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Spatial Concentration and Regional Diversification of Public Expenditures: The Case of Turkey*

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ABSTRACT

Public expenditure is one of the most important variables on determining both the share of public sector in an economy and the size of national income. Explaining the distribution of public expenditures across the country is as equally important as determining its relationship with other variables. The distribution of public expenditures may vary in terms of regional and functional classifications. The differences can provide information about the policies favored by the government. The aim of this paper is to analyze the spatial concentration and regional diversification of functional public expenditures in Turkey. For the purpose, Herfindahl–Hirschman and Duranton–Puga indices are generated for the period of 2004 and 2011. Statistical results indicate that, over the sample period, the government carried out a spatial concenration on housing and social welfare services expenditures. In addition, Bursa emerges as the province where regional diversification is highest.

Keywords: Functional public expenditures, spatial concentration, Herfindahl – Hirschman Index, Regional diversification, Duranton – Puga index.

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1. INTRODUCTION

The whole idea behind the existence of governments is to satisfy the peoples' social needs. Governments satisfy social needs and provide public services through expenses (with expenditures). Nevertheless, public expenditures are dependent on current conditions. Expenditures can be made as a result of changes in economical, fiscal, social and international conditions in order to improve income distribution provide economic development and full employment purposes.

Public expenditure is a substantial implementation to foster growth and development by state, which in turn eliminate inter-regional disparities, improve socio – economic development, and ensure overall functioning of state. Political power, uses and formalizes this substantial implementation with in the scope of the policies that they want to perform. The starting point of this study is to determine how public expenditure follows spatial concentration in Turkey. Also, an effort is made to identify the political power behind expenditure based policy.

Public expenditures may show regional variations. Some expense items may be privileged in some regions. To determine the outlook of public expenditures in Turkey, Herfindahl – Hirschman Index, which possesses an important place in economic literature, is used. In Turkey, the functional classification of public expenditures was made in accordance with 5018 Public Financial Management and Control Law. Public expenditure data set is collected from Ministry of Finance General Directorate of Public Accounts. Functional classification of public expenditures consists of following ten items: General public services, defence services, public order and security, economic affairs and services, environmental services, housing and public welfare services, medical services, recreation, culture and religion services, education services, social security and social solidarity services.

2. LITERATURE

HH index is used extensively in microeconomic based studies and in the analysis of market structure. However, in this paper we use HH index in a macroeconomical application with aggregated data. Below first we provide a brief summary of studies regarding both microeconomics and macroeconomics perspectives.

Laderman (1995), Yayla (2007), Bergstresser (2008), Kurul (2011), Iveta (2012), Chortareas, Garza-Garcia and Girardone (2012) have used HH index for banking sector. Yayla (2007) analyzed Turkish Banking Sector with assests, credits, deposits and sale variables for the period of 1995-2005. Empiricial evidence indicates that concentration has a falling tendency in 1995 – 1999 periods. Yet, it turns out to show a tendency towards increase between the years 2000 and 2005. Kurul (2011) has used HH index for analyzing the credit and deposit sturucture of Turkish Banking system. The author report that Turkish credits market is more competitive than desposit market.

Laderman (1995), examines Latin American urban banking market for the period of 1982–1992. Laderman (1995) emphasizes that the regulatory review of depository institutions has been extremely important for achieving a competitive banking sector. Another work on Latin America belongs to Chortareas et all (2012). In their paper, Chortareas et.al examines competiton, efficiency and interest margin in Latin America banking sector. Their findings show that concentration and market share have not got a major effect on interest margin. Iveta (2012) analyzes the market power of Czech banking sector during the years 2000 – 2010. According to HH index, the market concentration of the banking sector has showed a temperate decline during the sample period.

Bergstresser (2008) investigates the relationship between market concentration and debt portfolio risk of banks in American commercial banking system. According to the Bergstresser, there is a strong relationship between increasing concentration and reductions in the flow of bank capital to

construction and land development loans, which carry the highest risk category among commercial bank loans.

Erlat (1991), Eser and Köse (2005), Günalp (2011), Karaalp and Erdal (2012) conduct studies on the Turkish manufacturing sector. Analyzing the relationship between export and industrial concentration in selected sectors of Turkish manufacturing industry, Erlat (1991), reports a positive relationship between the two. Eser and Köse (2005), examined agglomeration, clustering and localisation trends of county manufacturing industry in Turkish industry for the year 2000. According to their findings, the industry is spatially concentrated and industrial activities concentrated in traditional industry areas, mainly in Istanbul. Günalp (2011) attempts to identify the determining factors of concentration in Turkish manufacturing industry for the period of 1993 – 1999. Karaalp and Erdal (2012) examine the effects of agglomeration of industrialisation and neighbour county's growth on the income differences between counties. The results reveal that the differences eventually decline. While the agglomeration has a positive impact, the effect of growth is negative for this case.

Friesenbichler (2007), Durukan and Hamurcu (2009), Yıldız (2012) conduct studies on the telecomunication sector. Friesenebichler (2007) investigated the relationship between innovation and competition in European mobile telephone sector (transition from 2G to 3G). HH index is applied to measure competition. The results of the study underline the difficulties associated with the implementation of lower prices and innovation targets at the same time. Durukan and Hamurcu (2009) examine the market concentration in mobile communication industries in Turkey, Kyrgyz Republic, Kazakhistan, Republic of Tajikistan, Turkmenistan and Republic of Uzbekistan. According to the results, markets of Turkey, Kazakhistan, Kyrgyz Republic and Turkmenistan reflect the characteristics of a highly concetrated oligopoly market while the markets of Republic of Tajikistan and Republic of Uzbekistan are moderately concentrated oligopoly. Yıldız (2012) measures the market concentration in Turkish mobile telecommunication and broad band internet services with HH index and reaches the empirical evidence of a highly concentrated oligopolistic structure.

Meilak (2008), Gönel, Vardar and Özer (2010), Değer (2010), Doğan and Kaya (2011) use HH index for measure concentration of foreign trade. Analyzing the country dimension of export concentration, Meilak (2008) investigates its connection with economic development. The paper argues that the position of depending on few trading partners and exporting in limited areas of small countries are controversial. Its conclusions also indicate that small countries have greater export concentration than the larger countries. This situation results from depending on limited resources, lower exporting volume and the inability to use economies of scale. Questioning whether Turkey might be a role model in terms of trade performance measurement, Gönel, Vardar and Özer (2010) investigate the commercial competitiveness of Turkey compared to the countries in its region. The paper points out that Turkey’s changing export specialization via measurable indicators and necessity of produce technological intense products to increase commercial competitiveness in its region. Değer (2010) investigates the importance of product range on Turkey's export. According to the paper, higher product range and manufacturing-dominated export structure have a great importance for Turkey’s long term economic growth. Doğan and Kaya (2011) analyze country and section based changings in Turkish foreign trade after customs union. Their findings indicate that customs union has converted Turkish exporting structure positively but a negative effect has been observed on Turkey’s import-dependent structure of EU products.

Depken II (1999), Oven, Ryan and Weatherson (2007) present works on sports. Boht studies use HH index to measure the competitive equilibrium on sports league and consider the effects of changes in the number of teams for equilibrium.

Camadan and Erten (2010), Pehlivanoğlu and Tekçe (2013) analyze Turkish electricity market. According to both papers, the market is fairly concentrated.

Chung, Derdenger and Srinivarsan (2013) quantified economic worth of celebrity endorsements by the sales of endorsed products. Particularly, they tried to measure effects of Tiger Wood’s on sales of Nike golf balls. HH index is used only to determine market structure. Silk and King III (2008)

analyze the concentration levels of American advertising and marketing industry. In the inspected period, mentioned sectors generally have a competitive structure. However, in some of the years, they have a moderate concentration level.

Allen, Bartiloro and Kowalewski (2005) tried to underline differences on financial structures of European Union members with new members after 2004.

Laposa (2013), analyzes commercial real estate investors, capital flows and vacancy rates by the help of HH index in an attempt to explain why and when investor composition changes.

Uysal and Öztürk (2005) examine Turkish mutual fund sector. They use HH index and Concentration Ratio (CR) for measuring the structure of competiton. Calculations are made for the whole sector as well as A and B types of investment funds. Both methods indicate that there is no concentration.

Lijesen (2004) develops an adjusted version of the HH index for close substitutes and tests the index empirically for civil aviation with airfare data. Gee and Strumpf (2007) investigate whether file sharing has reduced the legal sales of music. In the study, by using HH index, they measure the concentration of weekly downloads for each download. According to the analysis, there is no evidence that albums suffer from file sharing.

Sun and Shao (2009), in physical sciences, have used HH index to measure spectrum concentration.

Some of the studies regarding the public sector are conducted by Kalseth and Rattso (1998), Borge (2000), Borge (2005), Borge and Naper (2006) and Borge et al (2008) Gyrogy'nin (2012). Kalseth and Rattso (1998) investigate the economic, demographic and political factors that change administrative expenditures among municipalities. Borge (2000) analyzes the determinants of charges for public services via panel data method. Borge (2005) examines the relationship between budget deficits and political institutions while Borge and Naper (2006) study the efficiency of secondary schools. All mentioned studies above used HH index for measuring political power – party fragmentation.

Borge, Falch and Tovmo (2008) investigate the role of political and budgetary institutions, fiscal capacity and democratic participation in the efficiency of public sector. In the paper, HH index is used to measure party fragmantation in order to evaluate democratic participation. HH index indicates the distribution of seats in local council. According to the paper, an increase in party fragmentation (meaning a reduction in the HH index) results in a drop in the efficiency.

In his paper Gyrogy (2012) examines the homogenity of social security public program in Romania. The main evidence indicates that social contributions reached the top of the variation and fiscal reforms make employees advantageous.

3. DATA AND METHODOLOGY

The Herfindahl – Hirschman Index which allows to measure concentration statistically has been developed by Albert Otto Hirschman and Orris Clemens Herfindahl independently. This index measuring concentration is also known as Herfindahl Index. Hirschman first published his index, developed to measure countries' foreign trade concentration, in his 1945 book titled "National Power and the Structure of Foreign Trade" However, Herfindahl presented his index in his doctoral dissertation, measuring gross changes and market shares of firms in US steel industry, titled "Concentration in The Steel Industry" in 1950 and "International Copper Industry" in 1959.

The index has begun to be named as the Herfindahl index after Rosenbluth's works in 1955 and 1957. Since Hirschman's 1964 article, in which he claims the ownership of the index, the index began to be called with its current name.

Herfindahl – Hirscman Index (hereafter HH) was first introduced by William Baxter. In order to facilitate the application of the antitrust laws for mergers, the U.S Department of Justice, issued a numerical guideline that based on HH index in 1982.

As an indicator of competition with its easy calculation, HH index is an effective planning and tracking tool for regulators. Thus, it is actively used especially by the governmental institutions in the United States (Calkins 1983).

The HH index is calculated by summing the squares of the percentage market shares held by the respective firms:

$$HH_{1\ldots n} = \sum_{i=1}^{n} S_i^2$$

where S_i represents the market share of firm i and there are n firms in the market. Maximum value of the index is one and this value indicates the dominance of a single firm. Minimum value of the index is $\frac{1}{n}$ and this value reflects that each firm has the same share (McCan 2007). In this study we calculate the equation below to determine the concentration of public expenditrues.

$$HH_{F_1} = \sum_{R=1}^{m} \left(\frac{PE_{FR}}{PE_{FC}} - \frac{PE_R}{PE_C}\right)^2 = \left(\frac{PE_{FR_1}}{PE_{FC}} - \frac{PE_{R_1}}{PE_C}\right)^2 + \left(\frac{PE_{FR_2}}{PE_{FC}} - \frac{PE_{R_2}}{PE_C}\right)^2 + \cdots \left(\frac{PE_{FR_{81}}}{PE_{FC}} - \frac{PE_{R_{81}}}{PE_C}\right)^2$$

HH_{F_2}

...

$HH_{F_{10}}$

In the equation above; HH_F reflects spatial concentration index on functional basis; PE_{FR} reflects total public expenditures in R region for function F; PE_{FC} represents total public expenditures in country C for function F; PE_R stands fortotal public expenditures in region R; and PE_C is for total public expenditures in country C.

Duranton and Puga (2000), studied the advantages and disadvantages of cities with respect to specialization and diversification, trying to determine how the sectoral composition of a city affects its evolution.

Duranton and Puga (2000) suggest an easy method to calculate regional industrial diversity. Accordingly, regional diversity index RDI is calculatedas follows:

$$RDI_r = 1 \Big/ \sum_i |S_{ir} - S_{in}|$$

RDI is the relative diversity index of the region r, S_{ir} represents the share of industry i in region r, and S_{in} represents the share of industry i in the national economy n. For an individual region, RDI indicates the inverse of the summed differences between each regional and national industrial share. The value of the RDI increases as the regional employment distribution approaches that of the national economy (McCann, 2007).

$$DP_r = 1 \Big/ \sum_{i=1}^{n} \left|\frac{PE_{ir}}{PE_r} - \frac{PE_{in}}{PE_n}\right|$$

DP_r respresents, Duranton – Puga index in region r; PE_{ir} respresents public expenditure for function i in region r; PE_r represents total public expenditures in region r;PE_{in} represents public expenditure for function i in country n; PE_n represents total public expenditures in n country. In this study, we will calculate the equation below to determine the diversification of public expenditrues.

$$DP_{r_1} = 1 \Big/ \sum_{i=1}^{n} \left|\frac{PE_{ir}}{PE_r} - \frac{PE_{in}}{PE_n}\right| = 1 / \left(\left|\frac{PE_{i_1 r}}{PE_r} - \frac{PE_{i_1 n}}{PE_n}\right| + \left|\frac{PE_{i_2 r}}{PE_r} - \frac{PE_{i_2 n}}{PE_n}\right| + \cdots \left|\frac{PE_{i_{10} r}}{PE_r} - \frac{PE_{i_{10} n}}{PE_n}\right|\right)$$

DP_{r_2}

...

$DP_{r_{81}}$

In this study, sample period covers the years between 2004 and 2011 and per capita data were used in the analysis. Population data set is collected from TUIK (Turkish Statistical Institute) and Tuncer (2013).

4. ANALYSIS

According to the results of the HH analysis as listed in the Table 1, expenditures of housing and the public welfare services have highest spatial concentration. Spatial concentration is the highest in the years of 2008, 2009 and 2010. Over the sample period, other highest spatially concentrated expenditure is defence service expenditures. During the period of 2006 – 2010, defence service expenditures take the second place. The third most spatially concentrated public expenditure is economic affairs and services. Economic affairs and services expenditures is placed second in the years 2005 and 2011 while its ranked in third over the period of 2006 – 2010. General public services and education services appear to be the expense items with lowest spatial concentration.

Table 1: HH Index Calculations

Num	Function	2004	Function	2005	Function	2006	Function	2007
1	HPWS	0,1125	HPWS	0,1104	HPWS	0,085	HPWS	0,0818
2	SSS	0,0391	EAS	0,0366	DS	0,0292	DS	0,0296
3	EAS	0,0322	DS	0,0289	EAS	0,0262	EAS	0,0256
4	DS	0,028	SSS	0,0235	POS	0,0201	POS	0,0192
5	POS	0,0206	POS	0,0205	SSS	0,0178	SSS	0,0187
6	ES	0,0182	ES	0,0177	ES	0,0172	ES	0,0174
7	LCR	0,0153	LCR	0,0157	LCR	0,0153	LCR	0,0154
8	MS	0,0134	MS	0,0132	MS	0,0134	MS	0,0132
9	EDS	0,013	EDS	0,013	EDS	0,0132	EDS	0,0131
10	GPS	0,0013	GPS	0,0015	GPS	0,0014	GPS	0,0013

Table 2: HH Index Calculations (Continue)

Num	Function	2008	Function	2009	Function	2010	Function	2011
1	HPWS	0,2415	HPWS	0,2411	HPWS	0,2273	HPWS	0,0949
2	DS	0,0301	DS	0,0325	DS	0,0368	EAS	0,0361
3	EAS	0,0266	EAS	0,0276	EAS	0,0275	DS	0,0345
4	POS	0,0193	POS	0,02	POS	0,0206	POS	0,0191
5	ES	0,0169	ES	0,0167	ES	0,0168	ES	0,0169
6	LCR	0,0154	LCR	0,0154	LCR	0,0155	LCR	0,0158
7	SSS	0,0153	SSS	0,0147	SSS	0,0139	SSS	0,0137
8	MS	0,0133	MS	0,0132	MS	0,0132	MS	0,0131

9	EDS	0,013	EDS	0,0131	EDS	0,013	EDS	0,013
10	GPS	0,0016	GPS	0,0016	GPS	0,0009	GPS	0,0011

Abbreviations: General Public Services (GPS), Defence Services (DS), Public Order and Security (POS), Economic Affairs and Services (EAS), Environmental Services (ES), Housing and Public Welfare Services (HPWS), Medical Services (MS), Recreation, Culture and Religion (LCR), Education Services (EDS), Social Security and Social Solidarity Services (SSS)

Table 2 shows Duranton – Puga index calculations. According to the Duranton – Puga index; in 2004, 2005, 2010 and 2011 Bursa; in 2006 Kars; in 2007 Amasya, in 2008 and 2009 Muğla are the provinces with highest regional diversification. In the period examined, Bayburt and Bilecik provinces have the lowest index value.

Table 2: Duranton – Puga Index Calculations (2004 – 2007)

Num	Provinces	2004	Provinces	2005	Provinces	2006	Provinces	2007
1	Bursa	7,00309	Bursa	7,73609	Kars	7,64776	Amasya	7,05729
2	Adana	6,60796	Sivas	6,64935	Bursa	6,73029	Bursa	6,88224
3	İzmir	6,44719	Erzurum	6,59448	İzmir	6,55635	İzmir	6,78555
4	Sivas	5,20348	Adana	6,34622	Sivas	6,26115	İstanbul	6,60063
5	Konya	5,15604	İzmir	6,30908	İstanbul	6,23494	Adana	6,26961
6	Isparta	4,6845	Konya	5,97073	Muğla	6,1191	Muğla	6,24579
7	Şanlıurfa	4,67648	Edirne	5,41628	Amasya	5,96039	Konya	5,67974
8	Muğla	4,64043	Diyarbakır	5,14361	Adana	5,77625	Kars	5,60369
9	Malatya	4,63526	Amasya	5,11197	Çankırı	5,16716	Çankırı	5,50515
10	Kayseri	4,54793	Muğla	5,10282	Konya	4,96226	Sivas	5,50465
11	İstanbul	4,49164	Kayseri	5,099	Edirne	4,84225	Erzincan	5,25476
12	Antalya	4,35132	Isparta	4,78486	Balıkesir	4,75821	Kayseri	4,92417
13	Balıkesir	4,34944	Balıkesir	4,60233	Erzurum	4,71082	Isparta	4,88727
14	Mersin	4,34109	Antalya	4,60117	Aydın	4,67682	Balıkesir	4,7804
15	Edirne	4,33756	İstanbul	4,42502	Hatay	4,52107	Aydın	4,64447
16	Diyarbakır	4,27388	Kars	4,34236	Isparta	4,42147	Ağrı	4,56217
17	Çankırı	4,18273	İçel	4,33205	Antalya	4,38859	Mersin	4,50863
18	Amasya	4,04933	Şanlıurfa	4,16046	Kayseri	4,16886	Hatay	4,50128
19	Eskişehir	4,0212	Van	3,85436	Malatya	4,16661	Antalya	4,35292
20	Kars	3,73853	Aydın	3,76037	Diyarbakır	4,15429	Bolu	4,29601
21	Erzurum	3,61944	Erzincan	3,62002	Iğdır	4,10259	Van	4,24194
22	Artvin	3,5603	Çankırı	3,60505	Mersin	4,0722	Malatya	4,22804
23	Çanakkale	3,5544	Çanakkale	3,58235	Erzincan	3,97005	Çanakkale	4,15951
24	Bolu	3,43486	Iğdır	3,4807	Bolu	3,91467	Sinop	4,15929
25	K.Maraş	3,41744	Malatya	3,4515	Ankara	3,86117	Erzurum	4,13823
26	Aydın	3,34093	Bolu	3,3949	Burdur	3,84602	Edirne	4,09603
27	Muş	3,28856	Mardin	3,38983	Şanlıurfa	3,84497	Ardahan	4,0275
28	Erzincan	3,28029	Elâzığ	3,36318	Sinop	3,84017	Diyarbakır	3,90365
29	Mardin	3,2546	Hatay	3,3072	Çanakkale	3,73749	Yalova	3,83731
30	Hatay	3,21281	Artvin	3,27977	Van	3,69761	Afyon	3,76813
31	Ardahan	3,13118	Ağrı	3,26954	Muş	3,65268	Iğdır	3,70765
32	Kırklareli	3,05739	K. Maraş	3,21536	Kütahya	3,59627	Kütahya	3,70266

33	Elâzığ	2,99293	Samsun	3,2091	Ağrı	3,58126	Eskişehir	3,63815
34	Iğdır	2,9504	Muş	3,09915	Yalova	3,54351	Muş	3,5958
35	Samsun	2,89976	Ardahan	3,01757	Afyon	3,54145	Bartın	3,58103

Table 2: Duranton – Puga Index Calculations (2004 – 2007 cont.)

Num	Provinces	2004	Provinces	2005	Provinces	2006	Provinces	2007
36	Van	2,87618	Eskişehir	2,99795	Mardin	3,5339	Ankara	3,51493
37	Sakarya	2,86122	Kırklareli	2,95381	Artvin	3,4701	Burdur	3,50973
38	Kütahya	2,80114	Sakarya	2,84051	Ardahan	3,39256	Sakarya	3,44782
39	Burdur	2,78672	Kütahya	2,78273	Eskişehir	3,36759	Gaziantep	3,40006
40	Gaziantep	2,72744	Burdur	2,77337	K. Maraş	3,28906	Mardin	3,39414
41	Ağrı	2,70421	Afyon	2,76056	Sakarya	3,27847	K. Maraş	3,35454
42	Sinop	2,61196	Trabzon	2,74562	Bartın	3,2416	Manisa	3,34419
43	Bitlis	2,61036	Bitlis	2,69671	Denizli	3,23546	Osmaniye	3,31663
44	Afyon	2,58337	Gaziantep	2,65889	Kırklareli	3,19009	Kırıkkale	3,31559
45	Giresun	2,48425	Sinop	2,65366	Giresun	3,07394	Denizli	3,31379
46	Niğde	2,46501	Siirt	2,56033	Manisa	3,07075	Elâzığ	3,2991
47	Yalova	2,42973	Denizli	2,54669	Kırşehir	3,06063	Zonguldak	3,29761
48	Trabzon	2,41305	Yalova	2,533	Gaziantep	3,03463	Şanlıurfa	3,27026
49	Osmaniye	2,39275	Niğde	2,45988	Kırıkkale	3,00597	Kırklareli	3,22561
50	Denizli	2,36959	Bartın	2,45529	Elâzığ	2,94407	Kırşehir	3,13426
51	Bartın	2,35862	Osmaniye	2,34801	Samsun	2,91739	Samsun	3,11585
52	Manisa	2,28835	Giresun	2,33364	Batman	2,91537	Artvin	3,09247
53	Zonguldak	2,25117	Manisa	2,30667	Osmaniye	2,90591	Siirt	2,9819
54	Ordu	2,25019	Tekirdağ	2,29504	Yozgat	2,83052	Uşak	2,97443
55	Kırşehir	2,24102	Zonguldak	2,28535	Karabük	2,80698	Karaman	2,97092
56	Siirt	2,22593	Yozgat	2,26643	Corum	2,79505	Karabük	2,92569
57	Kırıkkale	2,20492	Kırşehir	2,21528	Siirt	2,79213	Giresun	2,9176
58	Ankara	2,13276	Gümüşhane	2,20805	Uşak	2,78161	Yozgat	2,89026
59	Tekirdağ	2,12439	Tokat	2,19602	Tokat	2,7757	Bitlis	2,87198
60	Tokat	2,11826	Uşak	2,18349	Nevşehir	2,75344	Corum	2,84447
61	Karaman	2,11619	Karaman	2,16757	Bitlis	2,75307	Nevşehir	2,84423
62	Gümüşhane	2,09468	Corum	2,14524	Kilis	2,73632	Tekirdağ	2,83805
63	Nevşehir	2,08798	Batman	2,14455	Karaman	2,73545	Rize	2,81096
64	Corum	2,08162	Kırıkkale	2,14351	Trabzon	2,70936	Trabzon	2,8092
65	Batman	2,08063	Nevşehir	2,11818	Düzce	2,69204	Tokat	2,80539
66	Yozgat	2,077	Kastamonu	2,11355	Gümüşhane	2,66148	Gümüşhane	2,77005
67	Kilis	2,06654	Kilis	2,08237	Zonguldak	2,65864	Kilis	2,68609
68	Uşak	2,06067	Karabük	2,08209	Rize	2,65243	Düzce	2,62678
69	Karabük	2,03188	Ordu	2,07003	Ordu	2,6316	Adıyaman	2,55792
70	Adıyaman	2,02513	Düzce	2,06343	Adıyaman	2,49496	Bingöl	2,49051

Table 2: Duranton – Puga Index Calculations (2004 – 2007 cont.)

Num	Provinces	2004	Provinces	2005	Provinces	2006	Provinces	2007
71	Aksaray	2,00385	Adıyaman	2,03279	Tekirdağ	2,43438	Ordu	2,45076
72	Düzce	1,98942	Rize	2,01075	Niğde	2,397	Aksaray	2,4486
73	Rize	1,96143	Bingöl	1,94997	Bingöl	2,32796	Batman	2,4194
74	Kocaeli	1,91995	Aksaray	1,94903	Aksaray	2,17926	Kastamonu	2,39973
75	Kastamonu	1,82854	Kocaeli	1,84327	Kastamonu	2,10596	Niğde	2,06035
76	Bingöl	1,80824	Ankara	1,71648	Kocaeli	1,94646	Hakkâri	1,86617
77	Hakkâri	1,42375	Hakkâri	1,64713	Hakkâri	1,84058	Kocaeli	1,82641
78	Tunceli	1,25543	Şırnak	1,37096	Şırnak	1,50157	Şırnak	1,72893
79	Şırnak	1,17965	Tunceli	1,26419	Tunceli	1,3032	Tunceli	1,27443
80	Bayburt	1,0839	Bayburt	1,07457	Bilecik	1,0708	Bilecik	1,06755
81	Bilecik	1,0839	Bilecik	1,07457	Bayburt	1,05298	Bayburt	1,0482

Table 2: Duranton – Puga Index Calculations (2008 – 2011)

Num	Provinces	2008	Provinces	2009	Provinces	2010	Provinces	2011
1	Muğla	6,82467	Muğla	6,84816	Bursa	6,52995	Bursa	7,53442
2	Kars	6,78946	İstanbul	6,73606	Erzincan	6,50602	İstanbul	7,46079
3	İzmir	6,29891	Kayseri	6,4043	Muğla	6,25381	İzmir	7,15851
4	İstanbul	6,27785	İzmir	5,98111	Amasya	6,14893	Edirne	6,55891
5	Bursa	6,13961	Amasya	5,91118	İstanbul	5,99216	Konya	6,06988
6	Sivas	5,67009	Bursa	5,81619	Isparta	5,8916	Amasya	6,00823
7	Isparta	5,62544	Isparta	5,75864	İzmir	5,79576	Erzurum	5,98643
8	Çankırı	5,25928	Erzincan	5,71178	Çankırı	5,72261	Muğla	5,78761
9	Adana	5,24459	Kars	5,58342	Bolu	5,43071	Kayseri	5,68898
10	Erzincan	5,24429	Adana	5,55614	Konya	5,38655	Isparta	5,67961
11	Konya	5,06762	Bolu	5,46679	Kars	5,28763	Adana	5,27233
12	Kayseri	4,97993	Edirne	5,14592	Edirne	5,26774	Mersin	5,19819
13	Erzurum	4,95428	Sivas	5,00644	Adana	5,14582	Antalya	5,11034
14	Amasya	4,83914	Erzurum	4,98912	Ardahan	4,87675	Sivas	4,8071
15	Balıkesir	4,71413	Konya	4,83101	Antalya	4,85598	Kars	4,80072
16	Aydın	4,63405	Çankırı	4,75712	Balıkesir	4,70929	Erzincan	4,77351
17	Ağrı	4,60308	Balıkesir	4,75665	Kayseri	4,69235	Balıkesir	4,54675
18	Bolu	4,47177	Ardahan	4,75039	Ağrı	4,54862	Bolu	4,39588
19	Edirne	4,44364	Aydın	4,45734	Aydın	4,45616	Çankırı	4,14157
20	Antalya	4,30873	Çanakkale	4,42098	Çanakkale	4,38058	Çanakkale	4,07988
21	Mersin	4,29568	Sinop	4,36699	Mersin	4,26286	Diyarbakır	4,05746

Table 2: Duranton – Puga Index Calculations (2008 – 2011 cont.)

Num	Provinces	2008	Provinces	2009	Provinces	2010	Provinces	2011
22	Çanakkale	4,23176	Antalya	4,35405	Sinop	4,19164	Mardin	4,0135
23	Sinop	4,1585	Mersin	4,30148	Bitlis	4,17135	Ardahan	3,97793
24	Iğdır	4,15103	Malatya	4,04158	Iğdır	4,15053	Aydın	3,96916
25	Ardahan	4,14379	Ağrı	4,03582	Sakarya	4,08799	Bitlis	3,7335
26	Malatya	4,0708	Afyon	4,0186	Kırklareli	4,04366	Samsun	3,69281
27	Diyarbakır	3,95085	Kırklareli	3,99441	Erzurum	4,02161	Kütahya	3,64266
28	Kütahya	3,93762	Iğdır	3,97298	Malatya	3,92714	Sakarya	3,53165
29	Yalova	3,70948	Kütahya	3,92325	Sivas	3,90861	Sinop	3,50728
30	Hatay	3,70794	Muş	3,84407	Kütahya	3,78116	Malatya	3,47698
31	Mardin	3,65157	Yalova	3,68066	Diyarbakır	3,73488	Ağrı	3,42073
32	Afyon	3,63507	Mardin	3,5736	Eskişehir	3,72984	Şanlıurfa	3,38477
33	Muş	3,57732	Kırıkkale	3,54784	Mardin	3,68195	Elâzığ	3,30644
34	Sakarya	3,49913	Diyarbakır	3,51678	Artvin	3,62012	K. Maraş	3,29778
35	Eskişehir	3,47166	Sakarya	3,51229	Muş	3,61712	Iğdır	3,28265
36	Kırıkkale	3,43116	Hatay	3,45979	K. Maraş	3,52022	Kırıkkale	3,23332
37	K. Maraş	3,35359	Bitlis	3,37382	Afyon	3,48759	Eskişehir	3,22156
38	Bartın	3,31152	Bartın	3,35895	Yalova	3,45712	Denizli	3,17582
39	Kırklareli	3,26918	K. Maraş	3,32794	Kırıkkale	3,41363	Afyon	3,11534
40	Denizli	3,22321	Samsun	3,30999	Hatay	3,4067	Trabzon	3,07808
41	Samsun	3,21027	Eskişehir	3,29087	Bartın	3,33541	Tekirdağ	3,04681
42	Bitlis	3,2043	Denizli	3,21985	Zonguldak	3,28064	Kırklareli	3,02075
43	Burdur	3,20424	Tekirdağ	3,20303	Denizli	3,27189	Hatay	3,01912
44	Artvin	3,15285	Zonguldak	3,16791	Ankara	3,25724	Bartın	2,98529
45	Zonguldak	3,1478	Burdur	3,13358	Bingöl	3,19056	Bingöl	2,98425
46	Şanlıurfa	3,06573	Şanlıurfa	3,12821	Burdur	3,17461	Yalova	2,96929
47	Elâzığ	3,04226	Giresun	3,05983	Samsun	3,15893	Siirt	2,9375
48	Siirt	3,03804	Trabzon	3,0506	Tekirdağ	3,14238	Muş	2,92434
49	Kırşehir	3,03043	Elâzığ	3,04895	Giresun	3,08735	Zonguldak	2,91562
50	Ankara	3,01586	Uşak	2,98545	Batman	3,05963	Burdur	2,85638
51	Giresun	3,00072	Ankara	2,94362	Nevşehir	3,02388	Van	2,78415
52	Tekirdağ	2,98043	Manisa	2,89482	Şanlıurfa	2,9969	Giresun	2,73334
53	Gaziantep	2,96623	Yozgat	2,88238	Uşak	2,99114	Manisa	2,71439
54	Yozgat	2,94169	Kırşehir	2,84945	Manisa	2,98952	Kırşehir	2,71255
55	Manisa	2,87345	Gaziantep	2,84667	Kırşehir	2,98675	Tokat	2,66483
56	Trabzon	2,79912	Karabük	2,84469	Gaziantep	2,93788	Nevşehir	2,63258

Table 2: Duranton – Puga Index Calculations (2008 – 2011 cont.)

Num	Provinces	2008	Provinces	2009	Provinces	2010	Provinces	2011
57	Uşak	2,79045	Tokat	2,81149	Trabzon	2,93515	Corum	2,62937
58	Van	2,77051	Gümüşhane	2,8077	Gümüşhane	2,91947	Yozgat	2,61603
59	Kilis	2,73065	Corum	2,80401	Karabük	2,89404	Batman	2,61532
60	Rize	2,72567	Siirt	2,80352	Tokat	2,88491	Gümüşhane	2,58072
61	Karaman	2,7151	Nevşehir	2,78473	Karaman	2,84261	Uşak	2,57137
62	Gümüşhane	2,71168	Bingöl	2,74728	Corum	2,84082	Karaman	2,55282
63	Batman	2,70004	Rize	2,72834	Yozgat	2,83028	Kilis	2,54087
64	Corum	2,68552	Karaman	2,72753	Elâzığ	2,78364	Gaziantep	2,50703
65	Karabük	2,68527	Kilis	2,71725	Kilis	2,76218	Ankara	2,49064
66	Nevşehir	2,67272	Van	2,67784	Osmaniye	2,72818	Karabük	2,48969
67	Osmaniye	2,65941	Osmaniye	2,67188	Rize	2,72032	Düzce	2,44329
68	Ordu	2,62921	Batman	2,60319	Ordu	2,71577	Osmaniye	2,43536
69	Tokat	2,62097	Ordu	2,56394	Aksaray	2,63669	Adıyaman	2,41748
70	Bingöl	2,55505	Aksaray	2,53401	Van	2,56408	Ordu	2,40073
71	Adıyaman	2,50253	Düzce	2,52987	Adıyaman	2,50123	Rize	2,38638
72	Düzce	2,46664	Kastamonu	2,49099	Siirt	2,44397	Aksaray	2,27798
73	Aksaray	2,36777	Adıyaman	2,34283	Düzce	2,42882	Niğde	2,20148
74	Kastamonu	2,21103	Artvin	2,24842	Niğde	2,23856	Kastamonu	2,09073
75	Niğde	2,21055	Niğde	2,21043	Kastamonu	2,12253	Artvin	1,99655
76	Kocaeli	1,75366	Kocaeli	1,82975	Kocaeli	1,8687	Kocaeli	1,87915
77	Şırnak	1,6741	Hakkâri	1,64603	Şırnak	1,6367	Şırnak	1,53068
78	Hakkâri	1,57461	Şırnak	1,63552	Hakkâri	1,33471	Hakkâri	1,5207
79	Tunceli	1,24146	Tunceli	1,15288	Tunceli	1,18198	Tunceli	1,21966
80	Bilecik	1,07141	Bilecik	1,06838	Bilecik	1,06634	Bayburt	1,07691
81	Bayburt	1,03829	Bayburt	1,05623	Bayburt	1,06339	Bilecik	1,07028

5. CONCLUSION

The aim of this paper is to analyze spatial concentration and regional diversification in public expenditures of functional classification in Turkey. In accordance with 5018 Public Financial Management and Control Law, the functional classification of public expenditures by provinces are considered to have ten basic functions. To determine the spatial concentration and regional diversification of public expenditures, Herfindahl – Hirschman Index and Duranton – Puga Index are calculated for the period of 2004 – 2011.

The results show that public expenditures have mostly concentrated on Housing and Social Welfare Services. Economic Affairs and Services and Defence Services are the other expenditure items with highest concentration. These statistical results indicate that the government performed a spatial concentration on Housing and Social Welfare Services Expenditures during the period of 2004-2011.

Furthermore, in 2004, 2005, 2010 and 2011 Bursa; in 2006 Kars; in 2007 Amasya; in 2008 and 2009 Muğla are the provinces with highest regional diversification. These results indicate that

Bursa province is regionally diversified from other provinces with the public expenditure policy pursued by the government over the years between 2004 – 2011.

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