BEHAVIOUR OF THE TURKISH URBAN SYSTEM: CORPORATE HEADQUARTERS

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ABSTRACT

Many studies have been particularly concerned with the locational trends and spatial distribution of the control and coordination functions of the firms and the implications of their location in the city system. In addition, a number of studies have been made related to concentration of activities of the firms in urban system hierarchy with nation-state. Such empirical findings raise the question of whether or not there is a tendency toward increasing concentration of headquarters in nation–states having centralized political systems (e.g. United Kingdom and France), while those nation–states those are having more decentralized political systems (e.g. United States and Germany) experience tendencies toward even greater dispersal in the location of the control and coordination functions of the top of 500 largest firms.

In this paper, the distribution of headquarters of 500 largest firms and changes in the distributions of these firms in Turkey has been examined in four-time period from 1980-2000. Using the available data; the location of headquarters, concentration of assets, sales and employments over this period, analysis of locational trends and spatial distribution of corporate influence by using standard and expanded rank-size rule with in the urban system hierarchy reveals a relatively decreasing concentrated system of corporate control and stability over time.

1. INTRODUCTION

In advanced industrial countries "quaternary activities" have increased significantly. These activities are concerned with the processes of production and distribution. They contain managerial, professional and technical jobs (Gotmann, 1970). At the same level, all these quaternary activities are interdependent, causing them to cluster together at points in space, which shows a high degree of centrality (Stephens and Holly, 1981). Quaternary activities create a spatially agglomerative tendency in large cities.

Urban planners and geographers have been particularly investigated locational trends and spatial distribution of control and coordination functions and the implementations of their location in the systems of cities. It is important to understand the relationship between control functions and the spatial organization of the urban system. Because decision made at the highest level of corporate control directly affect the growth and development of city systems. These are described as below (Pred, 1977):

-through the generation of local and non local multiplier effects

-by the diffusion of growth inducing or employment generating innovation impulses

-through the accumulation of "operational" decisions affecting the survival and scale summits in the organization located in other cities.

So far, a number of studies have been published about the concentration of corporate activities of the top of the urban system hierarchy within each nation-state. By using the results of these studies, some generalizations were made according to the tendencies. One of these generalizations is that headquarters tend to be concentrated in nation states having more centralized political system like as the United Kingdom and France and while headquarters tend to be dispersed in nation-states having federal and the more decentralized political systems as the United States and The Federal Republic of Germany.

With few exceptions, studies of the location of headquarters of large firms have focused in countries with advanced economies. In this study, trend is examined with the locational point of view of the largest industrial corporations in Turkey as a developing country over the period 1980-1997. Turkey is an excellent choice for this aim. Because city rank size distribution in Turkey was examined from 1945 to 1975 (Dökmeci, 1986) and from 1980

to1997 (Kundak and Dökmeci, 2000). These studies have showed that the city size distribution adjusted to the logarithmic straight-line quiet well. In general, the patterns of the distribution of cities in Turkey are quite regular when compared with other developing countries. The hypothesis of this study is that there is a relationship between city-rank size and geographical location of control and coordination functions. At the same time, the trends toward stability or change in the urban system of Turkey are examined.

2. METHODOLOGY

In this study, rank size model is utilized. The reason of using this model expresses the nature of the interdependencies among element of urban city system. Analytical framework of this model is developed by using the methods of Stephens-Holly and Strickland-Aiken. Stephens and Holly have searched the locational patterns of corporate headquarters in the USA. The findings showed that corporate control had become less concentrated between 1955 and 1975. At the same time, their analysis of the rank-size structure of corporate influence this period revealed considerable stability in concentration of corporate headquarters and assets in urban system. Strickland and Aiken also examined the extent which the geographical location of the control and coordination functions of corporate during period 1950-1982 of the headquarters of largest industrial firms and the concentration of capital, the analysis of locational trends and spatial distribution of corporate influence within the metropolitan hierarchy reveals a relatively decentralized system of corporate control and stability over time in both the position of metropolitan areas as centers of corporate influence and the rank-size distribution of corporate influence.

In both studies expanded rank-size methods were used. Those methods were improved by Cassetti to reformulate the rank-size model to include a time parameter in order to assess change in rank-size relations. In addition, regression models are calculated for periods 1997-1990, 1990-1985, and 1985-1980. In this model, a value of the change in population in a period as dependent variables and values of changes in assets, sales and employments in same period as in dependent variables were examined. By using the results of regressions, a possible relationship is explored between total population, corporate sales, assets and employment in a period.

Data related to the pattern of headquarter locations in Turkey are insufficient. Available data sources have problems due to insufficient detail, lack of comparability and mergers. The base source of information on the characteristics and location of corporate headquarters in Turkey is Istanbul Chamber of Industry's annual listings of the 500 largest industrial corporations.

3. BEHAVIOUR OF TURKISH URBAN SYSTEM BY SIZE DISTRIBUTION

Since the 1950's, Turkey has undergone rapid urbanization and has developed a more integrated city system. The extent of this integration, the form in which is expressed, and the way in which it has changed over time provide useful insights into the nature and regularities of urban growth. One of means of examining such regularities in the distribution of urban growth is through the analysis of rank size patterns. (Kundak-Dökmeci, 2000)

The rank-size distribution represents a model for evaluating a system of settlements, which are undergoing changes in population (Parr, 1970). The "rank-size rule" states that for a group of cities in a given region, the population of any individual city has a direct relationship to its rank by size and to the population of largest city. Rank-size model have been used and developed by many scientists like Auerbach (1913), Lotka (1924), Zipf (1949), Berryand Garrison (1958), Beckmann (1958) and others. The relationship is expressed as follows:

$$P = \frac{C}{r_i^q} \qquad (1)$$

as a logarithmic form;

$$\text{Log } P_i = \text{Log } C - q\text{Log}r_i \qquad (2)$$

P_i= Population of center i;
r_i=rank of center 1;
C= a constant approximately equal to the population of the center of rank 1;
q=the slope coefficient.

The plot of rank against size on double logarithmic paper should give a straight line with a slope of –q. The slope coefficient expresses the degree of concentration or dispersion of population within the urban system.

The standard logarithmic rank-size function (2) was fit to the data for 1980,1985,1990 and 1997. The results are given in Table 1 with t values shown below each regression coefficient. The regression results exhibit an increasing intercept values, from 6.404 in 1980 to 6.770 in 1997. In addition to the slope of rank-size distribution has increase in four periods.

Table 1 : Regression Equations, 1980-1997 for Turkish cities

Year	**LogC***	**q***	**R**	**R^2**
1980	Log P_i=6.407 (902.265)**	-0.960 logr (284.430)**	0.998	0.996
1985	LogP_i=6.521 (849.098)	-0.976 logr (277.889)	0.998	0.995
1990	LogP_i=6.639 (943.387)	-0.991 logr (317.972)	0.998	0.996
1997	LogP_i=6.770 (782,210)	-1.007 logr (271.325)	0.996	0.993

***** Values for log C and q are significant at the 0.05 level for all years.

****** t values

Source: State Institute of Statistics Republic of Turkey, Census of Population 1980,1985,1990 and 1997

In order to make a better examination of changes in the rank-size coefficients over time "expanded model " was developed by Cassetti (1972). The method expresses the parameters of the logarithmic form of the rank-size function to account for changes in the rank –size structure over time.

The values for log C and q remain constant only for given point in time. Since log C and q vary temporally, they can be expressed as a functions of time. (Stephens and Holly, 1981)

The expanded linear function for the intercept becomes and q;

$$\text{Log } C = \text{Log } C_0 + \text{Log} C_1 t \quad (3)$$

$$q = q_0 + q_1 t \quad (4)$$

where

C_0= constant at the initial point in time;
q_0=slope at the initial point in time;
t=time

Incorporating these linear functions with standard rank-size model (2), the expanded rank-size model becomes;

$$\text{Log } P_i = \text{Log} C_0 + \text{Log} C_1 t - q_0 \log r_i \quad (5)$$

In equation, $\log C_1$ and q_1 can be tested. The $\log C_1$ term shows significant growth (or decline) over time in the system of cities, while a term q_1 demonstrates a significant difference in the rates of growth (or decline) between larger and smaller urban areas. In addition to the logical inclusion of the temporal dimension of the urban rank-size distribution allows for a more precise identifications of stability and change over time, and, in the case of change, a more rigorous assessment of the locus of such city-system change. (Strickland-Aiken, 1985)

In this analysis is not clear whether the change is due to the expanding populations of the larger city alone or to an increase in larger places joined with decreases in the populations of smaller places. In this study the expanded logarithmic rank-size model determines source of change in the Turkish city system. According to the results, on the basis of t-test (0.05 level),
log C is significantly greater than zero but q is not. The results are given in Table 2.

Table 2: Expanded regression equation, 1980-1997 for Turkish Urban System

Equation	$LogC_0$	$Log\ C_1$	q_0	q_1	R	R^2
1980-1997	6.090*	0.0455	-0.814	-0.01368	0.931	0.867
	(174.66)**	(14.208)	(50.273)	(9.496)		

*Significant at the 0.05 level.

** t-values.

Source: See Table1

It can be concluded that for Turkish rank-size distribution, all city centers have increased at approximately at the same rate and change in population is statistically significant. Figure 1 shows parallel rank-size curves in over this time. In addition, it can be said that cities have experienced either no shift in population rank at all.

4. THE DISTRIBUTION OF CORPORATE BY SIZE

4.1. Corporate Distribution According to Sales

All population of city centers represents one of the city size parameters. The other measures are sales, assets and employments controlled by corporations (Stephens and Holly, 1981) when these data for the 500 largest industrial corporations are aggregated by city of head office location and they offer alternative definitions of the rank-size distribution of cities.

In this study it is referred to the aggregate assets, sales and employments held by corporations of a given city as an index of degree of corporate dominance of city. The standard logarithmic rank-size function was fitted to sales data for every each period. The result of regression is in Table 3.

Table 3: Regression equations, 1980-1997 size and rank cities defined by total industrial corporate sales

Year	Log C*	q*	R	R^2
1980	11.021 (48.21)**	-1.393 (6.263)**	0.884	0.781
1985	11.665 (45.56)	-0.958 (4.784)	0.739	0.546
1990	12.717 (68.75)	-0.926 (6.91)	0.805	0.648
1997	14.811 (86.361)	-0.968 (8.69)	0.819	0.671

***** Values for log C and q are significant at the 0.05 level for all years.

****** t values

Source: Istanbul Chamber of Industry for each year and State Institute of Statistics Republic of Turkey, Census of Population 1980,1985,1990 and 1997

The parameter q shows the percentage of P, corporate sales, associated with a change in rank. The larger q is the more rapidly the corporate sales decline with ranks and, the greater the locational concentrations of corporate control. (Stephens and Holly, 1982)

The regression results explain an increase in the intercept value over time and decrease in slope from 1980 to 1990 than a steady increase through 1997. Figures 2 shows the change in the rank-size distribution for city centers using the amount of sales a surrogate of population size.

The result of the expanded logarithmic rank-size model for the same data, indicate city centers having headquarters grew at approximately the same rate in terms of corporate sales. In according to sales expanded regression is below:

Table 4: Expanded Regression Equation According to Sales

Equation	Log C_0	LogC_1	q_0	q_1	R	R^2
1980-1997	11.504 (19.01)*	0.03626 (0.66)	-1.761 (3.46)	-0.142 (3.44)	0.688	0.473

*Significant at the 0.05 level (Source: See Table 3)

4.2. Corporate Distribution According to Assets

The standard and expanded rank-size models are applied to the corporate assets by city the same period. The standard regression result shows an increase in the intercept value over time, a decrease in slope from 1980 to 1985, then followed by a steady increase by 1990 and than decrease by 1997. The standard regression result is given in Table 5.

Table 5: Regression Equation, 1980-1997; size and rank of cities defined by total industrial corporate assets controlled

Year	Log C*	q*	R	R^2
1980	10.411 (40.38)**	-1.372 logr (5.47)	0.855	0.731
1985	11.095 (40.73)	-0.929 logr (4.36)	0.707	0.500
1990	12.272 (42.40)	-1.051logr (5.02)	0.701	0.492
1997	14.434 (55.182)	-1.017logr (5.99)	0.702	0.493

*Values for log C and q are significant at the 0.05 level for all years.

**t-values

Source: Istanbul Chamber of Industry and State Institute of Statistics Republic of Turkey, Census of Population 1980,1985,1990 and 1997

When the expanded logarithmic rank-size model is fitted to same data, the results shows all city centers have grown at approximately the same rate and the change in total asset is statistically significant. The expanded model result is given below:

Table 6: The Expanded Regression Equation According to Assets

Equation	Log C_0	Log C_1	Q_0	q_1	R	R^2
1980-1997	9.505 (50.86)*	0.287 (0.248)	-0.932 (33.19)	-0.0053 (0.59)	0.989	0.979

*t- values

Source: See table 5.

4.3. Corporate Distribution According to Employments

The standard and expanded rank-size models are applied to the corporate employments by city for the period 1980-1997 data. The standard regression result is given in Tablo7. The standard regression result shows a decrease in the intercept value from 1980 to 1990, then a increase from 1990 to 1997 and a decrease in slope from 1980 to 1985, followed a increase by 1990,then decrease in 1997.

Table 7: Regression equation; size and rank of cities defined by total industrial corporate employments

Year	Log C*	Q*	R	R^2
1980	5.371 (12.48)**	-1.705logr (4.07)	0.775	0.601
1985	4.474 (17.28)	-0.863logr (4.26)	0.699	0.489
1990	4.656 (25.65)	-1.042logr (7.93)	0.841	0.707
1995	4.713 (24.38)	-1.015 (8.092)	0.799	0.639

* Values for log C and q are significant at the 0.05 level for all years.

** t- values

Source: Istanbul Chamber of Industry and State Institute of Statistics Republic of Turkey, Census of Population 1980,1985,1990 and 1997

The expanded rank-size model is fitted the same data. The result of model exhibits all city centers have grown at approximately the same rate and the change in total employment is statistically significant. (Table 8)

Table 8: The Expanded Regression Equation According to Employment

Equation	Log C_0	Log C_1	Q_0	q_1	R	R^2
1980-1997	4.953* (23.67)	-0.0212* (1.24)	-1.281 (7.279)	0.0199 (1.39)	0.787	0.620

* Significant at the 0.05 level

Source : See Table 7

In addition to these analyses, the relationship the between growth (or decline) in population and growth (or decline) in corporate sales, assets, employments in a period in the system of cities are examined. A multiple-regression model is used for the analysis. The value of change in population is assumed to be the dependent variable of the analysis. The values of the changes in corporate sales, assets and employments are taken as independent variables. This model is given below:

$P_i = a_0 + A_1 CS_{Ý} + a_2 CA_i + a_3 CE_i$

P_i= growth (or decline) in population i city center;

$A_0, a_1, \ldots\ldots\ldots\ldots a_3$ constants

CS_i= growth (or decline) in corporate sales i city center;

CA_i= growth(or decline) in corporate assets i city center;

CE_i=growth(or decline) in corporate employments i city center.

The regression results are given in Table 9 for every three periods below:

Table 9: The regression results

1980-1985		
	R2	Beta weights
CSi	0.6250	0.885
CAi	0.0369	0.797
CEi	0.2070	0.832
Multiple R=0.887		
R2=0.786		
Standars Error=1,24		
1985-1990		
	R2	Beta weights
CSi	O.821	0.0301
CAi	0.992	0.3950
CEi	0.973	0.2780
Multiple R=0.993		
R2=0.986		
Standard Error=0.31		
1990-1997		
	R2	Beta weights
CSi	0.936	0.260
CAi	0.126	0.0003
CEi	0.920	0.6690
Multiple R=0.955		
R2=0.913		
Standard Error=0.74		

The results of regression analyses revealed that a value of growth (or decline) in population was largely predicated the values of changes in corporate sales, assets and employments in a period in Turkey city system. This results supports the other results of analyses.

The distribution of corporate headquarters in 1980,1985,1990 and 1997 are shown in Table 10. Several observations can be made about this table. First, it is noteworthy that, firms are distributed over a number of cities in Turkey from 1980 to 1997. But Istanbul has more than 45 percent of the top 500 firms over time and Izmir has also more than 10 percent of the top 500 firms over time. In the location of headquarters, cities like Bursa, Kayseri, Adana and Gaziantep have increased significant in over time. At the same time, the effects of public firm in top 500 firms are significant. Public firms have the share more than 16 percent in 1980,1985 and 1990. The effect of public firms has relatively decreased to 9 percent in 1997. This can be interpreted as effects of the privatization process.

Table 10. The number and percentages of the corporate headquarter locations of the largest firms in Turkey 1980-1997

1980			1985			1990			1997
ÝST	135	45,00%	ist	247	0,494	ist	247	0,494	ist
ÝZMÝR	31	10,33%	izmir	55	0,11	izmir	54	0,108	izmir
ADANA	26	8,67%	ankara	23	0,046	ankara	22	0,044	bursa
ANKARA	14	4,67%	adana	20	0,04	adana	17	0,034	ankara
BURSA	14	4,67%	bursa	11	0,022	bursa	14	0,028	kayseri
KAYSERÝ	8	2,67%	kayseri	9	0,018	kayseri	8	0,016	adana
ÝZMÝT	7	2,33%	izmit	8	0,016	kocaeli	7	0,014	g.antep
MERSÝN	4	1,33%	eskisehir	7	0,014	balþýkesir	5	0,01	denizli
ESKÝÞEHÝR	4	1,33%	denizli	6	0,012	gantep	4	0,008	kocaeli
DENÝZLÝ	2	0,67%	mersin	5	0,01	konya	3	0,006	eskiþehir
MANÝSA	1	0,33%	balýkesir	5	0,01	denizli	3	0,006	balýkesir
NÝÐDE	1	0,33%	tarsus	3	0,006	mwersin	3	0,006	antalya
KONYA	1	0,33%	konya	3	0,006	tarsus	2	0,004	konya
KAMU	52	17,33%	g antep	2	0,004	bolu	2	0,004	mersin
			giresun	1	0,002	eskiþehir	2	0,004	bolu
			ceyhan	1	0,002	edirne	2	0,004	giresun
			mardin	1	0,002	nigde	1	0,002	adapazarý
			çorlu	1	0,002	orduý	1	0,002	edirne
			ýsparta	1	0,002	giresun	1	0,002	tarsus
			salihli	1	0,002	söke	1	0,002	çanakkale
			adapazarý	1	0,002	ýsparta	1	0,002	ordu
			edirne	1	0,002	antalya	1	0,002	karabük
			antalya	1	0,002	kýrklareli	1	0,002	gemlik
			bolu	1	0,002	mardin	1	0,002	salihli
			burdur	1	0,002	afyon	1	0,002	bulancak
			kütahya	1	0,002	kütahya	1	0,002	ünye
			kamu	84	0,168	inegöl	1	0,002	inegöl
						tekirdað	1	0,002	k.ereðli
						aydýn	1	0,002	k.maras
						bilecik	1	0,002	çorlu
						k.maraþ	1	0,002	amasya
						kamu	90	0,18	niðde
									karacabey
									malatya
									trabzon
									kýrþehir
									kütahya
									mardin
									ýsparta
									kamu

The dispersion of firms in Turkey is similar to the dispersion of firms in the United States (1955-1975). There was the high concentration of firms in New York, USA and in addition to the more balanced distribution of headquarters have been seen from 1955 to 1975 (Stephens and Holly, 1981). Both two characteristics are observed the dispersion of the largest 500 firms in Turkey. But the case of Germany (Strickland and Ailken, 1985) and the United Kingdom (Goddard and Smith, 1973) are rather different from that of Turkey.

Table 10 presents the measure of corporate influence for cities. It shows the characteristics and distribution of the500 largest industrial corporations by headquarters controlled sales, assets and employments in the period 1980-1997. Several observations can be made about the data in this table. It shows the dominance of the more concentrated structure in 1980, but it indicates a more geographically balanced distribution in 1997 excluding Istanbul. Istanbul has protected its own large share. In the concentration of the top 500 firms controlled assets Istanbul have 35.79 percent in 1980. This proportion has stayed relatively in same one. The other important observation is that the effect of public firms has increased until 1990. After this period, the concentration of public firms have decreased .The process of privatization has been effective in decrease share of public firms controlled assets in 1997.

5. CONCLUSION

Number of characteristics of Turkish Urban system from 1980 to 1997 has been examined and some conclusions are made according to the findings. First, Turkish rank-size distribution in all city center has increased at approximately the same rate and change in population is statistically significant. Cities in Turkey have experienced either no shift in population rank at all. In addition, the rank-size distribution by using amount of assets, sales and employments as a surrogate of population size grew at approximately the same rate. The changes in total assets, sales and employments are statistically significant. The other result supporting this finding is that there was a relationship between a value of growth (or decline) in population and the values of changes in corporate sales, assets and employments in a period in Turkish city system.

The other important finding is that it can be seen the more concentrated structure in 1980, whereas the more geographically balanced distribution in 1997 exception Istanbul. Also, the effect of public firms in 500 top firms has increased to 1990. After that, their share in 500 top ranking controlled assets, sales and employments have decreased. This is the result of the beginning of privatization in same period.

The dispersion of firms in Turkey is similar to dispersion of firms in the United States (1955-1975). There was the concentration of firms in New York like Istanbul and more balanced distribution have been seen in period 1955-1975 like Turkey (1980-1997). The case of Germany and the United Kingdom are different from Turkey.

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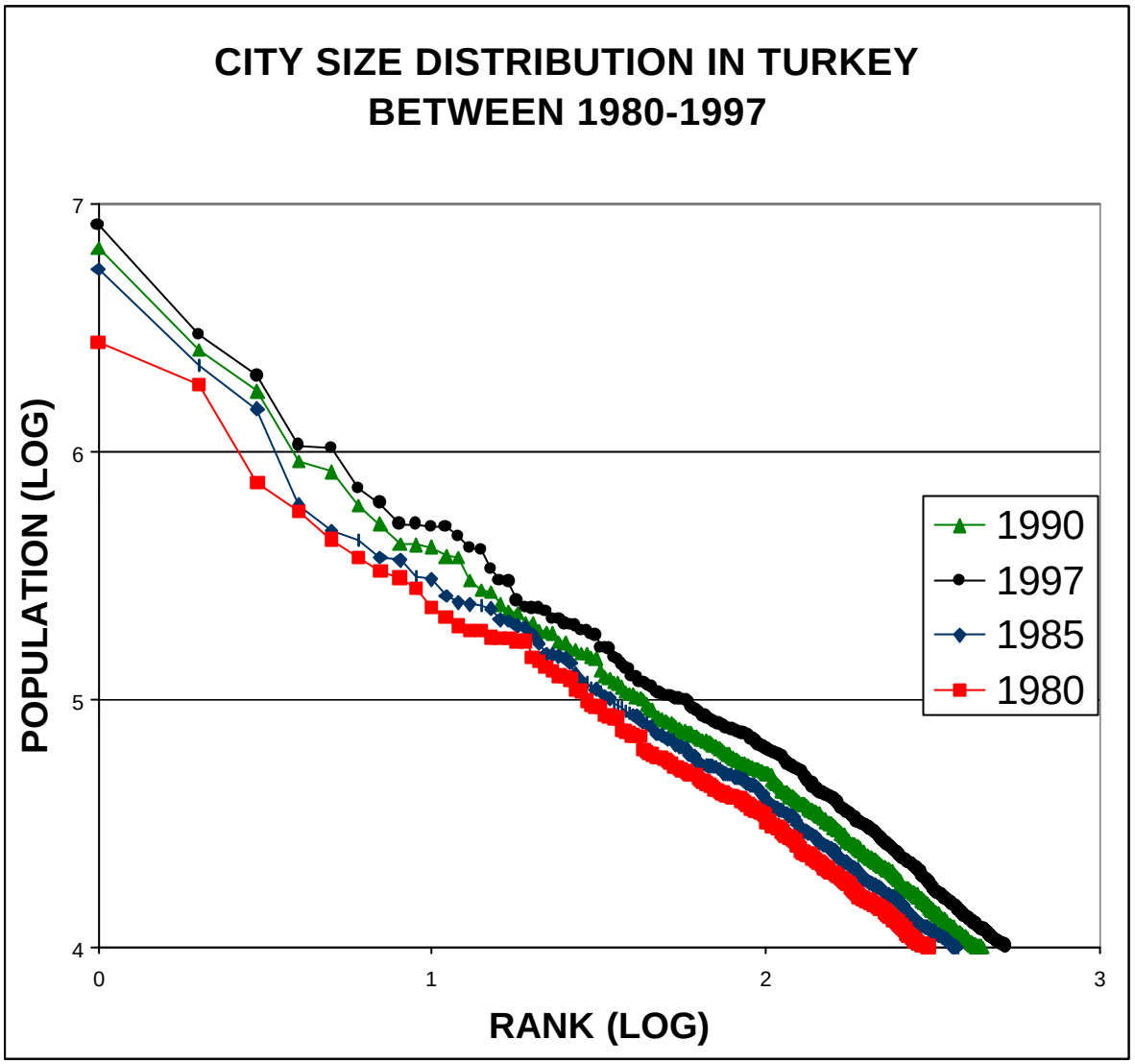

Figure 1. City rank-size distribution, 1980-1997

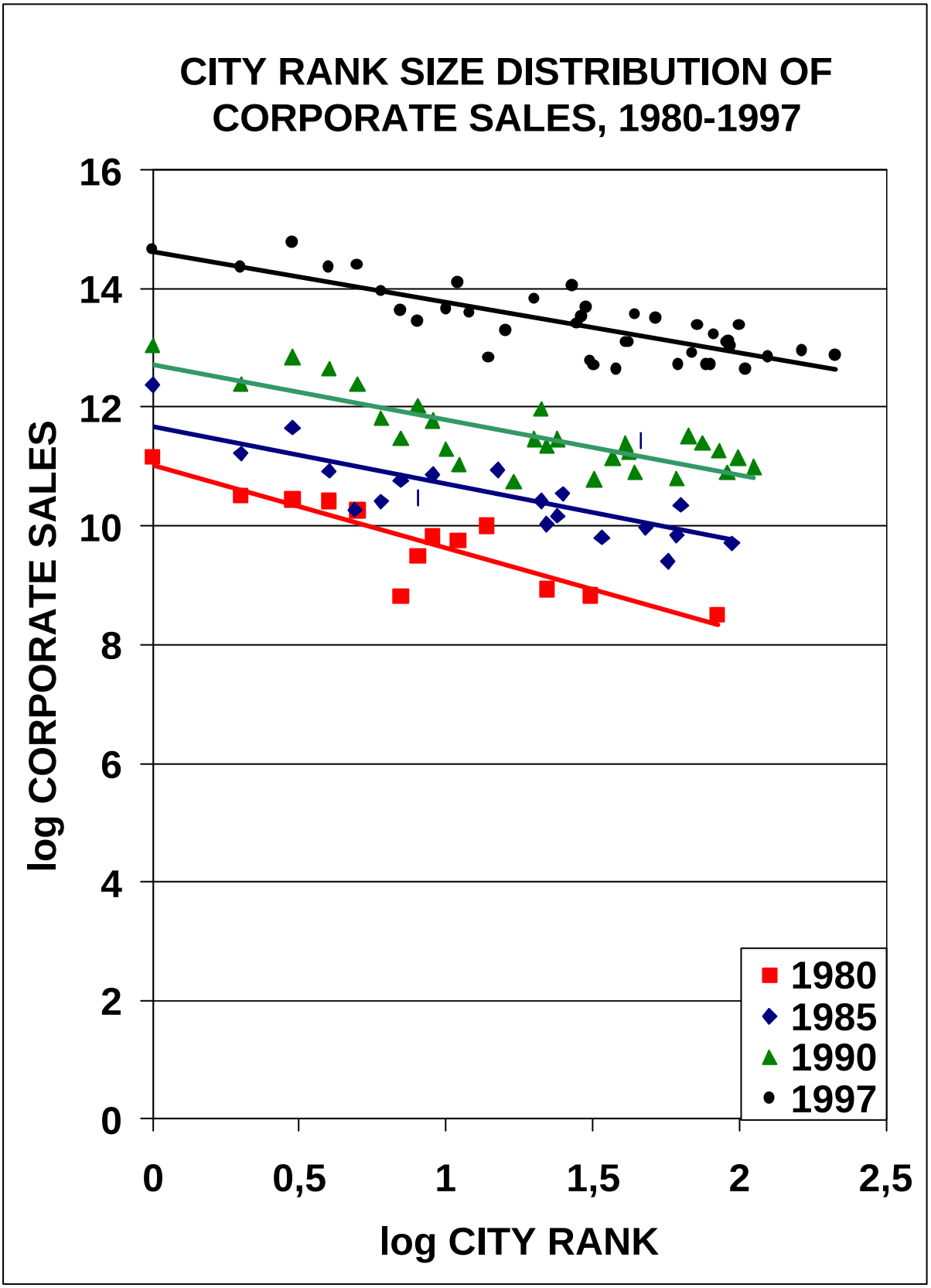

Figure 2. City rank size distribution of corporate sales, 1980-1997

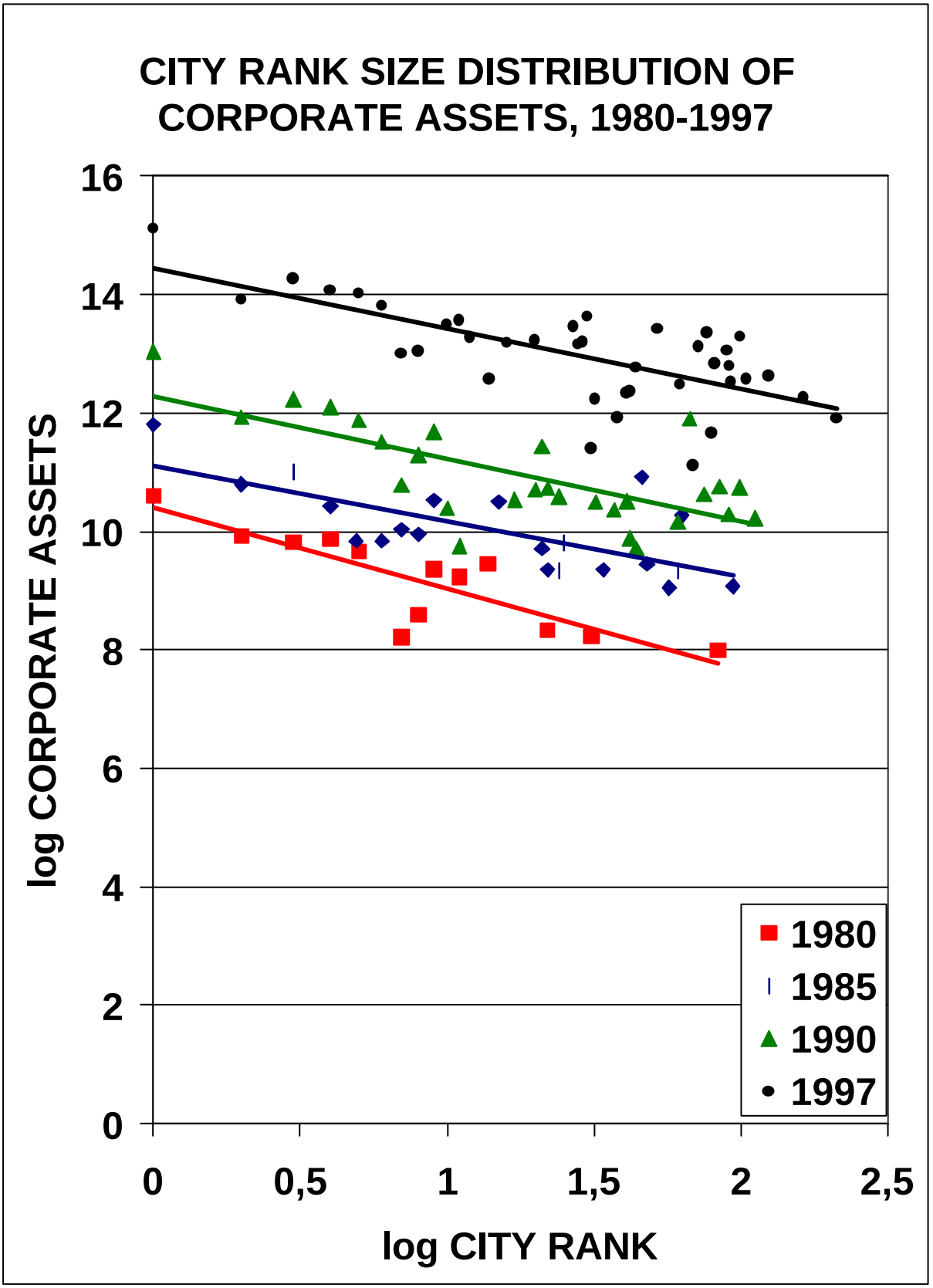

Figure 3. City rank size distribution of corporate assets, 1980-1997