benefit of a grant is received by politicians of the grantee government because they expand the expenditure (i.e. vote maximising) but do not face the disadvantage of grant (i.e. financing grant increases leads to vote-loss faced by grantor politicians). The indirect benefit for the grantor government is seen through a vote trading/political support from local government in exchange for the grants. Political support is associated with the endorsement of recipient politicians, and the delivering of votes of local supporters (special interest group) and other local interest groups (e.g. bureaucracy and union) to central politicians.

To reflect the above considerations, the following empirical model will be employed in order to capture the public choice approach of intergovernmental grants. (5.12) is inverted implicitly to yield G as a function of these variables:

$$LnG_i = \delta_0 + \delta_1 DM1 + \delta_2 LnN_i + \delta_k LnPOL_i + \varepsilon_i \qquad (5.13)$$

Here, G is the per capita central government grant to municipality i in 1996. δ_0 is constant, "N" is the city size (population of a municipality), "POL" is a political variable used to capture the politicians' influence in the grant allocation, "DM1" is dummy variable: 1 if the central government and municipal government are of the same political party, 0 otherwise.

This empirical model reflects the preceding theoretical model in that the amount of grant given to the local government varies with the degree of support given to the central government or the amount of support sought from the local government. The most important factor in the determination of grant size could be political party differences between local and central politicians, and hence this difference would reduce the central politician's expectations from local politicians. Once the central politicians see the local politicians not having provided endorsements and support, they may reduce the amount of grant to those local governments that are in conflict with them. For the estimation year, we had a coalition government in Turkey. Therefore, two political parties (TPP and WP) are included in measuring their influence on the grant determination. Thus, our result will also give evidence from a country where a coalition of parties governs the country. POL is therefore expressed

in two different ways. First, we used absolute differences of political strength of both the parties forming the coalition government (GOVSP). The second definition uses the absolute difference of political strength of the partner of the coalition government separately (WP and TPP). Consequently, we defined these variables in absolute differences:

GOVSP: the difference between the number of votes cast for opposition parties and the coalition government that is formed by both TPP and WP in that municipality.

WP: the difference between the number of votes cast for opposition parties and the political party WP (Welfare Party) that forms the coalition government in that municipality.

TPP: the difference between the number of votes cast for opposition parties and the political party TPP (True Path Party) that forms the coalition government in that municipality.

In order to capture the Public choice considerations which suggest that central government might allocate the grants to the regions with the highest marginal electoral benefit, we identified such regions by identifying the regions that contain the smallest absolute difference between the parties' strengths (GOVSP). If the coefficient on GOVSP is negative, this means that, while attempting to maximise the prospects for re-election, the government pursues the policies that will gain the support of opposition voters and hence allocates the funds to the municipality where it contains the smallest absolute difference between the parties' strength. This line of argument suggest that if the coalition government is powerful (or has a strong political support) in a region, it does not need to pay off its supporters since marginal electoral benefits from grant allocation would be little in a region with the greatest government support. Rather the government would prefer to buy votes in a region where its marginal electoral benefits are higher.

DM1 is a qualitative (dummy) variable if the municipal and the central government are of the same political party. For example, Leyden (1992) and Grossman (1994) argue that the "…ability to deliver voters is of greater value to the politician if all are of the same party" (see also Worthington and Dollery (1998)). The dummy variable is used to capture whether there is a positive relationship between the party of central government and local government while intergovernmental grant is distributed among municipalities. We would expect a positive sign on the coefficient of the dummy variable.

We also identify the regions that have changed hands in recent election by a dummy variable. Second dummy variable (DM2) is used to capture the government behaviour towards the municipalities that had fallen to opposition parties in recent election. Negative sign would indicate that municipalities that had recently fallen to the opposition party could be punished with lower allocation in the hope that the resulting voter annoyance would rebound on the regional governments concerned. On the other hand, positive sign on the coefficient of this dummy would indicate that the coalition government would try to regain the regions that had recently fallen to the opposition parties with higher grant allocation.

The variable N (number of people) is included to capture the effect of the number of each province's eligible voters since the majority of members of parliament are elected from the more populous cities.

5.3. Econometric Issues

Generally, the research methodology employed in estimating the impact of political factors at the level of the local government involves regressing sets of equity/efficiency and public choice variables against grants, where significant coefficients on the latter may indicate prima facie evidence of political influence on the grant allocation. An alternative procedure was pursued by Bungey et al (1991) and recently by Worthington and Dollery (1998) where the equity/efficiency and public choice models form non-nested hypotheses (models), even though strong

reasons exist for believing that both equity/efficiency and public choice variables belong in the same regression.

We will pursue two approaches. First, the two models will be separately estimated by Ordinary Least Squares (OLS). Then, the J-test procedure will be utilised to distinguish the two competing models of intergovernmental grants (See Davidson and MacKinnon (1981) and Kmenta (1986) for details of the J-test). In the second approach, both equity/efficiency and public choice variables will be included in the same regression.

In the J-test two models are specified as follows:

$$LnG_i = X_i \, \beta + \varepsilon_i \qquad (5.14)$$

$$LnG_i = Z_i \delta + v_i \qquad (5.15)$$

Here i = 1...n are municipalities, G is the per capita grant the ith municipality receives, and X and Z are the vector of explanatory variables in the respective regressions. β and δ are coefficient vectors in the respective regressions and ε and v are error terms. Because the two models are non-nested (i.e. neither of them can be obtained from the other by the parameter restrictions), the J-test procedure will be used by first adding $Z\bar{\delta}$ from the OLS estimation of equation (5.15) into equation (5.14) and obtaining the new model:

$$LnG_i = X_i \, \beta + \alpha(Z_i \, \hat{\delta}) + \omega_i \qquad (5.16)$$

While testing this artificial model, the null hypothesis is set as H_0: $\alpha = 0$, which is tested by the standard t-test. If the hypothesis is not rejected then equation (5.16) reduces to equation (5.14).[4] In the end, the results will be compared to judge the superiority of one model over the other. Inability to reject the above hypothesis will

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[4] The same procedure could be performed for equation 5.15 by adding the $X\hat{\beta}$ from estimation of equation 5.14 to equation 5.15 and re-estimating the artificial model.

give us the correct model to employ. In other words, model (5.14) encompasses model (5.15) in the sense that the latter model does not contain any other information that will improve the performance of model (5.14). By the same token, if the null hypothesis is rejected model (5.14) cannot be the true model.

5.4. Data

The dependent variable in our estimation is per capita grants. This variable is preferred to total grants because per capita grants are usually presumed to be the relevant decision variable used in such a distribution process, and because they avoid heteroscadasticity arising from proportionality of the error term with the size of population (see Alperovich 1984).

Most of the financial data utilised in the estimation of the grant functions is obtained from SIS (State Institute of Statistics), and its publications via Internet sites. Data on municipal grants is obtained from the 'Final Account of Municipal and Special Provincial Administrations and Villages 1996' (published by SIS 1999). We used population characteristics (density, urbanisation, and number of students) from the '1990 Census of Population: Social and Economic Characteristics of Population' published by SIS (1993). The population size and regional gross domestic product are for 1995 (the data source is as in chapter 4). Political variables are obtained from SIS's official publications ('Results of General Election of Representatives 24-12-1995' (summary tables)), 'Results of Election of Local Administrations, 26-3-1989' and 'Results of Elections of Local Administration 27-3-1994'). The number of motor vehicles is for 1996 (the only available year) and it is obtained from the SIS's Internet site. The number of houses is obtained from the 'Electricity, Gas and Water Statistics 1992' by SIS (1995).

Figure 5.1
Party Similarity/differences between central and municipal governments

Legend:

- 21 Low grant receiving municipalities held by government parties
- 14 high grant receiving municipalities held by opposition parties
- 16 High grant receiving municipalities held by government parties
- 15 Metropolitan municipalities excluded from our analysis
- 10 low grant receiving municipalities held by oposition parties
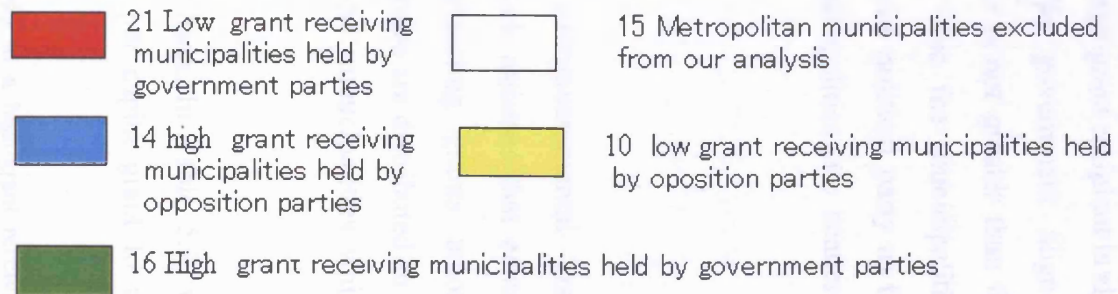
DM is constructed based on the central government political formation and the political identity of the municipal governments. We sketched the political characteristics of municipalities and their grant receipts in Figure 5.1. We excluded 15 Metropolitan municipalities from our analysis because their institutional features and the law applied to them are different from the ordinary municipalities. They are shown in white. The remaining 61 municipalities are divided into four categories. Red coloured regions show 21 low-grant receiving municipalities which belong to the same political party as the government.[5] 14 high-grant receiving municipalities belonging to opposition parties are shown in blue. 16 high-grant receiving municipalities held by the government are shown in green, and 10 low-grant receiving municipalities by the opposition parties are shown in yellow. The figure does not suggest whether or not a municipality which is a high-grant recipient is also a government-aligned municipality because among the government aligned municipalities the number of a high grant recipients (16) is not greater than the number of low grant recipients (21). We cannot say that the municipalities concentrated in certain parts of the country are of the same political party as the government. For example, 16 high-grant receiving municipalities are scattered across the country.

5.5. Estimation Results in the Turkish Case

We have outlined two competing hypotheses of intergovernmental grant determination. M1 is a model for grant distribution which assumes that central government pursues only equity objectives while allocating grants among municipalities. The alternative model (M2) assumes that grants are distributed so as to maximise the probability of re-election and reward the municipalities which deliver most support for its party.

All variables except for the dummy are in logarithmic form. In Table 5.2, we tabulate the estimation results for model M1. We use per capita grant to the

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[5] Municipalities are ranked from a low-grant receiving municipality to a high-grant receiving municipality. A high-grant receiving municipality means a municipality that is above the median in the rank.

municipalities as a dependent variable. The first column shows the estimation result when we employ all possible objective and need-based variables considered to be important in the grant distribution. In the second column, we omit two variables: population and the number of unemployed. Their estimated coefficients are negligible and statistically insignificant. In the end, we arrive at a model in which per capita grant is a function of per capita income (Y), the number of motor vehicles (MV), population density (D), the urbanisation ratio (U), the number of high school students (HS), and the number of houses (H) (see column 2).

The inclusion of the population variable (N) in (M1) is intended to capture the government's grant policy concerning such economies if there are possible economies of scale in the provision of service by municipal governments. Accordingly, it is expected that the coefficient of N will be negative. The finding that city size, as represented by N, is positively associated with per capita grants is against the widely held opinion[6] that provision of public services by local governments benefits from economies of scale. Our results show that central government in Turkey did not take account of this in forming the grant allocation policy. The positive coefficient shows that the increased demand effects appear to dominate the scale effects made possible by an increase in population. However, it is not statistically significant and hence we omit it in the second estimation.

The local unemployment rate (UE) is included in order to see whether grants are directed to economically depressed areas and is assumed to be positively related to grant. However, the effect is statistically insignificant. We therefore omitted the unemployment variable in the second estimation.

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[6] see Chapter 2 for the literature on local expenditure determination.

Table 5.2 Economic (Equity/Efficiency) Model (Model M1)

Dependent variable: Log (per capita grant)   Estimation year 1996

β_0	6.56 (5.61)*	6.49 (7.10)*
N	0.004 (0.03)	-
UE	-0.016 (-0.08)	-
Y	0.38 (2.17)**	0.39 (2.35)*
MV	-0.24 (-1.95)**	-0.24 (-2.04)**
D	0.21 (1.57)	0.21 (2.3)*
U	0.38 (1.21)	0.38 (1.34)
HS	-0.37 (-1.58)	-0.39 (-2.40)*
H	0.13 (0.97)	0.13 (1.04)
R^2	0.44	0.44
$\chi^2_{HET}(1)$	0.05 [0.810]	0.06 [0.803]
n	61	61

Note: Values in the parenthesis represent the t-values.
* indicates the significance at the one percent level.
** indicates the significance at the five percent level
All variables except for dummies are in logarithmic form.
χ^2_{HET} is the test for no heteroscedasticity based on the chi-square distribution with 1 degrees of freedom where p values are given in bracket.

The coefficients on population density (D), urbanisation (U) and the number of house (H) variables are positive. Only the population density variable, however, is statistically significant at the 1-percent level. We expect that if the cost of municipal provision varies with a scattered population, then the government should transfer the funds to the municipalities where population is scattered. However, unlike the expectations, the relationship between density and per capita grant is positive. The central government appears to consider that municipalities in more densely populated regions are in more need. A 1% increase in a municipality's population density would result in an approximate 0.21% increase in intergovernmental transfers from central government. This positive effect may capture agglomeration which itself may both cause and reflect problems such as congestion and pollution.

To mediate such problems the government might target the more densely populated areas.

The positive coefficient for U implies that, other things being equal, increased demand effects, attendant urban pollution and congestion problems appear to dominate the increased possibility for exploiting economies of scale in the provision of public goods created by urbanisation. However, the coefficient estimate is not statistically significant.

Regions with more motor vehicles are not considered to be in more need. A 1 % increase in a region's number of motor vehicle reduces the per capita grant by 0.24 %. Assuming the number of motor vehicles is likely to be high in wealthy regions, the negative sign on the coefficient of the motor vehicle variable may capture any wealth effect.

The negative sign on the number of high-school students variable is significant and not as expected. A 1 % increase in the number of high school students reduces the grant by 0.39 %. The percentage of students in Secondary Education, however, is likely to increase with local wealth. Thus, the negative sign on this variable may capture wealth effect by allocating relatively a low-grant to the regions with a relatively high percentage of high school students.

Contrary to our expectations, the coefficient on the income variable (Y) is positive and statistically significant. This indicates that the grant is distributed to resource rich municipalities -i.e. against the justification that grant has an income redistributive purpose. In principle, low income areas should be the ones regarded as being in greatest need and hence most worthy of receiving government grants. However, it must be acknowledged that, at least in the shorter-term prior to further development, some poor regions may lack the infrastructure and skills, required to deploy grants effectively. If this is so, it may be unproductive for central government to assign a high level of grants to such areas. This may indicate why they do not in fact receive high grants. Of course, this line of reasoning is rather

speculative and we have no way of confirming this with the data available to us in this thesis.

We estimated the public choice model separately in Table 5.3 using the per capita grant as dependent variable. In almost all cases, the dummy variable (DM1), which represents the party similarity between coalition and municipal government, as a measure of the political capital of the municipal government has the wrong sign - i.e. negative- but it is not significant. It is insignificant as a determinant of intergovernmental grants in Turkey. The goodness of fit of the estimated regression is around 0.15. This is much less than the R^2 we obtained from the previous estimation of 0.44. We thus find that independent variables in a political approach explain about 15 % of the variations in per capita grant allocation while independent variables included in the economic approach explain 44 % of the variations in per capita grant allocation.

Table 5.3 Public choice model (Model M2)

Dependent variable: Log (per capita grant)   **Estimation year: 1996**

δ_0	7.58 (5.72)*	7.42 (5.25)*
N	0.26 (2.44)*	0.27 (2.48)*
DM1	-0.06 (-0.45)	-0.04 (-0.28)
DM2	0.37 (1.34)	0.36 (1.30)
GOVSP	-0.003 (-0.015)	-
WP	-	0.76 (0.76)
TPP	-	0.04 (0.18)
R^2	0.15	0.16
F-test (df)	0.10 (2,56)	0.29 (3,55)
$\chi^2_{HET}(1)$	0.006 [0.934]	0.17 (0.673]
n	61	61

Note: values in the parenthesis represent the t-values.
* indicates the significance at the one percent level.
χ^2_{HET} is the test for no heteroscedasticity based on the chi-square
distribution with 1 degrees of freedom where p values are given in bracket.

Here, we include the population variable (N) to capture whether the government favours the large cities which have more eligible voters. The coefficient is positive and significant. This indicates that the coalition government allocates funds to big cities in order to compete with opposition parties (or to compete for potential voters).

The coefficient of GOVSP, which represents the smallest absolute difference between the parties' strength, is negative -indicating that the per capita grant allocation is influenced by the coalition government in order to increase the votes in places where the coalition government expects highest marginal electoral benefit (see column 2). That is, if the absolute difference between parties' strength is small in a municipality, the amount of grant given to the related municipality increases due to the coalition government's priority in closely fought regions. However, the coefficient is statistically insignificant.

The coefficient on the second dummy variable (DM2), which represents the municipality that had fallen to opposition in recent election, is positive. It indicates that the coalition government seems to allocate the grants to the regions which changed hands in recent election. However, it is not statistically significant to capture the government behaviour in a public choice approach.

If we drop GOVSP and DM1, the F statistic is obtained from the regression as $F_{(2, 56)}$ = 0.10. Because the computed F value does not exceed the critical F value from the F table at the 1 percent level of significance ($F_{(2, 56)}$ > 4.98), we cannot reject the null hypothesis that the joint significance of omitted variables is equal to zero. So, the F test indicates that we can omit these two variables from the model. This suggests that the political variables other than the population variable are not significant in explaining the per capita grant allocation.

When we substitute the absolute strength of the leading political parties separately (TPP and WP) for the absolute strength of the government party within a municipality (GOVSP), the results do not change much (see columns 3). The coefficients of political variables are still statistically insignificant. We applied the F-test to test the null hypothesis that the joint significance of omitted WP, TPP and DM1 is equal zero. The variable omission test suggests that the joint test of zero restriction on the coefficients of those three omitted variables gives the F value obtained from the regression as $F_{(3, 55)}$ = 0.29. The critical F value is $F_{(3, 55)}$ > 4.13 at the 1 % significance level. Because we cannot reject the null hypothesis that these three variables are insignificant, we may omit them from the estimation, again leaving only the population variable in the model as a political variable significant in explaining the per capita grant allocation.

Table 5.4 J-Test for Non-Nested Regression Models

J-test for Column 2 of Table 5.3	M1 against M2	1.63
	M2 against M1	6.14*
J-test for column 3 of Table 5.3	M1 against M2	1.70
	M2 against M1	6.05*

Note that * indicates the t-value is significant at the 1 percent level

We used the J-test to choose between Model M1 and Model M2. Table 5.4 shows the model selection. In the application, we used a different combination of political variables in the public choice model. The first row indicates the J-test results when our public choice model contains N, GOVSP, DM1 and DM2. To apply the J-test, suppose we assume model M1 is the null hypothesis, that is the maintained model, and model M2 is the alternative hypothesis. Now following the J-test steps discussed earlier, and using Microfit 4.0, the estimated PCG (per capita grant) values from model M2 are used as an additional regressor in model M1. Because the coefficient of this variable is statistically insignificant at the 1 % level (i.e. 1.63), following the J-test procedure, we have to reject model M2 in favour of model M1.

Now assuming model M2 as the maintained hypothesis and model M1 as the alternative hypothesis, and following exactly the same procedure as before, we obtain the result at the 1% level (i.e. 6.14) testing the statistical significance of the coefficient of PCG on the right hand side of the regression equation. This would suggest that we should now reject model M2 in favour of model M1. All this tells us that the second model (public choice approach) is not particularly useful in explaining the behaviour of per capita grant allocation in Turkey.

The second row in Table 5.4 indicates the J-test when we use N, WP, TPP, DM1 and DM2 variables in the public choice model. Following a similar approach as applied to the first row, the J-test result shows that we should reject the null hypothesis (M2) in favour of M1 that the coefficient on the artificial model is zero. A model selection criterion rejects the null hypothesis that α (in equation 5.16) is not different from zero (the t-value is 6.05 at the 1 % level). This means that the equity/efficiency model is favoured by the J-test due to rejecting the null hypothesis. Thus, our conclusion is that equity/efficiency models are better than mere political factors to explain the grant determination process in Turkey.

Next, we employ the hybrid of the two competing models in modelling grant determination in Turkey. This is because we investigate the possibility that, while the grant is distributed on the basis of objective and/or need criteria, it may not

preclude the role of political influence in the grant distribution among the municipalities.

5.6. The Hybrid Model of Grants to Local Governments

The approach to the grant distribution here follows Grossman's (1994, 1996) empirical work[7] and recently applied by Worthington and Dollery (1998) for intergovernmental grants in Australia. Grossman (1994) first argued that the federal politician is assumed to be a vote (V) maximiser. In the 1996 article, the federal politician is assumed to be a welfare (W) maximiser in the empirical application. We assume that politicians are welfare-maximisers. The central politicians' welfare (W) is a function of total votes. The political pay-off is a return on total government expenditures which comprise expenditure (E) on centrally provided pure public goods and grants (G) to the municipal governments. Grants are used as a means to purchase political capital, which is defined as the influence of politically powerful local politicians. That purchased political capital assists the central politicians to influence the voting decisions of local residents.

In general elections, voters are assumed to make their electoral choices by responding positively to: (1) own purpose (non-grant) expenditures by the central governments; (2) local expenditure perceived to be financed by central grants; and (3) expenditure of local politicians which influences the voting behaviour of constituents. Central politicians are constrained in achieving their objective by a balanced-budget condition. We assume that the central politicians' problem is to select E and the G_is to maximise his welfare:[8]

$$W = W(E, G; X)$$

(5.17)

subject to

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[7] The only difference in the model, which was presented in 1994 and in 1996, is in the objective of the federal politicians.

[8] Grossman (1994, 1996) used the well-known Stone-Geary function to define the central politician's preferences with E and $G_1...G_N$ as arguments. The central politicians' problem, then, is to select E and the G_is to maximise welfare.

$$E + \sum_{i}^{n} G_i = T \qquad (5.18)$$

X is the vector of factors used to determine the amount of grant given to a locality. Welfare maximising politicians would include such variables as the economic and/or social characteristics of the recipient governments and political choice variables. We will approximate G by an implicit log linear function:

$$LnG_i = \pi_0 + \pi_1 X^1{}_i + \dots + \pi_k X_i^k + \varepsilon_i \qquad (5.19)$$

Here, π_0 is constant, ε is error term. X includes a vector of "political characteristics measuring the amount and effectiveness of political capital [local] politicians ...have to sell" (Grossman 1994, p297; 1996, p977). These political variables measure the extent to which local political agents can successfully influence the voting decisions of local residents. Other things being equal, municipalities with political agents with the most political capital to sell receive the most grants. While designing the grant programme by taking account of economic and/or social characteristics of the recipient governments, welfare maximising politicians may also seek to distribute the grant to achieve the maximum political return possible. Therefore, we will estimate the third model which we will call the Hybrid Model.

5.7. Estimation Results for the Hybrid Model

Our choice of variables which comprise the vector of X in (5.19) includes both public choice variables and efficiency/equity variables and assume that while the central government reacts to correct for the regional disparities in needs and fiscal capacities, national politicians may also seek further re-election or to maximise votes. Per capita grant is assumed as a simple linear function of our choice variables:

$$\begin{aligned} LnG_i = \pi_0 &+ \pi_1 LnY_i + \pi_2 LnN_i + \pi_3 LnUE_i + \pi_4 LnD_i + \\ &\pi_5 LnMV_i + \pi_6 LnHS_i + \pi_7 LnH_i + \pi_8 LnU_i + \\ &\pi_9 DM1 + \pi_{10} LnGOVSP_i + \pi_{11} DM2 + \varepsilon_i \end{aligned} \qquad (5.20)$$

All variables are as explained earlier and they are in logarithmic forms except for the dummy variables.

Table 5.5 Hybrid Model

Dependent variable: Log (per capita grant)   Estimation year 1996

π_0	6.57 (4.51)*	6.57 (5.42)*
N	-.02 (-0.15)	-
UE	-0.05 (-0.28)	-
Y	0.35 (1.90)**	0.36 (2.07)**
MV	-0.27 (-2.24)**	-0.28 (-2.37)*
D	0.20 (1.53)	0.20 (2.03)**
U	0.50 (1.53)	0.47 (1.57)
HS	-0.32 (-1.31)	-0.37 (-2.26)**
H	0.14 (1.00)	0.15 (1.16)
DM1	-0.062 (-0.50)	-0.06 (-0.51)
DM2	0.44 (1.91)**	0.43 (1.92)**
GOVSP	0.05 (0.25)	0.06 (0.30)
F-test		0.05 (2,49)
R^2	0.50	0.49
χ^2_{HET} (1)	1.05 [0.304]	0.95 [0.330]
n	61	61

Note   * indicates the t-value is significant at the 1 percent level,
      ** indicates the t-value is significant at the 5 percent level.
      χ^2_{HET} is the test for no heteroscedasticity based on the chi-square
      distribution with 1 degrees of freedom where p values are given in bracket.

In Table 5.5, we tabulated the estimation results for the Hybrid Model. We started with the basic model where the per capita grant is assumed to be a function of population, unemployment, income, the number of motor vehicles, density, urbanisation, the number of high school students, and the number of houses. In the Hybrid Model, we added to the basic model in order to capture the political influence on the grant distribution the three political variables - the dummy variables (party similarity: DM1; parties fallen to opposition in recent election: DM2) and the absolute difference of government parties' strength (GOVSP)-. In this model (see column 3), the variables N and UE are excluded from the model.[9] Most of our estimation results show that the coefficients on income (+), motor vehicles (-) and

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[9] The F-test suggest that we can omit these two variables from the model as F statistics obtained from the regression - $F_{(2,49)}$ =0.05 - does not exceed the critical F value from the F table.

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HS (-) variables are of unexpected sign but statistically significant. We would normally expect a negative sign on the coefficient of income and a positive sign on the coefficients of the number of high school students and motor vehicle variables for reasons already discussed. The coefficient on the population density variable (D) is positive and statistically significant at the 5 % significance level. This parameter estimate is also contrary to our expectation. It indicates that the grant allocation does not distinguish the cost variations associated with a locality's population density. However, this positive sign may capture agglomeration effect as discussed earlier.

The sign of per capita income (Y) depends on whether the grant is distributed according to equity issues. If the distributive issues motivate politicians, the expected sign should be negative, indicating that equity goals are the focal issue. We have statistically significant and a positive sign on this variable which is against the equity and efficiency arguments supporting our earlier findings. It indicates that the government allocates the resources to the rich areas. All these signs reinforce our earlier findings from model M1, suggesting the lack of consideration of efficiency and equalisation as forces motivating grant allocation in Turkey.

We found that the political variable DM1 (the dummy for party similarity between municipalities and government parties) is negatively related to the amount of grant distributed. If the mayor and the coalition government are of the same parties, the amount of grant to the municipality decreases. The same political party affiliation reduces the grant to the municipality by 0.16 percent. The coefficient on our first political variable is negative but statistically insignificant, suggesting that political influence is not an important element in grant distribution.

We obtain positive signs on the political variable GOVSP (absolute differences of parties' strength within the region) but they are not statistically significant. This indicates that, if the coalition government's political strength is high in the municipality, the coalition government rewards the municipalities where it has strong support in order to reward or buy off their political capital (i.e. votes at an election). We could say that rather than allocating the funds to the regions, which would bring higher marginal electoral benefit to the government, the MPs politically

influence the government to allocate funds to their regions to pay off their electors and/or to increase the probability of re-election. However, it is a weak conclusion for we found no statistically strong support for it. We found that the coefficient of DM2 is positive and statistically significant. It shows that the coalition government in Turkey allocates the funds to the regions which had fallen to the opposition in recent election.

5.8. Conclusions

The purpose of this chapter was to subject the economic theory of political behaviour to an empirical test, using data on central government grants to local governments. This was done by empirically analysing the determinants of grant allocation to municipalities in Turkey under coalition government, and testing for the validity of the political dimension in this process.

We applied a "public choice" model and a "conventional" model to the empirical analysis of grant determination. We wanted to know which principles the government follows while allocating the intergovernmental grants between municipalities. We followed two procedures where the equity/efficiency and public choice models form non-nested hypotheses (models) in the first approach. In the second approach, we used the hybrid model - in which we have seen that strong theoretical reasons exist for believing that both equity/efficiency and public choice variables belong in the same regression. The hypothesis testing informs us that Model M2 (public choice model) is rejected against Model M1 (efficiency and equity model). This means that the efficiency and equity model is supported by the J-test procedure. However, we do not have strong evidence for saying that it is the correct model to explain the current grant distribution. Conversely, in the Turkish case, public choice theory by itself does not appear to be suitable for explaining the central-local government relationship.

A major hypothesis in the analysis of a hybrid model was that, while objective criteria such as density of locality, income levels, unemployment rates are thought to be *a priori* relevant important factors in explaining the process of grant allocation to

municipalities, the political dimension of the recipient localities is also an important factor affecting per capita grant. Our findings show that the sign of the political variable (the absolute difference of political parties' strength) is positive. It indicates that parties forming the coalition government do not allocate the grants to the regions where they can obtain highest marginal electoral benefits. On the other hand, the sign of party similarity in a municipality indicates that the coalition government chooses to allocate resources to areas where the municipalities are administered by opposition parties in order to 'buy-off' their supporters and increase support for the coalition government and, hence, the popularity of its parties. However, our findings, while suggestive, are not statistically significant. Our findings show that the government would try to regain the regions that had fallen to the opposition in recent election rather than punishing them with lower grant allocations in the hope that the resulting voter annoyance would rebound on the regional governments concerned.

Perhaps because of the coalition nature of government, the political dimension in the grant allocation process is not particularly valid in Turkey. It is possible that the coalition government has mechanisms for exerting control over the behaviour of parliament members. MPs of government cannot act independently from the party policy. The MPs of coalition parties may not be able to influence the government secretly to direct the funds to their constituents. Because parties may act to preserve the coalition government, rather than fighting each other, coalition partners may deal with the policies that are agreed. Also, one of the coalition partners would not let the other partner allocate the funds to the areas where it is trying to gain votes because this would mean one partner gaining votes at the expense of the other partner. In a sense, the coalition partners cannot play the game beyond the set rules. This line of research is related to the literature dealing with strategic interaction between competing parties at the national government level and a co-operative relationship between local government's budget decisions and re-election objectives of elected representatives in Parliament. A number of recent theoretical contributions have actually adopted a game-theoretic and political economy perspective to examine policy conflicts arising from decentralisation. The literature refers to this as "distributive politics". A distributive policy is one which benefits the citizens of one

jurisdiction but whose costs are borne by citizens of all districts. Notable recent examples in this literature are Lockwood (1998) and Persson and Tabellini (1999). While further investigation of this literature may be interesting, it is beyond the scope of this thesis.

An equity argument supports the allocation of grants to poorer municipalities so that the poorer regions can provide the same public services with the same tax rates as richer areas. We have found that, for the purpose of equalising the differences in fiscal capacity and/or income inequality between regions, the current system does not include the income element as a proxy for redistribution and an equalisation of fiscal capacity differences.

We have shown that the conventional explanation for grant allocation to local authorities in terms of central government equity and efficiency objectives is not particularly supported by the data in the Turkish context. This is despite the fact that, in some cases, the equity/efficiency or welfare maximisation model did find more support empirically than did the pure public choice model. Even if the equity-efficiency model was better supported by the data than the pure public choice model, our results show that we can find no systematic explanation for Turkish central government grants to local governments.

The fact that we have arrived at the conclusion that standard models do not explain Turkish grant behaviour provides more impetus justification for an investigation of how the grant system could be better designed to satisfy equity objectives. Accordingly, the next chapter attempts to test empirically whether the current grant system can be redesigned effectively to compensate for the horizontal differences in fiscal capacity and needs between municipalities.

CHAPTER VI

THE DESIGN OF THE INTERGOVERNMENTAL GRANT SYSTEM:

THE IMPACTS OF GRANT ON INTERREGIONAL EQUITY

6.1. Introduction

The empirical results in chapter 4 suggest that the intergovernmental grant in Turkey has a powerful influence on municipality spending. In the last chapter, the focus was on the question of whether the existing grant system has equity objectives, i.e. whether it has compensated for the interregional differences in fiscal capacity[1], factors giving rise to variations in expenditure needs, and the cost of local provision. By using statistical data, this section will analyse the hypothesis that intergovernmental government grants may advance interregional equity. We will show how effective the current grant system can be made to be in compensating for the horizontal differences in fiscal capacity and/or income, and the needs between municipalities.

In this chapter, we have practically important findings. We show that grant distribution can be used to correct for interregional income disparities. At the same time, we develop a theoretical model to allocate the country's funds effectively to arrive at government goals. Our theoretical model which uses objective indicators to distribute the grant can also be used by any countries like Turkey which are searching for a better grant design to adopt.

The structure of this chapter is as follows. Section 6.2 describes the resource distribution in the country. In section 6.3, we consider the equalisation of horizontal fiscal capacity differentials. In section 6.4, to counter inequality in the municipalities' needs for local expenditure, we will propose a horizontal equalisation grant that takes into account the need differences. In this section, we will use an

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[1] Local fiscal capacity is generally defined as the amount of revenue generated from applying the average tax effort (rate) to the locality's base. If the average local tax rate is given, then the differences in local fiscal capacity results from the unequal distribution of local resources and income (as a tax base to local taxes and revenues) among local governments.

optimisation process to find weights for the indicators in the proposed grant allocation. We will also be concerned with the practical issues of implementation. Section 6.5 will analyse the impact of grants on interregional equity in income. Section 6.6 concludes this chapter.

6.2. Designing a Fiscal Equalisation Mechanism in Turkey

Although major expenditure responsibilities are assigned to municipalities (see Table 3.2 in Chapter 3), the parallel revenue sources are not assigned to them. In such a situation, municipalities are not capable of meeting their expenditure responsibilities from their own revenue sources. In turn, this leads to their inability to bring about a redistribution of endowments and, hence, of personal income (welfare) through public expenditure. In Turkey, adjustment for vertical imbalances has been resolved mainly by using the general grant system. This enables the central government to enforce its preferences for the provision of merit goods which can be considered the minimum provision of public services and goods in poor areas. This policy is mainly advocated on the ground of bridging the gap between local expenditures and revenues.

The issue of horizontal balance arises because the distribution of resources between regions still needs to be addressed. The horizontal fiscal balance is defined as the net fiscal balance across jurisdictions at the municipal government level. In other words, broadly speaking, it is the balance between revenue sources and expenditure responsibilities at a municipal government level in different regions of the country. Because the differences in resource endowments and needs create differences in net fiscal benefits between regions, the horizontal fiscal imbalance needs to be corrected. There are existing differences in the income levels of provinces which create differences in their ability to raise revenues from existing revenue bases. As we have already seen, differences in needs may be due to: (a) differences in local responsibilities assigned; (b) differences in inter-jurisdictional characteristics such as urban population, geographical size (distance to service), and socio-economic conditions; and (c) differences in the cost of local provision due to a lack of scale

economies[2], physical shape or topographical conditions, and so on. Fiscal equalisation, therefore, may be addressed in part by compensating the municipalities for these differences in resource endowments and expenditure needs.

With the aid of the coefficient of variation (CV), which measures relative dispersion in the data, we can analyse the spatial disparity in the distribution of fiscal resources and needs factors. A value of CV equal to zero would mean that there is no interregional variation in the spatial distribution of the indicator. By contrast, a high value of CV reflects a huge variation in spatial distribution. The results are presented in Table 6.1 in Appendix A4. There is a great variation in the socio-economic indicators of the regions. However, the variation in PCE (per capita expenditure) is still considerably high (CV is 0.34). The ratio between maximum and minimum per capita municipal expenditure (max/min) is 5.47. One of the municipalities spends five times more per capita than the lowest spender. Because resources are distributed differently, we would expect the PCG (per capita grant) to differ between localities to reduce the variations in municipal expenditure but this is not the case in our study.

Table 6.2 (see Appendix A4) presents the correlation coefficient matrix and shows the correlation especially between per capita grant, per capita expenditure and socio-economic indicators. The correlations between per capita municipal expenditure (PCE) and the total number of motor vehicles (MV), urbanisation (U), high school students (HS), number of houses (H), population (N), per capita regional gross domestic product (PCY) are all positive. It is also notable that the existing grant system mostly allocates the funds to regions which are better endowed with resources. Furthermore, a high level of municipal expenditure is concentrated in municipalities with a high level of resources (e.g. doctors, hospitals, and income).

Interregional differences in the levels of economic development, resource endowments, and the distribution of population, cause interregional differences in local fiscal resources per capita. Differences in fiscal resources can lead to an unequal distribution of local goods and services between municipalities. This, in turn, may give rise to interpersonal inequities across the country. Given other

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[2] Scale economies could be correlated with three aspects of scale: jurisdiction/local authority size; city size; density/intensity of settlement (see Bramley (1990) for further explanations)

circumstances, municipalities with a per capita RET (Real Estate Tax) and an ENT (Environment Tax) roughly below the national average, such as the Municipalities of Mus and Mardin, may not be able to supply the same quantity and quality of local goods and services as those municipalities with an above the national average per capita RET and ENT, such as Kocaeli and Istanbul. As a result of the higher levels of assessed value, the RET bill on the standard house in Kocaeli may be higher than the Turkish average. Thus, one of the objectives of the grant system should be to compensate for such differences in fiscal capacity, as well as providing them with enough revenue sources for their local responsibilities. The next sections will discuss a methodology to design an equalisation grant which addresses the horizontal differentials in fiscal capacity and spending needs.

6.3. Targeting Fiscal Capacity Differential

Although there are two dimensions of equalisation concept, vertical and horizontal dimensions, because we are concerned with the existing grant distribution, our objective will be limited within the horizontal dimension of interregional fiscal equalisation. We will use two proxies to measure local fiscal capacity. Firstly, we will use per capita regional income. Secondly, per capita pre grant expenditure will be used as a proxy for local fiscal capacity.

6.3.1. The model and choice of data

One of the outstanding problems in testing the equalisation effect of a grant system is to define and to calculate the concept of 'regional fiscal capacity'. This is the first step towards identifying the problem in designing a proper system of equalisation. Fiscal capacity is commonly interpreted as the ability of a government unit to raise revenue for financing its public services (see ACIR 1982, 1990). Therefore, we will refer to 'regional fiscal capacity' as the ability of a municipal government to raise revenue for financing local provision.

The problem with calculating the fiscal capacity of a jurisdiction is that it requires an explicit definition of the concept of the 'maximum amount of revenue' which could possibly be raised There are some normative judgements in measuring the resource base and efficiency of the tax system. Furthermore, it is worth noting that, while for the central government the ability of citizens to pay taxes and the ability of the government to raise taxes are identical things, this is not so for municipal governments. This is because people may live in and work in different jurisdictions thereby easily avoiding the local taxes, or may pay local taxes for public services in jurisdictions other than the one in which they reside.

Local authorities need to know how much revenue they are capable of raising, and their relative fiscal capacity is compared to other local governments by national politicians. Equally important is for the central government to know the relative fiscal capacity between regions before calculating the grant funds. The estimates of fiscal capacity provide an insight into the changing fiscal characteristics of the country over time (see ACIR 1982, Kinkaid, 1989). That fiscal capacity differentials among the municipal governments are increasing or decreasing may have significant implications for both central and local policy. Convergence may lessen the need for targeted assistance or reduce the concern about local public service disparities. On the other hand, increasing fiscal disparities may reinforce the arguments for a stronger central equalisation role in local finance.

To test our hypothesis that we can achieve fiscal equalisation, we need to make a comparison of fiscal capacity between regions, and for this purpose, we should find a proxy for regional fiscal capacity. After finding some measures of revenue capacity of a region, we can compare the regions in terms of their proxies. Because interregional differences in the capability of raising revenues are mainly related to factors such as the number and value of properties, income or production levels, and the number of other tax objects and bases, these factors could ideally be used as indicators of local fiscal capacity.

Either macroeconomic data (as income in America) or microeconomic data (as RTS in Canada and Australia, and RRS in America) are needed. Although a potentially

major use of alternative estimates, the Representative Tax System (RTS)[3] and the Representative Revenue System (RRS), are to promote fiscal equalisation by developing aid formulas that produce a more equitable and efficient distribution of central government funds, we will not use such calculations for they require accurate data on the ability of municipalities to raise revenues to finance services and on the municipal tax effort.

Because of the lack of published detailed data, we will utilise per capita regional gross domestic product of a province (RGDP) as an indicator of fiscal capacity and call it 'income' (PCY) hereafter. In measuring the local fiscal capacity, the choice between personal income and the RRS involves a 'trade off'. It is worth noting that there is a conceptual difference between per capita regional income and per capita regional gross domestic product. While the former means that income accrues to the resident of the region, the latter includes total goods and services produced within a region by both residents and non-residents regardless of the allocation between regional (intranational) and extranational claims. It can also be argued that the differences in per capita income still may not be the perfect way to reflect the differences in the ability of regions to raise revenue. This is because per capita income does not reflect precisely the relative revenue raising abilities of municipalities as the per capita income cannot possibly reflect the nuances of local revenue systems.

The per capita income measure, as a proxy measure, is well established as a basis for measuring fiscal capacity. This sort of macroeconomic approach is long used in the American equalisation system to measure the state fiscal capacity. For example, it is the sole factor used by the AFDC (Aid to Families with Dependant Children) and Medicaid to indicate a state's fiscal capacity (ACIR (1982, p25)). The justification for this proxy is because (i) it is simple, (ii) it is ready available, (iii) the fiscal capacity of a region depends upon the level of economic activity or income levels of

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[3] The RTS calculates tax capacity by estimating the amount of revenue that each state (and its local government) would raise if an identical set of tax rates were used. The rates used in the calculation are representative in the sense that they are the national averages. The hypothetical tax yields directly reflect the differences between states in overall tax base. The RRS assembles wide range of statutory tax and non-tax revenue bases (see ACIR 1990).

the residents within the region. Thus, these advantages have been decisive in choosing this approach.

As we argued in the previous chapter, the current distribution mechanism does not effectively serve for fiscal equalisation purposes. The only factor to serve equalisation purpose could be regional per capita income levels. However, regression analysis found that per capita income was not negatively related to the level of grant. Also, by correlating PCY to per capita grant distribution, we found that per capita grant is positively related to PCY as a regional fiscal capacity (see Appendix A4 for Table 6.2). The correlation does not suggest a strong association between them (r=0.1). The correlation sign is positive. This means that the existing configuration of grant is not equalising the differences already manifested in the unequal distribution of income between the municipalities.

We also present the low-income low-grant receiving regions and high-income high-grant receiving regions in Figure 6.1. One striking feature of this map is that it indicates that the low-income regions and low-grant receiving regions are concentrated in the same part of the country (i.e. in the East). 19 low-grant receiving municipalities[4] are also poor regions in terms of regional income levels (they are shown in yellow). There are 18 high-grant receiving municipalities which are also rich regions in terms of regional income levels (they are shown in blue). The high-income high-grant receiving municipalities are concentrated in the west of the country. This, in fact, reflects the traditional discrepancy in the development stages between the west (and partly middle) of the country and the east of the country. Once again, this indicates that there is little apparent response to the income distribution in the grant programme.

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[4] A least grant-receiving municipality is defined as a municipality's grant receipts are lower than the median in the rank. A high grant-receiving municipality is also defined by a similar way but in the opposite direction.

Figure 6.1
Current Grant Distribution and Regional Income
(High-income high-grant and low-income low-grant receiving municipalities)

19 low income-low grant receiving municipalities	15 Metropolitan municipalities excluded from our analysis
18 high income- high grant receiving municipalities	

Figure 6.2 shows the remaining 12 high-income low-grant receiving regions (shown in yellow) and 12 low-income high-grant receiving regions (shown in blue). The distribution of regions are similar to the ones in Figure 6.1 in that high-income regions are mainly in the west (and north west), while low-income regions are in the east of the country. The government could only allocate a high grant to 12 low-income regions.

We can conclude that there was no inverse correlation between per capita grants and the fiscal capacity indicator (PCY). On the contrary, the relationship was found to be positive, although not strong enough. Thus, the role of grant in alleviating the differences in fiscal capacity does not exist. There are no explicit fiscal capacity indicators in the grant distribution criteria as in developed countries, so that a systematic approach to equalisation of fiscal capacity differentials is absent. This contributes to a non-significant impact of grants on interregional equity; it even means that the current grant design actually further widens the inequity.

Figure 6.2
Current Grant Distribution and Regional Income (continued)
(High-income low-grant and low-income high-grant receiving municipalities)
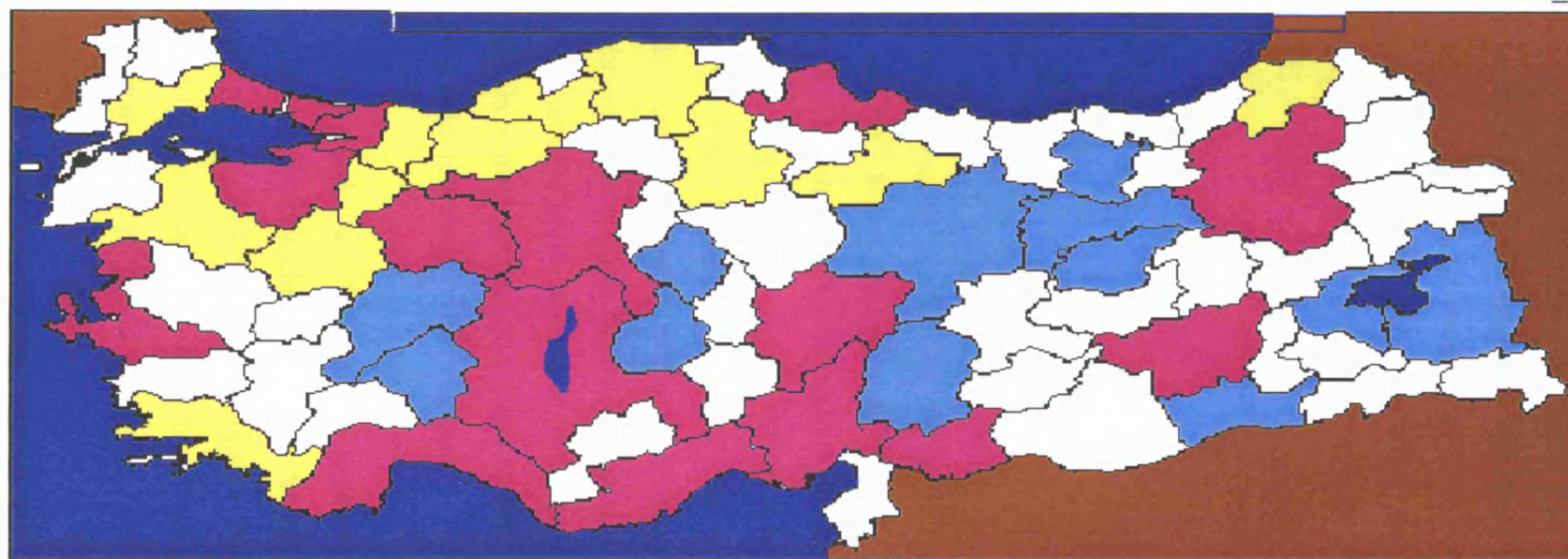
12 high income -low grant receiving municipalities	15 Metropolitan municipalities excluded from our analysis
12 low income-high grant receiving municipalities	

6.3.2. Implementation

In the first stage. we will use a formula to distribute the total grant, based solely on the regional per capita income (PCY) as the relative per capita fiscal capacity of municipal governments. In the second stage, we will document a figure which shows the actual distribution of grant and hypothetical distribution of grant (proposed). Simple correlation coefficient will be used to show statistically the equalisation tendency. The per capita relative fiscal capacity will be related to the grant that a municipality receives:

$$TG^Y_i = TG \times \frac{\dfrac{1}{PCY_i} N_i}{\sum_{i=1}^{n} \left(\dfrac{1}{PCY_i} N_i \right)} \qquad (6.1)$$

Basically. this formula inversely relates the intergovernmental transfers which a municipality receives (TG^Y) to per capita income (PCY). N is the population size. The denominator is a normalising element and its summation equates the current total grant (TG) to the total amount of equalising grant. To address horizontal imbalance. the proposed grant system is concerned with economic conditions in the distribution of funds. Regions having 'equal economic conditions', defined in terms of income levels. should receive equal shares of grants, while those regions having poorer economic conditions should be treated differently by receiving additional support. By this formula a municipality with a very low per capita income. or a poor region, receives more grant relative to richer regions.

Figure 6.3 shows us the relationship between per capita income (as an indicator of fiscal capacity and/or distributive object) and the distribution of grant per capita which would be given by (6.1). The current grant distribution is also plotted alongside the proposed grant allocation. We can see how the amount a municipal government receives is inversely related to per capita income. The simple correlation coefficient (r) between the indicator and per capita recalculated equalising grant is found to be negative (-0.88). Lower-income regions would receive relatively more grant than richer regions.

Figure 6.3
Proposed New Grant Distribution, Per capita Income
and Current Grant Distribution
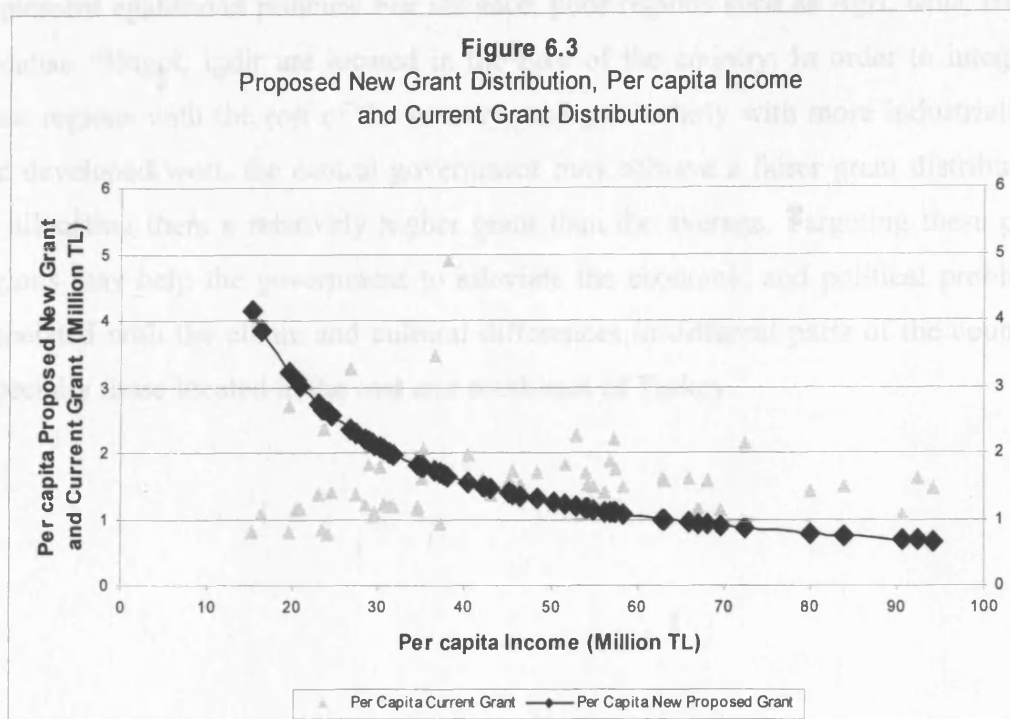
In Table 6.3, we provide the descriptive statistics. We show how these regions are ranked in terms of their income level and the amount of grant they used to receive (see column 2 and 3). In the fourth column of Table 6.3, we re-ranked the regions after designing the grant system in accordance with regional income levels. As we achieved a distributional pattern which follows the horizontal equity principle here, in column 4, we expect that regions with low fiscal capacity should receive more grants than the regions with high fiscal capacity. In other words, if the grant system has an equalising objective, regions which fall into a low fiscal capacity category, e.g. the 30 regions with the lowest income in the ranking, should enjoy above the median ranking, and vice versa. As we see in the table, they enjoy an above the median ranking. The redesigned system has a stronger tendency to bring about fiscal equalisation. For example, Agri was the poorest region in terms of income levels in 1994 but, at the same time, it was one of the lowest grant-receiving municipalities. With the suggested grant distribution formula, Agri's position would be better. Relatively rich regions, such as Bilecik, Kirklareli and Mugla, would receive lowest equalising grant.

One striking feature of this table is that it indicates the government can effectively implement egalitarian policies. For instance, poor regions such as Agri, Mus, Bitlis, Ardahan, Bingol, Igdir are located in the East of the country. In order to integrate these regions with the rest of the country, and particularly with more industrialised and developed west, the central government may achieve a fairer grant distribution by allocating them a relatively higher grant than the average. Targeting these poor regions may help the government to alleviate the economic and political problems associated with the ethnic and cultural differences in different parts of the country, especially those located in the east and south east of Turkey.

Table 6.3
Current grant allocation and new grant distribution based on per capita income

provinces	PCY	PCG^c	PCG^y
Agri	1	3	61
Mus	2	8	60
Bitlis	3	58	59
Ardahan	4	2	58
Bingol	5	12	57
Igdir	6	15	56
Bayburt	7	22	55
Sirnak	8	4	54
Van	9	57	53
Hakkari	10	1	52
Kars	11	26	51
Gumushane	12	59	50
Ordu	13	24	49
Batman	14	20	48
Aksaray	15	50	47
Yozgat	16	6	46
Bartin	17	9	45
Mardin	18	48	44
Adiyaman	19	21	43
Cankiri	20	18	42
Giresun	21	17	41
Urfa	22	16	40
Siirt	23	13	39
Sivas	24	39	38
Afyon	25	53	37
Tunceli	26	60	36
Sinop	27	5	35
Kirsehir	28	44	34
Erzincan	29	61	33
Isparta	30	52	32
Maras	31	41	31
Tokat	32	29	30
Kastamonu	33	23	29
Amasya	34	35	28
Malatya	35	46	27
Usak	36	34	26
Nigde	37	45	25
Corum	38	19	24
Trabzon	39	49	23
Rize	40	56	22
Elazig	41	43	21
Burdur	42	33	20
Sakarya	43	30	19
Zonguldak	44	25	18
Hatay	45	51	17
Denizli	46	55	16
Nevsehir	47	47	15
Kutahya	48	31	14
Artvin	49	10	13
Karaman	50	40	12
Edirne	51	37	11
Aydin	52	38	10
Balikesir	53	14	9
Manisa	54	36	8
Bolu	55	11	7
Kirikkale	56	54	6
Tekirdag	57	27	5
Canakkale	58	32	4
Mugla	59	7	3
Kirklareli	60	42	2
Bilecik	61	28	1

Note: Regions are ranked from low-income region (1) to high-income region (61),

PCG^c is current distribution of grant, it is ranked from low grant (1) to high grant (61) recipient,

PCG^y is hypothetical distribution of grant based on per capita regional income; it is ranked from low grant recipient (1) to high grant recipient (61).

6.3.3. Targeting per capita pre grant expenditure level as an alternative to PCY

Here we aim to reduce the variations in the per capita municipal expenditure across the country. We use the per capita pre-grant expenditure level as the base on which to conduct equalisation. The per capita pre-grant expenditure gives us some measure of the local revenue figures[5]. As there may be variations in the revenue sources between municipalities and as there is no common set of revenue sources[6], the per capita pre-grant expenditure may provide us with information as to whether there is a uniform level of provision across the country while showing us the fiscal capacity differential across the country.

Table 6.4 Coefficient of Variation in Expenditure and Grant (1991-1996)[7]

year	PCE91	PCE92	PCE93	PCE94	PCE95	PCE96
CV	0.37	0.51	0.37	0.33	0.32	0.34
max/min	7.07	15.57	9.65	4.48	4.74	5.47
year	PCG91	PCG92	PCG93	PCG94	PCG95	PCG96
CV	0.25	0.23	0.47	0.44	0.44	0.44
max/min	3.68	3.34	8.10	8.43	6.77	6.81

Note: CV is coefficient of variation and max/min is ratio of maximum to minimum.

Table 6.4 tells us that although there were high variations in the per capita grant (PCG) allocation to the municipalities, there was no equalising tendency in the per capita expenditure (PCE) level. Variations in per capita expenditure levels were very high especially in 1992. The ratio between the highest per capita spending municipality and the lowest was 15 in 1992. In other words, one particular municipality spends 15 times more per capita than some others. This means a huge gap between municipal relative spending levels. In order to infer that there is an equalisation tendency, an inverse correlation would be expected between the total grant that the ith municipal governments receive (TG^c) and the per capita pre grant expenditure (PCPGE) of the ith municipal government:

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[5] i.e., as an indicator of local fiscal capacity.

[6] i.e., municipalities vary in raising revenues since the endowment in their jurisdictions differs.

[7] We show the 1991-1996 period because, on a per capita basis, we can include 61 municipalities from 1991 (as N is derived from PCGDP data in which we have other municipalities' population starting from 1991).

$$TG^e_i = TG \times \frac{\dfrac{1}{PCPGE_i} N_i}{\displaystyle\sum_{i=1}^{n}\left(\dfrac{1}{PCPGE_i} N_i\right)}$$

Here TG^e_i is the total grant i^{th} municipality receives, TG is total grant the central government distributes, N is the population, and PCPGE is per capita pre-grant expenditure or per capita own source revenue (see Chapter 3 for details). By correlating the relative per capita pre-grant expenditure with the per capita new grant distribution PCG^e, we observe that the per capita proposed new grant is negatively correlated with the per capita own source expenditure. The correlation between the two appears to be moderately high, $r = -0.65$. The direction of relationship is favourable, suggesting that this system can distribute the grant to compensate adequately for own source expenditure differentials.

After calculating the per capita equalisation grant for 1996 (PCG^e), expenditures of municipalities are then hypothetically calculated for 1996 (see Figure 6.4). We can see the discrepancy between a municipality's actual expenditure and how much it would have spent if it had received the proposed equalising grant. As we can see, some municipalities need on average to increase expenditure 2-2.5 times more in order to reduce per capita expenditure variations from per capita fiscal capacity differentials across the country.

Figure 6.4

Actual Expenditure and Hypothetical Expenditure
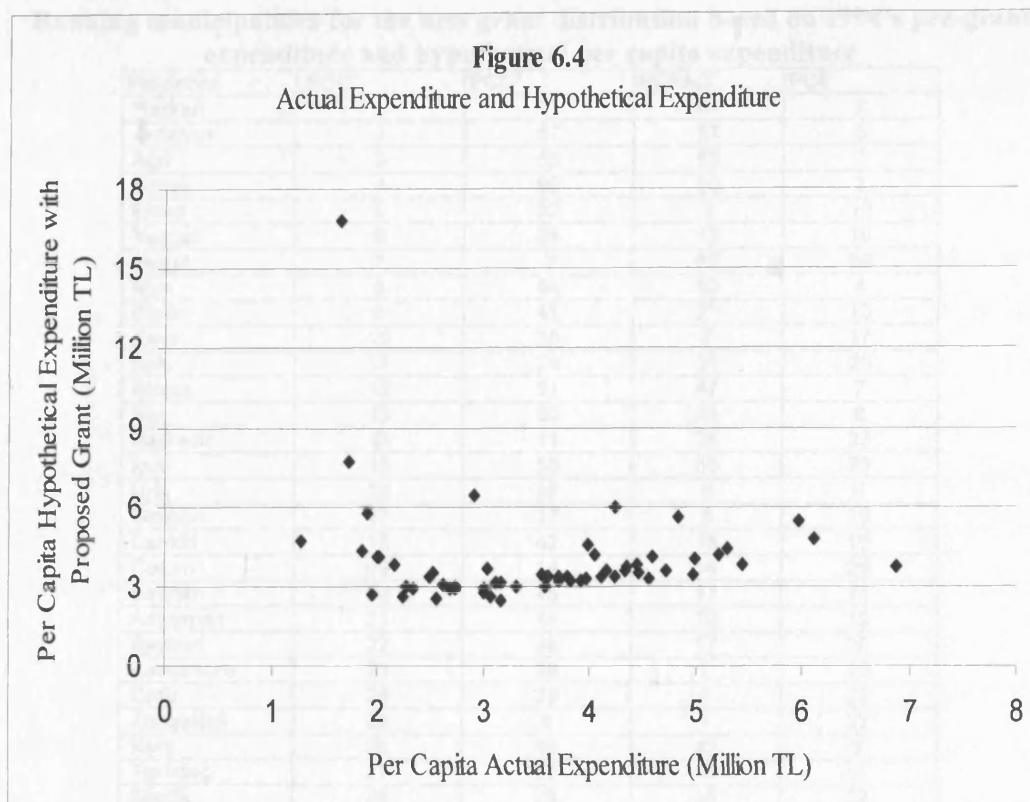
We provide the rank table after and before redistribution takes place (see Table 6.5). In column 3 of Table 6.5, municipalities are ranked in terms of the new per capita grant distribution (PCG^e). For example, the lowest grant receiving municipalities in 1996 was Hakkari (its rank is 1 in column 2). It was also one of the lowest spending municipalities (its rank is 2 in column 4). If the grant system took account of the pre-grant revenue inequalities (as a proxy for a relative fiscal capacity measure), then Hakkari would become the highest grant receiving as well as the second highest spending municipality in 1996.

Table 6.5
Ranking municipalities for the new grant distribution based on 1994's pre-grant expenditure and hypothetical per capita expenditure

Provinces	PCG^c	PCG^e	PCEAG^e	PCE^c
Hakkari	1	61	61	2
Ardahan	2	57	57	5
Agri	3	56	53	1
Sirnak	4	60	60	3
Sinop	5	32	3	10
Yozgat	6	34	13	18
Mugia	7	2	55	59
Mus	8	54	50	4
Bartin	9	47	27	13
Artvin	10	35	7	17
Bolu	11	24	31	29
Bingol	12	51	47	7
Siirt	13	50	46	8
Balikesir	14	11	26	33
Igdir	15	58	59	20
Urfa	16	46	5	6
Giresun	17	37	8	19
Cankiri	18	42	15	16
Corum	19	14	14	28
Batman	20	45	11	11
Adiyaman	21	44	10	12
Bayburt	22	36	17	26
Kastamonu	23	38	2	15
Ordu	24	33	9	22
Zonguldak	25	8	1	27
Kars	26	49	43	9
Tekirdag	27	17	45	51
Bilecik	28	28	25	32
Tokat	29	29	24	31
Sakarya	30	1	44	55
Kutahya	31	40	48	41
Canakkale	32	10	36	46
Burdur	33	26	29	35
Usak	34	16	35	43
Amasya	35	9	30	45
Manisa	36	25	18	34
Edirne	37	21	19	36
Aydin	38	6	51	57
Sivas	39	20	42	48
Karaman	40	18	39	47
Maras	41	41	16	25
Kirklareli	42	15	22	38
Elazig	43	39	6	21
Kirsehir	44	23	21	39
Nigde	45	22	28	42
Malatya	46	30	4	24
Nevsehir	47	7	49	56
Mardin	48	48	52	40
Trabzon	49	12	34	49
Aksaray	50	27	20	37
Hatay	51	31	12	30
Isparta	52	4	54	60
Afyon	53	19	37	52
Kirikkale	54	13	23	50
Denizli	55	5	32	54
Rize	56	3	41	58
Van	57	52	33	14
Bitlis	58	53	38	23
Gumushane	59	59	58	44
Tunceli	60	55	56	53
Erzincan	61	43	40	61

Note: PCG^c is the per capita actual grant distribution ranked from the lowest recipient (1) to the highest recipient (61) region in 1996 (same ranking applies for all columns). PCG^e is per capita new grant based on per capita pre-grant expenditure (revenue). PCEAG^e is per capita hypothetical expenditure if the grant is based on per capita pre-grant expenditure. PCE^c is per capita actual expenditure in 1996.

6.4. Targeting Expenditure Needs

The second area of equalisation is concerned with the differences in expenditure needs and the cost of local provision. In order to enable local government to provide the required local goods and services, the differences in the spending needs of regions need to be compensated for. The important thing is that any factor which gives rise to the differences in municipal spending across regions has to be carefully defined and examined. Equalisation is also concerned with differences in the cost of local provision. Because of the cost differences between regions, equal amounts of expenditure do not necessarily match equal provision of goods and services. Therefore, there are significant variations in the provision because of the variations in the cost of providing a unit of local output.

The variations in expenditure needs and the cost of local provision may result in an inability to provide the required local goods and services to meet the local demands. This will lead to interregional inequality in opportunity to enjoy merit goods, employment opportunities, and hence final income. That is why the measurement of local expenditure needs is critical to the system of grant transfers from central government. We now will address the role of grants in compensating for the differences in expenditure needs between municipalities. Several issues such as conceptual problems in measuring needs must be clarified at the outset.

6.4.1. The conceptual problems in measuring needs

'Needs' can be defined as factors that give rise to the local public expenditure per head which would be necessary to provide an average standard of provision. To ease or completely remove the inequity which is created by interregional disparities in regional spending needs, some sort of equalisation grant is required from the central government. Where resources are inadequate, identifying high need regions and allocating the available resources to those regions with greater needs becomes an important policy issue.

To take an example from the education sector, big cities such as Hatay and Malatya with a relatively high number of high school children, would require more public

transportation than cities in the east with fewer school children (in Bayburt and in Sirnak). In the water supply service, the number of houses (consumers subscribed) requiring connection is higher in the Denizli and Malatya regions than the national average. In order to deliver this service, spending on maintenance and pipe line construction, ought to be higher in Denizli than in Ordu which has a higher population but much lower than average house numbers. Also, in the Southeast regions, household size is larger than in the Western cities. This also means that, although the population size might be relatively close between two regions, (e.g. in Adiyaman and Kutahya which are relatively higher than average), there could be fewer houses in the eastern regions because of the household size (e.g. in Adiyaman). This indicates that the differences in need is not solely reflected in the differences in the size of population. These examples imply that a proper measurement of expenditure needs is essential for a system of grant distribution, which aims to reduce the existing inequity between regions.

At the conceptual level, the assessment of needs is a very difficult matter. Individuals alone may not be the best judges of what they need for they may lack the appropriate knowledge or technical information about what is possible. Bradshaw (1972) suggests that defining a 'needs' concept involves the values and perspectives of different groups. As Bramley (1990) summarises, the question is related to 'Who decides?'. He suggests a typology of need and goes on to argue that there are different ways of defining needs: normative needs as defined by experts and expressed needs. According to Bramley, individual choice, expert decision, and political or collective choice define the needs. The process will involve an input from individuals and a well-informed discourse about priorities among a range of individual and collective community needs. In practice, the political process will fall short of such idealised views in terms of popular participation, equality of power and influence, and quality of information available. Different political structures and dominant ideologies may well lead to different choices being made within this framework (Bramley (1990)). Therefore, it is clear that, in practice, needs will implicitly be defined in the political process through resource allocation. Measuring the needs is still difficult for one is always confronted with the question of the reliability and usefulness of any proxy indicators of need. Spending needs measurements are a reflection of this issue. Two approaches to measuring municipal

expenditure needs may be suggested for the benefit of our analysis: standard spending needs and relative spending needs.

6.4.2. The standard spending needs approach

An ideal system of transfer, which aims to equalise spending needs, may use the standard spending needs approach. However, this approach requires a set of service standards (e.g. it could be requirements set by parliament)[8] to be determined for every local government service. Based on the prescribed standards, the central government can calculate some estimates of the cost of providing local services to secure the prescribed standard. It then allows the grantor to rank or to decide which regions are more or less in need. However, there are some practical problems in applying this approach in the Turkish context. First of all, there is no legal definition of a standard service level. The concept is vague and can be easily manipulated in the political arena. Even within the Grant Related Expenditure (GRE) system, which was the previous grant scheme used in England, the terminology used varied from document to document. As Bramley (1990, p145) pointed out 'Instead of the fairly uncompromising word 'equal', one finds references to 'typical', 'average', 'similar', 'common', or 'comparable standard', often with a 'broadly' or 'approximation' thrown in (Bramley et al, 1983, par 2.2.)' (see also Midwinter et al (1987) on an agenda). Also, it is difficult to put the priorities of municipalities on the agenda. Some municipalities may give a high priority to one service area while the same service is given little priority by another municipal government. An effort to secure the priority, therefore, can influence the level of spending in the priority sector. Nor is detailed data readily available for standard assessment.

6.4.3. The relative spending needs approach

To measure expenditure needs differences we can use the relative spending needs approach to measuring needs. This approach starts with finding variations in the actual spending levels. Here the spending needs of a region are measured by

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[8] If the standard is to be achieved at the output, in the case of refuse collection, for example, standard output could be one collection per dwelling per week. Thus, the standards are notional, not actual, and not necessarily to be spelt out in details.

comparing the region with the other regions, using figures of average values of indicators derived from a statistical analysis of all local governments with similar characteristics. The aim of this approach in general is to identify the determinant of expenditure needs (or expenditure differences) by using regression analysis.

Estimates could start from an analysis of the variations in either total spending, or in spending on a particular service. However, in the Turkish context, because the municipal spending on particular municipal functions is not documented, we will use the total municipal spending. In practice, several explanatory variables, which it is suggested represent objective differences in expenditure, include demographic, geographic, or socio-economic variables. The variables that have significant regression/correlation coefficients with per capita expenditure are then used as indicators of needs. In England, for example, highly complex formulae have been developed. Indicators were entered into the grant formula with their coefficients weighted[9]. A similar approach is also used in Denmark where there is a direct attempt to include all the main factors affecting such needs as the number of children, number of elderly people and the kilometres of road (OECD, 1981 and Lotz, 1997). This approach is the one commonly used, partly because it helps to explain why expenditure levels differ between regions (see Midwinter 1987). In

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[9] In England, the Revenue Support Grant makes up the difference between the government's assessment of the Standard Spending Assessments (SSAs) for each authority and their assumed revenue from council tax and non-domestic rates.

Each year the government announces the SSA for each local authority. This is made up of a component SSA for each service that the authority provides. SSAs are intended to indicate the government's estimate of the level of expenditure required to deliver a 'standard' level of services, given a locality's needs, as measured by social and economic indicators. For each service category, the calculation of the SSA takes account of the authority's relevant indicators (such as its demographic, geographic, economic and social characteristics). For a number of assessments, regression analysis has been used to establish the link between a set of drivers of expenditure needs – or standard spending indicators – and a spending level required to satisfy those needs within a standard level of service (Duncan and Smith 1995).

The process is usually accomplished by multiplying the numbers in the client group (which reflects the characteristics of related service such as the number of pupils or elderly people) by an estimated unit cost allowing for additional costs. The allowances for additional costs are based on regression analysis which is used to attach weights to factors such as population sparsity that influences costs and Additional Educational Needs (AENs) (see Potter (1997, p347)). An allowance is expressed as an extra unit cost per member of the relevant client group. For example, for primary education, there is an additional unit cost per pupil aged 5-10. The relative weights to be given to the indicators in the measurement of AENs were obtained from regressing the adjusted unit cost per pupil on two independent variables: ethnicity and a composite measure of lone parents and income support. Thus, differences in SSAs between authorities with the same service responsibilities are due solely to differences in their underlying characteristics. So, for each authority, the SSA varies because of authority differences in the cost of provision.

order to evaluate whether a grant policy is objective or not, this approach may help to identify some objective variables which may account for differences in municipal spending needs. It is also practical because it allows use of the readily available data.

6.4.4. Targeting spending needs

Since the standard spending needs approach is not practical as a means of measuring needs, we will use the relative spending needs approach to see whether the per capita grant distribution can be used to compensate for needs variations. Not all factors that are significantly correlated with per capita spending are included in the analysis. The explanatory variables are chosen on the basis of the belief that they are the objective factors which account for differences in expenditure needs. The analysis will start by examining the extent of disparities in actual per capita municipal expenditure. Then, we will develop a model for the grant allocation using the objective indicators in an optimisation process. Finally, a hypothetical result will be presented to prove the hypothesis that grants could be distributed to compensate for the differences in spending needs.

Table 6.4, presented above (in section 6.3.3, p153), indicates the variations in actual spending levels between regions. The coefficient of variation (CV) of per capita total spending was almost the same from 1991 to 1996, except for 1992. It can be considered to have been high. For example, the ratio of spending per capita between the largest and the smallest spender was 7.07 in 1991 and 5.47 in 1996. The ratio shows an increasing tendency for a variation in spending levels between 1991 and 1993. In that table, we can see that, while the grant is distributed among municipalities unequally, the variation in per capita expenditure level is still high and is not converging. This suggests that the grant is not distributed to reduce the variations. In order to identify the factors which determine these variations, we analysed the matrix of correlation coefficient between per capita grant, per capita expenditure and socio-economic indicators (see Appendix A4). The following variables/indicators are suggested to reflect the objective differences in expenditure needs (the correlation coefficient (r) between per capita expenditure and the relevant indicator is given in the parenthesis):

- Population(N) measured in millions,($r = 0.07$),

- Per capita income (Y) measured in millions, ($r = 0.51$),

- Number of high schools students (HS) per thousand people, ($r = 0.33$),

- Population density (i.e. people per square kilometre of area) (D), ($r = 0.13$)

- Unemployment rate (UE), ($r = -0.09$)

- Number of motor vehicles (MV) per thousand people, ($r = 0.59$)

- Number of houses (H) per thousand people, ($r = 0.41$)

- Urbanisation (U), proportion of people living in the urban area, ($r = 0.24$).

The inclusion of these variables in our optimisation was rationalised in the previous chapter (see section 5.2.1). Thus, we will not repeat rationalisation here. With a hypothesis that higher spending levels are driven by higher objective needs, it is expected that some proxies for 'needs' will have a positive relationship with spending levels but that their relationship to grant allocation will differ. For example, unemployment levels show the resource endowments, or needs. So, a municipality which has a high unemployment in its jurisdiction is assumed to be a poor region. To correct for this inequality in resource endowments, the grant is supposed to be positively correlated to the unemployment rate in order to correct for fiscal deficiency (resource deficiencies).

6.4.5. A Model for Optimal Grant Allocation

For the purpose of finding optimised coefficients for need indicators in the calculation of a grant to each municipality, we propose the following model. In the model, we minimise the inequalities across municipalities, using the following quadratic objective function.

$$\sum_{i=1}^{n} \left(t_i + g_i - \left[\bar{t} + \bar{g} \right] \right)^2 \qquad i = 1,2,\ldots,61 \qquad (6.3)$$

Here, t is municipality's non-grant revenue per capita (i.e. non-grant expenditure/or own source expenditure by municipal government), and g is grant per capita. The bar sign refers to the average of the variable. Here, the aim of the grant is to minimise

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inequality in locally raised revenue in order to make intergovernmental grants equalising in that they allow for similar levels of service to be provided for similar local tax bills.

In the light of the above, we have the following optimisation problem:

$$\min_{\beta_0 \cdots \beta_k} \sum_{i=1}^{n} \left(t_i + g_i - \left[\bar{t} + \bar{g} \right] \right)^2 \tag{6.4}$$

subject to

$$g_i = \beta_0 + \beta_1 X_i^1 + \ldots + \beta_k X_n^k \tag{6.5}$$

$$\sum_{i=1}^{n} N_i g_i = TG \tag{6.6}$$

$$g_i \geq 0 \tag{6.7}$$

Here N_i is population of the ith region, X^k are need indicators, and β_k are coefficients of need indicators which will be used as weight factors in the grant distribution. In detail, equation (6.5) says that per capita grant will be distributed via an allocation rule which is function of socio-economic indicators of needs. The optimisation process will yield optimised beta coefficients β_k for need indicators that minimise inequality in locally raised revenue across municipalities. The use of the above quadratic function is because of its tractability; the fact is that the quadratic function is a good approximation to more complicated functions. An optimal solution is found by using Microsoft Solver™, which uses a mathematical programming algorithm.

There are two constraints: equation (6.6) requires that all grants that are distributed to municipalities will equal the total grants available, and equation (6.7) implies that no municipality will receive a negative grant. The use of the restrictions (6.6) and (6.7) is because total amount of grant to be distributed is fixed by law. Thus, we should allocate only the total amount available to the municipalities. Also, it would be difficult to find all the required funds to fully equalise the expenditure differences arising from the need differences.

The restriction with the distribution of a positive or zero grant rather than a negative grant is because of the difficulty of implementing the penalised grant system (which

would require some regions, depending on the outcomes, to be subtracted from or to finance the other regions). Regions which are required to be financing the other regions would object to this type of grant allocation, and because of the self concerned politicians, the government may not find it a feasible grant programme to implement.

We considered the linear grant programme because we wanted to make the allocation simple and not a complicated one. The convenience of the linear grant formula is because of its ability to accommodate *a priori* relevant local needs variables in a clear cut systematic fashion. We also employed different form of grant functions to allow non-monotonous behaviour of per capita grant with respect to the need variables. This is because the government might find it optimal to increase per capita grants up to a given level of the need indicators and decrease it thereafter, or vice versa. To investigate this possibility, we added the squares of indicators in equation (6.5). We also used the variables in logarithmic form.

The results obtained are displayed in Table 6.7a in Appendix 6.1. As is evident from this table, the results obtained do not change the distributional characteristics of grant proposal very much. For example, after the grant proposal, Burdur becomes the 4th least grant recipient with the linear grant distribution; 3rd with the non-linear allocation; and 9th with the logarithmic form of grant allocation. In the ranking, Agri becomes the 61st, 59th, and 61st with respective allocations, whilst Mugla is still the least (1st) grant recipient in the respective grant allocations.

Table 6.6
Optimisation Results

Indicators	Coefficients	Contribution to average grant received (Million TL)
Y	-29.32	-0.48
MV	-43.198	-0.708
H	-13.462	-0.22
HS	-11.265	-0.18
D	-11.401	-0.187
UE	16.426	0.269
N	9.495	0.156
U	19.323	0.817
β_0	2.699	2.70
n	61	

Table 6.6 reports the optimisation results. Optimised beta coefficients for the indicators are presented in the second column and the corresponding per capita grants disbursed for each of the indicators are calculated. Overall, the income and the number of motor vehicle factors are most decisive for the municipalities' qualifications for grant monies. Income has a negative coefficient (-29.32), and thus enables a relatively poor municipality to receive large amounts of grant. Another factor which increases the region's grant receipts, is the urbanisation index (U). On average municipalities receive 0.817 million TL on their urbanisation index. If the region is more urbanised, the demand for public services is higher and a certain minimum level of goods and services has to be provided. Also, it may lead to a greater need for municipal expenditure due to problems of large cities: congestion and pollution. Thus, the region receives a relatively higher grant than one that is less urbanised.

The positive coefficient on unemployment (UE) indicates that higher grant should be given to the needy regions which are concentrated with relatively higher number of unemployed. We found a positive coefficient on the population (N) variable. The positive coefficient implies that the increased demand effects appear to dominate the scale effects made possible by an increase in population. An increase in region's population brings a greater demand for local goods and services. Hence, municipalities should be compensated for having relatively high number of clients.

Factors with negative coefficients have a counter effect on municipality grant receipts. The coefficients on the number of houses (H) and high school students (HS) are negative. If the number of houses and high school students is relatively high in a municipality, it would receive relatively less grant under the optimal scheme. Although municipalities do not provide the education services, we would normally expect that an area with relatively more high school children would require more public transportation than an area with relatively few high school children. On the other hand, the number of high school students might be high in a region where the families are well educated and wealthy. This might lead the families to support their children's desire for higher education. As a result, this wealth effect might outweigh the need effect in the optimisation process to reduce inequality in locally raised

revenue across municipalities. Also, although we include the number of houses as a need indicator, it may as well be argued that the number of houses may be an indicator of wealth. The negative sign indicates that the wealth effect outweighs the need effect in the optimisation process. In that case, municipalities having a relatively high number of houses should receive less grants. These may justify negative coefficients on HS and H.

We used the number of motor vehicles (MV) as a need indicator for this gives rise to variations in municipal costs, and hence municipal expenditure. Targeting the cost of service provision in equalisation would require that a municipality having above average costs be given above average per capita grants. However, the coefficient of the number of motor vehicles is negative. Assuming that the number of motor vehicles is likely to be high in wealthy regions, the negative sign on the coefficient of the motor vehicle variable might capture any wealth effect.

Low density municipalities are given more per capita grant in order to compensate them for having relatively scatter population. In other words, there is a possibility that the new grant moderately compensates for the differences in the cost and/or need of service provision associated with increasing cost of providing goods and services to dispersed population.

Tables 6.7 show the result of new distribution after the "optimised" allocation formula is applied. PCG^n refers to formula based grant distribution (proposed). Equation (6.5) is applied to the grant allocation in 1996, and the amount of proposed per capita grant (column 3) and the rank of municipalities in terms of new proposed allocation system (column 5) are shown.

The optimised grant amounts dramatically change the appearance of the grant distribution between municipalities. For example, Hakkari's position in the rank table is 1. It is the lowest grant-receiving municipality. However, taking account of regional relative needs factors would put Hakkari in the fifth place (57) in the list of the high grant receiving municipalities (PCG^n) (see Table 6.7). Municipalities such as Denizli (55,5), Hatay (51,8), Isparta (52,20), Nevsehir (47,12) and Rize (56,54)

are the primary losers in the new grant system[10]. They are relatively rich and low-need regions. The main gainers from the system changes are the municipalities of Hakkari (1,57), Ardahan (2,49), Agri (3,61), Sirnak (4,60), Mus (8,55), and Bingol (12,53).

The development process stimulates the need. Regions in need in terms of low income, high unemployment levels and greater urbanisation will require more central assistance. Also, low-income regions cannot directly affect the central government policy, nor indeed, may they have enough political power to influence the government's choice. Because rural and/or low-income regions are isolated, the government should allocate more grants to the isolated regions in order to deliver minimum basic local services and infrastructures. Equitable treatment of isolated eastern regions such as Mus, Agri, Bingol, Hakkari, Ardahan and Sirnak is crucial for integrating them with the rest of the country. It also helps to bring the development of poorer regions nearer to the level of western cities.

Figure 6.5 shows that, currently, 19 municipalities should not be receiving higher grants if we apply our proposed allocation. They are shown in green. There are 20 high-grant receiving municipalities with our proposal which qualify for high grant. They are shown in red. The remaining 10 high-grant receiving municipalities still qualify for higher grants according to our criteria (Afyon, Bitlis, Erzincan, Gumushane, Malatya, Maras, Mardin, Sivas, Tunceli, and Van). They are shown in blue. There are 12 low-grant receiving municipalities which are overlapped by actual and proposed grant allocation. They are shown in yellow.

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[10] The first number in parenthesis refers to municipality rank in the actual grant distribution and the second number is for municipality rank in the needs related grant distribution.

Table 6.7 Grant Distribution based on Relative Spending Needs
A comparison between current grant and proposed new grant distribution based on relative need indicators

Provinces	PCG^c	PCG^n	PCG^c	PCG^n
Hakkari	0.785	2.573	1	57
Ardahan	0.792	2.419	2	49
Agri	0.816	2.810	3	61
Sirnak	0.833	2.735	4	60
Sinop	0.913	1.757	5	35
Yozgat	1.048	2.344	6	48
Mugia	1.065	0.127	7	1
Mus	1.083	2.551	8	55
Bartin	1.102	1.725	9	34
Artvin	1.126	1.552	10	27
Bolu	1.137	1.142	11	17
Bingol	1.145	2.477	12	53
Siirt	1.149	2.428	13	50
Balikesir	1.176	0.847	14	10
Igdir	1.179	2.433	15	51
Urfa	1.195	2.505	16	54
Giresun	1.203	2.085	17	40
Cankiri	1.208	2.195	18	43
Corum	1.210	1.591	19	28
Batman	1.217	2.466	20	52
Adiyaman	1.227	2.282	21	46
Bayburt	1.366	2.071	22	39
Kastamonu	1.379	1.546	23	26
Ordu	1.387	2.177	24	42
Zonguldak	1.397	1.343	25	22
Kars	1.416	2.253	26	45
Tekirdag	1.439	1.143	27	18
Bilecik	1.448	0.963	28	13
Tokat	1.467	1.951	29	36
Sakarya	1.489	1.001	30	14
Kutahya	1.490	1.072	31	16
Canakkale	1.494	0.294	32	2
Burdur	1.511	0.541	33	4
Usak	1.533	0.716	34	7
Amasya	1.582	1.453	35	25
Manisa	1.584	0.886	36	11
Edirne	1.593	1.003	37	15
Aydin	1.606	0.506	38	3
Sivas	1.607	2.225	39	44
Karaman	1.609	0.647	40	6
Maras	1.625	2.040	41	38
Kirklareli	1.626	0.797	42	9
Elazig	1.689	1.593	43	29
Kirsehir	1.692	1.598	44	30
Nigde	1.708	1.336	45	21
Malatya	1.721	1.658	46	32
Nevsehir	1.749	0.957	47	12
Mardin	1.799	2.702	48	58
Trabzon	1.824	1.214	49	19
Aksaray	1.828	1.656	50	31
Hatay	1.893	0.795	51	8
Isparta	1.973	1.280	52	20
Afyon	2.070	1.955	53	37
Kirikkale	2.140	1.375	54	23
Denizli	2.215	0.623	55	5
Rize	2.269	1.396	56	24
Van	2.356	2.568	57	56
Bitlis	2.719	2.731	58	59
Gumushane	3.281	2.158	59	41
Tunceli	3.472	2.309	60	47
Erzincan	4.883	1.668	61	33

Note: PCG^n is per capita hypothetical grant distribution based on need indicators. PCG^c is per capita currently distributed grant. Based on the actual and proposed distribution, columns 4 and 5 give the region's rank number ordered from low grant receiving municipality (1) to high grant receiving municipality (61).

Figure 6.5
Current Grant Distribution and Needs Based Grant Distribution

20 high grant receiving municipalities with proposed allocation formula

15 Metropolitan municipalities excluded from our analysis

10 high grant receiving municipalities with actual and proposed allocation

19 high grant receiving municipalities with current allocation

12 low grant receiving municipalities with actual and proposed allocation
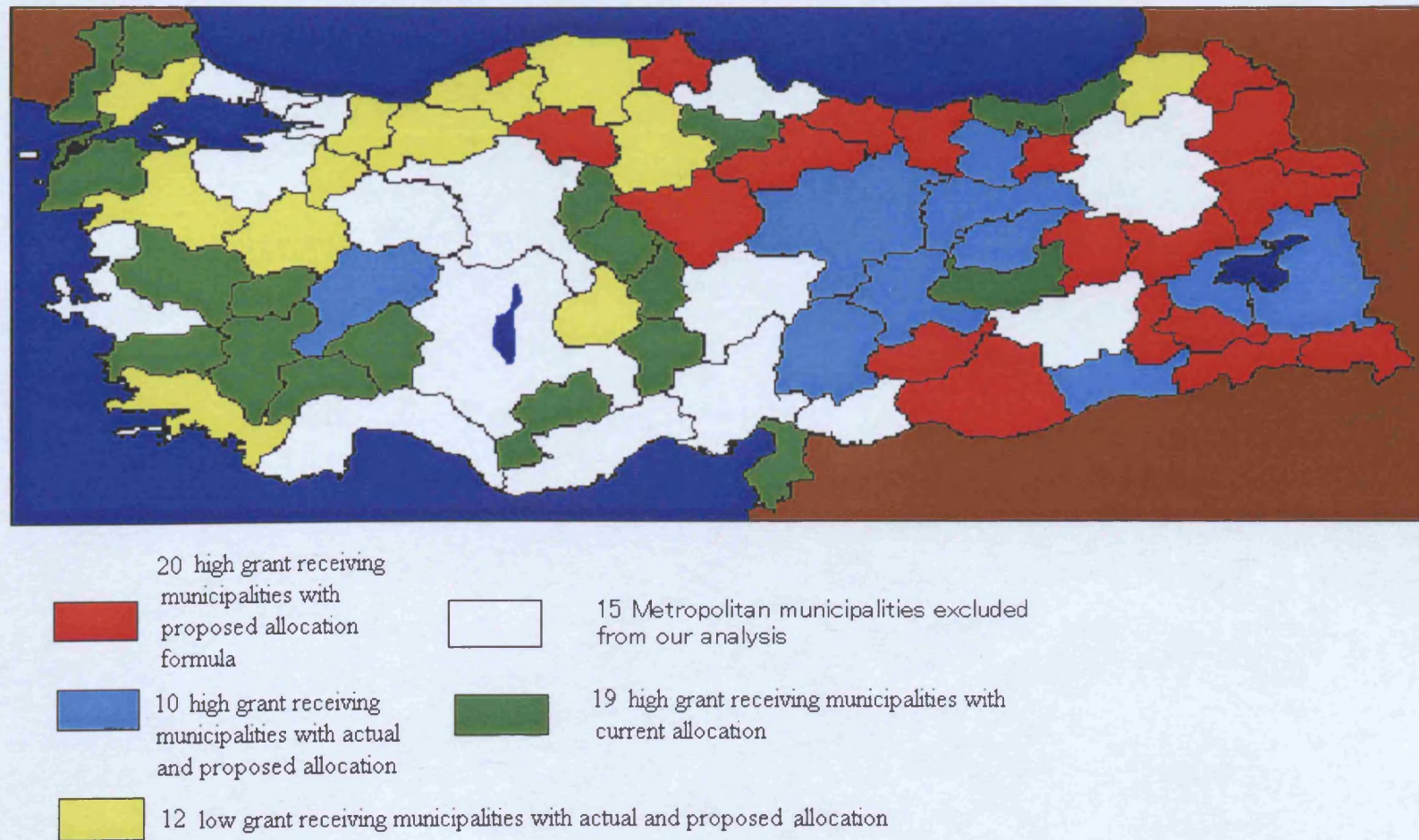
6.4.6. Practical Issues of Implementation

To see the feasibility of the special grant programme, we should analyse the country's political situation. This would answer whether we are able to implement any grant programme even if it includes objective factors. Dummy variables are used to distinguish the ruling party from the opposition parties (see Table 6.8 in Appendix 4). The first dummy is given for the 1996 political situation: it is 1 if the ruling party and the mayor of the municipalities are of the same political parties, 0 otherwise. Dummy 2 is defined similarly for 1999. We run a cross sectional regression to see the applicability of the grant programme. We included each dummy variable in a separate OLS estimation. The dependent variable is GAINER, which is defined as the grant gained (lost) after proposed formula as a proportion of the current grant receipt. If the coefficient on the dummy variable is significantly positive, this indicates that municipalities represented by the party in power centrally tend to receive larger grant increases. This would suggest that political factors would play some role in grant allocation.

Table 6.9. The Applicability of Grant Design
Dependent variable: GAINER   61 ordinary municipalities

Regressors	1996	1999
Constant	0.47	0.65
	(3.37)	(5.05)
DUMMY	0.19	-0.12
	(1.07)	(-0.71)
R^2	0.02	0.01
χ^2_{HET} (1)	0.64	5.53
	[0.463]	[0.018]

Note: t-values are in the parenthesis.
χ^2_{HET} is the test for no heteroscedasticity based on the chi-square distribution with 1 degrees of freedom where p values are given in bracket.

In fact, in Table 6.9, the coefficients on dummy variables are insignificant. This implies that the changes to the grant allocation would have no relationship with the party in power or in opposition. The above results help us to decide whether the proposed grant programme would be likely to face significant political opposition where attempts made to implement it. It is likely that the current government would not face any strong opposition from the municipalities represented by the party in power and their representatives elected in their regions because their regions would not be disadvantaged by the objective grant programme.

6.5. Distributive Effect of Alternative Grant Designs

The change in the Gini-coefficient is a traditional measure used in studies of the redistributive effects of government policy, and we will employ it here to measure the redisributive effect of grant programmes.[11] Each region is assumed to be represented by only one individual. So, we abstract from the distribution of income within the regions. The income concept used is per capita gross regional domestic product since we do not have data on personal income.

First, we measure initial or primary income inequality (including per capita pre-grant expenditure, or own source revenue) between regions by using Gini's coefficient of income inequality (Π^p). Second, income, modified by the intergovernmental redistribution in question, is calculated. Finally, the Gini coefficient of interregional inequality is computed for modified income. The percentage change of this Gini coefficient relative to that of primary income gives the measure of the redistributive effects of grant programme (r^e).

Π^p is computed by the following formula (see Sen 1997):

$$\Pi^p = 1 + \frac{1}{n} - \frac{2}{n^2 \mu^+} \left[y^+_1 + 2y^+_2 + ... + ny^+_n \right]$$

(6.8)

$$y^+_1 \geq y^+_2 \geq .... \geq y^+_n$$

y^+ = per capita income including municipality's own source revenue,

$n = 1,2,...,61$

μ^+ = mean per capita income including municipality's own source revenue.

The higher the Gini coefficient, the greater is the inequality of income distribution and the lower is welfare, other things equal. A value of 0 means exact equality; a value of 1 means all income is concentrated in one region. The redistributive effect (r^e) of a grant is measured by:

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[11] Although there are other available measures of income inequality (e.g. Atkinson index), to keep the analysis simple, we will work only with Gini coefficients.

$$r^e = \left(\frac{\Pi^P - \Pi^m}{\Pi^P} \right) \times 100 \qquad (6.9)$$

Here, Π^m is the Gini coefficient for the modified per capita income (y^m), assuming that per capita grant add up to per capita income and municipal per capita own expenditure:

$$\Pi^m = 1 + \frac{1}{n} - \frac{2}{n^2 \mu^m} \left[y^m{}_1 + 2y^m{}_2 + \ldots + ny^m{}_n \right] \qquad (6.10)$$

The overall interregional redistributive effect of the grant programmes is summarised in Table 6.10. The results indicate for the recent year the percentage extent to which the grant at the central level tends to equalise average per capita income differentials between regions. If poor regions are treated favourably, for instance, the redistributive measure (r^c) will indicate a greater overall effect.

Table 6.10
The overall redistributive effect of grant programmes in Turkey
(Percentage degree of reduction in inter-regional income differences)

	Π	$\Delta\Pi$	r^c
Current income distribution with municipal per capita own source revenue (Π^P)	0.259241		
Income modified with:			
Current grant distribution (PCG^c)	0.256978	0.002263	0.9%
Income based distribution (PCG^y)	0.254333	0.004909	1.9%
Needs based distribution (PCG^n)	0.254639	0.004602	1.8%
Expenditure based distribution (PCG^e)	0.252142	0.007099	2.7%

Note: Π is the Gini Coefficient; $\Delta\Pi$ is the change in Gini coefficient of regional income inequality due to grant system (i.e. $\Delta\Pi = \Pi^P - \Pi^m$). r^c is redistributive effect (proportional change or relative change in the Gini coefficient).

The results in Table 6.10 show that the current grant programme does not have much objective of redistribution. It reduces income inequality by quite a small degree: the redistributive effect is 0.9% (as measured by the proportional change in the Gini coefficient), and $\Delta\Pi$, the reduction in Gini coefficient, is 0.002. The alternative systems we have suggested so far have the advantage of alleviating inequalities in interregional income distribution. Among these, expenditure based distribution has the largest effect of reducing income differences but it may not be a policy-neutral grant design because municipalities may reduce their own revenue to be entitled to

higher grant from government. It reduces income inequality by 0.007 and its redistributive effect is 2.7%. A needs-based grant system, however, may be the best alternative for it also takes account of factors that give rise to municipal expenditure, other thing being equal; and it is a policy neutral grant design because municipalities cannot manipulate their grant receipts by controlling the objective variables (indicators) in the grant allocation. Its impact on interregional equity is relatively high: it reduces income inequality by 1.8%. Our proposed new formulae are having approximately 2-3 times the redistributive impact of the present system. These results prove that by compensating for horizontal differences in fiscal capacity (proxied by income or pre grant revenue) and needs between municipalities we can effectively redesign a grant system in order to have a significant impact of grants on interregional equity in income.

6.6. Conclusions

Although an equalising grant may account for reducing income differentials between regions, it is not the most effective means for redistributing income among individuals. More direct methods for achieving this objective, such as transfer payments, social insurance and progressive income taxation[12] are available. Nevertheless, a possible role remains for equalising grants. This role arises partly because low income people cannot directly select the level of services or taxes in their jurisdiction nor, indeed, may they have enough political power to influence their local government's choice (see Ladd and Yinger, 1994, p218). Thus, the grant secures a minimum provision of goods and service levels.

While equalising grants will channel funds to poorer regions, they are clumsy instruments for interpersonal redistributive purposes. Most low-income areas will have some wealthy residents and most well-off areas usually have some poor residents. Therefore, transfers from rich to poor regions through some sort of equalising grant are likely to have some unfair interpersonal redistributive elements for there is a possibility of providing benefits to the rich in those poor areas, and vice versa. Thus, this type of grant is unlikely to be a satisfactory substitute for a national

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[12] If we ignore "envy", progressive taxation only increases welfare if the proceeds are spent.

tax programme if the aim is to achieve an equitable distribution of income among individuals.

We should acknowledge that an ideal grant system that fully satisfies each aspect of equalisation is difficult to accommodate. This is partly due to the difficulty in achieving every aspect of the requirements for equalisation, and partly because a grant system always involves elements of compromise and trade-off between different objectives (e.g. equity versus efficiency) and adaptations to the political system. Also, it may not be possible to implement the form of equalisation grant proposed above because some municipalities would not receive enough grants to meet their service responsibilities. This problem can be overcome by introducing a flat grant to every municipality and any additional grant above the uniform rate could be allocated by a formula-based distribution. The fact that in Turkey the grant has shown relatively little relationship to the indicators (income, fiscal capacity and spending needs) may reflect the existence of deficiencies in the allocation formula. Failure of the grant system to address the fiscal disparities in terms of income, resources and needs between regions means that municipal governments are not able to provide minimum provision of goods and services or equal opportunities. This could mean that municipalities are incapable of making corrections for interregional disparities in per capita income, even if this were in the national interest.

In this chapter, we have been concerned with the effects of grants in adjusting fiscal imbalances in order to bring about interregional equity. The horizontal equity principle requires that individuals of similar means living in different municipal boundaries should be equally well off and not disadvantaged because of location preferences. Hence, the central government grant to municipalities should have an equalisation element. The first area of equalisation is concerned with equalising (compensating for) the differences in per capita fiscal resources. Fiscal resources are distributed unevenly across the regions in the country. Inter-provincial differences in the level of economic development, resource endowments, and distribution of population, may cause inter-provincial differences in municipal fiscal resources per capita. We have shown that a central government can design a grant system which attempts to reduce horizontal imbalance in fiscal resources and incomes.

The second area of equalisation is concerned with the differences in needs which is defined as factors giving rise to per capita relative municipal expenditure. Needs may differ among municipalities due to cost and demand variations. Here we have offered an optimisation model which allows weights to be attached to objective/need indicators in the grant allocation formula. The grant allocation may be weighted in favour of poor areas to stimulate development, bring services nearer to a standard level (however defined), and compensate for lower direct revenue potential. The distribution of grant is to be heavily weighted in favour of regions with low per capita incomes (PCY), assuming that low-income regions are in greatest need. Weighting allocations in favour of low-income areas is clearly a critical element in any redistributive policy aimed at reducing regional disparities in wealth. We have also shown that regional income levels may serve as an indicator of fiscal capacity and/or need of a region. Hence, poor and needy regions in terms of regional income levels should receive more grants. With small amendments, this needs-based grant proposal can be used in Turkey where there is no systematic approach to grant allocation, and there is a search for better grant design. Indeed our grant allocation design, in the long run, may reduce income inequalities between regions.

CHAPTER VII CONCLUSION

In this thesis we have studied the effect of intergovernmental grants on local government expenditures and developed a model to enable a systematic analysis of central government grants. The main achievements and findings of the thesis can be summarised as follows.

In Chapter 4, we developed a dynamic explanatory model of municipal expenditure for the first time in Turkey. To the best of our knowledge, most of the results presented were arrived at for the first time in the context of developing countries, though some refer to developed countries. We have estimated the elasticity coefficients to quantify formally the impact on total local government expenditure of changes in the exogenous variables such as per capita income, total lump-sum grant and population. The empirical analyses are largely consistent with the theoretical framework and provide a number of useful insights into the pattern of local finances in Turkey. Results of the empirical model of municipal behaviour suggest that major determinants of local government expenditure include the income levels within a jurisdiction, the size of the municipality (measured in terms of population), grants and past expenditure levels (i.e. supply adjustments to past years' demand for local public goods and services). The levels of past expenditure have a major impact on local government expenditure. One would expect the decision making process to hold in the longer run and we found that municipal governments are implementing the desired spending at a considerable speed. Our result in this aspect contributes to the current literature which seems to ignore the significant impact of past year's expenditure while estimating the demand for (or determinant of) local expenditure.

Transfer receipts of local government, which are lump-sum grant from central government and are exogenous to local government finances, have a stimulatory impact on local government expenditure. It may be noticed, however, that the elasticity coefficient for grant-in-aid is less than unity in both the short run and long run. In the long run, however, evaluated at mean values, the propensity is slightly greater than unity. This implies that an increase in such a revenue source leads to a more than equivalent increase in expenditure. Our result is consistent with the

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institutional framework, where it is argued that higher intergovernmental transfers are likely to be translated only into higher expenditure but not into a reduction of a municipality's own fiscal effort. Also, given the wide-spread results from static private demand studies in which the case for saying that the income effect is greater than that of the grant effect on local expenditure is rejected, the dynamic and static estimation of Turkish municipal government expenditure show that we have a flypaper effect as the grant effect is greater than that of the income effect on local expenditure. Thus, an important contribution of this thesis is to satisfy Bailey and Connoly (1998)'s request for the inclusion of dynamic elements into the exclusively static approach by taking account of time lags in adjusting the supply of local government services to the current demand conditions.

The purpose of Chapter 5 was to subject the economic theory of political behaviour to an empirical test, using data on central government grants to local governments. This was done by empirically analysing the determinants of grant allocation to municipal governments in Turkey under coalition government and testing for the validity of the political dimension in the process.

We followed two procedures. The equity/efficiency and public choice models form non-nested models in the first approach. In the second, we used the hybrid model in which we have seen that strong theoretical reasons exist for believing that both equity/efficiency and public choice variables belong in the same regression. The hypothesis testing informs us that the public choice model is rejected against the efficiency and equity model. However, we have no concrete evidence for saying that the latter is the correct model to explain the current grant distribution.

A major hypothesis in the second analysis was that, while objective criteria, such as density of locality, income levels, unemployment rates, city size, numbers of houses, students and motor vehicles, are thought to be *a priori* relevant important factors explaining the process of grant allocation to municipalities, the political dimension of the recipient localities is also an important factor affecting per capita grant. Our findings show that the government would try to regain the regions that had fallen to the opposition in recent election rather than punishing them with lower grant

allocations in the hope that the resulting voter annoyance would rebound on the regional governments concerned.

Furthermore, one of our findings shows that the sign of the political variable (the absolute difference of political parties' strength) is positive in the grant regression. It indicates that parties forming the coalition government do not allocate the grants to the regions where they can obtain highest marginal electoral benefits. On the other hand, the sign of the coefficient on party similarity in a municipality indicates that the coalition government chooses to allocate resources to areas where the municipalities are administered by opposition parties in order to 'buy-off' their supporters and increase support for the coalition government and, hence, the popularity of its parties. Unfortunately, the coefficients which suggest these hypotheses were all statistically insignificant.

Our results in this chapter build on earlier empirical findings and we provide further insight into this developing literature. Our contribution on the public choice approach to the grant allocation lies in the nature of coalition government. Our results show that under the coalition government neither of the parties is able to affect or divert the direction of the country's resources in its favour.

An equity argument supports the allocation of grants to poorer municipalities so that the poorer regions can provide the same public services with the same tax rates as richer areas. We have found that for the purpose of reducing the differences in fiscal capacity and/or income inequality and needs between regions, the current system does not include the income element as a proxy for redistribution and an equalisation of fiscal capacity differences. We have shown that the conventional explanation for grant allocation to local authorities in terms of central government equity and efficiency objectives is not supported by the data in the Turkish context.

The fact that we have arrived at conclusions about which standard models do not explain Turkish grant behaviour have given more prominence in explaining the need for an investigation of how the grant system could be better designed to satisfy equity objectives. Therefore, in Chapter 6, we have attempted to test empirically

whether the current grant system can be redesigned effectively to compensate for the horizontal differences in fiscal capacity and needs between municipalities. Although an equalising grant may account for reducing income differentials between regions, it is not an effective means for redistributing income among individuals and it is a clumsy instrument for interpersonal redistributive purposes. More direct methods for achieving this objective, such as transfer payments, social insurance and progressive income taxation are available. Nevertheless, a possible role remains for equalising grant.

In Chapter 6, we were concerned with the effects of grants in adjusting fiscal imbalances in order to bring about interregional equity. We tried to answer the public policy question of how government should design its intergovernmental transfers. We have shown that a central government can design a grant system which attempts to reduce horizontal imbalance in fiscal resources. This, in turn, helps to reverse undesirable consequences in terms of the distribution of merit goods and services, and thus incomes. This is exemplified by the fall in the Gini coefficient under our proposed allocation formula to municipalities from the central government than under the existing formula.

The second area of equalisation is concerned with the differences in needs which is defined as factors giving rise to per capita relative municipal expenditure. Needs may differ among municipalities due to cost and demand variations. We have offered an optimisation model which allows weights to be attached to objective/need indicators in the grant allocation formula. This method may be used by any country which seeks to systematise its grant allocation for it includes objective factors in the formula to derive weights. We have shown that regional income levels may serve as indicators of a region's fiscal capacity and/or needs. Hence, poor and needy regions in terms of low regional income levels should receive more grants. With small amendments, this needs-based grant proposal can be used in Turkey where there is no systematic approach to grant allocation, and there is a search for better grant design. By using Gini's coefficient of income inequality to measure inequality between regions, we have shown that our grant allocation design, in the long run, may indeed reduce income inequalities between regions. Thus, our contribution to

the literature here is that we developed a model which has three features and can be pointed out as follows: First, because our proposed distribution takes account of the objective factors in the grant distribution programme, it achieves policy neutrality. Secondly, this targeting can be used as a means of distributive politics, i.e. a fair income redistribution between regions may be achieved. Lastly, the regions can be compensated for the horizontal differences in needs and in local tax capacity.

Appendixes

A1

Numerical Analysis of Grants Effect

The tax price to consumer reduces to 0.67 with the matching rate equal to 0.50 [P= 1/1+s = 1/1+0.50 =0.67]. We assume that the initial fiscal circumstances[1] are £100 per capita expenditure and per capita local taxes collected. Income and price elasticities of demand are ½ and -½; per capita income is £500. With the matching rate equal to 0.50, the tax price to consumer decreases by 33 per cent (from £1 to 0.67 pound). As price elasticity is assumed to be -½, expenditure increases by 16.5 per cent[2] [1/2(0.33) 100 + 100] to £116.50. One third of this amount of spending generates a matching grant equal to £38.83. Now we can analyse the implication of the microeconomic principle that, if the local government were offered a lump sum grant[3] equal to £38.83 per capita, income increases by 7.76 per cent (from £500 to £538.83). As a result, spending rises by 3.88 per cent from 100 to 103.88 [1/2(0.0776) 100 +100]. We can compare the effect of the matching grant to the lump sum grant and see that, in the former, expenditure increases by 16.5 per cent while the lump sum grant results in 3.88 per cent increase. Therefore, *this simple example proves why the matching grant stimulates a greater increase and level of spending than the equal-size lump sum grant.*

For a grant of closed-ended type, the analysis must be modified. Assume that the maximum amount of grant offered is fixed at £50 per capita. What happens next is the price rises up to the spending level of £100 is £0.67. Each extra pound spending reduces the price by £0.33 up to the maximum spending of £100 that generates maximum grant (£50 per capita). If the amount spent exceeds £100, the grant becomes a lump-sum grant.

The issue of tax relief arises from the fact that most local services have inelastic price elasticity of demand. Therefore, matching grants on some services are expected to be

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[1] that is adapted from Fisher (1996).
[2] Price elasticity of demand is found by $E_D^P = (\Delta E / \Delta P)(P/E)$
$= -½ = (\Delta E/0.33)(1/100)$; $\Delta E = 16.50$
Income elasticity is $E_D^Y = (\Delta E/\Delta Y)(Y/E)$; $½ =(\Delta E/38.83)(500/100)$; $\Delta E = 3.883$

used for tax relief. In the numerical example, the locally raised amount of taxes is equal to £77.67 and remaining part (%38.83) offered by grant. Initially £100 of expenditure has to be financed by £100 of local taxes (tax price is £1). But after the grant scheme begins, increasing expenditure by 16.50 percent requires only £77.67 of locally raised taxes. Therefore, the remaining part of the locally raised 100 pounds is equal to (100-77.67 = 22.33)) 22.33 and this £22.3 of local funds may now have an alternative use. It could be either spent (increasing expenditure) on other categories/local services or on local tax relief/tax cut.

We said that the equivalent per capita grant of £38.83 increases income by 7.76 per cent that in turn increases the expenditure by 3.88 per cent. Per capita expenditure increases to £103.88 because of the lump sum (equivalent) grant. This total amount of expenditure generates £65.05 of locally raised resources. Therefore £100-£65.05 = £34.95 amount of money need not to be raised. In other words, if the local government's own spending was initially 100 pounds, because £65.05 of it is financed by the grantor, and the remainder could be used for tax relief or spent on other services.

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[3] Equal amount of matching grant =38.83 is given as lump sum.

Table 2.2. Review of Literature (Empirical Results of the Flypaper Effect)

AUTHOR	SAMPLE	RESULTS	REMARKS AND CONCLUSION
		(η_e income elasticity, δ_e price elasticity, β_e grant elasticity. The terms without lower superscript e refer to marginal propensity.)	
Baker and Smart (1999)	10 Canadian provinces; 1981-1994; OLS.	$\beta = -0.084$ $\eta_e = -0.263$	Provinces responded to the grant reform (grant is converted to closed-ended grant) by reducing the growth rate of local expenditures.
Barnett, Levaggi and Smith(1991)	72 shire county councils and Metropolitan Districts; 1987- 88; Iterative OLS.	Two rival models are tested: <u>Conventional model</u> emanates from Wilde (1968,1971) and assumes that the preferences are those of a decisive voter, such as the median voter. <u>Flypaper model</u> includes piecewise linear budget constraint.	In the majority of cases, the flypaper model outperforms the conventional model in its ability to explain the expenditure levels.
Becker (1996)	49 states and Columbia; 1977 – 1986; OLS.	$\eta_e = 0.069$ $\qquad\qquad\qquad \eta = 0.065$ $\beta_e = 0.311$ $\qquad\qquad\qquad \beta = 0.413$ $\delta_e = -2.7$ $\qquad\qquad\qquad\; \delta = -5761$	The flypaper effect is sensitive to functional form.
Dollery and Worthington (1995)	1981 to 1992 in Australia; OLS	Log $(1/P_r')Y = 1.58$ $\qquad\qquad (1/P_r')Y = 0.22$ Log $(Pr'/Pg') = -1.77$ $\qquad\quad Pr'/P_g' = -0.739$ Log $(1/Pg') = -2.22$ $\qquad\qquad 1/ P_g' = -0.60$ As P'_r (the perceived price of recipient expenditures) falls relative to P_g' (the perceived price of grantor expenditures), federal non-grant expenditures will fall.	log-linear form is superior to linear form. The negative coefficient on Pr'/P_g', which is the indicator of illusion at the grantor level, support the fiscal illusion hypothesis of the flypaper effect in Australia.
Gramlich and Galper (1973)	76 quarterly data on state and local government 1954 –1972; 10 cities for 1962-1970; OLS.	Time series $\qquad\qquad$ Time series and cross-section $\beta = 0.43$ $\qquad\qquad\qquad\quad \beta = 0.25$ $\eta = 0.10$ $\qquad\qquad\qquad\quad \eta = 0.049$	Income received in the public treasury has a much different effect from income received by private households.
Grossman (1990)	136 counties and cities of Virginia; 1980-81; 2SLS	ED: $\quad \delta = -170.760 \quad \eta_e = 0.5, \quad \eta = 0.01, \quad \beta = 1.17, \quad \beta^f = 1.65, \quad \beta^s = 0.72$ PS: $\quad \delta = 5351, \qquad \eta_e = 1, \qquad \eta = 0.003, \quad \beta = 0.37, \quad \beta^f = 0.65, \quad \beta^s = 0.009$ GGA: $\delta = -108260, \quad \eta_e = .5, \qquad \eta = 0.001, \quad \beta = 0.16, \quad \beta^f = 0.37, \quad \beta^s = 0.003$ ED (Education), PS (public safety), and GGA (general government administration) , f (federal), s (state).	The fiscal illusion effect is greater for federal grants than for state grants (i.e. federal grant has greater impact than state grant) resulting in taxpayers underestimating the cost of intergovernmental grants.
Hammes and Wills (1987)	1962-1984 Canada (OLS ?)	$\eta = 0.26$ $\qquad\qquad\qquad\qquad \beta = -1.33$ $\beta_e = -0.34 \qquad Pr'/P_g'(= \beta_e$) is a price illusory effect at grantor level.	1% rise in grant to lower levels of government reduces federal direct expenditures by about 1/3 a per cent.
Hewitt (1986)	1274 survey observations Probit- and non-linear estimation.	$\eta_e^{respondents} = 0.218$ (not statistically significant.) $\delta_e^{Grant\ receipts} = -0.583$ (insignificant) $\delta_e^{Grant\ disbursement} = -1.931$	The coefficient on Grant disbursement is -1.931. When government increases its grant disbursements, the demand for its

		$\eta_c^{state} = -0.475*$	services falls because of the perceived price increase.
Heyndels and Smolders (1994)	302 Flemish municipality in 1990; OLS.	$\delta_e = -0.65$ $\eta_e = 1.36$ β_e, coefficient on the flypaper effect variable (lnFLY), is 0.33.	The result supports the flypaper hypothesis as β_e is different from zero.
Islam (1998)	39 upper tier municipalities in Canada. 1977 – 1991; OLS and G2SLS.	For regional governments: $\eta = 0.0071 \sim 0.2496$ $\beta = -0.399 \sim 0.0036$ For county governments: $\eta = 0.0194 \sim 0.88$ $\beta = 0.42$ and 3.1349	The coefficient of grant per capita (G) found to be significant in 21 out of 39 municipalities: mostly negative for regional municipalities and positive for counties.
Islam and Choudhury (1990)	49 upper-tier municipalities in Ontario; 1979-1984; OLS and 2SLS.	Total expenditure trans. and communication Education, Health and welfare OLS 2SLS $\beta_e = -0.158$ -0.283 - - $\eta_e = -0.101$ -0.1559 0.62 0.11 $\delta_e = -0.068$ -0.2583 -0.39 0.14	Grants are considered to be endogenous in the municipal budgetary decision-making model, which is derived from an expected vote maximisation by politicians.
Islam and Choudhury (1989)	49 municipalities Ontario 1977-1984 2SLS	$\beta_e = -0.283$ $\eta_e = -0.155$ $\beta = -2.83$ $\eta = -0.39$	An estimated unconditional aid propensity much larger than the income propensity indicated an evidence of the flypaper effect.
Logan (1986)	US federal government expenditure; 1947 – 1983; OLS (linear and non-linear)	$\beta_e = -1.53$ $\beta = -2.12$ His hypothesis is that grant while reducing perceived price of recipient government expenditure, it also increases the price of grantor government expenditure and hence reduces federal direct expenditures.	Federal direct expenditure falls as grant increases i.e. illusion at grantor level. A dollar of aid seems to offset more than a dollar of non-aid expenditure as β is –2.12.
Megdal (1987)	Monte Carlo experiments ML.	The block grant variable in an OLS model is endogenously constructed and hence estimates of the propensity to spend lump-sum aid are biased upward. This results in erroneous conclusions regarding the existence of a flypaper effect.	Monte Carlo findings support the use of maximum likelihood approach in estimating a model where budget constraint is piece wise linear.
Moffitt (1984)	50 US states and district of Columbia in 1970; ML.	ML estimation of non-linear budget constraint	The flypaper effect could be caused by non-linear budget constraint as he concludes from the result that the flypaper effect is almost exactly equal to zero.
Preston and Ridge (1993, 1995)	The British Social Attitudes Survey 1990; (1397 respondents)	$\eta_e = 0.545 \sim 0.622$ $\beta_e = 5.055 \sim 5.582$ The grant effect is positive and well above the income effect.	Grants seem to have exaggerated effect on local spending because of the possibility that under perception of grant leads to under perception of tax prices and hence causing large increase in voter's demands.

Slack (1980)	50 upper-tier municipalities in Ontario, Canada. 1973 -1974 3SLS.	Translog model $\qquad$ Stone-Geary model $\eta_e = 0.934 \qquad\qquad 0.258$ $\delta_e = -0.334 \qquad\qquad -1.78$ $\beta_e = 0.05 \qquad\qquad 0.14$	There is a significant difference between the coefficients in Stone-Geary and Translog model. Different functional form causes different results.
Strumpf (1998)	237 Minor Civil Divisions in Pennsylvania 1960-1992;OLS.	$\eta_e = 0.23 \sim 0.42$ $\delta_e = -0.351 \sim -0.253$ (Table 3, p405). $\beta_e = 0.55$	These estimates are consistent with the flypaper effect, since there is a higher marginal propensity to spend out of wage tax collections and highway aid than from private income.
Turnbull (1998)	141 medium size cities in five Midwestern States in America for 1980. Non-linear Least Squares.	$\delta_e = -0.57$ $\eta_e = 0.61$ complexity= -070 the flypaper effect parameter $(\Delta) = 2.81$	The empirical estimates supports the notion that introducing tax price illusion generates the flypaper effect.
Winer (1983)	9 Canadian provinces. 1952-53 to 1969-70; 2SLS	$\qquad\qquad \eta \qquad\qquad \beta$ Equation 4: $\quad 113.65 \qquad 1.2$ Equation 8: $\quad 60.76 \qquad 0.10$ The decisive voter's income is proxied by per capita income in the province. He argues that if the separation by itself increase the government expenditure, the coefficient on G, (β), must be significantly positive.	Then because of the positive coefficients on G, the separation created by grants reduces perceived tax prices and increases provincial expenditures in Canada.
Wyckoff (1988)	115 small local governments in Michigan; OLS	Current expenditure $\qquad\qquad$ Capital expenditure $\delta_e = -0.341 \qquad\qquad\qquad -1.354$ $\eta_e = 0.757 \qquad\qquad\qquad 1.972$ $\beta_e = 0.145 \qquad\qquad\qquad 1.079$ In bureaucratic model, β_e must exceed zero and β must be greater than one. If the median voter paradigm holds, the composition of income between grants and private income should not matter, and hence $b_4=0$.	The median voter model explains current expenditure, while the Niskanen model better explains capital expenditure. as b_4 is greater than zero in Niskanen model, flypaper effect is explained best by bureaucratic model.
Wyckoff (1991)	202 Michigan school districts 1978-79; OLS - NLL-2SLS- log-linear	He tested the four explanations of the flypaper effect.	None of the explanations of the flypaper effect was statistically proved.
Zampelli (1986)	18 large U.S. cities; 1974 –1978; FIML.	social services $\qquad$ urban support $\qquad$ all other services $\eta_e = 0.3076 \sim 0.8429 \quad 0.4584 \sim 0.4793 \qquad 0.7891 \sim 0.8429$ $\delta_e = -0.3202 \sim -0.99 \quad -0.4204 \sim -0.5308 \qquad -0.4579 \sim -0.6442$ Demands for most local public goods are price and income inelastic. Increases in population size reduce per capita expenditure on public services.	He could not reject the hypothesis of no flypaper effect. He provides further evidence in support of McGuire (1975,1978) suggestions that local official are able to convert some fraction of conditional aid into pure fungible sources.

A 3

Table 3.2A. Allocation of services in metropolitan municipalities

Functions	Municipalities	
	Metropolitan	Town
Basic Communal Infrastructure services		
• Road and avenue	X	...
• Naming road and street	X	...
• Sewerage	X	...
• Green fields and Parks	X	X
• Cemetery	X	...
• Water supply	X	...
• Gas and central heating	X	...
Basic Civic services		
• Passenger and cruise terminal	X	...
• Waste collection	...	X
• Waste and solid waste disposal	X	...
• Street cleaning and control	...	X
• Fire fighting	X	...
• Traffic	X	...
• Public transportation	X	...
• Environment(public) health and control	X	...
Construction services		
• Master plan	X	...
• Detailed plan	...	X
• Constructing licence and Construction control	...	X
Social services		
• Health (hospital)	X	...
Economic services		
• Laboratory for food and drinks	X	...
• Fruit market and market place	X	X
• Slaughter house	X	X
• Centre for industry area	X	...
• Constructing/renting of hotels/shops	X	...
• To organise chamber of commerce	X	...
Social and cultural services		
• Entertainment places	X	X
• Heritage protection	...	X
• Libraries and community centre	X	X
• Occupation course	X	X
• Sports field	X	X
• Assistance to elderly and children	X	X

Source: Zerrin Toprak Karaman. Yerel Yonetimler. 1996. Izmir.

TABLE 3.4A A comparison between Metropolitan and Ordinary Municipalities

ANKARA

year	budget share	real estate taxes	other municipal taxes	municipal fees	contribution	institutions and enterprise	profits of enterprises	revenues of properties	charges	fines	various revenues	special aids	special funds
1992	0.41	0.02	0.02	0.02	0.01	0.01	0.00	0.34	0.02	0.01	0.13	0.02	0.01
1993	0.27	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.07	0.01	**0.58**	0.01	0.01
1994	0.33	0.03	0.04	0.01	0.00	0.01	0.00	0.06	0.02	0.01	0.46	0.01	0.02
1995	0.44	0.03	0.04	0.01	0.00	0.01	0.00	0.10	0.02	0.02	0.31	0.02	0.00
1996	0.48	0.02	0.04	0.01	0.01	0.01	0.00	0.07	0.02	0.16	0.16	0.02	0.00

ISTANBUL

year	budget share	real estate taxes	other municipal taxes	municipal fees	contribution	institutions and enterprise	profits of enterprises	revenues of properties	charges	fines	various revenues	special aids	special funds
1992	0.61	0.04	0.05	0.04	0.01	0.01	0.00	0.05	0.03	0.02	0.13	0.00	0.01
1993	0.56	0.02	0.04	0.04	0.03	0.01	0.00	0.04	0.02	0.02	**0.22**	0.00	0.00
1994	0.50	0.10	0.08	0.03	0.01	0.01	0.00	0.07	0.03	0.02	0.14	0.00	0.00
1995	0.53	0.06	0.09	0.05	0.02	0.00	0.02	0.09	0.04	0.03	0.06	0.01	0.00
1996	0.57	0.04	0.05	0.03	0.02	0.01	0.00	0.09	0.03	0.06	0.06	0.03	0.00

MARDIN

year	budget share	real estate taxes	other municipal taxes	municipal fees	contribution	institutions and enterprise	profits of enterprises	revenues of properties	charges	fines	various revenues	special aids	special funds
1992	0.49	0.02	0.03	0.04	0.00	0.17	0.00	0.10	0.01	0.01	0.07	0.05	0.01
1993	0.50	0.02	0.02	0.05	0.01	0.02	0.00	0.02	0.02	0.01	**0.15**	0.10	0.08
1994	0.63	0.02	0.04	0.03	0.00	0.02	0.01	0.02	0.00	0.00	0.05	0.14	0.03
1995	0.57	0.01	0.03	0.03	0.01	0.02	0.02	0.04	0.01	0.01	0.05	0.20	0.00
1996	0.53	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.04	0.01	0.07	0.18	0.02

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year	budget share	real estate taxes	other municipal taxes	municipal fees	contribution	institutions and enterprise	profits of enterprises	revenues of properties	charges	fines	various revenues	special aids	special funds
1992	0.77	0.01	0.01	0.01	0.00	0.05	0.00	0.04	0.00	0.00	0.01	0.08	0.03
1993	0.54	0.01	0.05	0.01	0.00	0.04	0.00	0.04	0.00	0.00	**0.14**	0.14	0.04
1994	0.56	0.02	0.02	0.02	0.01	0.03	0.02	0.14	0.02	0.01	0.03	0.07	0.04
1995	0.65	0.01	0.00	0.02	0.02	0.02	0.03	0.07	0.01	0.01	0.07	0.08	0.01
1996	0.61	0.00	0.02	0.01	0.01	0.05	0.04	0.02	0.04	0.01	0.02	0.15	0.01

Table 3.5A   Final Account of Kutahya Municipality (1995)

type	part	section	article				
1	0	0	0	Tax revenues	230,716,867,604	52%	52%
	1	0	0	General budget tax revenue share	172,420,221,672	39%	39%
	2	0	0	revenue from municipality taxes	48,458,874,754	11%	11%
		1	0	announcement and advertisement tax	560,481,430	1%	
		2	0	entertainment tax	286,333,156	1%	
		3	0	real estate tax	12,139,940,860	25%	3%
		4	0	communication tax	1,804,993,572	4%	
		5	0	electricity and gas consumption tax	10,548,514,987	22%	2.4%
		6	0	fire insurance tax	517,214,973	1%	
		7	0	environment tax	22,601,395,776	47%	5%
		8	0	metropolitan share from environment tax	-		
		9	0	others	-		
	3	0	0	Municipal fees	9,837,771,178	2%	2%
		1	0	occupant fee	2,051,756,005	21%	
		2	0	working permit fee on holidays	941,588,800	46%	
		3	0	spring water fee	-	0%	
		4	0	announcer fee	557,745,297	6%	
		5	0	-	733,218,040	7%	
		6	0	scale and measure examination fee	35,737,970	0%	
		7	0	building construction fee	232,263,577	2%	
		8	0	other fees	5,285,461,489	54%	
2	0	0	0	revenues other than taxes	214,631,490,531	48%	48%
	1	0	0	contribution to spending	14,086,955,702	3%	3%
		1	0	contribution to road spending	1,370,279,167	10%	
		2	0	sewage spending	-	0%	
		3	0	water supply	1,684,626,150	12%	
		4	0	property owners promises	3,356,815,847	24%	
		5	0	measure and scale officers expense	7,902,000	0%	
		6	0	pollution prevention spending	-	0%	
		7	0	expense of municipal run places	1,762,031,762	13%	
		8	0	other contribution to expenditure share	5,905,300,776	42%	
	2	0	0	other shares paid to municipality	3,710,234,648	1%	1%
		1	0	museum entry fee	-		
		2	0	mine management shares	-		

		3	0	consultation fee from technical report	3,710,234,648	100%	
		4	0	share from approval of agreement that necessitate the privilege or licence	-		
	3	0	0	yield of corporations and enterprises	87,932,407,778	20%	20%
		1	0	general administration	63,718,940	0%	
		2	0	cleansing corporation	103,919,352	0%	
		3	0	health and social aid institution yield	53,503,665	0%	
		4	0	prosperity and transportation	77,291,145,396	88%	
		5	0	agricultural corporation	30,956,595	0%	
		6	0	educational institutions	35,133,957	0%	
		7	0	economic institutions	10,354,029,873	12%	
	4	0	0	profits of entrepreneurs	-		
		1	0	water supply enterprise			
		2	0	gas enterprise			
		3	0	local bus service			
		4	0	refrigeration			
		5	0	slaughter house			
		6	0	other enterprise profits			
	5	0	0	revenues of properties of municipality	66,605,170,372	15%	15%
		1	0	yields	49,944,122,418	75%	
		2	0	revenues from moveable goods	15,119,856,260	23%	
		3	0	revenue from personal assets	1,541,191,694	2%	
	6	0	0	charges	12,097,831,088	3%	3%
		1	0	fees from whole sale market occupant	221,081,000	2%	
		2	0	wholesale transportation	-		
		3	0	wholesale market duty	3,608,372,155	30%	
		4	0	irrigation charges	1,017,738,263	8%	
		5	0	water disposal rate	6,915,007,368	57%	
		6	0	other fees	335,632,302	3%	
	7	0	0	fines	11,915,298,357	3%	3%
		1	0	-	492,398,500	4%	
		2	0	tax fines	8,669,736,555	73%	
		3	0	confiscated goods value	-		
		4	0	other fines	2,753,163,302	23%	
	8	0	0	various revenues	18,283,592,586	4%	4%
3	0	0	0	special aids and funds	1,038,116,500	0%	0.2%

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Table 6.1. Socio-economic Indicators of Regions: Descriptive Statistics

Indicators	cv	Ratio of max to min
MV (number of motor vehicles per thousand people including car, buses, truck and tipper truck)	0.59	16.27
PI (public investment (TL) per thousand people)	1.14	100.49
Hos (number of hospital per thousand people)	0.49	7.91
Bed (number of beds at hospital per thousand people)	0.56	11.85
HS (number of high school students per thousand people)	0.35	6.48
TR (total number of retired person per thousand people)	0.50	12.67
Doc (number of doctors per thousand people)	0.40	7.13
OH (number of other health staff per thousand people)	0.35	4.68
H (number of water subscribers per thousand people e.g. number of dwelling, public institutions, companies, parks etc)	0.55	13.75
UE (number of unemployed per thousand people 1994)	0.34	3.77
0-14 (number of people aged between 0 and 14 year- old per thousand people)	0.26	3.64
65+ (number of elderly aged 65 and over per thousand people)	0.39	6.60
U(urbanisation; ratio of people living in urban area)	0.20	3.73
N (population in 1994)	0.58	11.84
PCG (per capita grant a municipality receives)1996	0.44	6.8
PCY (per capita RGDP)1994	0.45	6.24
PCE(per capita municipal expenditure)1996	0.34	5.47
D (density index defined as people per square kilometre of area	0.62	14.74
Notes: CV: coefficient of variation Max: maximum value of variable in the data Min: minimum value of variable in the data		

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Table 6.2 Correlation Coefficient matrix

	MV	Pi	Hos	BED	HS	TR	DOC	OH	H	UE	0-14	65+	N	PCG	PCY	PCE	D	U
MV	1.00	0.03	0.20	0.38	0.27	0.61	0.59	0.60	0.40	-0.42	-0.65	0.47	0.32	0.05	0.78	0.59	0.24	0.28
PI	0.03	1.00	0.07	0.04	0.19	-0.11	0.14	0.14	0.01	0.18	-0.07	0.09	-0.11	0.21	0.01	0.22	-0.24	-0.05
Hos	0.20	0.07	1.00	0.54	-0.08	0.48	0.38	0.61	-0.07	-0.21	-0.34	0.71	-0.33	0.20	0.26	0.23	-0.34	-0.24
Bed	0.38	0.04	0.54	1.00	0.24	0.57	0.73	0.62	0.26	-0.03	-0.38	0.51	0.06	0.11	0.31	0.39	0.03	0.11
HS	0.27	0.19	-0.08	0.24	1.00	0.15	0.41	0.36	0.47	0.49	-0.15	0.07	0.18	0.20	0.29	0.33	0.31	0.33
TR	0.61	-0.11	0.48	0.57	0.15	1.00	0.58	0.60	0.33	-0.29	-0.58	0.77	0.03	0.09	0.63	0.47	0.23	0.04
Doc	0.59	0.14	0.38	0.73	0.41	0.58	1.00	0.74	0.44	-0.20	-0.60	0.52	0.10	0.15	0.60	0.54	0.11	0.21
OH	0.60	0.14	0.61	0.62	0.36	0.60	0.74	1.00	0.36	-0.12	-0.56	0.69	-0.13	0.08	0.56	048	-0.09	0.04
H	0.40	0.01	-0.07	0.26	0.47	0.33	0.44	0.36	1.00	0.01	-0.33	0.15	-0.01	0.21	0.31	0.41	0.04	0.67
UE	-0.42	0.18	-0.21	-0.03	0.49	-0.29	-0.20	-0.12	0.01	1.00	0.53	-0.15	-0.08	0.21	-0.34	-0.09	0.04	0.11
0-14	-0.65	-0.07	-0.34	-0.38	-0.15	-0.58	-0.60	-0.56	-0.33	0.53	1.00	-0.28	-0.16	0.00	-0.67	-0.49	-0.15	-0.23
65+	0.47	0.09	0.71	0.51	0.07	0.77	0.52	0.69	0.15	-0.15	-0.28	1.00	-0.21	0.10	0.49	0.36	-0.14	-0.19
N	0.32	-0.11	-0.33	0.06	0.18	0.03	0.10	-0.13	-0.01	-0.08	-0.16	-0.21	1.00	-0.09	0.21	0.07	0.62	0.31
PCG	0.05	0.21	0.20	0.11	0.20	0.09	0.15	0.08	0.21	0.21	0.00	0.10	-0.09	1.00	0.10	0.64	-0.07	0.16
PCY	0.78	0.01	0.26	0.31	0.29	0.63	0.60	0.56	0.31	-0.34	-0.67	0.49	0.21	0.10	1.00	0.51	0.21	0.37
PCE	**0.59**	0.22	0.23	0.39	**0.33**	0.47	0.54	0.48	**0.41**	**-0.09**	-0.49	0.36	**0.07**	0.64	**0.51**	1.00	**0.13**	**0.24**
D	0.24	-0.24	-0.34	0.03	0.31	0.23	0.11	-0.09	0.04	0.04	-0.15	-0.14	0.62	-0.07	0.21	0.13	1.00	0.19
U	0.28	-0.05	-0.24	0.11	0.33	0.04	0.21	0.04	0.67	0.11	-0.23	-0.19	0.31	0.16	0.37	0.24	0.19	1

Table 6.7a. New grant distribution based on Need indicators: gainers and losers
(Different Grant Functions Applied)

provinces	PCG^c	PCG^n	PCGnonlinear	PCGloglin
Adiyaman	21	46	35	42
Afyon	53	37	34	37
Agri	3	61	59	61
Aksaray	50	31	26	34
Amasya	35	25	20	23
Ardahan	2	49	53	55
Artvin	10	27	29	24
Aydin	38	3	2	3
Balikesir	14	10	11	6
Bartin	9	34	38	35
Batman	20	52	45	52
Bayburt	22	39	57	43
Bilecik	28	13	23	12
Bingol	12	53	52	56
Bitlis	58	59	58	58
Bolu	11	17	15	15
Burdur	33	4	3	9
Canakkale	32	2	4	2
Cankiri	18	43	50	48
Corum	19	28	21	26
Denizli	55	5	5	7
Edirne	37	15	9	11
Elazig	43	29	41	30
Erzincan	61	33	27	33
Giresun	17	40	30	39
Gumushane	59	41	48	40
Hakkari	1	57	56	57
Hatay	51	8	32	5
Igdir	15	51	51	51
Isparta	52	20	14	25
Karaman	40	6	6	16
Kars	26	45	42	41
Kastamonu	23	26	37	27
Kirikkale	54	23	25	29
Kirklareli	42	9	8	4
Kirsehir	44	30	28	28
Kutahya	31	16	18	18
Malatya	46	32	43	31
Manisa	36	11	24	10
Maras	41	38	33	38
Mardin	48	58	54	53
Mugia	7	1	1	1
Mus	8	55	55	59
Nevsehir	47	12	13	8
Nigde	45	21	22	20
Ordu	24	42	40	44
Rize	56	24	19	22
Sakarya	30	14	10	17
Siirt	13	50	46	50
Sinop	5	35	39	32
Sirnak	4	60	61	60
Sivas	39	44	36	46
Tekirdag	27	18	12	13
Tokat	29	36	31	36
Trabzon	49	19	16	21
Tunceli	60	47	49	47
Urfa	16	54	60	49
Usak	34	7	7	14
Van	57	56	47	54
Yozgat	6	48	44	45
Zonguldak	25	22	17	19

Note: PCG^c is per capita currently distributed grant. PCG^n is per capita hypothetical grant distribution based on need indicators. In PCGnonlinear, squares of indicators are included as well as their linear form. In PCGloglin logarithm of variables are used in the optimisation. Column 3 and 4 gives the region's rank number ordered from high grant receiving municipality (1) and low grant receiving municipality (61).

A4　　　　　**Table 9b. Political Characteristics of Municipalities**

provinces	Dummy1	Dummy2
Adiyaman	1	0
Afyon	0	1
Agri	0	0
Aksaray	0	1
Amasya	1	1
Ardahan	1	1
Artvin	1	0
Aydin	1	1
Balikesir	1	1
Bartin	0	1
Batman	1	0
Bayburt	1	1
Bilecik	1	0
Bingol	1	0
Bitlis	1	0
Bolu	0	1
Burdur	1	0
Canakkale	0	0
Cankiri	1	1
Corum	1	0
Denizli	1	0
Edirne	1	1
Elazig	1	0
Erzincan	0	1
Giresun	0	0
Gumushane	1	1
Hakkari	1	0
Hatay	0	0
Igdir	1	1
Isparta	1	1
Karaman	1	1
Kars	0	1
Kastamonu	1	1
Kirikkale	0	1
Kirklareli	0	1
Kirsehir	0	1
Kutahya	1	0
Malatya	1	1
Manisa	1	1
Maras	0	0
Mardin	1	0
Mugla	0	0
Mus	1	1
Nevsehir	1	0
Nigde	0	1
Ordu	0	1
Rize	0	1
Sakarya	1	0
Siirt	1	0
Sinop	0	1
Sirnak	1	1
Sivas	1	0
Tekirdag	1	1
Tokat	1	0
Trabzon	0	0
Tunceli	0	0
Urfa	1	0
Usak	0	1
Van	1	0
Yozgat	0	1
Zonguldak	0	1

Source: **(a)** prepared from SIS's official publications ('Results of General Election of Representatives 24-12-1995' (summary tables)) and 'Results of Elections of Local Administration 27-3-1994'). **(b)** prepared from SIS's Internet sites (http://www.die.government.tr)

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