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Dogrueel, Fatma and Dogrueel, A. Suut

Marmara University, FEAS, Department of Economics

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The Deindustrialization of Istanbul[#]

Fatma DOGRUEL* & A. Suut DOGRUEL**

ABSTRACT

Istanbul and Adana are among the oldest and important industrial zones of Turkey. However, the shares of these two regions in the Turkish manufacturing sector substantially decreased after the year 1980. Initially, Adana was a center for the textile industry and the textile was the engine of the Turkish manufacturing sector. During 1980's and 1990's, textile industry gradually lost its dominance. Therefore, the change in the share of Adana can be explained by this phenomenon. On the other hand, manufacturing activities in Istanbul are highly diversified. The basic factor behind the decrease in the share of manufacturing sector of Istanbul is the deindustrialization policy implemented in this city during the last several decades. As a result of this policy some of the plants moved to neighborhoods of Istanbul. At the same time, constructions of new large scale plants were not allowed.

In spite of the implementation of the deindustrialization policy, Istanbul still have largest share in the Turkish manufacturing sector. Considering the geographical proximity, in addition to direct effects on Istanbul, it is possible to expect that these policies may indirectly affect neighborhood regions. Employing the spatial statistical techniques, we analyze the growth of the manufacturing in Istanbul and its neighborhoods. The paper also focuses on the effects of the deindustrialization policy on the productivity and the firm size in Istanbul.

Key words: deindustrialization policy, productivity changes, firm size, shift-share analysis
JEL codes: O18, R12, R38

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* Marmara University, Email: fatma.dogruel@marmara.edu.tr

** Marmara University, Email: suut.dogruel@marmara.edu.tr

1. INTRODUCTION

Istanbul was the capital city of Ottoman Empire over the four centuries. Hitherto, Istanbul has been also the cultural, commercial and industrial capital of the country. Historically, the other coastal provinces, namely Izmir (situated at the West side of the Aegean region) and Adana (situated at the eastern side of the Mediterranean region) and their hinterlands were other two important economic centers of the country. However, despite of their rich industrial cultures, the weights of Istanbul and Adana have declined gradually. Probably, some agglomeration effects play crucial role behind these changes. The decline in the share of Adana can be partly explained by the shifts of textile activities from Adana to other new emerging industrial centers. On the other hand, the decline in the share of Istanbul can be attributed to the deindustrialization policies implemented during last several decades. After 1980, not only new investments, replacement and modernization investments in the manufacturing sector promoted to move away from Istanbul to the eastern and western hinterlands.

In spite of the implementation of the deindustrialization policy, Istanbul still have largest share in the Turkish manufacturing sector. Considering the geographical proximity, in addition to direct effects on Istanbul, it is possible to expect that these policies may indirectly affect neighborhood regions. Employing the spatial statistical techniques, we analyze the growth of the manufacturing in Istanbul and its neighborhoods. The paper also focuses on the effects of the deindustrialization policy on the productivity and the firm size in Istanbul.

The paper uses the manufacturing employment data of annual manufacturing surveys of TURKSTAT (Turkish Statistical Institute). The manufacturing sector classification is 3-digit ISIC Rev-2 (International Standard Industrial Classification of all Economic Activities, Revision 2), and the regions are defined at NUTS2 level. In addition to Istanbul, as the neighborhood regions, we consider the old hinterland and the new industrial centers Bursa (TR41) and Kocaeli (TR42) in the east side of Istanbul. And, in the west side, Tekirdağ (TR21), which is still a hinterland region of Istanbul.

The following section briefly discusses the theoretical background of the agglomeration effects. In this section the paper constructs the link between deindustrialization policy and centrifugal forces (push effects), and also discusses centripetal forces (pull effect). The third

section gives some aspects of the regional characteristics of Istanbul and its neighborhoods. The fourth section presents the findings of the manufacturing growth decomposition in four regions considered. The fifth section focuses on the structure of the industry in Istanbul. Last section concludes the paper.

2. THEORETICAL BACKGROUND

What are the main characteristics of agglomeration? And, how can we build up a link between deindustrialization policy and the forces affecting geographical concentration of economic activities? Because of the interdisciplinary character of these issues, it is possible to refer to the vast literature on the concepts of the geographical distribution of industries and the factors affecting the spatial decision of an industry. Industrial organization theory, regional science and urbanization are the main cornerstones of the literature. Trade theory is also related to this literature.

Spatial decision of an industry became a crucial question over the recent decades. However, the link between space and economy is not a new topic; pioneering contributions to the spatial factors on industry decisions emerged in the first half of the 19th century. Fujita and Thisse (2002: 10) call attention to the contributions of J. H. von Thünen on the localization issue. Thünen ([1826] 1966) has described the main centripetal and centrifugal forces behind the formation of an agglomeration (Quoted by Fujita and Thisse, 2002: 10).¹ Fujita and Thisse (2002: 11) cite Hotelling (1929), Lösch (1940), Isard (1956), Koopmans (1957), and Greenhut (1963) as pioneering works on the relationship between space and economics.² Krugman (1995: 37-38) points out another leading contributor, Alfred Weber, on location theory. Krugman (1995: 36-39) also states Lösch and Christaller for the central place theory.³

¹ Fujita and Thisse (2002: 10) give further detail about the main centripetal and centrifugal forces using some direct quotations from J. H. von Thünen ([1826] 1966) *Der Isolierte Staat in Beziehung auf Landschaft und Nationalökonomie*. Hamburg: Perthes. English translation: *The Isolated State*. Oxford: Pergamon Press (1966).

² Fujita and Thisse (2002: 10) quoted from Hotelling, H. (1929). "Stability in Competition," *Economic Journal*, Vol.39, pp. 41-57), Lösch, A (1940). *Die Raumliche Ordnung der Wirtschaft*, Isard (1956), Koopmans (1957), and Greenhut (1963).

³ "Central place theory" analyses "the location and the roles of manufacturing/marketing/etc. centers serving a hypothetical evenly spread agricultural population" Krugman (1995: 38).

The localization decisions of industries have been deeply discussed in Marshall (1920). Marshall ([1890] 1920: Chapter 10) has described the economic environment and elucidated his observations on the location issue. He discussed "... modern forces on the geographical distribution of industries (p.21)" considering both demand and supply side.

Paul Krugman is another prominent contributor to the field. Here, we would like to draw attention to the classification of the forces affecting geographical concentration of economic activities by using Krugman's approach: Krugman (1999) defines the "centripetal forces" as *market size effects (linkages), thick labor markets and pure external economies*; the "centrifugal forces" as *immobile factors, land rents and pure external diseconomies*. Krugman relates the centripetal forces to "the three Marshallian sources of external economies" (Krugman, 1999).

It is not sufficient to identify the forces affecting geographical concentration of economic activities to seize the changes in an agglomeration. We should refine the analysis by defining the geographical units. The geographical units can be defined in a wide range from industrial district to metropolitan area. Audretsch, Falck, and Heblich (2007) define three types of agglomeration, as "industrial district", "industrial agglomeration" and "urban agglomeration", by referring to the Marshall's external economies in space. Audretsch et al (2007: 12) stress that urban agglomeration "... are not dominated by one manufacturing industry but are, instead, historically grown centers rich with cultural life and other amenities that support a certain lifestyle." Urban agglomeration may be in two forms: one center where large share of the country's economic activities concentrated in and a primary gravity center coexist with other major centers. Cairo, Mexico City and Sao Paulo can be seen as the examples of the first form, where New York, London and Paris as the examples of the second form. We can mention about New York in the US, New Mexico in Mexico or Sao Paulo in Brazil. The case of Istanbul can be seen as the transition from the first form to the second form: Istanbul is a typical example of urban agglomeration in definition of Audretsch et al (2007: 12). On the other hand, hinterlands of Istanbul can be marked as not only diversified manufacturing activities, but also gradually enriching cultural life.

Concerning the changes of industrial location in developing countries, it is necessary to focus on two points. First one is to identify the link between industrialization policy and the forces affecting geographical concentration. For example, we expect that deindustrialization policy

directly or indirectly has an effect similar to the centrifugal forces: The implementations of official restrictions on land use (deindustrialization policy) the land rents would be higher than the otherwise. Second one is how other industrial locations are affected when industry will move out of the region. The industry may shift to any province in the country or hinterlands of the region. The outcomes can be differing from one country to another. However, an empirical work on Turkish manufacturing sector displays that the manufacturing sector shifted to the developed regions, not to the lagged regions (Dogrue and Dogrue, 2006 and 2007). Deichmann, Lall, Redding and Venables (2008: 243) observed a similar pattern for India and Indonesia. They state that: *“Empirical results suggest that firms are likely to relocate from cities into areas near large urban agglomerations rather than to smaller cities elsewhere, because agglomeration benefits continue to compensate for the costs of increasing congestion and higher wages.”* The industrial production historically accumulated in the Marmara region and hinterland of the region. Furthermore, after 1980, Adana in the southern part of the country, loosed its importance in the country manufacturing; and, Izmir, in the west side, has difficulties in order to keep its importance. The industry moved to the east and west sides of Istanbul.

3. ISTANBUL AND ITS HINTERLAND

Historically, the Turkish governments stimulated pull effect (centripetal forces) in Istanbul by implementing same targeted policies. However, one should say that, Istanbul was always the main industrial location of the country without any targeted policy. After a major structural change in industrial strategy, and shifting from import substitution to open up economy to international competition created new industrial centers in the other regions in some extend. However, regional disparities reduced within the developed regions, not in the whole country.

The strong pull effect of Istanbul has been always the motivation for the comprehensive city plan. During the last half century, there were several planning attempts in order to control chaotic expansion of Istanbul. In the beginning the attempt was to reorganize industrial localizations, later it turns to shift the industry out of the region. *“1966 Sanayi Nazım İmar Planı”* (1966 Development Plan for Regulating Industry) was the first attempt to organize the industrial organization in Istanbul. East Marmara and Trakya Regions were defined as the new growing industrial area in the plan (Quoted from Zaimoğlu (1971) by Yüzer and

Giritliođlu (2003)⁴. “1980 Metropolitan Alan Nazım Planı” (1980 Metropolitan Area Development Plan) was the next attempt to organize the industrial localization in Istanbul (Yüzer and Giritliođlu, 2003). This Plan included deindustrialization of industry as well as many restrictions on the industrial production in order to keep the city from environmental pollution. It is possible to say the real momentum of deindustrialization policy was the 1980 Plan, and comprehensive policy implementation begun in Istanbul following this year.⁵ The third plan was implemented in 1995 (Metropolitan Area Sub Region Master Plan) and the last one will be introduced in 2010. After 1980, the manufacturing sector has gradually moved to East and West hinterlands of Istanbul over the last three decades. And, the shift of industry from Istanbul to its hinterland is still continuing. In spite of persistent implementation of the deindustrialization policy, Istanbul still is the main industrial center of the country.

Using employment data and considering NUTS2 (Level-2) 26 regions we classified the regions of Turkey into four groups in terms of their industrialization characteristics (Dogruel and Dogruel, 2007): The industrial zones, hinterlands and emerging regions, minor industrial regions, and poorly industrialized regions. The industrial zones are TR10, TR31, TR41, TR42 and TR62. The leading industrial centers Istanbul, İzmir, Adana, Kocaeli and Bursa are in this group. “Istanbul and Kocaeli is the “industrial belt” of Turkey. Initially, Bursa and Kocaeli have grown as the industrial hinterland of Istanbul. During the last two decades, Bursa has become more important business district than Adana. Kocaeli, on the other hand, became eastern part of the “industrial belt” of Turkey”(Dogruel and Dogruel, 2007). Tekirdađ (TR21) is the hinterland of Istanbul (TR10), and Manisa (TR33) is the hinterland of İzmir (TR31) respectively. Aydın (TR32), Kayseri (TR72) and Gaziantep (TRC1) became important centers after 1980. These three cities are the emerging industrial centers (Dogruel and Dogruel, 2007) (See Figure 1). We consider the old hinterland and the new industrial centers Bursa (TR41) and Kocaeli (TR42) in the east side of Istanbul. And, in the west side, Tekirdađ (TR21), which is still a hinterland region of Istanbul, although grows and develops very quickly

⁴ Zaimođlu, S., (1971). *İstanbul Sanayi Bölgeleri*, Hüsütabat Matbaası, İstanbul, 177-194. Yüzer and Giritliođlu (2003) also refer to İSO, (1981). *İstanbul Metropolitan Alanında Sanayi Yerleşim Planlaması*, İstanbul Sanayi Odası Yayınları, İstanbul.

⁵ Planlama.Org (An internet portal) also refers this date for the beginning of deindustrialization policy. http://www.planlama.org/index2.php?option=com_content&task=view&id=1522&pop=1&page=0&Itemid=93 Accessed on December 23, 2008.

Total manufacturing employment share of these four regions is around 59 percent with slight decrease over the two decades. Figure-2 shows that the considerable decrease in the share of Istanbul from 42 percent in 1980 to 29 percent in 2000 is compensated by the increases in the shares of the other three regions. These figures support our result that we have obtained earlier for Turkey (Dogrue and Dogrue, 2007), and match the outcome of Deichmann et al (2008: 243). Since the industry shifted from Istanbul to Kocaeli earlier, the slope of the growth trend in Kocaeli is flatter than the slopes in Bursa and Tekirdag.

Figure 1: Map of regions

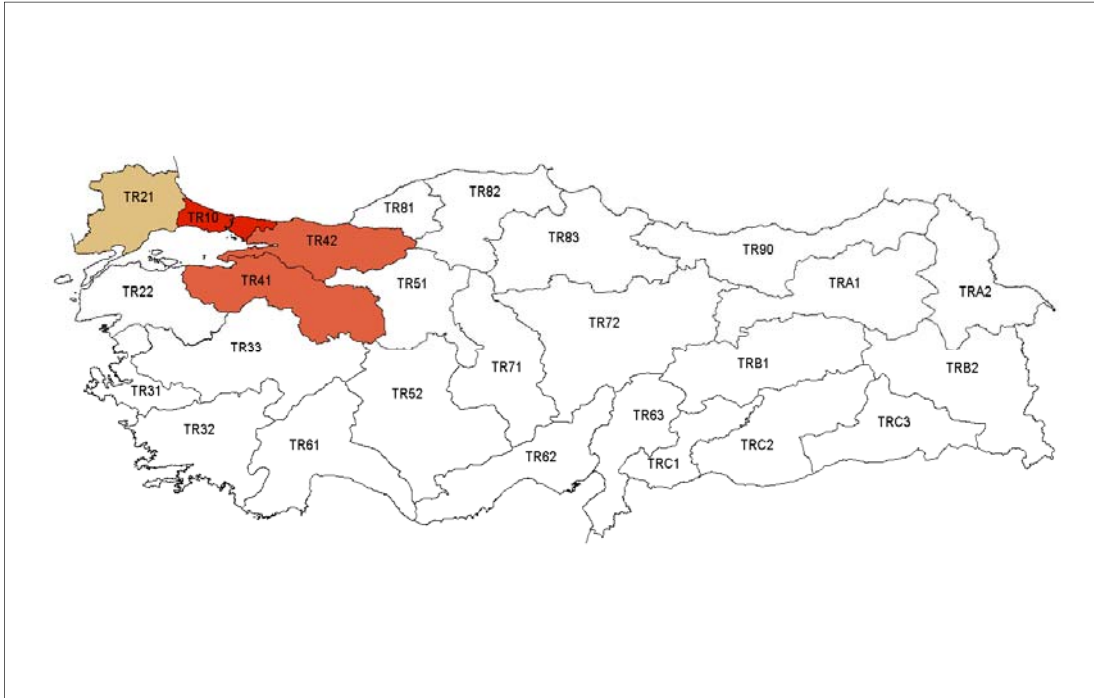
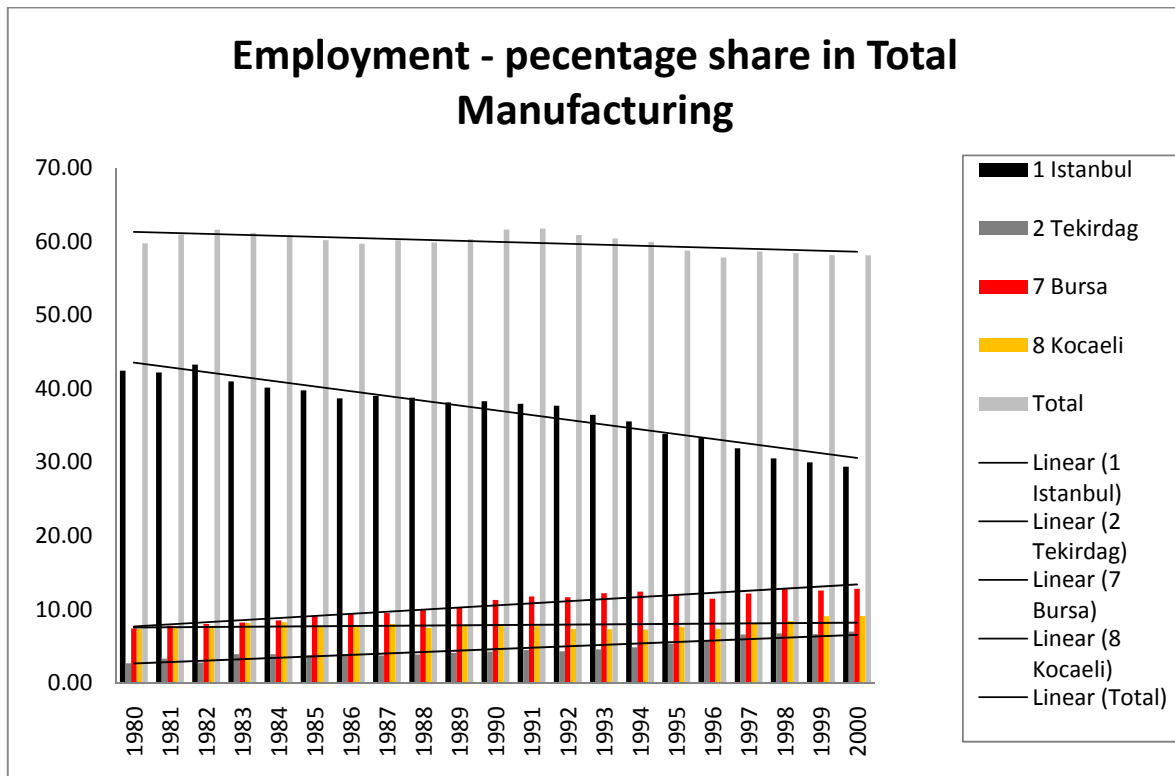


Figure 2



4. DECOMPOSITION OF MANUFACTURING EMPLOYMENT GROWTH IN ISTANBUL REGION AND NEIGHBORHOODS

In this section we present the quantitative analysis of the manufacturing employment growth in Istanbul and in its neighborhoods. The employment data of the period of 1980-2000 is used for the calculation of the decomposition of the five-year growth using shift-share method. Although, Istanbul takes the most important share of manufacturing sector in Turkey, we expect that deindustrialization policy affects the growth rate and sectoral composition of manufacturing sector within the region.

The spatial statistics has number of tools to analyze the data. In this section, we use shift-share approach in order to decompose the manufacturing employment growth in Istanbul and its neighborhood for the period 1980-2000. Traditional shift-share analysis quantifies the components of regional growth. The components of regional growth (GR) rate consist of “national growth effect” (NGR), “industry mix effect” (IME) and “competitive effect” (CE).⁶

$$GR=NGR + IME + CE$$

The last two components represent the shift within the region.⁷

The traditional shift-share analysis is not appropriate tool when the time period is not smooth (i.e., crisis occurs or there happens another major change) or when there are important differences between national and regional growth rates (Barff and Knight, 2006). Dynamic shift-share reduces the effect of unexpected events or changes in the regional economy.⁸ It is also not possible to accept that the development of the manufacturing sector in Istanbul has a smooth path during the period of 1980-2000. Therefore, we need to add a dynamic

⁶ The shift-share analysis is frequently used, although it is a simple quantitative spatial technique. Hoover and Giarratani (1999) mention assert that the first use of the technique appear in Daniel B. Creamer, *Industrial Location and National Resources* (Washington, D.C.: Government Printing Office, 1943) (quoted by Hoover and Giarratani, 1999: Appendix 12-1). However, the landmark text was *Regions, Resources and Economic Growth* by Harvey S. Perloff, Edgar S. Dunn, Jr., Eric E. Lampard, and Richard F. Muth (The Johns Hopkins Press, 1960) (Riefler, 1984; Hoover and Giarratani, 1999: Appendix 12-1).

⁷ Hoover and Giarratani (1999: Appendix 12-1) state that the "mix component" corresponds to Dunn's "net proportionality shift," and the "competitive component" corresponds to Dunn's "net differential shift."

⁸ A detailed version of dynamic procedure is defined in Harris et al (1994: 6-8).

dimension into the analysis. To this end, we evaluated the growth components for moving five-year periods instead of the entire period.

Decomposition of the manufacturing employment growth in Istanbul for five-year periods using shift-share analysis is given in the Table-1 and Figure-4. As the consequence of the decreasing share of Istanbul in national economy, regional share effects are higher than the regional growth rates during the entire period. Until the last two five-year periods, relatively low growth is compensated by the industry mix effect. This shows that excluding the last two five-year periods, fast growing manufacturing sectors have dominated in Istanbul. Negative values of the competitive effect show that the initial structural advantage of manufacturing sector in Istanbul gradually disappeared. In other words, regional factors other than the initial advantages hamper the manufacturing growth in Istanbul. Centrifugal forces, including the deindustrialization policies, can be seen as the source of the negative competitive effects. This result also can be seen in change of the composition of manufacturing in Istanbul (Figure-3). Share of middle and high technology sectors in total manufacturing steadily decreased in Istanbul from 59 percent in 1980 to 47 percent in 2000.

For the three regions around Istanbul, shift share analyses present opposite results (Figure-4). Manufacturing employment growth rates in Tekirdag, Bursa and Kocaeli regions are higher than the regional shares. Negative or low industry mix effects shows that fast growing sectors have small shares in these neighborhood regions. In spite of the initial disadvantages, high growth rates relative to national growth rates achieved in these regions are the outcome of the positive and high competitive effects.

The results for the neighborhood regions outlined above are amplified when decomposition of the growth is calculated relative to the manufacturing growth in Istanbul (Figure-5). The results displayed in Figure-5 decompose the deviation of the growth rates of these regions from growth of manufacturing in Istanbul. In other words, we compare the growth performances of three regions with Istanbul. The results show that competitive effects significantly increase for Tekirdag, Bursa and Kocaeli. Considering that the total share of four regions in Turkish manufacturing stay around 59 percent, diversities of competitive effects between Istanbul and other three regions demonstrate a strong interaction between these regions.

Table 1: Decomposition of Manufacturing Growth in Istanbul (%)

	Regional Growth	Regional Share	Industry Mix Effect	Competitive Effect
1984	14.84	21.44	3.12	-9.72
1985	16.06	23.20	3.05	-10.19
1986	6.34	18.94	1.61	-14.22
1987	14.67	20.48	1.59	-7.40
1988	17.68	21.88	4.21	-8.42
1989	12.13	16.89	2.88	-7.63
1990	13.35	14.51	4.88	-6.05
1991	-3.37	-0.62	3.48	-6.23
1992	-2.30	0.48	3.40	-6.17
1993	-5.16	-0.77	3.25	-7.64
1994	-11.65	-4.84	1.12	-7.93
1995	1.27	13.52	3.15	-15.40
1996	3.00	16.61	3.04	-16.66
1997	13.46	29.68	0.74	-16.96
1998	23.44	43.80	0.45	-20.81
1999	8.08	22.03	-2.01	-11.94
2000	0.57	13.96	-2.81	-10.59

Figure 3:

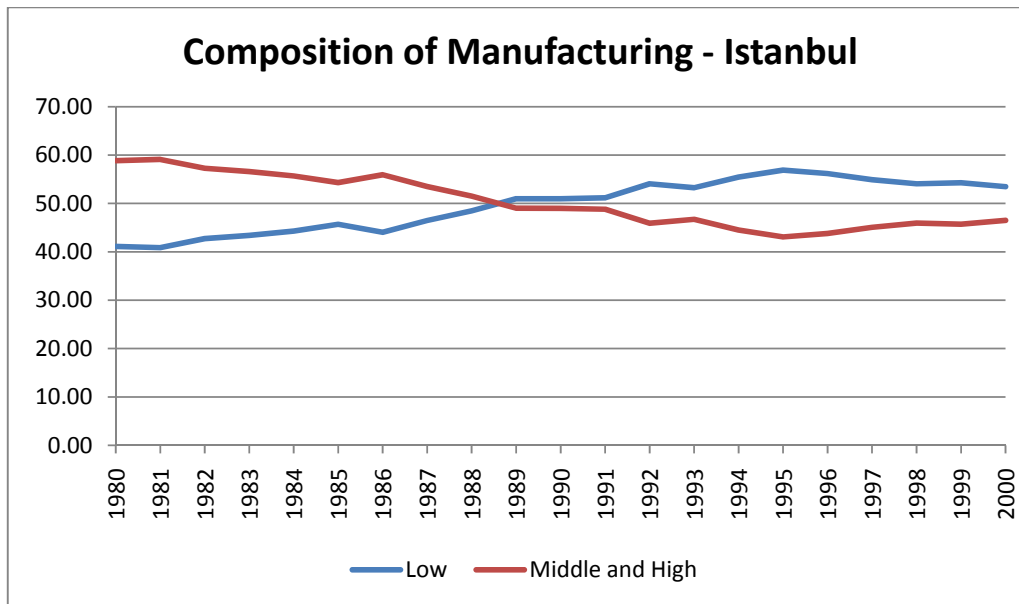
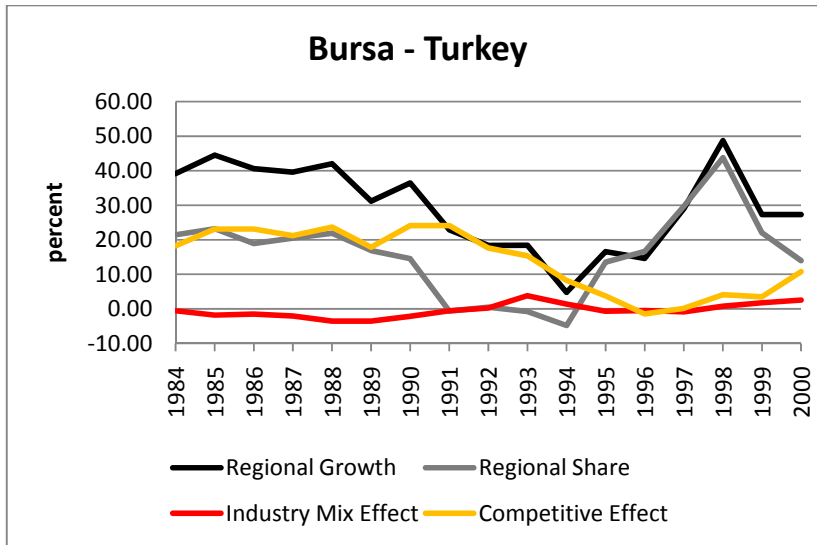
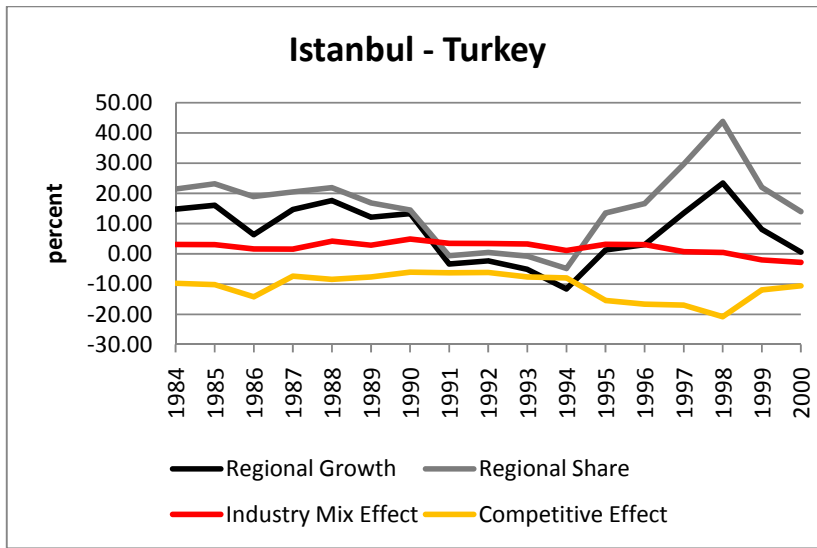


Figure 4: Decomposition of Manufacturing Growth



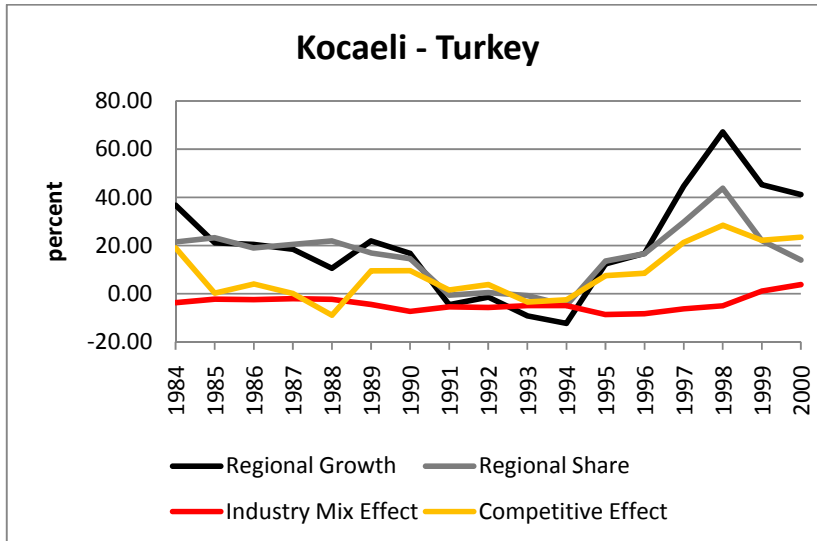
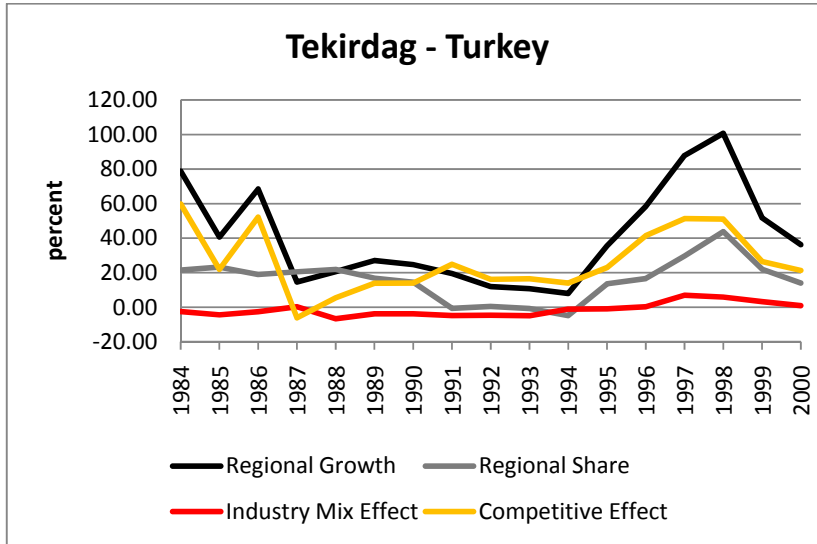
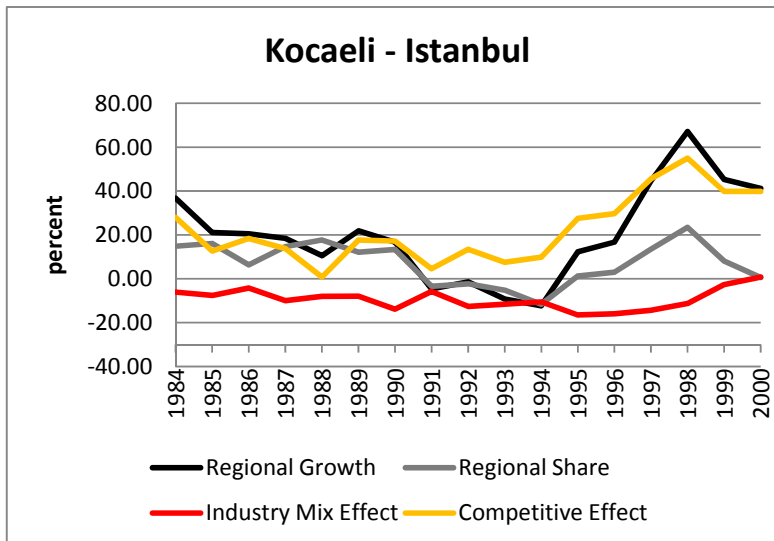
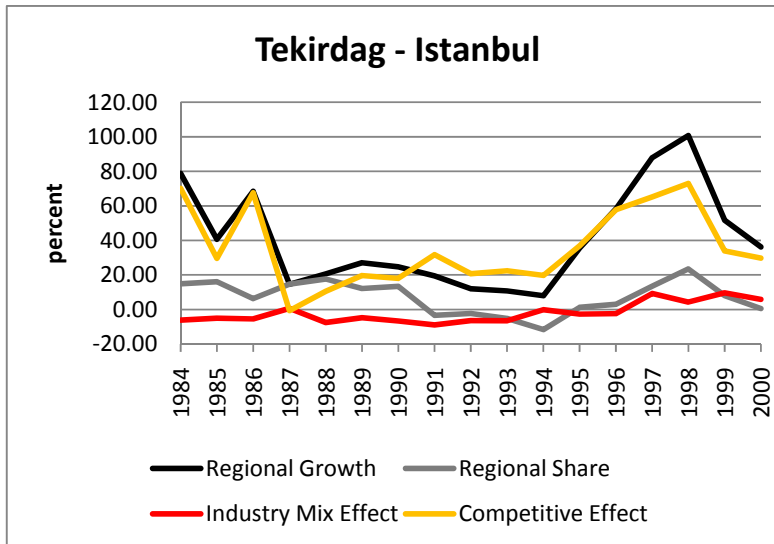
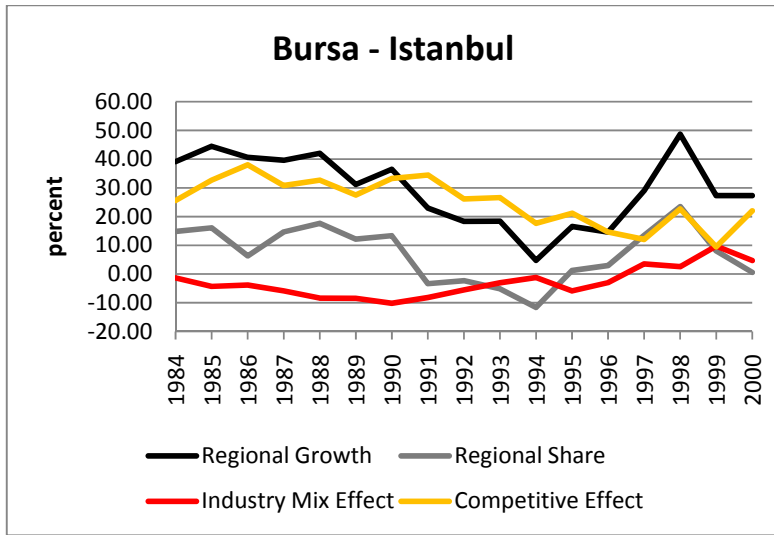


Figure 5: Decomposition of Manufacturing Growth



5. CHANGE IN THE INDUSTRIAL STRUCTURE OF ISTANBUL

The results of the shift-share analyses given in the previous section show that the regional factors have important effects on the diminution of the manufacturing activities in Istanbul. In this section we will present how the industrial structure of Istanbul changed during this period. In order to quantify the industrial structure we employ three indicators. First one is the scale of the firms measured by the average number of worker employed. Second one is productivity measured as the output per unit of work hour. However, changes in these indicators are not only outcome of the changing structure of the manufacturing activities in Istanbul, but also an outcome of the overall technology change in the industries. Therefore, in order to eliminate the sector effect, we employ the relative values calculated by dividing the country average. The results show the region specific change in productivity and firm size in Istanbul. Third indicator is the sectoral employment share in Istanbul which shows the change in the composition of the manufacturing.⁹

Table-2 gives average annual percentage changes of these indicators for the period of 1980-2000. Wearing appeals (322) have highest employment share growth rate. In spite of decrease in the relative firm size, relative productivity of this industry has significant improvements. Similar trend is observed in the food (311) and textile (321) sectors. Total share of these three sectors in manufacturing employment of Istanbul steadily increased from 32 percent in 1980 to 46 percent in 2000 (Table-A1). This observation reveals that there is strong tendency in the low technology manufacturing of Istanbul towards smaller but more productive units. Opposite development is observed in rubber (354) industry: Firm size and productivity increases are highest in Istanbul. Similar but modest results are found for beverage (313), wood (331), leather (323), other chemical (352), other non-metallic products (369), other metals (372) and optical products (385) industries. Except other chemical (352), these industries have very small share in the manufacturing employment of Istanbul. In other words, movement towards larger and more productive firms does not shape the overall structure of manufacturing activities in Istanbul. On the other hand, we observe significant decreases in the productivities in the most of the middle and high technology industries.

⁹ Relative productivities, relative firm sizes and composition of manufacturing in Istanbul are given in appendix table by sectors for the period of 1980-2000.

During the implementation of the deindustrialization policies, the shares of Istanbul in all industries decreased considerably, except paper (341) and other manufacturing (390). At this point, we may ask to what extent the changes in firm size and productivity can be attributed to changes in the share of Istanbul in each industry. Table-3 gives correlation coefficients for the pairs of three indicators: Relative productivity, relative firm size and the share of Istanbul in the industry. Significant coefficients at 1 percent level are marked as bold. All of the 14 significant correlations between firm sizes and employment shares are positive. Considering that, except other manufacturing (390), the employment share decreased in these industries, we can conclude that in 13 industries deindustrialization policies may explain, at least partly, decrease in the firm size in Istanbul. For productivity, we obtain mix results: The decrease in the share of Istanbul creates productivity decreases in some industries and productivity increase in the others.

Table 2: Average annual percentage change (1980-2000)

	Employment share	Firm size	Productivity
Food (311)	-1.60	-0.76	1.67
Other food (312)	-2.53	1.63	1.35
Beverage (313)	-2.14	1.32	1.27
Textile (321)	0.55	-0.64	1.99
Wearing appeals (322)	9.00	-0.11	0.41
Leather (323)	-1.74	0.65	1.30
Shoes (324)	2.62	0.13	0.14
Wood (331)	-7.84	0.65	1.40
Furniture (332)	1.72	-1.25	-1.52
Paper (341)	3.09	1.80	0.35
Printing (342)	-0.27	-0.48	0.82
Industrial chemical (351)	-5.34	-1.00	5.26
Other chemical (352)	0.92	0.83	1.13
Rubber (354)	1.03	9.30	27.85
Fuel products (355)	-2.62	-0.82	1.14
plastics (356)	-0.07	-0.45	0.30
Pottery, china and earthenware (361)	-5.82	-3.02	0.55
Glass (362)	-2.63	-0.49	-0.52
Other non-metallic products (369)	-0.99	2.55	1.49
Iron and steel (371)	-3.75	-0.60	2.34
Other metals (372)	-0.86	1.74	2.30
Metal products (381)	-2.59	-0.61	-0.30
Machinery except electrical (382)	-2.51	-0.35	0.79
electrical machinery (383)	0.21	0.12	-0.05
Transport equipment (384)	0.26	-0.02	-0.58
Optical products (385)	7.15	2.12	1.63
Other Manufacturing (390)	4.00	0.15	-0.09

Tobacco (314) and Petroleum (353) are excluded

Table 3: Correlation coefficients

	Corr 1	Corr 2	Corr 3
Food (311)	-0.3081	0.1934	-0.4487
Other food (312)	0.6487	-0.0644	0.2942
Bevarage (313)	-0.1219	0.5320	-0.3861
Textile (321)	-0.4009	0.6988	-0.3929
Wearing appeals (322)	-0.4151	-0.1763	-0.5214
Leather (323)	-0.0233	-0.2507	-0.1247
Shoes (324)	-0.1173	-0.3699	-0.2497
Wood (331)	0.0646	0.4960	0.2759
Furniture (332)	0.5039	0.6357	0.7879
Paper (341)	-0.3889	0.4160	0.2569
Printing (342)	-0.7924	0.8131	-0.7464
Industrial chemical (351)	0.5682	0.8522	0.4009
Other chemical (352)	0.5306	-0.4598	-0.8634
Rubber (354)	-0.3637	0.5071	-0.3488
Fuel products (355)	-0.5041	0.9110	-0.5077
plastics (356)	0.1902	0.4062	0.2288
Pottery, china and earthenware (361)	0.8258	0.9776	0.8885
Glass (362)	0.4886	0.0108	0.0805
Other non-metallic products (369)	0.5767	-0.3152	-0.5625
Iron and steel (371)	-0.3292	0.5557	-0.7593
Other metals (372)	0.2715	0.7048	0.0773
Metal products (381)	0.1432	0.4264	0.4370
Machinery except electrical (382)	0.4375	0.5295	0.5456
electrical machinery (383)	0.0475	-0.2049	0.2375
Transport equipment (384)	0.5045	0.5985	0.7836
Optical products (385)	0.0009	-0.4798	0.0265
Other Manufacturing (390)	0.1336	0.7885	0.1629

Tobacco (314) and Petroleum (353) are excluded

Critical value: 0.4869

Corr 1: firm size - productivity

Corr 2: firm size - employment share

Corr 3: productivity - employment share

6. CONCLUSION

The paper shows that the deindustrialization policies implemented in Istanbul region have considerable effects on the manufacturing sector. As the direct effect, these policies stimulate centrifugal forces in Istanbul: The share of this region in the Turkish manufacturing decreased. On the other hand, as the indirect effect, these policies provoked centripetal forces in the Bursa, Kocaeli and Tekirdag regions due to geographical proximity. We also show that the deindustrialization policies have significant effects on the industrial structure of Istanbul. Simple descriptive statistical tools explain the relationship between the changes in the level of the concentration of the industries and firm size and productivity in Istanbul.

Dogruel&Dogruel, 2010

Although we observe a shift to low technology industries in the composition of the manufacturing, sectoral diversification is still persisting.

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Table A1: Sectoral employment shares in manufacturing of Istanbul (%)

	Sectors:													
	311	312	313	321	322	323	324	331	332	341	342	351	352	354
1980	5.91	0.46	0.81	21.80	3.86	1.34	0.95	1.34	0.75	1.03	2.87	1.31	6.18	0.25
1981	5.59	0.44	0.78	20.82	4.65	1.58	1.41	0.94	0.68	1.02	2.99	1.43	6.09	0.34
1982	5.68	0.53	0.74	21.54	5.68	1.62	1.23	0.88	0.72	1.20	2.93	1.16	5.80	0.32
1983	5.34	0.44	0.85	21.24	6.23	1.84	1.26	0.92	0.80	1.31	3.16	1.33	6.02	0.38
1984	5.45	0.50	0.89	21.48	7.20	1.72	1.03	0.76	0.80	1.20	3.26	1.32	5.96	0.27
1985	5.13	0.46	0.83	20.00	10.25	1.77	1.12	0.65	0.93	1.19	3.36	1.33	5.69	0.38
1986	5.47	0.53	0.74	18.77	9.80	1.70	1.16	0.52	0.80	1.26	3.29	1.39	5.94	0.50
1987	5.38	0.53	0.82	19.33	11.92	1.76	1.11	0.52	0.81	1.28	3.04	1.33	6.26	0.19
1988	5.12	0.60	0.67	19.16	14.89	1.48	0.98	0.51	0.73	1.00	3.34	1.09	6.14	0.29
1989	5.26	0.55	0.73	19.03	17.82	1.36	1.00	0.45	0.67	0.99	3.13	1.00	6.25	0.42
1990	4.89	0.51	0.76	18.97	17.82	1.43	1.17	0.44	0.68	1.11	3.21	0.85	6.23	0.44
1991	4.84	0.53	0.85	18.47	18.82	1.14	1.22	0.33	0.68	1.21	3.10	0.84	6.51	0.47
1992	4.76	0.53	1.02	19.21	20.38	1.10	1.37	0.43	0.83	1.37	3.10	0.86	5.95	0.21
1993	4.50	0.53	0.67	18.85	20.42	1.07	1.46	0.31	0.92	1.28	3.25	0.62	6.08	0.21
1994	4.96	0.49	0.50	19.31	21.86	1.04	1.47	0.18	0.85	1.36	3.44	0.63	5.63	0.38
1995	4.97	0.46	0.39	18.38	23.94	1.25	1.54	0.15	0.94	1.63	3.25	0.31	5.71	0.37
1996	4.48	0.43	0.40	18.48	23.71	1.20	1.52	0.20	0.82	1.47	3.47	0.29	5.93	0.10
1997	4.26	0.42	0.44	24.06	18.37	1.14	1.74	0.16	0.86	1.66	1.79	0.25	6.40	0.10
1998	3.94	0.23	0.40	22.30	19.24	1.31	1.79	0.22	0.93	1.52	2.18	0.33	5.85	0.08
1999	4.49	0.22	0.39	22.62	18.91	0.98	1.55	0.18	1.05	1.47	2.41	0.24	6.89	0.05
2000	4.13	0.22	0.42	23.11	18.49	0.81	1.33	0.16	0.95	1.69	2.16	0.29	7.17	0.04

	Sectors:														Total
	355	356	361	362	369	371	372	381	382	383	384	385	390		
1980	1.52	3.33	1.22	2.55	2.56	2.93	2.30	10.36	7.42	9.44	5.94	0.39	1.15	100	
1981	1.69	3.70	1.08	2.16	2.14	3.26	1.62	10.66	7.30	9.37	6.58	0.36	1.35	100	
1982	2.49	3.64	0.87	2.48	2.00	3.17	1.17	9.64	7.82	8.88	6.06	0.45	1.30	100	
1983	1.76	3.40	0.97	2.52	2.04	3.14	1.20	9.42	6.37	9.21	6.83	0.47	1.55	100	
1984	1.55	3.24	0.99	2.52	2.00	2.89	1.22	9.11	6.26	9.51	6.80	0.43	1.61	100	
1985	1.73	3.11	0.95	2.45	1.99	2.76	1.18	8.48	6.02	9.46	6.71	0.43	1.64	100	
1986	1.69	3.22	0.81	2.46	1.99	2.74	1.22	8.52	6.06	10.29	6.98	0.45	1.68	100	
1987	1.65	2.93	0.69	2.41	1.95	2.71	1.20	8.31	5.87	9.90	6.09	0.39	1.62	100	
1988	1.58	2.98	0.65	2.45	2.02	2.91	1.22	7.50	5.41	9.43	5.82	0.58	1.46	100	
1989	1.55	2.69	0.66	2.45	1.89	3.11	1.24	7.09	4.98	8.70	4.92	0.63	1.43	100	
1990	1.51	2.82	0.57	2.27	1.42	2.87	1.14	6.95	4.56	9.87	5.42	0.63	1.45	100	
1991	1.19	2.80	0.38	2.14	1.40	2.75	1.18	6.77	4.31	9.87	6.07	0.65	1.47	100	
1992	1.09	2.91	0.37	1.84	1.39	2.15	1.04	6.42	4.50	9.27	5.87	0.63	1.41	100	
1993	0.97	3.04	0.35	1.66	1.35	2.46	1.06	6.37	4.66	9.35	6.14	0.77	1.64	100	
1994	0.79	3.09	0.38	1.68	1.51	2.27	0.98	6.03	4.64	8.27	5.83	0.71	1.70	100	
1995	0.68	3.07	0.13	1.45	1.35	2.17	1.10	5.90	4.32	8.15	5.75	0.89	1.75	100	
1996	0.60	3.20	0.21	1.43	1.78	1.55	0.76	6.35	4.35	8.30	6.17	0.84	1.93	100	
1997	0.61	2.98	0.20	1.46	1.68	1.78	1.09	6.15	4.54	9.40	5.69	0.68	2.07	100	
1998	0.52	3.18	0.20	1.47	2.09	1.16	1.28	6.47	4.28	9.96	6.01	0.96	2.09	100	
1999	0.56	3.13	0.22	1.45	2.18	1.16	1.29	6.16	4.49	9.17	5.77	0.78	2.19	100	
2000	0.69	3.18	0.18	1.42	1.80	1.13	1.46	6.02	4.30	9.44	5.88	1.13	2.41	100	

Table A2: Firm size by sector in Istanbul (relative to country average)

	Sectors:													
	311	312	313	321	322	323	324	331	332	341	342	351	352	354
1980	1.07	0.82	1.33	0.80	1.02	0.87	1.06	1.23	1.12	0.59	1.22	0.53	1.02	0.43
1981	0.86	0.76	1.33	0.75	0.96	0.89	1.05	1.12	0.99	0.57	1.17	0.55	1.04	0.47
1982	0.86	0.92	1.24	0.79	0.94	0.94	1.06	1.12	1.01	0.65	1.20	0.49	0.99	0.49
1983	0.83	0.77	1.68	0.75	0.82	0.96	1.07	1.14	0.98	0.63	1.23	0.51	1.01	0.53
1984	0.79	0.75	1.54	0.76	0.91	0.94	1.09	1.06	0.92	0.63	1.23	0.52	1.00	0.47
1985	0.85	0.84	1.90	0.81	0.96	0.94	1.15	1.03	0.98	0.57	1.27	0.45	1.02	0.67
1986	0.92	0.85	2.11	0.78	0.97	0.91	1.09	0.91	0.95	0.56	1.25	0.46	1.01	0.78
1987	1.11	0.92	2.04	0.77	0.93	0.96	1.07	0.95	0.88	0.55	1.23	0.46	0.98	0.44
1988	1.14	0.96	2.14	0.77	0.91	1.03	1.09	1.02	0.82	0.52	1.25	0.49	1.01	0.63
1989	0.99	0.95	1.81	0.75	0.91	0.96	1.08	0.94	0.78	0.54	1.22	0.50	1.00	0.99
1990	0.86	0.94	2.02	0.73	0.90	1.00	1.09	0.93	0.86	0.56	1.29	0.45	0.99	1.09
1991	0.78	0.99	2.31	0.71	0.92	0.99	1.08	0.96	0.88	0.58	1.23	0.46	0.99	1.00
1992	0.86	1.16	2.01	0.75	0.97	1.13	1.13	1.00	0.98	0.64	1.23	0.59	1.06	0.69
1993	0.87	1.09	1.50	0.72	0.97	1.24	1.12	1.13	0.90	0.61	1.22	0.46	1.05	0.73
1994	0.86	1.08	1.31	0.70	0.97	1.25	1.03	0.92	0.85	0.62	1.16	0.50	1.03	1.71
1995	1.00	1.22	1.26	0.68	0.96	1.13	1.09	0.76	0.91	0.67	1.13	0.36	0.99	1.64
1996	0.95	1.29	1.19	0.76	0.93	1.11	1.14	0.80	0.75	0.73	1.15	0.38	1.03	0.53
1997	0.99	1.42	1.07	0.76	0.98	0.90	1.15	0.81	0.88	0.81	0.95	0.32	1.05	0.57
1998	0.90	0.81	1.14	0.70	1.01	0.95	1.19	1.16	0.95	0.74	1.09	0.41	1.05	0.58
1999	0.83	0.73	1.36	0.70	1.03	0.92	1.07	1.08	0.83	0.77	1.15	0.30	1.08	0.40
2000	0.83	0.89	1.41	0.69	0.97	0.94	1.07	1.20	0.80	0.80	1.07	0.35	1.19	0.57

	Sectors:												
	355	356	361	362	369	371	372	381	382	383	384	385	390
1980	0.73	0.90	0.77	1.06	0.97	0.84	0.85	1.03	1.05	1.01	0.89	0.82	1.03
1981	0.78	0.92	0.78	0.81	0.91	0.86	0.64	0.99	1.01	0.99	0.88	0.75	1.04
1982	0.86	0.89	0.71	0.79	0.97	0.87	0.47	0.92	1.04	0.97	0.81	0.86	1.01
1983	0.76	0.88	0.58	0.88	1.01	0.89	0.59	0.89	0.89	0.95	0.85	0.91	1.00
1984	0.77	0.86	0.54	0.89	1.01	0.79	0.54	0.87	0.90	0.96	0.82	0.85	0.98
1985	0.94	0.90	0.49	0.97	1.03	0.85	0.62	0.97	0.98	1.00	0.96	0.94	0.99
1986	0.92	0.84	0.41	0.99	1.02	0.86	0.60	0.95	0.97	1.03	0.96	0.93	1.13
1987	0.85	0.79	0.36	0.96	1.00	0.84	0.58	0.95	0.94	0.99	0.84	0.88	1.09
1988	0.85	0.82	0.34	0.88	1.02	0.90	0.60	0.93	0.92	0.98	0.86	0.96	1.11
1989	0.83	0.81	0.44	0.92	1.00	0.99	0.61	0.95	0.94	0.90	0.77	0.95	1.10
1990	0.97	0.76	0.38	0.91	0.96	1.03	0.62	0.89	0.85	0.92	0.73	0.96	1.13
1991	0.74	0.77	0.28	0.91	1.03	0.96	0.66	0.91	0.84	0.90	0.69	0.93	1.10
1992	0.69	0.80	0.29	1.00	1.01	0.89	0.75	0.96	0.88	1.00	0.67	0.85	1.11
1993	0.66	0.84	0.29	1.14	1.10	0.99	0.74	0.93	0.88	1.04	0.66	0.94	1.08
1994	0.55	0.86	0.28	1.20	1.33	1.05	0.77	0.91	0.86	1.01	0.65	0.92	1.09
1995	0.58	0.85	0.14	1.13	1.09	0.77	0.82	0.94	0.89	0.97	0.75	1.01	1.12
1996	0.59	0.85	0.25	1.06	1.50	0.75	0.76	0.95	0.99	1.00	0.79	1.06	1.11
1997	0.52	0.84	0.36	0.94	1.27	0.94	0.80	0.89	0.98	1.02	0.82	0.87	1.11
1998	0.44	0.88	0.23	0.94	1.57	0.69	0.95	0.96	0.92	1.10	0.85	1.11	1.13
1999	0.44	0.84	0.21	0.86	1.52	0.69	0.98	0.91	1.01	0.96	0.87	1.02	1.09
2000	0.53	0.82	0.20	0.89	1.39	0.64	1.03	0.89	0.94	1.00	0.84	1.14	1.05

Table A3: Productivity by sector in Istanbul (relative to country average)

	Sectors:													
	311	312	313	321	322	323	324	331	332	341	342	351	352	354
1980	0.89	1.46	1.06	0.79	1.12	0.93	1.12	0.94	1.25	0.83	1.15	1.16	0.97	0.75
1981	0.87	1.42	1.18	0.61	0.97	0.95	1.08	1.02	1.13	0.81	1.13	1.41	0.91	1.37
1982	0.89	1.37	1.08	0.91	1.04	0.95	1.09	0.78	1.25	0.79	1.15	1.06	0.95	1.08
1983	0.94	1.66	0.75	0.93	1.30	1.03	1.10	0.86	1.29	0.98	1.14	1.52	0.91	1.16
1984	1.09	1.51	1.10	0.86	1.25	1.10	1.02	1.01	1.22	0.90	1.11	1.43	0.94	2.47
1985	1.08	1.35	1.24	0.95	1.15	1.11	1.03	0.97	1.24	0.92	1.14	1.69	0.96	5.65
1986	1.10	1.51	1.15	0.96	1.13	1.16	1.04	1.14	1.28	0.90	1.09	1.53	1.05	1.48
1987	0.98	1.47	1.13	0.95	1.17	1.08	1.05	1.32	1.16	0.83	1.18	1.53	0.95	2.64
1988	0.86	1.52	1.13	0.98	1.22	1.01	0.98	1.16	1.01	0.78	1.11	2.13	0.93	1.37
1989	0.93	1.36	1.28	0.97	1.19	0.98	1.02	1.17	1.15	0.79	1.11	1.57	0.95	1.14
1990	0.98	2.10	1.19	1.01	1.19	0.97	0.99	1.20	0.95	0.78	1.16	2.03	1.01	1.50
1991	1.11	1.77	1.10	1.01	1.14	0.97	1.05	1.48	1.04	0.86	1.25	1.90	1.00	1.92
1992	1.02	1.96	1.28	1.09	1.13	1.07	1.12	1.11	1.19	0.74	1.31	2.09	0.97	0.49
1993	1.20	2.34	1.35	1.12	1.16	1.10	1.10	1.76	1.11	0.86	1.32	1.63	1.00	0.65
1994	1.30	2.09	1.18	0.96	1.18	0.98	1.11	0.86	1.02	0.73	1.35	2.14	1.05	0.48
1995	1.30	1.62	1.27	0.97	1.21	0.97	1.19	0.56	0.97	0.86	1.39	0.75	1.09	0.41
1996	1.03	1.58	1.24	0.98	1.24	0.96	1.15	0.54	1.09	0.70	1.49	0.81	1.12	1.10
1997	1.03	2.53	1.24	0.93	1.20	0.94	1.00	0.56	0.92	0.77	1.59	1.02	1.00	1.87
1998	0.93	0.96	1.16	1.02	1.18	1.20	1.06	0.37	0.78	0.77	1.47	0.97	1.20	3.54
1999	1.09	1.14	1.38	1.03	1.17	1.00	1.05	0.45	0.88	0.73	1.46	0.99	1.10	2.99
2000	1.12	0.90	1.06	1.01	1.16	1.12	1.11	0.61	0.82	0.79	1.31	1.41	1.16	3.49

	Sectors:												
	355	356	361	362	369	371	372	381	382	383	384	385	390
1980	0.55	0.91	1.19	1.02	1.24	0.94	0.77	0.99	1.05	1.03	1.08	1.16	1.06
1981	0.56	0.82	1.16	0.74	1.19	0.80	0.98	1.00	0.96	0.93	1.20	1.06	1.13
1982	0.58	0.88	0.99	0.58	1.45	0.80	0.85	0.95	1.23	0.98	1.18	1.11	1.06
1983	0.45	1.04	1.23	0.81	1.18	0.85	0.92	0.97	0.98	1.04	1.04	1.20	1.05
1984	0.44	0.99	0.91	0.75	1.55	0.73	0.87	1.05	1.35	1.08	1.06	1.23	0.97
1985	0.50	0.98	1.14	0.81	1.35	0.61	0.89	1.07	1.28	1.08	1.04	1.01	0.85
1986	0.58	0.96	0.84	0.72	1.35	0.80	0.79	1.08	1.05	1.13	1.02	1.20	1.02
1987	0.64	0.90	0.66	0.71	1.50	0.84	0.83	1.04	1.07	1.13	1.04	1.26	1.02
1988	0.48	0.84	0.74	0.70	1.52	0.92	0.80	1.09	0.97	1.08	1.05	1.13	1.03
1989	0.53	0.92	0.65	0.75	1.69	0.96	0.82	1.05	1.04	1.06	1.05	1.12	1.02
1990	0.50	0.89	0.75	0.71	1.53	0.95	0.70	0.96	1.01	1.01	1.06	0.96	1.01
1991	0.49	0.87	0.66	0.86	1.56	0.97	0.71	0.88	0.76	1.05	0.84	1.14	1.02
1992	0.55	0.78	0.71	0.74	1.54	0.98	0.62	0.87	0.79	1.06	0.88	1.03	1.05
1993	0.55	0.77	0.73	0.75	1.53	0.88	0.85	0.83	0.79	1.08	0.91	1.02	1.04
1994	0.57	0.86	0.63	0.83	1.64	0.92	0.78	0.79	0.71	1.03	0.82	0.90	1.08
1995	0.65	0.83	0.15	0.82	1.73	1.30	0.83	0.77	0.86	1.00	0.95	0.99	1.02
1996	0.64	0.87	0.15	0.89	2.11	1.20	0.77	0.82	0.93	0.97	0.95	1.03	1.03
1997	0.56	0.88	0.17	0.81	1.94	1.27	0.68	0.95	0.94	0.98	1.02	1.03	0.99
1998	0.64	0.89	0.28	0.71	1.68	1.19	0.98	1.00	1.05	1.05	0.99	0.94	0.98
1999	0.60	0.94	0.50	0.81	1.58	1.00	1.03	0.95	0.84	1.04	0.81	1.64	0.97
2000	0.60	0.92	0.36	0.74	1.43	1.22	0.97	0.90	0.95	1.00	0.88	1.14	1.00