

# Equalization via Fiscal Decentralization

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## 1. Introduction

**Fiscal decentralization** (FD) means devolution of power and responsibilities of national (central), government towards sub-national (local), governments.<sup>2</sup> Attaining economic efficiency, equality and macroeconomic stability can be considered among the main issues of concern for FD. As all these targets may not be simultaneously achieved, however, policy priorities provide guidance for the design of fiscal decentralization. Macroeconomic stability concerns, for example, may inhibit the central government from devolving its fiscal tools to sub governments as local policy priorities may be in conflict with macroeconomic stability and other national goals. While economic growth and efficiency, on the one hand, and equality, on the other, are often considered to be mutually exclusive targets, Petchey (1993), argues that fiscal equalization can in fact enhance efficiency by correcting fiscal distortions associated with free migration”.<sup>3</sup> Nevertheless, the interconnections and/or trade-offs among these three targets necessitates great care with the process of decentralizing fiscal activities.

Decentralization of fiscal activity can be in regards to i) expenditures and ii) revenues. For empirical purposes, FD can be measured, respectively, as: i) local government spending in province  $i$  /total government spending in province  $i$ , and ii) local government revenues in province  $i$  /total government revenues in province  $i$ . Since a correct measurement of the extent of fiscal decentralization must only take into account the decentralizable aspects of public spending, however, the exclusion of pure public goods, such as defense and social security, is important .<sup>4</sup> Based on these definitions, Neyapti (2003) states that, between 1970s and 1990s, Canada, Switzerland, Australia and United States got the highest ranks with

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<sup>2</sup> See Samuelson (1954) and Oates (1972) and Oates (2001) for pioneering research.

<sup>3</sup> Inefficiencies that arise from fiscally induced migration can be eliminated by fiscal equalization. (based on Sagbas and Bagdigen (2003), p. 18.)

<sup>4</sup> Education, being a public good with significant socio-economic externalities in a country like Turkey may also be considered to be one of those expenditure items that warrant central government action until a standard (such as national average) is achieved.

regards to expenditure decentralization, followed by Argentina, India, Pakistan and Brazil in the group of less developed countries.

The literature on FD has recently started to offer studies on international experiences that suggest elements of successful FD, though optimal design issues are yet far from being conclusive and policy proposals are difficult to generalize. Theoretically, because heterogeneity in the needs and wants renders decentralized provision of public goods to dominate a uniform provision, factors such as *country size*, *ethnolinguistic diversification*, measures of *local accountability*, among others, are all pointed out to affect the success of FD (see, for example, Panizza, 1999; Von Braun and Grote, 2000; Tanzi, 2000). Nevertheless, panel studies have shown that the macroeconomic and development effects of FD are not unambiguous, although good institutional infrastructures are shown to help reap the positive benefits of FD.<sup>5</sup> Neyapti (2003) provides a survey of the literature on the effects of FD and the factors that influence its effectiveness.

In view of the recently drafted legislations that aim to increase the power of local authorities with regard especially to their spending decisions, this study focuses on an important aspect of FD across the sub-national units of Turkey: equalization. The literature on fiscal decentralization focuses on two main types of imbalances: i) between national and sub-national governments (*vertical imbalances*)<sup>6</sup> and ii) among the sub-national governments (*horizontal imbalances*). Vertical imbalances mainly emanate from two sources: a) tax bases usually differ both across regions and between central and sub-national governments; b) given

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<sup>5</sup> While FD appears to affect poverty reduction and social capital positively; its effect on the quality of education and health is negative; and on growth and corruption are uncertain (see, for example, Treisman [2000], Fisman and Gatti, [2000] and de Mello [2000]). The effects of FD on deficits and inflation rely on political stability and good governance for the first, and also on central bank independence for the second (Neyapti, 2003).

<sup>6</sup> Revenue sources, especially the commendable tax bases, available to national governments are most often greater than those available to sub-national governments. According to OECD (2002), the main tax bases available to subnational governments in Europe are incomes (not the taxes on payroll or workforce), profits and capital and property taxes.

a tax base, the capacity of tax collection, including *tax effort*<sup>7</sup>, may differ both across regions and between sub-national and national governments.

Even though factors such as scale and administrative capacity favor central government against local governments with regards to local tax collection ability, ability of subnational governments to collect local taxes may dominate that of the center especially when those taxes are targeted for locally determined spending needs. The outcomes of local spending are also better monitored if its costs are correctly signaled to tax payer-consumers, unlike in the case of grant-financed activities. In addition, grant supported activities are more likely to be centrally determined than not and thus may not respond to local needs and preferences. Moreover, subnational governments, unlike central governments, can be held directly accountable for the spending that is financed by locally collected revenues. Internalizing the costs of a spending activity (eg. user charging) that links local spending with local taxes, would thus contribute to both allocative efficiency and local accountability. Hence, improving local revenue capacity and FD may indeed be a factor that helps mitigate vertical imbalances.

On the other hand, since decentralized spending and revenue collection decisions may heavily depend upon the extent and nature of local interest groups activity, one would expect that the more encompassing the dominant local interests the more efficient the revenue collection as well as the spending decisions. The foregoing arguments indicate that the following issues must also be taken into account in analyzing the outcomes of FD experiences: i) that non-locally financed local fiscal activity may lead to wrong price signals

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<sup>7</sup> One way of measuring tax effort is: (Revenue collection/ revenue base).

and *fiscal illusion*<sup>8</sup> and ii) that horizontal imbalances and within-region imbalances may be aggravated with decentralization.<sup>9</sup>

While the diversity of local preferences, economic circumstances and capacities, which can be more closely observed by local than central governments justifies FD, the objective of eliminating or reducing vertical imbalances need to be taken into account along with the aim of reducing horizontal imbalances in the process. In this paper, we refer to the attempt of achieving this joint objective as *fiscal equalization* (FE). Hence, in this study we first analyze of the extent of vertical and horizontal imbalances, and then propose a mechanism for fiscal equalization.

Since a just distribution of wealth, or achieving socio-economic equality, across and within the regions of a country can itself be considered a pure public good with great externalities, eliminating or reducing horizontal imbalances is essentially the responsibility of the central government. The main tool for performing this responsibility, fiscal equalization, are intergovernmental transfers, which are mainly in the form of *grants* and *revenue-sharing*. In Turkey, revenue sharing method, supplying about half of municipal revenues, is simple, since it is mainly based on the population criteria. Nevertheless, it is argued that this method is neither equality-enhancing (due to the derivation principle<sup>10</sup>) nor transparent (due to mostly discretionary deduction practice) as it may seem. Grants, on the other hand, are relatively insignificant and rather discretionary as well.<sup>11</sup>

Indeed, eliminating or reducing horizontal imbalances is an extremely challenging task; budgetary allocations to local governments may work against their intended purposes by

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<sup>8</sup> Fiscal illusion arises from the fact that while a local public spending benefits only a local public, its funding usually is obtained from the general public (see, Von Hagen and Harden, 1995).

<sup>9</sup> If revenues are mostly decentralized and revenue-sharing is reduced, richer regions will have more to spend, locking the poorer regions into lower spending capacities.

<sup>10</sup> 'origin-based revenue principle' where the amount of central taxes collected from an area determining the additional revenue share for that area. This was introduced by the Law Number 3030 in 1984 to provide additional revenue sharing to metropolitan municipalities; with this law, metropolitan municipalities were entitled to receive 5% of all the national taxes collected at the headquarters of the province in which they are located. (Sagbas and Bagdigen, 2003: 109).

<sup>11</sup> Sagbas (2003)

increasing incentives to spend and lowering incentives to tax, and thereby hindering fiscal discipline in relatively less advantaged regions. Hence, equalizing while decentralizing requires prudent monitoring and reinforcement mechanisms as well. Allocation of shared revenues needs to abide by a rule-based mechanism, with necessary monitoring arrangements, geared to eliminating both vertical and horizontal imbalances. Such a well-designed mechanism could impose a *quasi-hard-budget constraint* on subnational governments. This, in turn, would have potential consequences of improved governance, reduced poverty and regional development, elements that could also facilitate the success of FD with regards to its other objectives. Hence, FE can be treated as a disciplining device for FD and is therefore complementary to FD.

In designing an equality-enhancing revenue sharing mechanism, the initial step is naturally to measure socio-economic disparities as well as vertical imbalances across subnational divisions. As this study focuses on *fiscal equalization* outcomes of fiscal decentralization, we need to investigate not only *local expenditure needs* and *revenue collection capacities*, but also *how the central government could best allocate resources in financing fiscal imbalances across the subnational units while addressing the horizontal imbalances* as well. Conceding that this is a rather complex and challenging task, this paper can be considered as a preliminary attempt to address the issue.

In view of the forgoing discussions and the relevant literature, this paper proposes a method of redistribution for Turkey that is based on the measures of vertical and horizontal imbalances across the provinces. The data in the current study belongs to the year 2000, and the proposed methodology needs to be repeated every year to incorporate changing conditions.

The rest of the paper is organized as follows. Section 2 briefly covers methodological issues. Section 3 reports the various measures of vertical and horizontal imbalances across

the Turkish Provinces. Section 4 analyzes the relationship between vertical and horizontal imbalances in Turkey. Section 5 concludes.

## 2. Methodology

A World Bank survey of equalization practices via fiscal decentralization investigates the measurement of both fiscal capacity and expenditure need in individual sub-national units.<sup>12</sup> Expenditure needs are proposed to be determined by legally obligated types of services, local costs and prices and demographic factors. The proposed method of measuring the revenue collection capacity<sup>13</sup> is based on personal income or GDP of a given sub-national unit. “A composite income index” where weights are assigned according to the types of incomes constituting the local tax base is a modified version of this method.<sup>14</sup>

An alternative approach is the regression of local expenditures (revenues) on socio-economic variables. Sagbas (2003) constructs regression models to investigate disparities across local units in Turkey with respect to both *expenditure need* and *taxation capacity*.

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<sup>12</sup> Both Ma (1997) and Yilmaz and Bindebir (2003) report the details of intergovernmental transfer systems in various industrial and developing countries. Below, are the characteristics of four classifications of fiscal transfer systems that emerge from Ma (1997)'s study of nine countries.

In countries like Australia, Germany, Japan, Korea and United Kingdom, transfers are made on the basis of both equalization of fiscal capacities (R) and expenditure needs (E) across regions (Formula A). According to this method, once E and C are measured<sup>12</sup>, the government fills the gap:  $TR_i = E_i - R_i$ , where i denotes the region. However, since the available pool of transfers may be different than the total of such entitlements, actual transfers (ATR) are calculated as:  $ATR_i = (TT/\sum TR_i) * TR_i$ , where TT is the actual pool of transfers. Variations of this method can also be implemented by either selecting a fraction of the difference ( $E_i - R_i$ ) to be financed in transfers along with some discretionary part (OTR); or applying the formula after allowing for some standard level of transfers (ST) across the regions:  $TR_i = ST_i + (E_i - R_i) + OTR_i$ .

The second formula (Formula B) only considers equalization of fiscal capacities, an example of which can be found in Canada. The formula assumes the same expenditure need across the regions, and aims to eliminate the deviation of regional tax collection from the national average. By contrast, the third transfer method (Formula C) only considers equalizing expenditure needs, without emphasis on fiscal capacity due to difficulties in its measurement. To measure fiscal needs, a weighted average of various socio-economic and demographic indicators are used. India, Italy and Spain are examples to this type of fiscal transfer system.

The final classification (Formula D) of fiscal transfer methods entails the equalization of transfers only on the per capita basis. While Turkey is one example to the use of this formula, Germany, Canada, England and India also use it in certain types of transfers.

As Ma(1997) points out, the most advanced fiscal transfer formula is the first one (Formula A) in that it address both vertical and horizontal inequalities in the most effective way. In terms of data requirements, however, it is also the most demanding one.

<sup>13</sup> Based on Sagbas (2003), who also lists the potential pros and cons of these methods.

<sup>14</sup> An alternative, *representative tax system* is based on the assessment of relative revenue-raising abilities of subnational governments. This system is non-operative for Turkey due to its uniform tax rates and unavailability of local tax base information.

Both models include the following explanatory variables: *population (pop)*; *population density (den)*; *age dependency ratio (adr)*; *urbanization rate (urb)*; *per capita income and corporation tax (ict)*; *per capita local GDP (GDP)*; *number of employees in industrial, financial and commercial sectors (emp)* and a *dummy for municipalities that are tourism or commercial centers (dum)*. The expenditure function thus estimated is in effect a demand function. Sagbas observes that the variables that affect tax collection are *gdp* (only for non-metropolitan areas), *ict*, *emp* and *dum*, *adr* and *urb*, where the first four effects are positive and the last two are negative and significant. In the estimation of expenditure demand, the effects of *pop* and *adr* are negative and *ict* and *emp* (both only for <10,000) are positive and significant. These statistically significant findings are indicative of the inefficiency of using population as the only redistributive criteria in Turkey.<sup>15</sup>

The use of the regression analysis outlined above, especially if further relevant variables are considered, however, is mitigated by possible estimation problems. Among such problems, the most obvious one being multicollinearity, should caution against the use the resulting coefficients as the specific weights in a redistribution function. Rather, such regression results should indicate which variables are relevant for generating fiscal discrepancies.

Ma (1997) indicates that, selection of region-based indicators to measure fiscal needs require careful simulations and consultations with regional authorities. Notwithstanding this warning, we suggest that the *principal components analysis*<sup>16</sup> could be a superior approach to ascertain the weights for the relevant variables to measure the expenditure needs and revenue collection capacities. Various educational, social and macroeconomic indicators can be

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<sup>15</sup> Non-tax revenues, though much less significant than tax revenues of municipalities across the country, may also be incorporated in devising a formula to close regional disparities. Sagbas proposes equalization of non-tax revenues only on the basis of deviations from national averages of population and GDP per capita.

<sup>16</sup> Principle component analysis is the extraction of some linear combination of the columns of an X matrix (each corresponding to different variables) such as:  $z = Xc$  that provides the best fit to all the columns of X (see, for example, Greene, 1993).



considered among the factors whose variation across the provinces may play a role in both determining expenditure needs (E) and revenue raising capacities (R). One should note however, that while some factors, such as sectoral potentials, may help explain the differences in E and R across the provinces they need not be the variables per se that define horizontal imbalances that needs to be eliminated, a point we will revisit later in this paper.

In addition, at the central government level, how the local fiscal gaps are closed remains to be a policy decision that depends on the size of the pool and budget position. Revenue sharing and grant decisions, both of which could be open- or close-ended, must follow transparent but buoyant rules so as to achieve efficiency and accountability. Ma (1997), for example, suggests that the transfers should be based on the formula:

$$TR_i = (\hat{E}_i - \hat{R}_i) - OTR_i$$

subject to the constraint that

$$\Sigma(TR_i) = \text{pool of revenues (TR)}$$

where  $TR$  is transfers;  $(\hat{E}_i - \hat{R}_i)$  is the difference between “potential” expenditure needs and revenue collection capacity; and  $OTR$  is “other transfers”. A possible way to formulize  $OTR$  is to treat it both as carrot and stick, in the sense that it can be used as a device both to penalize the local governments that do not make improvements with regards to their vertical and horizontal positions, and to help them to achieve the national standards in case of a “justified need” for it. In case  $\Sigma(TR_i)$  exceeds  $TR$ , then  $ATR_i = TR_i [\text{TR}/\Sigma(TR_i)]$  becomes the actual level of transfers. Many countries use a mixed formula of grants and revenue sharing based on different sets of fiscal indicators (see Ma, 1997).

For the implementation of the above suggestions, while bestowing subnational governments with accountability, fiscal distances related with discrepancies in the socio-economic factors must be closely monitored and made transparent. To avoid adverse selection and moral hazard problems that may arise in the process, an advisory body for Fiscal

Equalization (call it, Fiscal Equalization Board: FEB<sup>17</sup>) can be proposed as a body in charge of this duty.<sup>18</sup> FEB can be considered as a means of institutionalizing FE, as institutions are not only rules and regulations but also the enforcement mechanisms (see, for example, North, 1986).

As for transparency, the redistributive function designed by the principle component analysis may be a limited one due to its complexity, in the sense that although the factors that go into the analysis and the methodology of the analysis may be made public, the exact weights of individual factors obtained in the principal component analysis need not be revealed. This deliberate half-transparency could serve to reduce the possibility of adverse selection and moral hazard problems. For example, if education has a large weight in determining expenditure means and/or revenue capacities, a local government may mainly focus on education to receive its reward, while may ignore the other socio-economic developments. The stick can then be the penalties that can be devised in relation to the growing size of deviations in other indicators of socio-economic sort.

As an additional implementation issue, Ma (1997) proposes that obtaining political support for the newly devised program would require a gradual, rather than all at once, adoption, while the population-based system is phased down over time by, say, initially fixing the nominal amounts of transfers.

### 3. Fiscal Status and Socio-Economic Standing of Turkish Provinces

In this section, we present the relative status of Turkish provinces with regards to both fiscal and socio-economic indicators. To do this, we first form the indicators of *vertical imbalances* across the 81 provinces of Turkey and inspect their relative positions (Section

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<sup>17</sup> In Turkish: *Mali Esitleme Kurulu*: MEK.

<sup>18</sup> Examples to such institutions are Commonwealth Grants Commission of Australia; State Finance Commission in India and Uganda Local Governments Finance Commission (see Yilmaz and Bindebir, p. 21)

3.1). Next, to ascertain the extent of *horizontal imbalances* across the provinces, we compose indices of macroeconomic, education, other social indicators (Section 3.2). Using these, we then analyze whether these indicators and fiscal variables have any connection with each other in Section 4.

### 3.1. Measures of Vertical Imbalance (VI)

We consider three measures of vertical imbalance (VI): i) the ratio of provincial expenditures to total provincial revenues (VI1); ii) the ratio of provincial expenditures to own revenues (VI2); and iii) the ratio of provincial expenditures to revenues received in the form of shared taxes (VI3). All the provincial data used in the following analysis are based on the aggregates of municipal and special provincial administrations.

Across the provinces, the average of VI1 is 0.98, indicating that, on average, expenditures are almost equal to the total provincial revenues, inclusive of shared tax revenues.<sup>19</sup> This is not surprising since the Turkish budget reporting system is inclusive of the financing of the deficits. When VI is measured according to the second definition, the average turns out to be 1.69, meaning that expenditures of provinces are, on average, higher than revenues exclusive of shared taxes. As for the third type of VI measure, the average is naturally much larger: 2.65, which indicates the importance of own revenue sources of provinces in total revenues.

Figures 1a to 1c below show the frequency distribution of the ratios of these three measures of VI to their respective averages across the provinces. Hence, the way to read the graphs is as follows: when a city falls within the range of 0,75 and 1,25, the vertical imbalance it incurs is within one quartile of the average measure of VI. According to this interpretation, Figure 1a reveals that there are only 3 cities that fall out of that range of VI1,

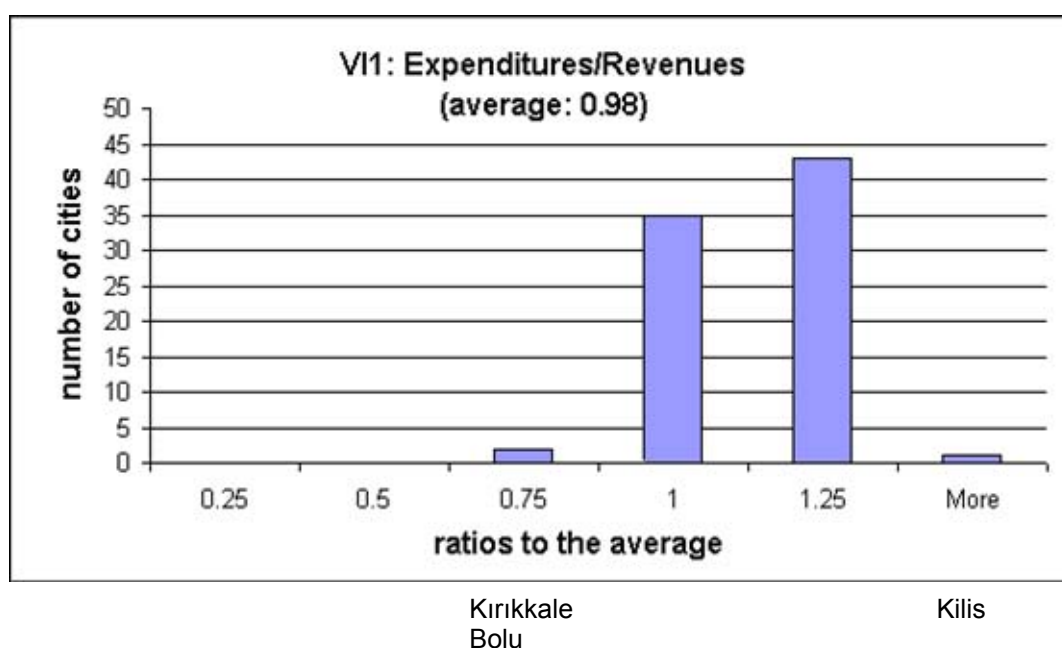
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<sup>19</sup> Revenues of provinces are composed of tax (inclusive of shared taxes) and non tax revenues and aid and funds (State Statistical Institute databases).

which indicates a rather equal distribution of VI1 across the provinces of Turkey.

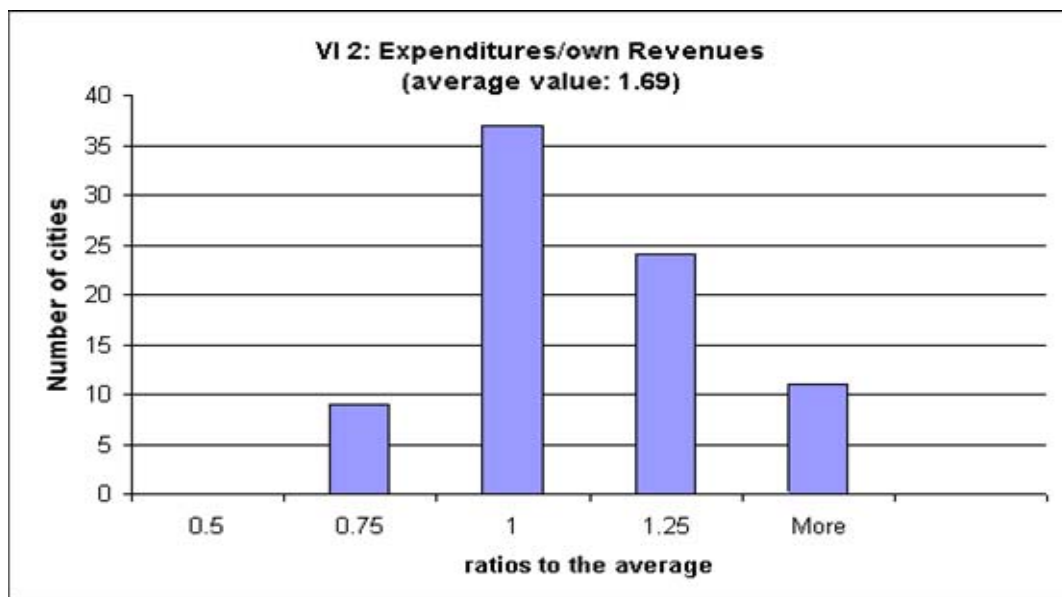
Furthermore, Figure 1a also shows that while only 1 province incurs more than 25% more of the average VI1, 2 cities incur at least 25% less than the average figure. The rest of the provinces are all within the 25% vicinity of the average figure.

**Figure 1a:** Distribution of VI1 Across Provinces



A similar picture is observed in Figure 1b: based on the measure of VI2, 11 cities provinces exceed the average ratio by more than 25%, while there are 9 provinces that exhibit less than 25% of the average measure of VI2.

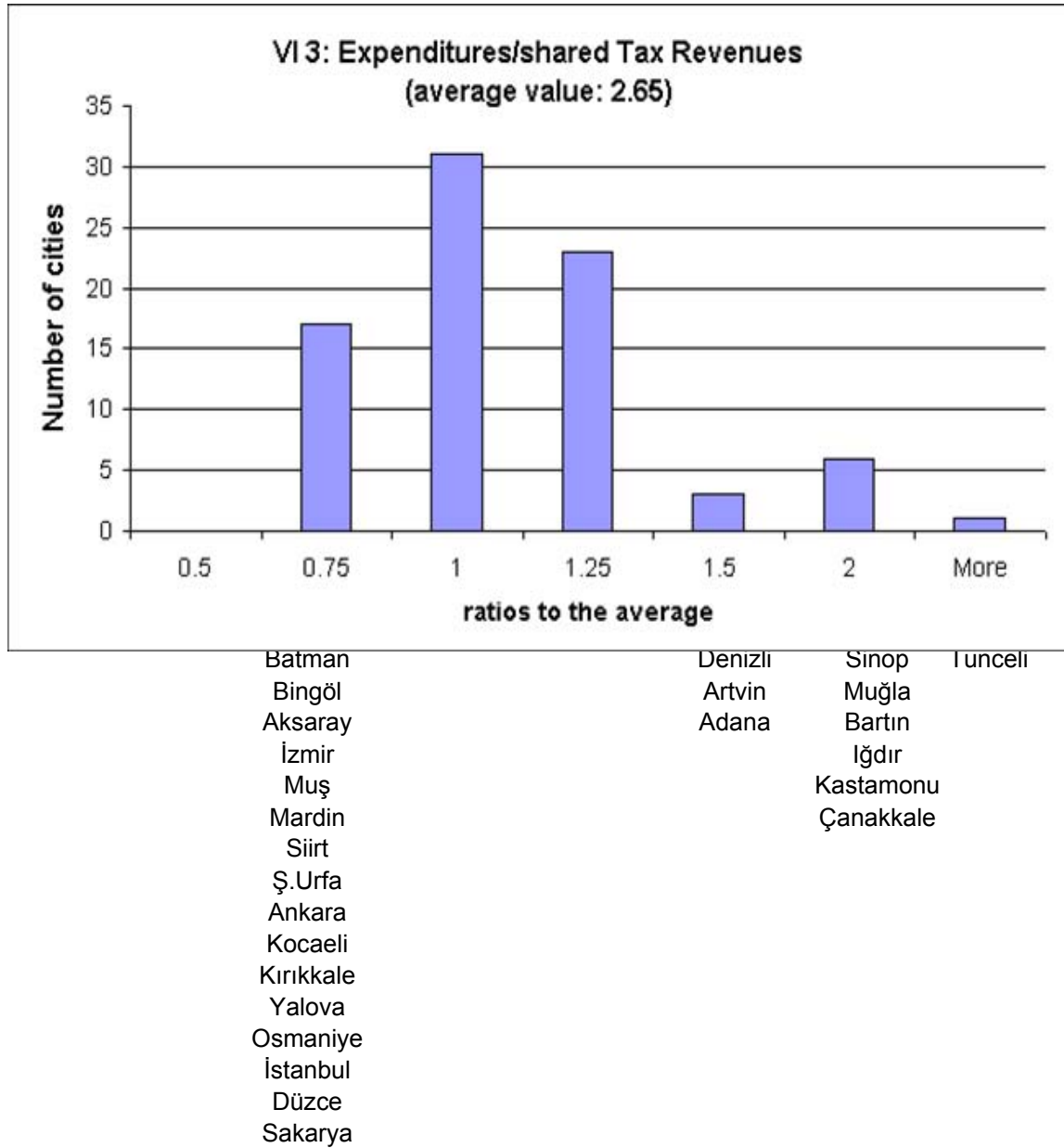
Like VI1 and VI2, VI3 also exhibits a rather concentrated distribution of VI across the provinces. However, the lower and upper tails of the distribution in this case indicates a greater variation in the distribution of shared taxes; there are 17 provinces that incur at least 25% less than the average of VI3 whereas 10 provinces incur more than 25% of the average figure.

**Figure 1b:** Distribution of VI2 Across Provinces

Bilecik  
 Çankırı  
 Çanakkale  
 Iğdır  
 Kars  
 Kastamonu  
 Ardahan  
 Bolu  
 Tunceli

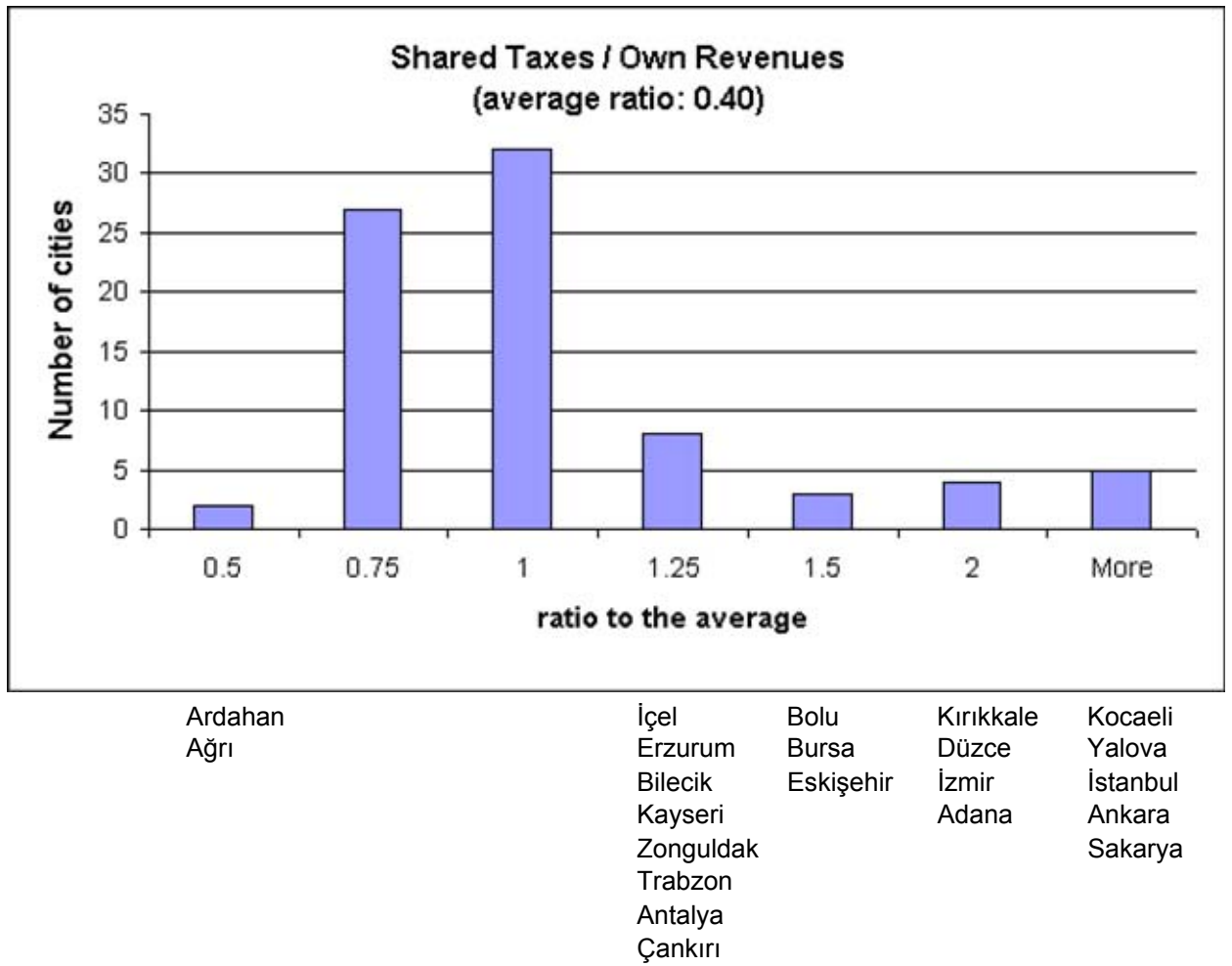
Ankara  
 Diyarbakır  
 Siirt  
 Sakarya  
 Ş.Urfa  
 İstanbul  
 Kocaeli  
 Bingöl  
 Erzurum  
 Kilis  
 Mardin

Reading from Figures 1a to 1c, it is possible to argue that, though not the vertical imbalances, per capita shared revenues are rather unevenly distributed across the provinces. To be able to interpret this point, we next look at the financing of these imbalances (VI2) via the main transfer system in Turkey: shared tax revenues. Figure 1d shows the distribution of the ratio of shared revenues to own revenues across provinces.

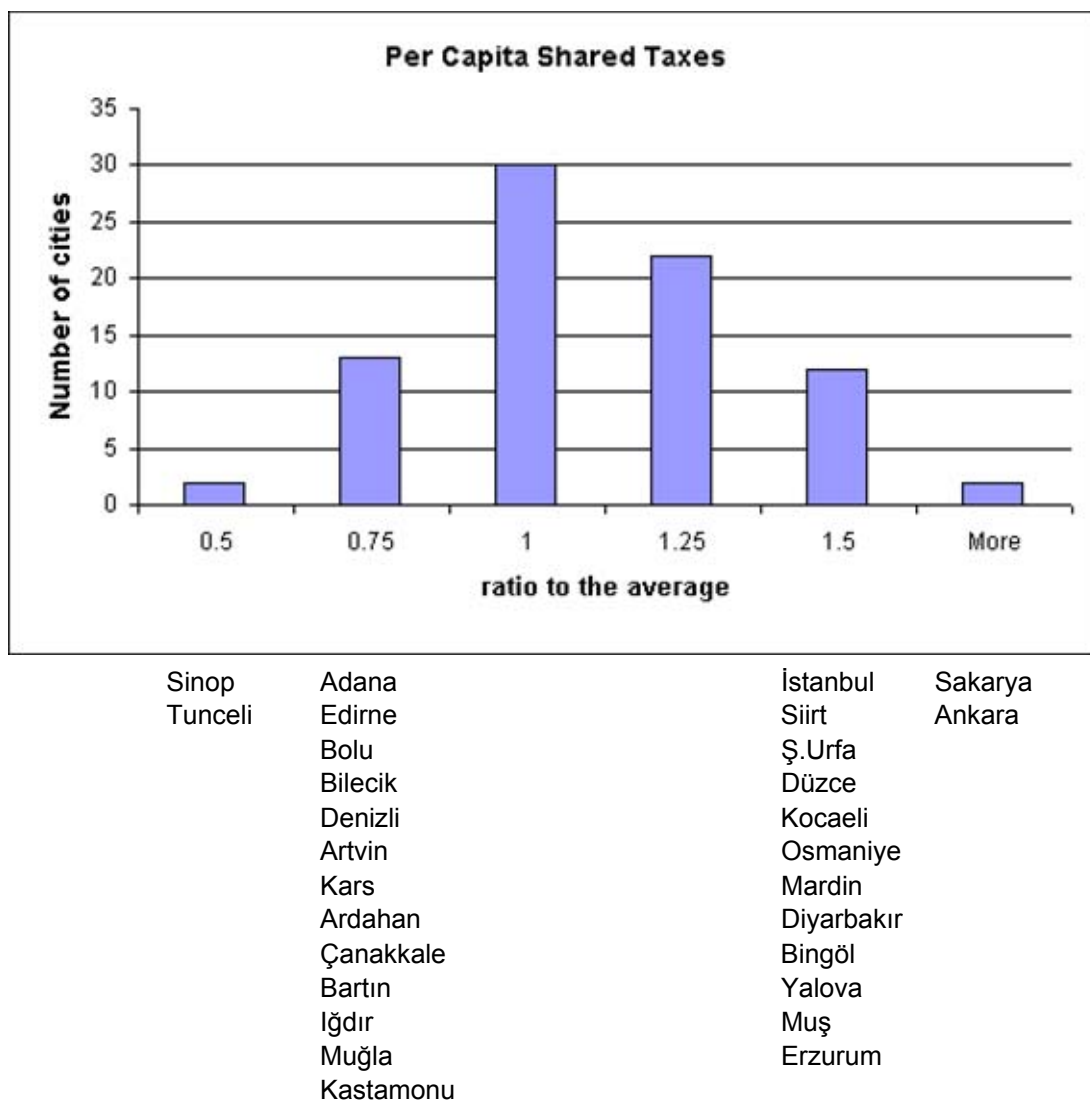
**Figure 1c:** Distribution of VI3 Across Provinces

According to Figure 1d, while only 2 cities (Agri and Ardahan) receive shared revenues by less than half of their own revenues, 9 cities receive shared taxes by more than one and a half fold of their own revenues. Specifically, the data indicates this ratio is more than two-fold in Kocaeli, Yalova, Istanbul, Ankara and Sakarya.<sup>20</sup>

<sup>20</sup> It needs to be noted, however, Kocaeli, Yalova, Sakarya, Duzce and Bolu have suffered from the 1999 earthquake and hence they received unusually high transfers in 2000.

**Figure 1d:** Distribution of the ratio of Shared Revenues to Own Revenues

Based on the above observations, there appears to be room for a more even distribution of shared revenues so as to possibly obtain more desirable economic outcomes across the provinces as well as for the macroeconomy. Indeed, Figure 1e shows that, even though population is the basis of shared revenue distribution, per capita shared revenues are also widely dispersed across the provinces of Turkey, induced possibly by the derivation principle and the lack of transparency with regards to the finances of local units, such as in the form of discretionary deduction practices.

**Figure 1e:** Distribution of per capita Shared Revenues

In an attempt to design an equitable redistributive formula of the revenue pool, in the next section we turn to the analysis of the relative positions of provinces with regards to socio-economic status, namely the horizontal imbalances. By doing this, we not only intend to capture the major aspects of socio-economic discrepancies across the provinces in Turkey, but also use those discrepancies to devise an egalitarian system of transfers.



### 3.2. Measures of Horizontal Imbalances: Socio-economic status

To investigate the discrepancies across provinces, we consider three clusters of socio-economic indicators as measures of horizontal imbalances: social, educational and macroeconomic. The following four indicators form an index of education as a separate cluster (EDUC): teacher to student ratio in both primary and high schools, and female schooling rate in both primary and high plus vocational schools. To form an index of social indicators (SOCIAL), other than education, we take into account the following eleven indicators: human development and poverty indices<sup>21</sup>; the ratio of villages and subsettlements with sufficient water; doctor per population; urbanization rate; population density; ratio of green card holders<sup>22</sup>; infant mortality rate; percentage of asphalt road; private car ownership (per 10 000 people) and electricity consumption (KWh per capita). Next, we use the following five variables to form an index of macroeconomic status (MACRO): GDP per capita; (the inverse of) the share of agricultural value added in GDP; bank deposits per capita (as an indicator of access to financial markets); ratio of wage earners; and a dummy for provinces with development priorities (KOY). The reason to include the share of agricultural value added in GDP in the Macro cluster is that agricultural sector is both more difficult to tax and monitor and is also subject to climatic conditions, all of which may pose fiscal difficulties in regions where this ratio is large. The similar argument goes for the inclusion of the ratio of wage earners.

All the data mentioned are obtained from the web site of the State Statistical Institute (unless otherwise indicated) for the year 2000, which is the most recent year for which the majority of the data were available. Hence, because there are numerous indicators (20 of them) of social and economic performance, which are all likely to be highly correlated with

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<sup>21</sup> obtained from United Nations (2004).

<sup>22</sup> the rate of use of unemployment insurance.

each other, we apply *principle components analysis*<sup>23</sup> rather than reporting each indicator individually across the provinces; this leads us to obtain their summary indices that are easier to report and digest. Principle components analysis enables us to focus on the clusters of information, rather than various individual indicators that may indeed be highly correlated with each other. To form the principle components, all the indicators listed above are adjusted for their scale differences by using logarithms when needed.

The results of the principle component (PC) analysis reveal that if we use the first PC as one composite index for each of the MACRO and SOCIAL clusters, we would be able to account for 59 % and 49% of the overall variability that could be explained by the 5 and 11 variables listed above for the two cluster of variables, respectively. Considering that the first principle components of both Macro and Social clusters carries such large proportion of information contained in the list of 16 variables, below we choose to report the relative positions of provinces based on these information only. As for education, even though the first principle component carries only the 38% of the variability in all of the four variables listed above<sup>24</sup>, for consistency in exposition, we again report the results based on the first principle component of Educ below.

Hence, Figures 2a to 2c show the distribution of first principle component of each three clusters of socio-economic indicators. The figures indicate that all clusters of indicators demonstrate a quite uneven socio-economic status across the provinces, and social index (Figure 2c) is the most widely spread cluster across the provinces, followed by macroeconomic performance index.

It is interesting to observe in Figure 2b that education appears to be the most equally distributed attribute of socio-economic status across the provinces, while Tekirdag, Kocaeli,

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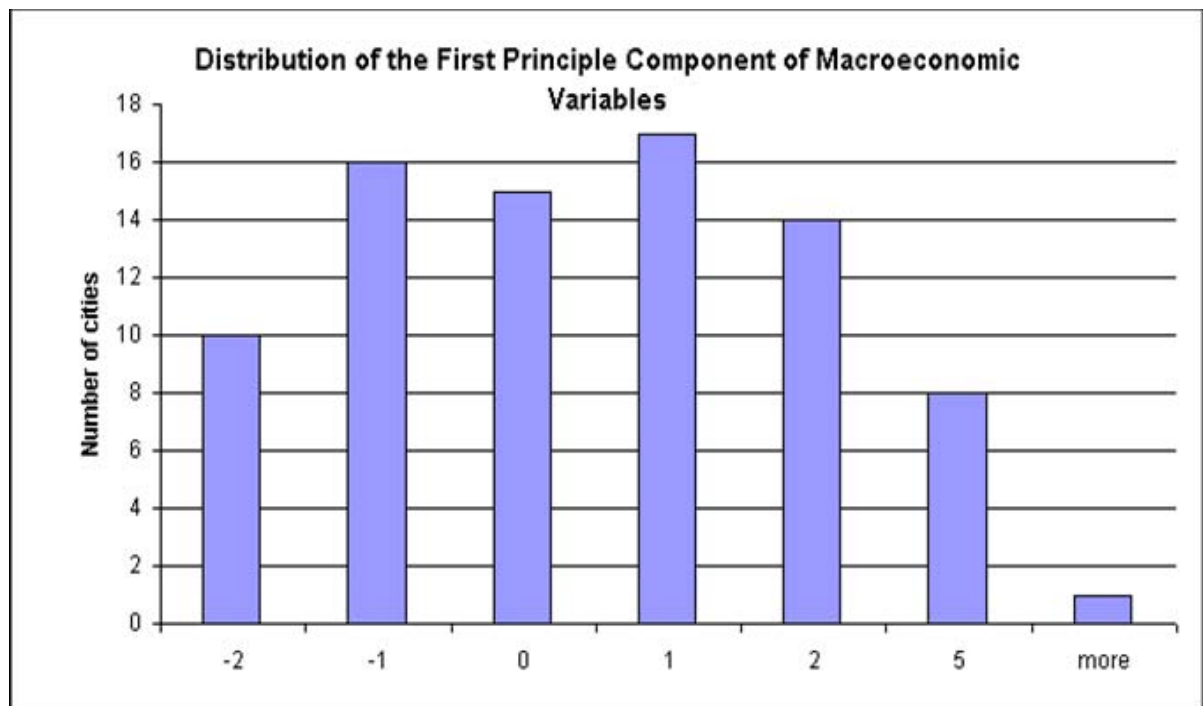
<sup>23</sup> See, for example, Greene, 1993, pp. 271-73.

<sup>24</sup> The first principle component of this cluster is correlated with the female primary and secondary schooling rates with more than 84%; with 20% with teacher to student ratio in primary school; and with 7% with the teacher to student ratio in secondary school. Hence, it mostly accounts for the female schooling rate.

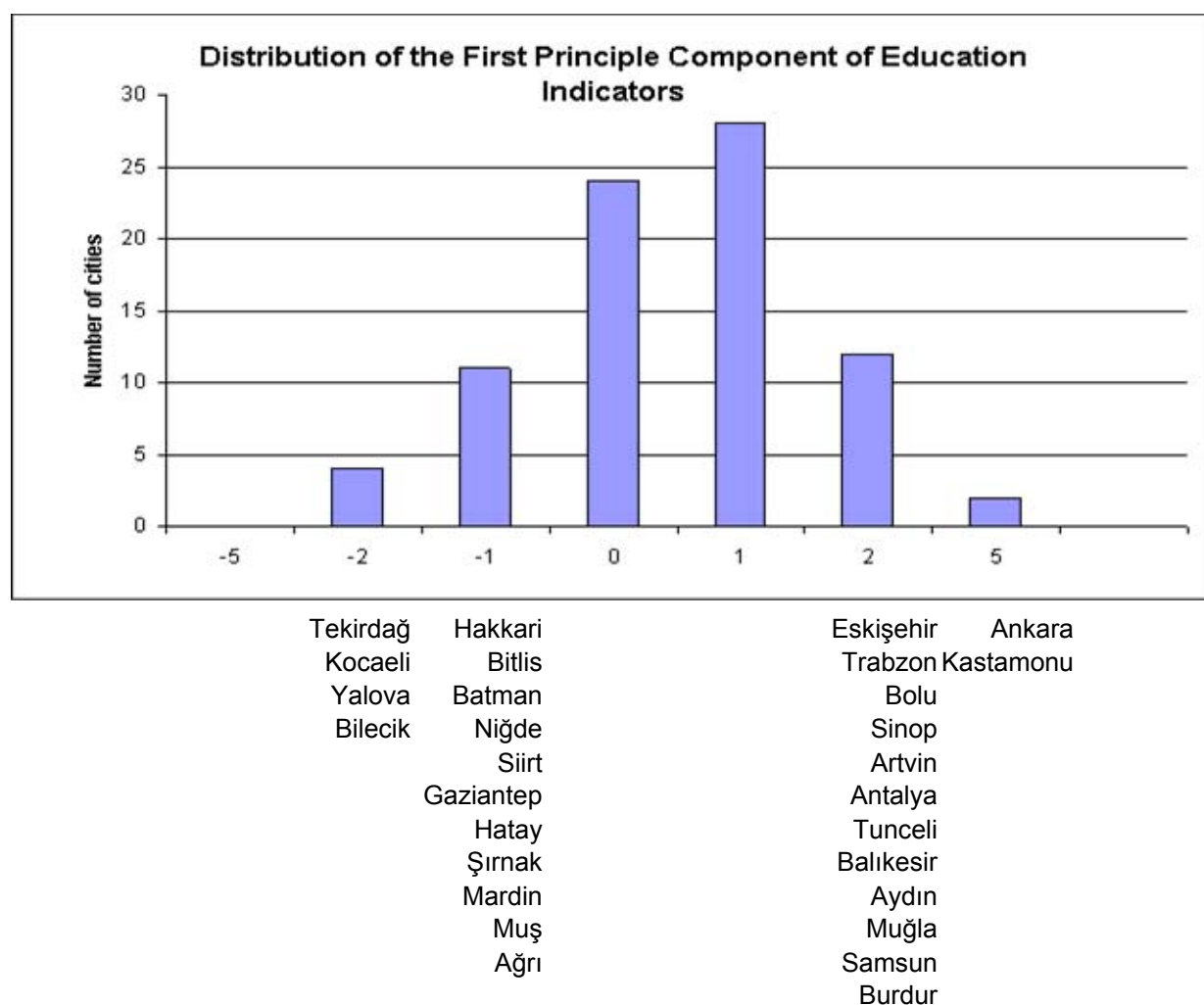
Yalova and Bilecik rank at the bottom of the distribution, Ankara and Kastamonu depict about four-fold the average education performance. Overall, of the 81 cities, while 14 stand out on the upper tail of the distribution, majority of the cities (52 of them) are positioned in the center of the distribution and 15 are in the lower tail.

## Figure 2: Distribution of the Indices of Socio-Economic Indicators

**Figure 2a:** Distribution of the Index (First Principle Components) of Macroeconomic Performance



Bayburt	Bartın	Tunceli	Uşak	İzmir	Ankara	İstanbul
Ş.Urfa	Erzincan	Afyon	Samsun	Adana	Kocaeli	
Gümüşhane	Çankırı	Kırıkkale	Hatay	Bolu	Yalova	
Hakkari	Osmaniye	Artvin	Sakarya	Muğla	Bursa	
Bingöl	K.Maraş	Niğde	Burdur	Bilecik	İçel	
Van	Diyarbakır	Giresun	Isparta	Denizli	Eskişehir	
Ardahan	Erzurum	Aksaray	Nevşehir	Antalya	Tekirdağ	
Bitlis	İğdir	Sinop	Düzce	Edirne	Kırklareli	
Ağrı	Batman	Kilis	Zonguldak	Aydın		
Muş	Tokat	Elazığ	Çanakkale	Manisa		
	Mardin	Çorum	Karaman	Kayseri		
	Kars	Amasya	Kırşehir	Karabük		
	Yozgat	Ordu	Trabzon	Balıkesir		
	Adıyaman	Kastamonu	Kütahya	Gaziantep		
	Şırnak	Malatya	Konya			
	Siirt		Rize			
			Sivas			

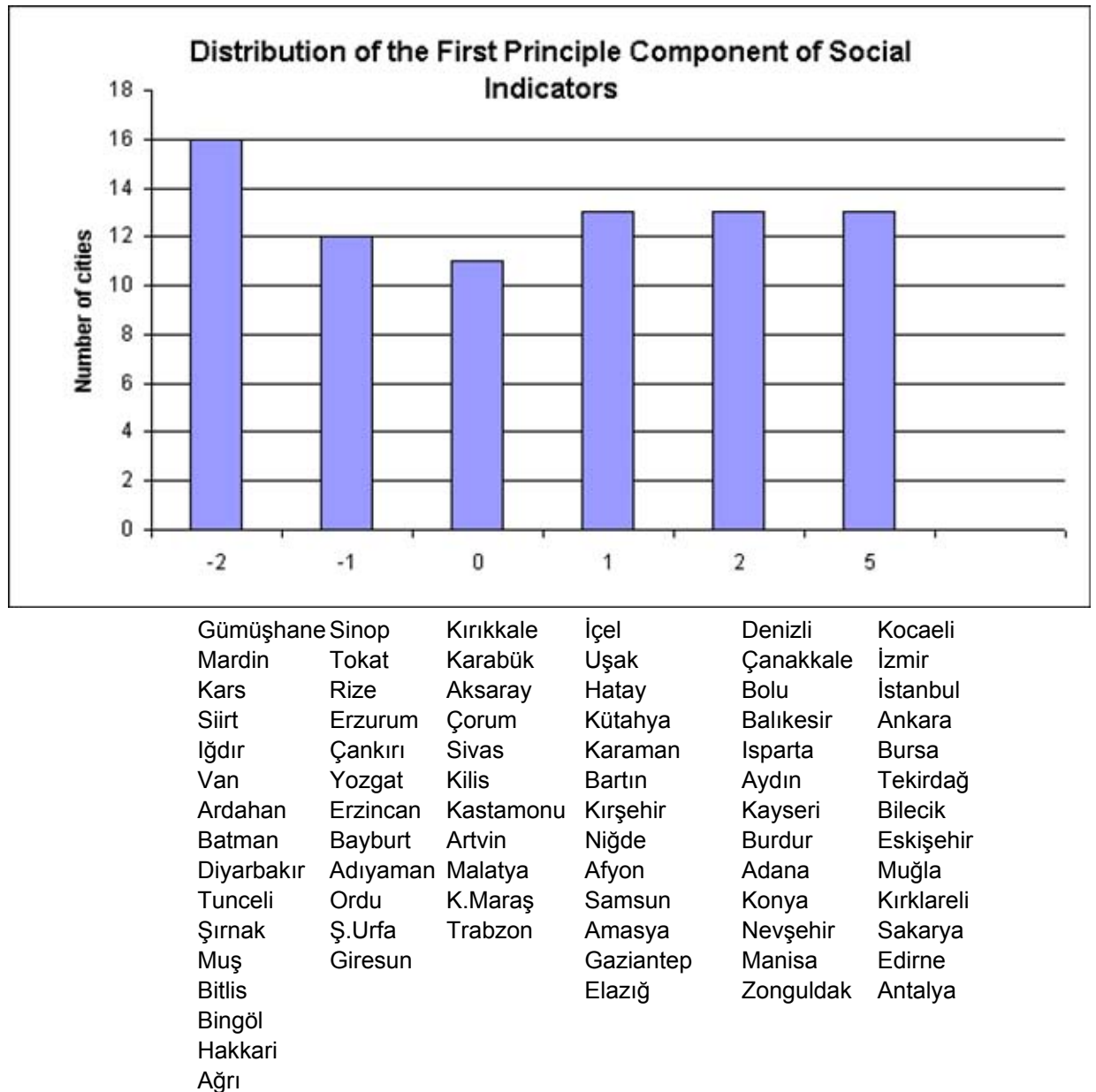
**Figure 2b:** Distribution of the Index (First Principle Component) of Educational Status

We also constructed principle components of all the clusters combined, finding out that the first principle component of all the socio-economic indicators accounts for 42% of all the variability in them<sup>25</sup>. Figure 2d depicts the distribution of this index (first principle component) of the 20 socio-economic indicators formerly clustered as Educ, Social and Macro. Figure 2d, as an overall index of socio-economic status, also reveals a wide dispersion across the provinces of Turkey. In view of such large discrepancies, one may easily conclude that it is not very meaningful to only focus on a population-based system of distribution of the revenue pool as does the current system. Rather, an egalitarian system of

<sup>25</sup> The first 4 of these principle components account for about 69 % of the variation in the 20 indicators discussed above.

redistribution needs to address these wide divergences in socio-economic conditions across the provinces. It is highly likely that both E and R would differ across the provinces that display different socio-economic status.

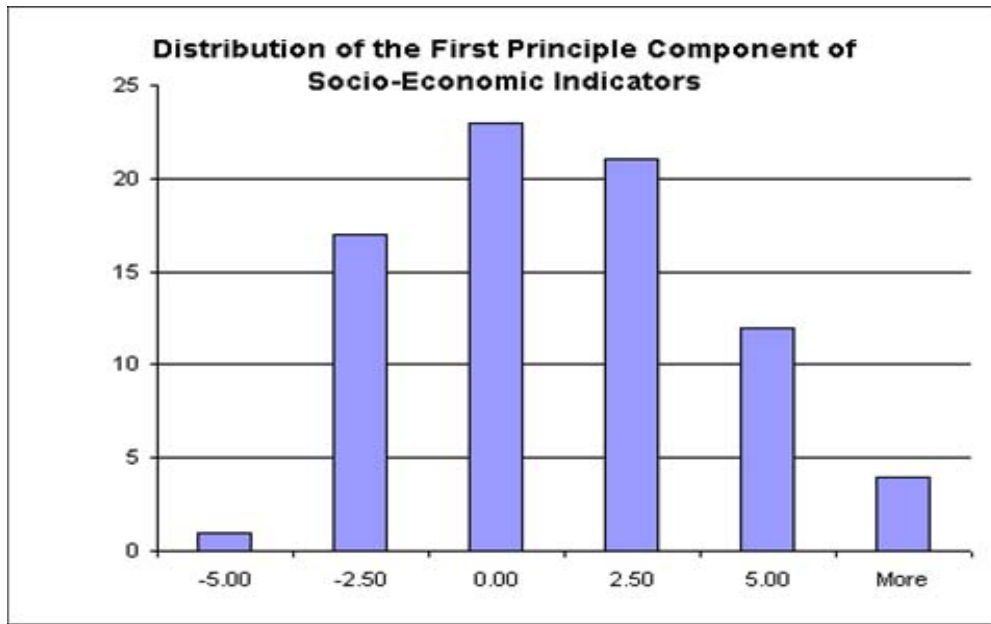
**Figure 2c:** Distribution of the Index (First Principle Component) of Social Status



An interesting observation substantiating this argument, for example, is that, Istanbul, Ankara and Kocaeli, for example, that turn out to be the outliers on the upper tail of the

distribution according to various measures of VI and according to the ratio of shared tax revenues to own revenues (see Figures 1a, 1b and 1d), also turn out to be in the upper tail of the distribution with respect to socio-economic indicators (see Figure 2d).

**Figure 2d:** Distribution of the Overall Index (First Principle Component) of Socio-Economic Status



I	II	III	IV	V	VI
Ağrı	Adıyaman		Balıkesir	İzmir	İstanbul
	Ş.Urfa		Aydın	Eskişehir	Ankara
	Batman		Sakarya	İçel	Kocaeli
	Yozgat		Manisa	Tekirdağ	Bursa
	Diyarbakır		Çanakkale	Kırklareli	
	Bayburt		Kayseri	Muğla	
	Siirt		Samsun	Bilecik	
	Kars		Uşak	Antalya	
	Gümüşhane		Zonguldak	Edirne	
	Iğdır		Isparta	Denizli	
	Van		Burdur	Bolu	
	Şırnak		Karabük	Adana	
	Ardahan		Gaziantep		
	Hakkari		Hatay		
	Bitlis		Konya		
	Bingöl		Nevşehir		
	Muş		Kırıkkale		
			Kütahya		
			Elazığ		
			Kırşehir		
			Karaman		

Based on the distribution emerging in Figure 2d, we next look at average values of the fiscal indicators across different, though somewhat superficially determined, socio-economic groupings of the provinces. Table 1 clearly indicates that as socio economic performance improves (going from column I to VI), there are accompanying increases in expenditures, own revenue collection, and as mentioned above, interestingly, shared taxes per capita as well. Table 1 thus shows that, across the provinces, the improvements in the budgetary positions due to relatively better socio-economic performance are not realized; all three of the VI measures, that are not notably different from each other across different socio-economic statuses point at this direction.

**Table 1:** Averages of fiscal indicators across provinces grouped by socio-economic performance index.

<b>AVERAGE:</b>	<b>I</b>	<b>II</b>	<b>III</b>	<b>IV</b>	<b>V</b>	<b>VI</b>	<b>Overall</b>
<b>VI1</b>	0.96	0.98	0.98	1.00	0.96	0.98	<b>0.98</b>
<b>VI2</b>	1.45	1.80	1.62	1.67	1.50	2.22	<b>1.69</b>
<b>VI3</b>	2.81	2.47	2.94	2.63	2.93	1.88	<b>2.65</b>
<b>EXPpc</b>	23.62	36.48	52.05	54.78	68.68	106.43	<b>55.10</b>
<b>ownREVpc</b>	15.96	11.60	21.16	24.18	35.54	38.88	<b>34.42</b>
<b>sTAXpc</b>	8.40	15.12	18.63	22.30	24.65	59.99	<b>22.70</b>

(Note: EXPpc is per capita expenditures; ownREVpc is total tax and non tax revenue minus share revenues; and sTAX pc is the shared per capita taxes.)

#### 4. The relationship between socio-economic status and fiscal position

This section investigates whether the discrepancies among the fiscal positions across the provinces are related with horizontal imbalances defined as divergences in their socio-economic status. In view of Table 1, it is predictable that the better the macroeconomic performance, education and social indicators, the larger the municipal revenues that can be collected. It is also obvious that the better the socio-economic status, the more municipal spending has been taking place, thus leaving the implications with regards to the effect of socio-economic status on vertical imbalances ambiguous. In what follows, we will attempt to

identify the provinces whose expenditure levels and own revenues diverge from the average levels implied by the relevant socio-economic status. This way, we will be able to point at policy proposals for those provinces in the direction of either improving their revenue collection capacity or adjusting expenditures upward or downward.

To address these points, we utilize our data efficiently by employing the first 4 principle components of the total of 20 indicators (PC20) listed above under each cluster, which all together account for the 69% of all variation in the 20 variables.<sup>26</sup> In addition, we control for the cities that suffered from the 1999 earthquake by a dummy variable (D)<sup>27</sup>. Moreover, even though we argue that the size of population or being a metropolitan municipality should not justify the divergence from the (average) levels estimated by the level of socio-economic status, we nevertheless add the (logarithm of) population (pop) and a dummy for metropolitan municipalities (MM) so as to account for the effects of these factors that may have already been affecting the local fiscal decisions in Turkey. Hence, this analysis concentrates on the prevailing factors that effect E and R and thus attempts to identify divergences from the average practice. The usefulness of this approach hence lays in identifying the major problem cases and helps to redirect the redistributive practices towards a more reasonable system of determining E and R that is based solely on socio-economic criteria, rather than by factors such as population which are likely to have been manipulated and used as a criterion of redistribution due to political concerns. One should additionally note, however, that the 20 criteria proposed in this paper may be modified and extended under objective conditions.

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<sup>26</sup> Alternatively, we use the first three principle components of each of the three clusters of socio-economic indicators explained above: Educ, Social and Macro, accounting for about 70% to 90% of all variation that can be explained by the variables included in the respectively clusters. Since the results are virtually the same as in the case of the principle components of all the 20 indicators taken together, with all clusters being significant except for education in own revenues. For purposes of efficiency in estimation and simplicity, we only report the results with the 4 PCs formed on the basis of all 20 indicators, though the alternative estimations can be obtained from the author.

<sup>27</sup> Those cities are: Bolu (14), Kocaeli (41), Sakarya (54), Yalova (77) and Duzce (81), where the numbers in parentheses are the license numbers.



Hence, we estimate the following two models for expenditures and revenues, respectively:

$$E = \beta_0 + \beta_1 * PC20_1 + \beta_2 * PC20_2 + \beta_3 * PC20_3 + \beta_4 * PC20_4 + \beta_5 * D + \beta_6 * MM + \beta_7 * pop + e \quad (1)$$

$$R = \gamma_0 + \gamma_1 * PC20_1 + \gamma_2 * PC20_2 + \gamma_3 * PC20_3 + \gamma_4 * PC20_4 + \gamma_5 * D + \gamma_6 * MM + \gamma_7 * pop + \varepsilon \quad (2)$$

where the estimations are made with OLS method and White-heteroskedasticity correction has been performed to obtain consistent standard errors:  $e$  and  $\varepsilon$ , respectively.

**Table 2:** OLS estimations of (logs of) E and R (per capita), using robust errors.

Explanatory variables:	Dependent Variables:	
	Expenditures (E)	Own Revenues (R)
constant	114.76*** (3.48)	83.27** (1.99)
PC1	4.43*** (7.98)	2.86** (7.22)
PC2	2.10* (1.94)	1.79** (1.97)
PC3	2.33* (1.95)	0.68 (0.42)
PC4	3.77 (3.55)	0.91 (0.80)
Earthquake Dummy	28.77 (2.93)	3.15 (1.09)
Population (in logs)	-4.83* (-1.95)	-4.68 (-1.50)
MM	12.12* (2.06)	5.72 (1.20)
R-bar square	0.66	0.31
Nu. of obs.	78	78

\*\*\*, \*\* and \* indicate significance at 1%, 5% and 10% levels, respectively.

The numbers in parentheses are the t-ratios.

Table 2 reports the estimation results for per capita expenditures and per capita own revenues, the latter calculated as the sum of own tax revenues and non-tax revenues. We argue what the estimation of the models above yields can be interpreted as the “revenue collection capacity” and “expenditure needs”, based on socio-economic status. The first

column indicates that there is positive and significant relationship between the socio-economic status and the expenditures of provinces.

While we also observe a negative effect of population, being a metropolitan municipality leads to higher expenditures beyond the effects of socio-economic variables; both of these effects, however, are only significant at 10%. While this reflects the current practice, however, we argue that last two effects may be eliminated overtime as factors that could affect expenditures are already taken into account in PC variables.<sup>28</sup> Indeed, we do not see the significant effect of either population or MM on the revenue collection capacity, whereas own revenues are positively and significantly associated with the first two principle components of socio-economic indicators. We also observe that the model above has a much higher goodness of fit in case of expenditures than for revenues (column 1 as compared to column 2), which indicates that socio-economic conditions have not been as significant in determining the revenue collection capacity in Turkey as much as we consider it should. Moreover, the positively significant relationship between the PCs and E indicates the dominance of cases where more spending leading to good socio-economic status rather than bad socio-economic status leading to more spending.

Based on the difference between the estimated expenditure needs and own revenue collection capacities, we can then calculate estimated transfers as:

$$TR_{est} = E_{est} - R_{est} \quad (3)$$

where  $E_{est}$  and  $R_{est}$  represent the estimated values of E and R, respectively, following the models (1) and (2) above.

Table 3 below utilizes the estimation results reported in Table 2 to rank the deviations of estimated transfers ( $TR_{est}$ ), implied by the difference between estimated expenditures and own revenues, from actual transfers, in the form of shared taxes, plus aid and fund.

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<sup>28</sup> When we estimate both of the models by excluding the last two terms, namely MM and pop, the goodness of fit are reduced to 0.63 and 0.29, respectively for E and R.

According to column (4) of the table, the sum of actual transfers (inclusive of aid and funds) exceeds the sum of implied amounts by 127 Million TL (per capita). This also implies an average vertical imbalance (calculated as E/own revenues) of 2.58, which is slightly lower than the actual average level of 2.86.

The tables demonstrates that especially Kirikkale, followed by Bilecik, Ankara, Cankiri, Kocaeli and Hakkari are listed at the top of the cities that receive much more than the average amount of transfers given their socio-economic status. By contrast, Agri, Diyarbakir, Balikesir (from the bottom of the list) appear to receive less than the amount estimated by their socio-economic status. It should be noted, however, that this analysis merely provides estimates and its results should not necessarily be viewed conclusive.

**Table 3:** Ranking of Turkish Provinces according to the deviations of estimated transfers from actual transfers (including aid and funds).

License Number	Estimated transfers				License Number	Estimated transfers			
	(1) Shared Tax pc	(2) Aid& fund pc	(3)	(4) Actual-estimated		(1) Shared Tax pc	(2) Aid& fund pc	(3)	(4) Actual-estimated
71 Kırıkkale	43.47	40.35	30.60	53.21	40 Kırşehir	19.14	4.32	23.63	-0.17
11 Bilecik	25.46	32.13	31.05	26.54	66 Yozgat	14.32	10.06	24.62	-0.24
6 Ankara	61.67	10.15	47.75	24.06	70 Karaman	17.38	9.19	26.81	-0.25
18 Çankırı	22.90	26.80	25.85	23.84	8 Artvin	14.91	18.08	33.65	-0.65
41 Kocaeli	76.23	15.32	72.31	19.24	52 Ordu	17.22	10.20	28.50	-1.08
30 Hakkari	16.44	22.19	22.01	16.63	31 Hatay	19.53	6.24	26.95	-1.18
37 Kastamonu	16.19	35.31	39.61	11.89	33 İçel	27.95	10.69	39.97	-1.33
54 Sakarya	59.95	11.65	59.70	11.89	35 İzmir	37.55	5.45	44.41	-1.42
14 Bolu	31.30	36.61	56.96	10.95	38 Kayseri	24.99	9.00	35.41	-1.42
53 Rize	21.88	17.10	28.88	10.10	65 Van	13.41	9.01	24.54	-2.12
46 K.Maraş	19.59	16.38	26.27	9.70	15 Burdur	16.91	9.09	28.17	-2.16
5 Amasya	22.21	15.59	28.55	9.25	9 Aydın	17.60	11.75	31.70	-2.35
76 Iğdır	12.97	26.00	29.99	8.97	23 Elazığ	16.53	6.15	25.76	-3.08
34 İstanbul	71.71	5.36	68.39	8.68	58 Sivas	16.44	8.18	27.79	-3.17
57 Sinop	11.63	27.12	30.83	7.91	16 Bursa	30.34	8.53	42.80	-3.93
51 Niğde	19.10	13.66	25.04	7.72	45 Manisa	18.80	6.59	29.68	-4.30
13 Bitlis	16.21	14.14	22.90	7.45	67 Zonguldak	24.88	9.84	39.06	-4.34
32 Isparta	19.11	13.72	25.86	6.98	26 Eskişehir	28.57	8.07	41.08	-4.44
19 Çorum	16.58	17.01	26.70	6.89	42 Konya	21.42	6.71	32.82	-4.68
60 Tokat	21.60	7.97	23.80	5.77	12 Bingöl	15.76	4.79	25.25	-4.70
74 Bartın	13.45	27.85	35.67	5.63	64 Uşak	21.45	6.46	32.81	-4.91
49 Muş	17.91	7.77	20.30	5.39	20 Denizli	18.30	12.27	36.08	-5.52
25 Erzurum	27.73	10.17	32.67	5.23	72 Batman	13.61	7.59	26.76	-5.56
68 Aksaray	19.64	10.56	25.24	4.95	7 Antalya	23.41	9.98	39.52	-6.13
50 Nevşehir	17.92	16.04	29.11	4.85	47 Mardin	14.13	2.87	23.13	-6.14
24 Erzincan	20.80	8.98	25.22	4.55	55 Samsun	20.88	10.51	37.62	-6.23
79 Kilis	16.16	6.57	25.79	3.95	22 Edirne	17.03	9.31	32.65	-6.32
28 Giresun	15.19	17.04	28.42	3.81	2 Adıyaman	15.75	1.80	24.86	-7.30
29 Gümüşhane	14.37	12.43	23.33	3.47	36 Kars	12.13	2.81	24.01	-9.07
69 Bayburt	20.16	7.52	24.32	3.36	39 Kırklareli	17.83	3.57	31.81	-10.42
75 Ardahan	10.20	20.53	27.44	3.29	27 Gaziantep	18.89	6.85	36.23	-10.48
3 Afyon	21.51	8.45	26.84	3.11	59 Tekirdağ	17.47	6.04	34.29	-10.79
43 Kütahya	18.44	11.22	26.73	2.94	17 Çanakkale	13.58	5.44	30.68	-11.66
73 Şırnak	13.50	11.80	23.31	1.99	48 Muğla	15.12	10.03	37.13	-11.97
44 Malatya	21.01	7.86	27.18	1.69	62 Tunceli	14.93	na	27.48	-12.55
78 Karabük	20.07	13.58	32.00	1.65	10 Balıkesir	17.27	1.61	32.38	-13.49
61 Trabzon	23.65	11.25	33.41	1.50	21 Diyarbakır	16.57	7.93	39.41	-14.91
56 Siirt	17.47	7.79	23.91	1.35	4 Ağrı	8.40	0.28	25.15	-16.47
1 Adana	35.79	2.41	37.77	0.42					
63 Ş.Urfa	16.22	6.14	22.29	0.07	<b>Total (Million TL):</b>	<b>1697.8</b>	<b>907.8</b>	<b>2478.7</b>	<b>126.9</b>

### *Eliminating Horizontal Imbalances (HIs):*

Up to this point, we only used HIs to identify the estimated (or justified) level of VI to be financed by transfers, without addressing the question of how to reduce or eliminate those HIs. For purposes of equalization, however, we need to modify the above formula (3) to also incorporate a factor designed to reduce or eliminate HIs. To do this, we consider a subset of socio-economic indicators that we think constitutes an objective set of criteria with respect to which all provinces are *desired to converge*. For this, we end up with 11 criteria from the set of 20 indicators above: teacher to student ratio in both primary and high schools, and female schooling rate in both primary and high plus vocational schools; human development and poverty indices; the ratio of villages and subsettlements with sufficient water; doctor per population; infant mortality rate; percentage of asphalt road; and GDP per capita.<sup>29</sup> To this list of criteria, we also apply principle components analysis and find out that the first principle component (call it SE) accounts for the 38% of all the variability contained in the set of 11 variables. Figure 3 shows the distribution of SE across provinces, depicting a rather uneven picture.

Using the first principle component, SE, of this set, we then calculate the distances of individual provinces ( $d_i$ ) from the average SE value. We consider this distance measure as another justification for providing provinces transfers in case the pool of actual transfers exceed the sum of above defined “estimated transfers”. We utilize this variable in the following way to suggest a way to calculate equitable transfers:

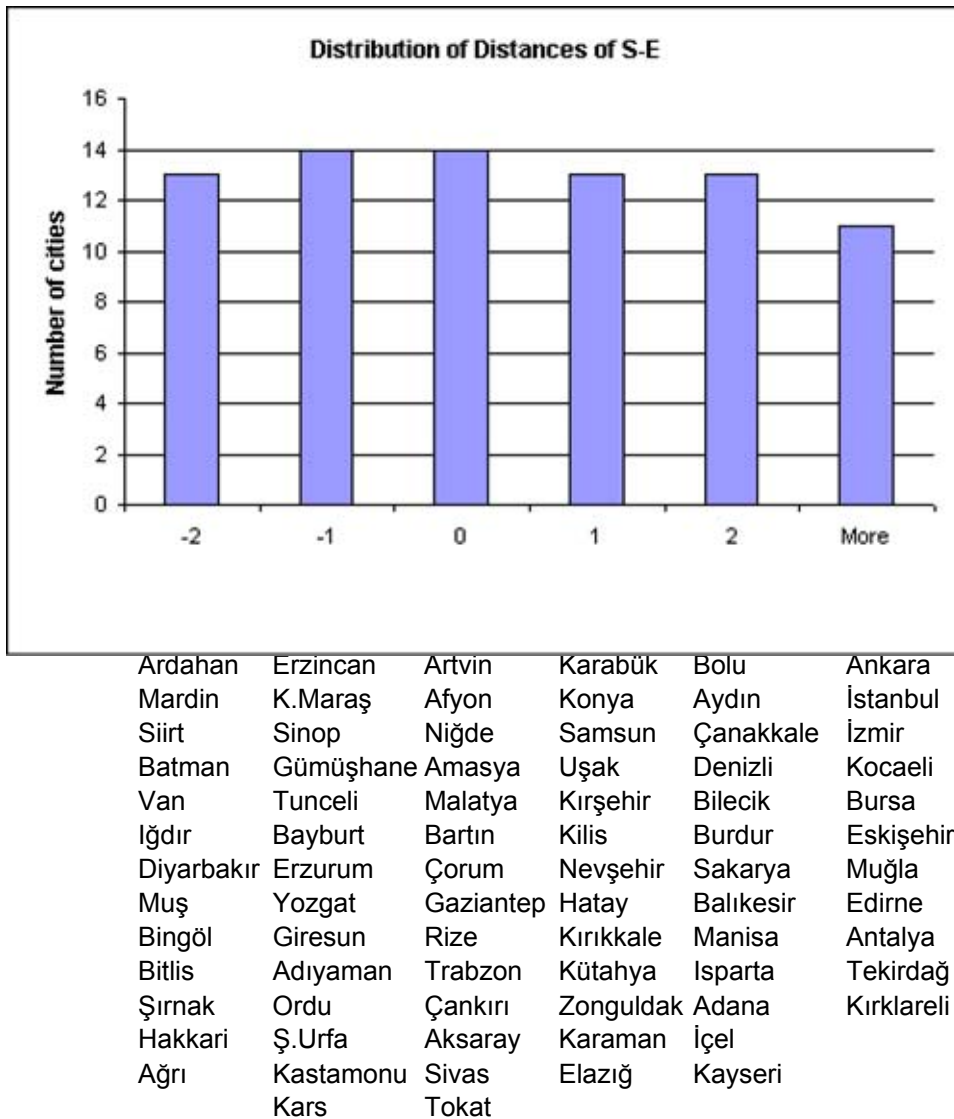
$$TR' = d_i * (TR \text{ pool} - \sum_i TR_{\text{est}}) \quad (4)$$

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<sup>29</sup> As was mentioned earlier for the set of 20 criteria that we hypothesized to affect E and R, this list of 11 indicators are also subject to modification granted that the modification is based on objective reasoning.

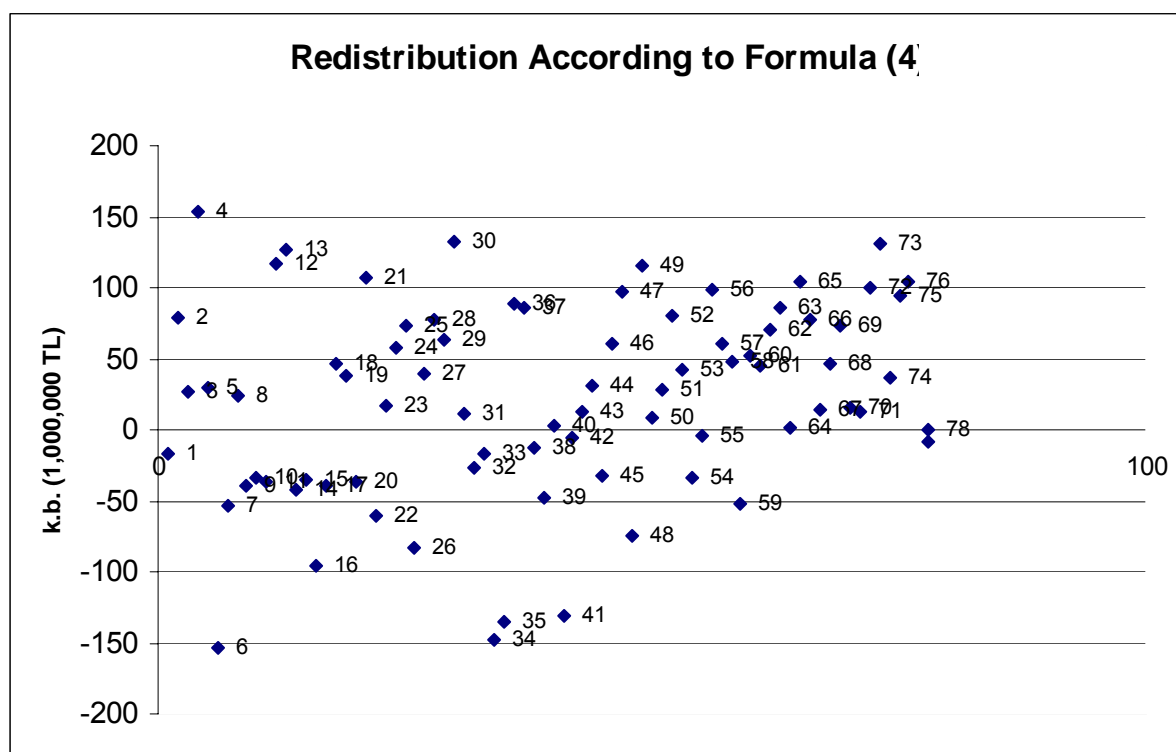
where  $d_i$  is given by:  $d_i = (SE_{max} - SE_i) / \sum_i (SE_{max} - SE_i)$  and  $i$  stands for each of the provinces.<sup>30</sup> Note that, if only formula (4) is taken into consideration, all transfers would be purely redistributive, collecting revenues from the richest provinces and allocating them to the poorest. Figure 4 depicts this pure redistribution case.

**Figure 3:** Distribution of the distances of “socio-economic status” from national average



<sup>30</sup> This formulation gives the province with the lowest SE the highest weight, while the sum of all  $d_i$ 's add up to 1.

**Figure 4:** Transfers in case of pure redistribution – According to Formula (4).



(Note: numbers are the license numbers of each province)

However, this formulation does not take into account the “estimated” level of transfers to each province that we suggest in formula (3). Hence, we use (4) to modify (3) in the following way:

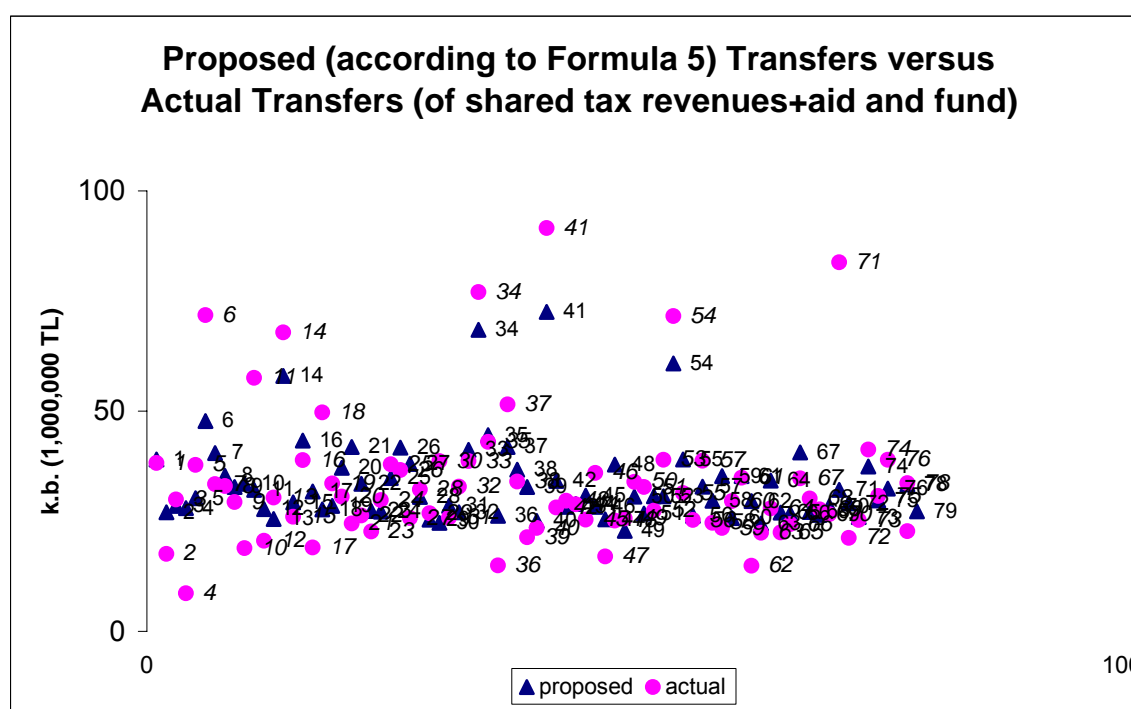
$$TR^* = TR_{est} + TR' \quad (5)$$

Formula (5) defines our proposed level of transfers that not only takes into account the estimated amount of transfers, based on the differences between estimated expenditure needs and revenue collection capacities, but also redistributes the remainder of the revenue pool ( $TR$  pool  $-\sum_i TR_{est}$ ), if a positive amount, with the weights calculated on the basis of distances to the best province in terms of SE. In case, on the other hand, the sum of estimated transfers exceed the TR pool, then, the actual transfer amount can be adjusted by the formula:

$$TR_i = (TR_{est_i} / \sum_i TR_{est_i}) * TR \text{ pool}$$

Considering that the revenue pool (inclusive of aid and funds) exceeded the sum of estimated transfers in 2000 (see Table 3), we could indeed implement the modification suggested in Formula 5. Figure 5 below shows the position of the actual transfers of each province vis a vis the amount suggested by formula (5), which is what we call “Proposed Transfers”: TR\*.

**Figure 5:** Proposed versus Actual Transfers -- according to formula (5)



Since the redistributed part of the transfers according to formula (4) is rather small (127 Million TL per capita), the rankings of the deviations of proposed figures from the actual ones depicted in Figure 5 are very similar to the ones already reported in Table 3 above, and hence we do not report them again here.

#### *Making Formula (5) Dynamic:*

The above analysis is a static one in the sense that for each period, transfers are determined based on some observation of the relevant factors, namely those listed under the clusters of EDUC, SOCIAL and MACRO and other idiosyncratic factors, such as natural disasters hitting certain areas. Indeed, since many of these indicators change only slowly over



time, the estimation can be made in less than yearly frequencies, such as once in every four or five years. A more relevant issue with regards to the dynamic aspect of the estimation, however, is in regards to formula (4) or the second portion of formula (5). As this formulation should advocate for closing the HIs or reducing  $d_i$ 's, the impact of the transfers that are provided with this motivation needs to be closely monitored as reductions in  $d_i$ 's, should be rewarded, while increases should be penalized by means of a predetermined incentive mechanisms. Such a mechanism needs to be transparent, and incentives may include debt-forgiveness or additional transfers. Formula (6) is a modified version of Formula (5) that also incorporates such a factor:

$$TR_i^{**} = TR_{est_i} + d_{it} * (TR_{pool} - \sum_i TR_{est} - A) + (DCF_i) \quad (6)$$

where A is a predetermined amount of funds out of the total revenue pool that is allocated for a “dynamic correction factor (DCF)” assigned specifically for reward or penalties. Hence,

$$DCF_i = f(\text{improvements in income distribution; cash/accrual; environmental improvements; improvements with regards to governance}) * A .$$

where  $f'$  is positive and thus means that in case of deteriorations, DCF can be negative as well. Once again, it needs to be pointed out that the factors that constitute rewards and punishments may be a list that may differ from the ones mentioned above, but nevertheless must be objectively and transparently defined.

It is of utmost importance that such equalization mechanism is as free from political concerns as possible. Therefore, institutionalization of the above system of redistribution may require an independent organization that may be called “Fiscal Equalization Board” (FEB). The duties of FEB would include data collection and processing and advising the relevant government bodies regarding the allocation of transfers. The transparency of such a system can be reinforced with public reports of FEB that could also provide a mechanism of enforcement.

## 5. Conclusions

This study analyzes the issue of fiscal equalization, with an application to Turkey. We define fiscal equalization as eliminating vertical imbalances (VI) by taking into account the horizontal imbalances (HI). We argue that HI influences VI and hence an equitable transfer system need to consider such implied variation in VI. Moreover, we argue that in addition to the attempt to reduce or eliminate VI, reducing or eliminating at least certain aspects HI is also a fiscal concern and need to be taken into consideration in designing a transfer mechanism.

In view of the relevant literature and evidence provided by Turkish data, we propose such a mechanism and provide a preliminary empirical analysis that suggests the extent of divergences of a more equitable system than the current one that is solely based on the population criteria. We also point out the need for an independent organization that could help institutionalize such a mechanism with respect to its implementation, monitoring and enforcement: “Fiscal Equalization Board”.

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