MODELLING THE RELATIONSHIP BETWEEN
PRODUCTIVITY, EMPLOYMENT AND WAGES IN TURKISH
SMALL AND MEDIUM SIZED ENTERPRISES, 1981-1998


The Institute of Economics and Social Sciences
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GÖRKEMLİ DEMİREL


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September 2001

I  certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of  Master of Economics.


---------------------------------
       (Assist.Prof.Kıvılcım Metin-Özcan)
            Supervisor


I  certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Economics.


---------------------------------
       (Prof.A.Erinç Yeldan)
       Examining Committee Member


I  certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Economics.


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       (Assist.Prof.Ahmet H.Köse)
       Examining Committee Member


Approval of the Institute of Economics and Social Sciences


---------------------------------
       (Prof.Dr.Kürşat Aydoğan)
            Director

# ABSTRACT

MODELLING THE RELATIONSHIP BETWEEN PRODUCTIVITY, EMPLOYMENT
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ENTERPRISES, 1981-1998

Demirel, Görkemli

Master of Economics

Supervisor: Assist. Prof. Kıvılcım Metin-Özcan

September, 2001

This thesis analyzes the empirical relationship between wages and productivity as well as the relationship between wages and employment in Turkish manufacturing industry. Unlike the previous studies done for manufacturing industry, in this study the size definitions of manufacturing industry, sectoral distribution and the sectoral division between public and private sector are considered. In the empirical part of the thesis, first wage and productivity and wage and employment relationships are estimated by using OLS method. After finding out both wage-productivity and wage-employment relationships are significant, descriptive growth rate comparisons are made for the period of 1981-1998. The main conclusion that emerges from both analyses is that relationship between variables of interest is valid. Wages, productivity and employment relationship have important policy implications regarding especially on Turkish small and medium sized enterprises.

Keywords: Small and medium sized enterprises (SMEs), Productivity, Employment, Wages, Regression

# ÖZET

TÜRKİYE'DEKİ KÜÇÜK VE ORTA BÜYÜKLÜKTEKİ İŞLETMELERDE
VERİMLİLİK, İSTİHDAM VE ÜCRETLER ARASINDAKİ İLİŞKİNİN
MODELLENMESİ, 1981-1998

Demirel, Görkemli

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Eylül, 2001

Bu çalışma, Türkiye'deki Küçük ve Orta Büyüklükteki İşletmelerde verimlilikle ücretler arasındaki ilişkinin yanısıra istihdam ve ücretler arasındaki ampirik ilişkiyi açıklamaya çalışmaktadır. Bu çalışmanın bugüne kadar imalat sanayii için yapılmış diğer çalışmalardan farkı imalat sanayii ölçek tanımlarının, sektörel dağılımının ve kamu ile özel sektör arasındaki farklılığın incelenmesidir. Öncelikle ampirik analiz kısmında E.K.K (En Küçük Kareler) yöntemi uygulanmıştır. Ücretler-verimlilik ve ücretler-istihdam ilişkisinin anlamlılığı EKK tahminlerinden bulunduktan sonra, 1981-1998 dönemi için tanımlayıcı büyüme oranları karşılaştırması uygulanmıştır. Uygulama sonuçları her iki analizde de ilgili değişkenler arasında anlamlı ilişki olduğunu göstermiştir. Türkiye'de ücretler, verimlilik ve istihdam arasındaki iliskinin özellikle küçük ve orta büyüklükteki işletmeler üzerinde önemli politika önermeleri olduğu sonucuna varılmıştır.

Anahtar Kelimeler: Küçük ve orta büyüklükteki işletmeler (KOBI), İstihdam, Verimlilik, Ücretler, Regresyon

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# CHAPTER 1

## INTRODUCTION

In developing countries and Turkey in addition to factories, small production units named workshops also make production. Small and Medium Enterprises (SME's) are known as fundamental economic units of our era. These small production units display production type differences and they have flexible production systems[1]. Today, these enterprises, besides large manufacturing industries, which are classified by considering number of employees, are accepted as locomotive of the Turkish economy. Manufacturing industries not only have important share in the value added and employment created in Turkish economy, but also are the important component of economic policies as they create economic and external advantage. In a country like Turkey where there is economic and social unrest, the saving cost created by manufacturing industries prevent the growth of the economic and social problems in economic depression periods, owing to their contribution to

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[1] See Kaya, Pecen ( 1999) and Taymaz (1997) for further information.

employment, adaptation to conjuncture change and specialization in certain subjects. Firms in manufacturing industries are inclined to technological innovations and adapt easily to variations and kinds of demand; they constitute regional balanced progress by decreasing deformity of income distribution. In addition to encouraging and guiding personal savings, SME's are supporter and complement of large enterprises[2]. SME's are balance and stability component of social systems and they are one of the main insurance of the democratic society and liberal economy[3]. Examining SME's by enterprise numbers, employee numbers and value added created, it is clear that they have important place in Turkish economic and social life.

Considering the importance of SME's in Turkish economy couple of empirical paper analyse the manufacturing industries data in late 1990s. Among them, Metin-Ozcan (2001) discussed historical development of employment, number of enterprises and value added in Turkish manufacturing industry by regarding size definition of both manufacturing industry and sub-sectors. By the guidance of the efficiency wage theory, the relationship between productivity and wages as well as employment-wage relationship are examined by Yenturk (1997). Metin (1995a), conducts two different models that are aiming to clarify the direction of the relationship between wages, productivity and employment. Having motivated from the previous works mentioned above, the purpose of this thesis is not only to have

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[2] For further information see "Economic and Industrial Report" by KOSGEB.

[3] Metin-Ozcan (2001).

general idea about the manufacturing industry[4] but also to point out the relationship between employment, productivity and wages in manufacturing industry.

The rest of the study is organized as follows. In chapter 2, a summary of phases of macroeconomic adjustment in Turkish manufacturing industry is given. Then, by presenting the size definitions of manufacturing industry, and examining the historical development of employment, number of enterprises and value added in Turkish manufacturing industry, general structure of the industry is discussed. In chapter 3, the role of manufacturing industry in Turkish economy is evaluated regarding sectoral developments and incentive certificates reserved for the manufacturing sub-sectors. In chapter 4, early literature about the relationship between productivity and wages as well as the relationship between productivity and wages are discussed. Empirical analysis is given in Chapter 5. Firstly, OLS estimation is applied to the models constructed, which are displaying wage-employment and wage-productivity relationships. Next, the links between these variables are examined considering labor market elasticities, growth patterns and sectoral labor densities in manufacturing industry in order to confirm the test results. Finally, in chapter 6 the concluding remarks based on the empirical results are discussed. The tables, related definitions and figures are given in the corresponding Appendices.

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[4] In early studies, private manufacturing industry data is used, generally. However, manufacturing industry survey data used in this thesis includes total of public and private enterprises. Then, in

# CHAPTER 2

# STRUCTURE OF TURKISH MANUFACTURING INDUSTRY

In this chapter, after a summary of macroeconomic adjustments in Turkish manufacturing industry, the size definitions of manufacturing industry are given so as to form a classification pattern for the thesis. Next, the historical development of the enterprises included in selected classification pattern and their percentage contribution to manufacturing industry are discussed regarding number of enterprises, employment and value added.

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empirical analysis chapter of the thesis, the data is separated into public and private enterprises in order to set general characteristics.

**2.1 PHASES OF MACROECONOMIC ADJUSTMENT IN TURKISH MANUFACTURING INDUSTRY, 1981-1998[5]**

The post-1980 adjustments of Turkish economy can be partitioned into three broad periods: "1981-1988", "1989-1993" and "1994-1998". In the first period, integration to the global markets is achieved through commodity trade liberalization, in line with the declaration of structural adjustment program in 1980, aiming to reduce the state's role in economic affairs. Over this period, which can be named as *"export-led"* phase, both replacing fixed exchange rate regime with flexible regime of crawling-peg and direct export subsidies are the main instruments. In addition, the suppression of wage incomes, which cuts labor costs as well as reducing domestic demand, is the source of the surplus created. 1980 program achieves its targets by lower inflation, higher GDP growth, liberalized external trade regime and financial system. The export-led growth strategy of the early 1980's was successful and economy did not experience any recession in this period. However, after the general elections and new parliament in 1984, inflation started to rise again. The stated foreign trade objectives towards manufacturing exports are not applied consistenly and this led to a failure the export oriented growth strategy of the 1980's. In 1988, the classic mode of surplus creation reached its limits. In the second period, 1989-1993, with the pressure of populist policies labor unions succeeded in attaining significant increases in wages. Moreover, in 1989, convertibility of Turkish Lira is

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[5] This section is formed by examining Voyvoda, and Yeldan (1999), Boratav, Kose and Yeldan(2000), Ertugrul and Selcuk. (2001), Metin-Ozcan, Voyvoda and Yeldan (2000), Metin-Ozcan, Voyvoda and Yeldan (2001) , see these papers for an over-view of the post-1980 Turkish structural adjustment reforms.

declared and by the flows of "hot money" Turkish domestic asset markets are opened to global financial competition. Post-1989 financial liberalization completed the integration of domestic economy with the global commodity and financial markets, and initiated a process of short-term foreign capital-led growth. So, it is possible to name this period as *"unregulated financial liberalization"* phase. Unsustainability of the post-1989 growth path resulted in the shortage of short-term funds. In early 1994, which was the beginning year for the third period, 1994-1998, the economy experienced major crisis as well as declaration of devaluation. Then, government announced a stand-by arrangement, which was approved by International Monetary Fund (IMF) Board. However, by the effect of post-1994 crisis environment, economic surplus move towards financial sectors rather than industrial sectors. So, the stabilization program of year 1994 and stand-by agreement came to end in 1995. Till 1998, government did not display any serious attempt to stabilize economy and to reduce inflation. Towards the end of the period 1994-1998, which can be named as *"financial crisis and reinvigoration of short-term capital-led"* phase, government set up another disinflation program under guidance of IMF, but the general elections in 1999, two devastating earthquakes and two major crisis in 2000 and 2001 led to deterioriation of fiscal balance of the public sector.

## 2.2 SIZE DEFINITIONS OF MANUFACTURING INDUSTRY

Small enterprises are owner directed, high degree personalized enterprises, they generally participate in local activities and finance their growth by internal resources. According to International Standardization Organization (ISO) the enterprises that employ workers less than 20 is categorized as small, the ones that employ 20-99 workers are accepted as medium enterprises. This fact shows that SME definition for our country and for other countries differ according to employment level and capital level in public and private sector. For instance, the enterprises that employ; 1000-1500 workers in USA, 50-500 workers in Germany, 101-300 workers in South Korea are classified as SME's.[6] In Turkey by the definitions of institutions that are concerned with the subject, it is possible to classify small and medium enterprises by a variety of criteria used by several institutions[7].

Common definition according to number of employed worker criteria is the one formed by State Institute of Statistics (SIS). In manufacturing sector the enterprises that employ 1-9 workers are classified as micro-sized; the enterprises that employ 10-49 workers are classified as small-sized; the enterprises that employ 50-199 workers are classified as medium-sized enterprises. [8]

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[6] The definitions given in this paragraph is taken from "Dünya'da ve Türkiye'de Kobi Tanımları", publication of KOSGEB.

[7] Classification of SME's by various criteria is given in Appendix C.

[8] Size definition of SIS is used in our thesis.

Halkbank, one of the state banks, defines criteria of SME's with incentive certificate as the enterprises that employ 1-150 workers. Halkbank again forms *Normal SME* definition as the enterprises that employ 1-250 workers. Halkbank and Undersecretariat of Treasury apply fixed investment loans to the enterprises with a fixed capital less than 400 billion TL. Net balance sheet value criteria is applied to the enterprises with a net balance sheet value less than TL value that cover 2 million USD by Undersecretariat of Foreign Trade.[9]

Considering various definitions given above, we decided to use the definition of SIS in the thesis, which also fits with our data.[10]

## 2.3 HISTORICAL DEVELOPMENT OF EMPLOYMENT, NUMBER OF ENTERPRISES AND VALUE ADDED IN TURKISH MANUFACTURING INDUSTRY

In this section, we analyse the distribution of Turkish manufacturing industry enterprises according to their sizes regarding number of enterprises, level of employment, value added and productivity[11] for the years 1981, 1985, 1990, 1995 and 1998, considering the five years developments in the examined period.

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[9] The definition of small and medium enterprises that are accepted by European Commission is given in Appendix D.

[10] The data and definition of variables are given in Appendix A.

[11] Value added is deflated by manufacturing industry WPI, taking 1981 as a base year and productivity is calculated by the ratio of real value added to employment.

| TABLE 1-a. DISTRIBUTION OF TURKISH MANUFACTURING INDUSTRY ENTERPRISES ACCORDING TO THEIR SIZES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Number of employees | Number of enterprises | % share of number of enterprises | level of employment | % share of level of employment | value added (million TL) | value added share (%) | production per worker (productivity) million TL |
| **1998** | small enterprises 10-49 | 7857 | 63.58 | 195647 | 16.15 | 296096.9452 | 7.46 | 1.513424408 |
| | 50-99 | 2012 | 16.28 | 141179 | 11.66 | 264550.0814 | 6.67 | 1.873862836 |
| | 100-199 | 1224 | 9.91 | 170895 | 14.11 | 409166.4489 | 10.31 | 2.394256409 |
| | medium enterprises (50-199) | 3236 | 26.19 | 312074 | 25.77 | 673716.5303 | 16.98 | 2.158835822 |
| | sme (10-199) | 11093 | 89.77 | 507721 | 41.92 | 969813.4755 | 24.45 | 1.910130712 |
| | large enterprises (200+) | 1264 | 10.23 | 703493 | 58.08 | 2997166.418 | 75.55 | 4.260406881 |
| | total manufacturing sector | 12357 | 100 | 1211214 | 100 | 3966979.893 | 100 | 3.275209743 |

| TABLE 1-b. DISTRIBUTION OF TURKISH MANUFACTURING INDUSTRY ENTERPRISES ACCORDING TO THEIR SIZES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Number of employees | Number of enterprises | % share of number of enterprises | level of employment | % share of level of employment | value added (million TL) | value added share (%) | production per worker (productivity) million TL |
| **1995** | small enterprises 10-49 | 6774 | 66.22 | 162389 | 16.67 | 397.8889973 | 6.87 | 0.002450221 |
| | 50-99 | 1450 | 14.18 | 100331 | 10.30 | 342.880288 | 5.92 | 0.003417491 |
| | 100-199 | 955 | 9.34 | 132057 | 13.56 | 613.8100158 | 10.60 | 0.004648069 |
| | medium enterprises (50-199) | 2405 | 23.51 | 232388 | 23.86 | 956.6903037 | 16.53 | 0.00411678 |
| | sme (10-199) | 9179 | 89.74 | 394777 | 40.53 | 1354.579301 | 23.40 | 0.003431252 |
| | large enterprises (200+) | 1050 | 10.26 | 579156 | 59.47 | 4434.044058 | 76.60 | 0.007656044 |
| | total manufacturing sector | 10229 | 100 | 973933 | 100 | 5788.623359 | 100 | 0.005943554 |

| TABLE 1-c. DISTRIBUTION OF TURKISH MANUFACTURING INDUSTRY ENTERPRISES ACCORDING TO THEIR SIZES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Number of employees | Number of enterprises | % share of number of enterprises | level of employment | % share of level of employment | value added (million TL) | value added share (%) | production per worker (productivity) million TL |
| **1990** | small enterprises 10-49 | 5762 | 64.95 | 137319 | 13.36 | 4072.496288 | 5.53 | 0.029657194 |
| | 50-99 | 1220 | 13.75 | 84503 | 8.22 | 3834.273739 | 5.20 | 0.04537441 |
| | 100-199 | 852 | 9.60 | 118991 | 11.57 | 5709.843142 | 7.75 | 0.047985504 |
| | medium enterprises (50-199) | 2072 | 23.36 | 203494 | 19.79 | 9544.116882 | 12.95 | 0.04690122 |
| | sme (10-199) | 7834 | 88.31 | 340813 | 33.15 | 13616.61317 | 18.48 | 0.039953327 |
| | large enterprises (200+) | 1037 | 11.69 | 687383 | 66.85 | 60083.34174 | 81.52 | 0.087408827 |
| | total manufacturing sector | 8871 | 100 | 1028196 | 100 | 73699.95491 | 100 | 0.071678897 |

| TABLE 1-d. DISTRIBUTION OF TURKISH MANUFACTURING INDUSTRY ENTERPRISES ACCORDING TO THEIR SIZES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Number of employees | Number of enterprises | % share of number of enterprises | level of employment | % share of level of employment | value added (million TL) | value added share (%) | production per worker (productivity) million TL |
| **1985** | small enterprises 10-49 | 8036 | 75.48 | 169643 | 18.11 | 30405.51161 | 8.34 | 0.179232339 |
| | 50-99 | 1128 | 10.59 | 78530 | 8.38 | 20346.76235 | 5.58 | 0.259095407 |
| | 100-199 | 622 | 5.84 | 87228 | 9.31 | 29150.51921 | 8.00 | 0.334187637 |
| | medium enterprises (50-199) | 1750 | 16.44 | 165758 | 17.70 | 49497.28156 | 13.58 | 0.29861172 |
| | sme (10-199) | 9786 | 91.91 | 335401 | 35.81 | 79902.79317 | 21.93 | 0.238230635 |
| | large enterprises (200+) | 861 | 8.09 | 601339 | 64.19 | 284500.889 | 78.07 | 0.473112319 |
| | total manufacturing sector | 10647 | 100 | 936740 | 100 | 364403.6821 | 100 | 0.389012621 |

| TABLE 1-e. DISTRIBUTION OF TURKISH MANUFACTURING INDUSTRY ENTERPRISES ACCORDING TO THEIR SIZES | | | | | | | |
|---|---|---|---|---|---|---|---|
| Number of employees | Number of enterprises | % share of number of enterprises | level of employment | % share of level of employment | value added (million TL) | value added share (%) | production per worker (productivity) million TL |
| small enterprises 10-49 | 6979 | 75.93 | 144897 | 17.97 | 118610 | 8.78 | 0.818581475 |
| 50-99 | 984 | 10.71 | 67772 | 8.41 | 80317 | 5.95 | 1.185105943 |
| 100-199 | 517 | 5.63 | 72469 | 8.99 | 110711 | 8.20 | 1.5277015 |
| medium enterprises (50-199) | 1501 | 16.33 | 140241 | 17.39 | 191028 | 14.15 | 1.362140886 |
| sme (10-199) | 8480 | 92.26 | 285138 | 35.36 | 309638 | 22.93 | 1.085923307 |
| large enterprises (200+) | 711 | 7.74 | 521141 | 64.64 | 1040749 | 77.07 | 1.997058378 |
| total manufacturing sector | 9191 | 100 | 806279 | 100 | 1350387 | 100 | 3.082981685 |

(Row label on left side spanning: **1981**)

** Calculations are performed by the author using SIS data (Manufacturing Industry Censuses for 1981-1998) and value added is deflated by 1981=100 manufacturing WPI.

Examination of Table1-a, Table1-b, Table1-c, Table1-d and Table1-e showed that over 1981-1998 the shares of enterprises classified according to size definitions do not change significantly. It is observed that for the examined years the percentage share distribution among small, medium and large-sized enterprises display similar characteristics: large enterprises produce most of the value added and SMEs create huge employment capacity in the industry. In the following analysis, we firstly investigate the percentage distribution of the year 1998 to examine the general characteristics of manufacturing industry mentioned above. Secondly, we discuss the variations in the labour productivity of the enterprises.

Examining 1998 manufacturing sector SIS data reported in Table1-a, we could see that most of the enterprises in manufacturing sector are small enterprises by having %63.5 of the total. However, they only contribute %7.46 of the total value added of the manufacturing industry as well as %16.1 of the total employment. With lower share of number of enterprises, medium enterprises cause %25.77 of the total employment and create %16.9 of the total manufacturing value added. In addition, large-sized enterprises are the most important enterprises, as they create %75.55 of

the total manufacturing industry's value added by using %10.22 of the total enterprises in the sector. Consideration of the production per worker roughly, which is formed by dividing the level of value added to employment level[12], is useful to realize the productivity levels in the enterprises that are classified regarding the size definitions.

In 1981, a significant level of labor productivity is observed mainly for the total manufacturing industry with 3.082.981 TL. However, from Table1-d clear decline in productivity of manufacturing industry is realized. Although, the total number of enterprises and level of employment increases, there is a sharp decline in real value added which leads to lower productivity in manufacturing industry. Table1-c displays the characteristics of manufacturing enterprises in 1990. After 1989 elections, high inflation as well as high wage policy leads to lower level of productivity in this period, which is the direct consequence of "populist policies". It is noteworthy that the total number of enterprises diminishes in 1990, due to the decrease in the number of small enterprises. The reflections of 1994 crisis are mainly observed, by drops in both value added and wages in addition to the transfer of economic surplus from industrial sectors towards financial sectors[13], in 1995. In this year, employment level continues to decline, as it is expected. For 1998, the clear development is recognized in manufacturing industry due to higher levels of number of enterprises, employment and value added. The significant rise in value

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[12] The productivity is described as the ratio of value added to employment level, since the value added is the part of output that is purified from input, which can be considered the real output of the enterprise. For further details please visit www.mpm.gov.tr.

[13] Boratav, Yeldan, Kose (2000).

added, which stems from the improvements in inflation rate-by the disinflation program[14]-leads to a higher productivity level that is above the 1981 level. It is important to note that the productivity of large enterprises exceeds the total productivity of the industry for the examined years, except for 1981.

The clear outcome from the discussion of productivity by considering Table1-a, Table1-b, Table1-c, Table1-d and Table1-e is that the number of workers employed in the enterprises determines level of productivity directly, as expected.[15]

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[14] Ertugrul, Selcuk (2001).

[15] See Metin Ozcan (2001).

FIGURE.1-a PERCENTAGE SHARE OF ENTERPRISE NUMBER



FIGURE.1-b PERCENTAGE SHARE OF EMPLOYMENT



FIGURE.1-c PERCENTAGE SHARE OF VALUE ADDED
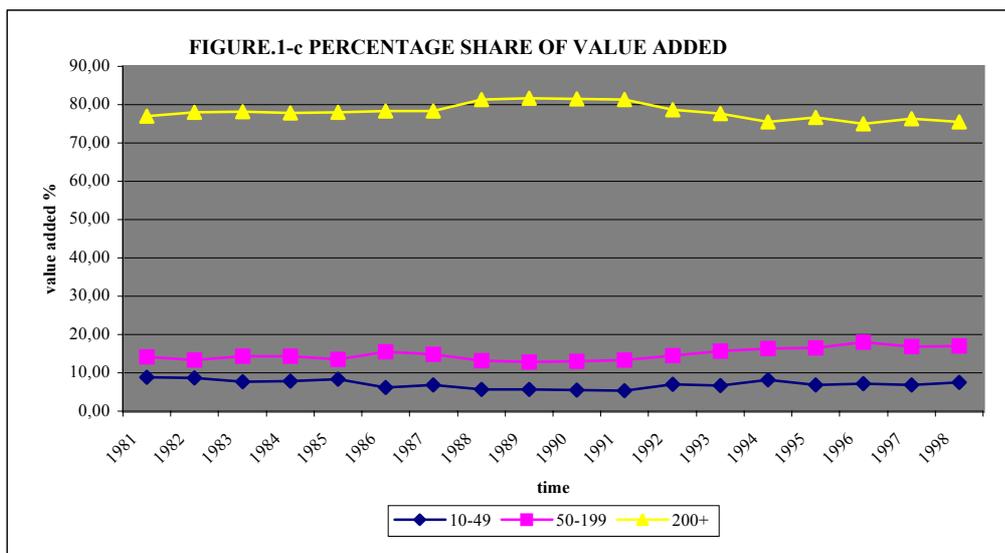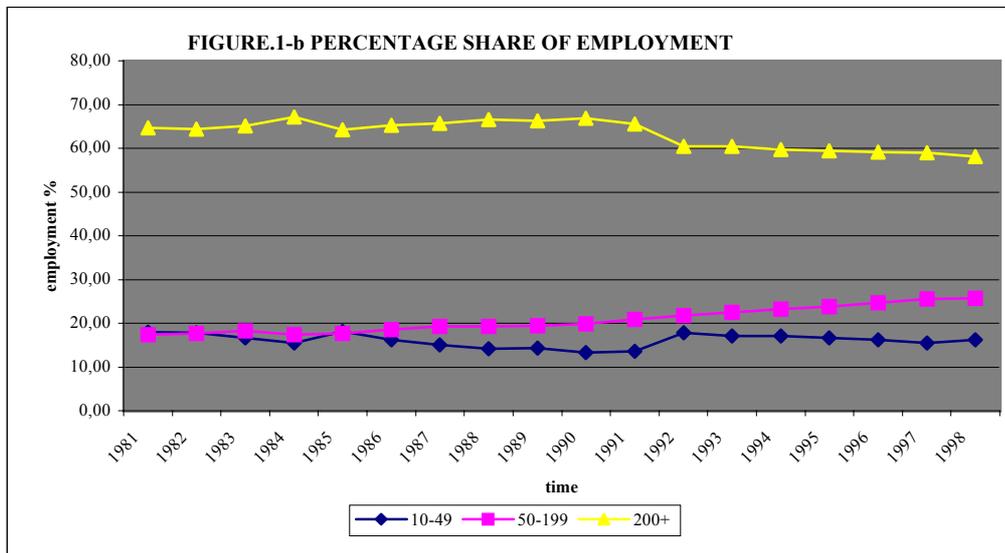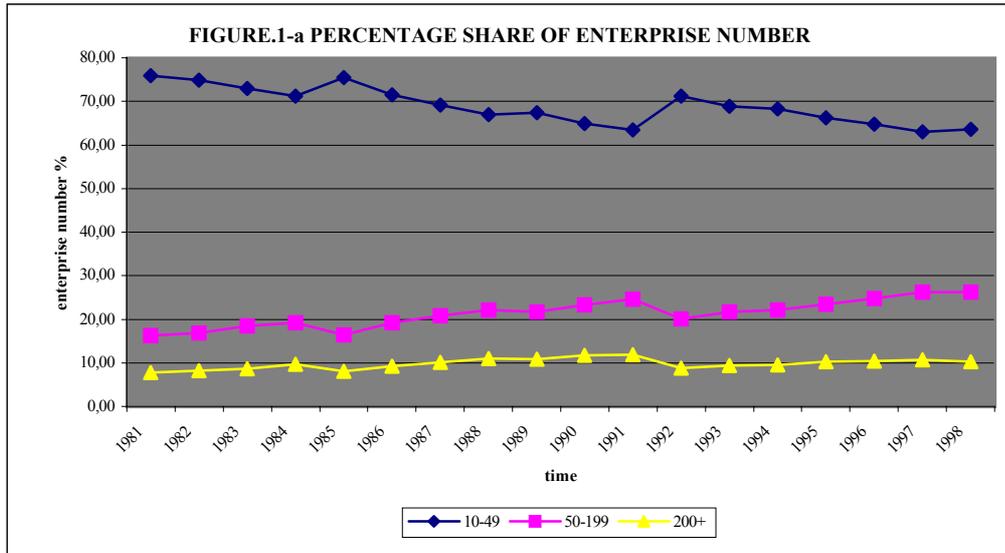
**The data used to form these graphs are taken from Appendix B, Table1

Now, we analyse the development of employment, number of enterprises and value added in Turkish manufacturing industry by using graphical explanations over the period of 1981-1998.

In Figure1-a, Figure1-b and Figure1-c over the period 1981-1998 Turkish Manufacturing industry's number of enterprises, employment and value added [16] defined as a percentage of the total are reported respectively. From Figure 1-b, it is clear that the small enterprises (employ 10-49 workers) are substantial than the large (employ 200+ workers) and medium-sized enterprises (employ 50-199 workers). Although small enterprises follow a declining trend, they preserve their critical position by having more than % 60 of the enterprises of the total manufacturing industry. Interestingly, the trend of small enterprises shows upward movements in 1985, 1989 and 1992. As in1981-1988 period Turkey adapted to export-oriented growth policy[17], the large enterprises that have capability to export gain more importance for the economy and promoted more than the small enterprises. This fact is reflected in the Figure1-a as the downward movement of the share of small enterprises. It is obvious that there is a steady increase in the contribution of the medium and large enterprises through the period 1980-1998. Moreover, they follow similar trends since both have a sharp decline in their shares in 1985,1989 and 1992. In 1985, both wage excluded costs and wage costs for the manufacturing enterprises decrease[18], which encourages new enterprises to enter the industry, and in this year

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[16] Value added is deflated by taking 1981 as a base year.

[17] Voyvoda, E. and Yeldan, A.E. (1999).

[18] Similar to the analysis done by Yentürk (1997) covering the period 1974-1993, we also derived the wage and wage excluded cost in the manufacturing industry for the period 1980-1998 and presented

the total number of enterprises in manufacturing industry increases. The advantage of lower wage and wage excluded costs is mainly observed by small enterprises, as their share in the number of enterprises increased to  % 75.5. In 1992, a sharp upward movement in the share of small enterprises is recognized. 1988-1991 is the period in which the wage costs for the manufacturing industry grow; in 1992; the wage costs for the industry declines. Since the wage excluded cost is having a diminishing trend in post-1989 period; this leads to an expansion in the total number of enterprises of manufacturing industry. This expansion is mostly reflected on small enterprises by increasing their share in the total industry.

By Figure1-b, it is obvious that although large enterprises are nearly %10 of the total enterprises of the manufacturing industry, they have great contribution to employment of the industry.  During the period of 1981-1990, large enterprises share of the industries' employment level is almost stable in %70-80 band. However, during the post-1990 period their share of total employment in manufacturing industry diminishes and reaches its lowest level in 1998. Both in 1985 and 1992 there is significant downward movement in their shares due to the lower wage excluded costs and lower wage costs of the manufacturing industry in these periods[19]. Small enterprises also have a declining tendency-yet we must note that in 1985 and 1992, they increase their percentage shares in the total employment of manufacturing sector-which is reverse of the fact for large enterprises.  In 1981-

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in Appendix E.  Wage cost is calculated by dividing real wage to real output and wage excluded cost is calculated by dividing input to output.

[19] See Appendix E for the wage cost and wage excluded cost figure.

1998 period, medium-sized enterprises slightly increase its contribution to the total manufacturing employment level and have its highest share in 1998.

Figure1-c gives us an opinion of the value added of the manufacturing industry. The greatest share of the value added is created by the contribution of large enterprises with nearly %75 of the total value added created in manufacturing sector. Until 1991 value added share of large enterprises in the industry is nearly flat, except for the year 1988. During the post-1991, period large enterprises show a declining tendency for their share in the manufacturing industry's total value added. On the other hand, both small and medium enterprises have nearly stable trend till 1991 by exchanging their shares slightly and during the post-1991 period both of them started to increase their shares in the manufacturing industry value added.

By examining Figure1-a, Figure1-b and Figure1-c together, we must note that although small enterprises have considerable position in total manufacturing industry enterprises, yet their contribution to manufacturing industry employment and value added are weak. On the contrary, instead of their lower share in the number of total manufacturing enterprises, large enterprises are capable of having the highest shares of the total manufacturing industry for both the level of employment and the level of value added.

# CHAPTER 3

# THE ROLE OF MANUFACTURING INDUSTRY IN TURKISH ECONOMY REGARDING THE SUB-SECTORS

In this chapter we investigate the sectoral development of the manufacturing industry in Turkish economy regarding the data provided by SIS for the year 1998. We first analyse the total manufacturing industry and then we employ the data for each category for the number of employed persons, respectively.

## 3.1 DEVELOPMENT OF EMPLOYMENT, NUMBER OF ENTERPRISES, VALUE ADDED AND GROSS ADDITIONS TO FIXED CAPITAL REGARDING SECTORAL DIVISIONS

Industrialism means technology and it requires long-term way of thinking and planning.[20]   From the year 2000, the aim is to form a small and medium sized enterprises vision in Turkey, which is appropriate for both necessities and opportunities of the information society. Starting out from this motivation, nine sectors of the Turkish manufacturing industry are classified on the basis of the number of enterprises, number of employees, value added they produced and addition to their fixed capital in Table2. Having done this, we aim to determine the most important locomotive sectors of the manufacturing industry.

In Table 2, percentage share distribution of the number of enterprises, the number of employees, value added and gross additions to fixed capital of the 9 manufacturing sectors for 1998 are reported. By examining the share of 2-digit economic activities in total manufacturing industry regarding the number of establishments, number of employees, value added and gross additions to fixed capital during 1998 in the total manufacturing industry, four important sectors of the manufacturing industry are determined. These sectors, which can be considered as the locomotive sectors of the economy, are (32) textile, wearing apperal and leather industries, (38) manufacture of fabricated metal products, machinery and equipment, transport equipment, professional and scientific and measuring and controlling equipment,

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[20] Muftuoglu (1991).

| TABLE 2. % share distribution of the number of enterprises, level of employment, value added and gross additions to fixed capital of 9 manufacturing sectors for 1998 | | | | |
|---|---|---|---|---|
| INFERIOR SECTORS | Number of enterprises | Level of employment | Value added | Gross additions to fixed capital during the year |
| 31 Manufacture of food, beverages and tobacco | 15,63 (3) | 15,45 (3) | 14,6 (4) | 13,73 (4) |
| 32 Textile, wearing apparel and leather industries | 31,12 (1) | 34,54 (1) | 17,33 (3) | 24,82 (1) |
| 33 Manufacture of wood and wood products including furniture | 4,08 | 2,32 | 1,22 | 1,74 |
| 34 Manufacture of paper and paper products; printing and publishing | 2,86 | 3,02 | 2,75 | 4,44 |
| 35 Manufacture of chemicals and chemical petroleum, coal, rubber and plastic products | 8,8 (4) | 9,03 (4) | 27,05 (1) | 17,14 (3) |
| 36 Manufacture of non-metalic mineral products, except products of petroleum and cool | 7,73 | 6,58 | 6,72 | 9,33 |
| 37 Basic metal industries | 3,50 | 5,50 | 8,41 | 6,44 |
| 38 Manufacture of fabricated metal products, machinery and equipment, transport equipment, professional and scientific and measuring and controlling equipment | 24,6 (2) | 22,87 (2) | 21,62 (2) | 21,92 (2) |
| 39 Other manufacturing industries | 1,06 | 0,69 | 0,30 | 0,44 |

**Source:** State Institute of Statistics, Ankara

* Values in the paranthesis enumerate 4 important inferior sectors.

(35) manufacture of chemicals and chemical petroleum, coal, rubber and plastic products and (31) manufacture of food, beverages and tobacco[21].

(32) Textile is the most important sector of the total manufacturing industry. It has %31.12 of the total number of manufacturing enterprises, %34.54 of the total manufacturing employment, % 17.33 of the total manufacturing industry's value added and %24.82 of the total gross additions to fixed capital during 1998.

Considering the share of the number of enterprises and the level of employment, value added and gross additions to fixed capital, (38) manufacture of fabricated metal products is the second important sector of the manufacturing industry. This sector produces % 21.62 of the total manufacturing industry value added and creates %21.92 of the total gross additions to fixed capital during 1998. Third important sector is  (31) manufacture of food regarding the number of enterprises and level of employment, while it is the fourth important sector for both the total value added and the total gross additions to fixed capital created in the industry during 1998 with %14.6 and %13.73 shares, respectively. On the other hand, (35) manufacture of chemicals is the fourth important sector by considering its shares in the total number of enterprises and the total level of employment. In manufacturing industry, manufacture of chemicals sector is the most important sector with its %27.05 contribution to total manufacturing industry value added and third important sector

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[21] Similar test is conducted by Metin-Ozcan (2001) for micro-small sized enterprises, unlike the study of Metin-Ozcan, in this thesis (35) manufacture of chemicals is the fourth important sector rather than (33) manufacture of wooden products sector.

of the total manufacturing industry's gross additions to fixed capital during 1998 with its 17.14 percentage share.

In order to examine the role of four important sub-sectors of the manufacturing industry and their contribution to economic development, percentage share distribution of number of enterprises, number of employed, value added and addition to gross fixed capital in the total of these sectors are computed in Table 3a-d and their respective growth rates regarding previous census value are calculated. In Table 3-a-d, the shares of the number of enterprises for the four important sectors and their growth rates are given for the years 1981, 1985, 1990, 1995 and 1998. Taking 1980-1995 period into consideration, the shares of food sector, manufacture of chemicals sector and manufacture of fabricated metal products sector diminish significantly. Food sector's and manufacture of chemicals sector's shares in the total number enterprises continue to decline between 1995-1998 whereas the share of manufacture of fabricated metal products increases and reaches a level that is above its 1985 share level. Textile sector's shares in the total manufacturing industry show an upward trend-considering number of enterprises, level of employment, gross additions to fixed assets and value added-for the period 1980-1998.

| Table 3-a. % share distribution and the growth rates of the number of enterprises for 4 important manufacturing sectors | | | | |
|---|---|---|---|---|
| Inferior sectors years | 31 | 32 | 35 | 38 |
| 1981 | 21.67 | 20.31 | 11.64 | 25.36 |
| 1985 | 21.39 (19,97) | 23.95 (38,21) | 9.58 (4,62 | 24.00 (14,37) |
| 1990 | 21.35 (-9,07) | 26.30 (1,30) | 9.27 (0,12) | 22.58 (-11,49) |
| 1995 | 17.51 (-3,71) | 30.78 (5,78) | 8.82 (-0,33) | 22.26 (-2,02) |
| 1998 | 15.63 (3,82) | 31.12 (6,54 | 8.80 (8,26) | 24.60 (14,24) |

| Table 3-b. % share distribution and the growth rates of the level of employment for 4 important manufacturing sectors | | | | |
|---|---|---|---|---|
| Inferior sectors years | 31 | 32 | 35 | 38 |
| 1981 | 21.95 | 24.01 | 9.69 | 21.37 |
| 1985 | 20.65 (-0,83) | 25.15 (4,20) | 9.48 (6,78) | 21.68 (5,49) |
| 1990 | 18.32 (-4,53) | 28.80 (1,11) | 9.85 (2,27) | 21.20 (5,04) |
| 1995 | 17.33 (-0,10) | 32.77 (10,38) | 9.51 (2,69) | 20.77 (1,11) |
| 1998 | 15.45 (5,45) | 34.54 (4,89) | 9.03 (2,47) | 22.87 (9,43) |

**Source**: Calculations are performed by the author using SIS data (Manufacturing Industry Censuses for 1981-1998). Values in the parenthesis are growth rates of the employment level and number of enterprises to the preceding census value of the employment level and number of enterprises, accordingly $(X_t-X_{t-1}/X_t)$.

In Table 3-a, the values in parenthesis are the growth rates of the number of enterprises as to the preceding survey of the number of enterprises. From the table, rapid growth ratios are observed for (31) food sector, (32) textile sector and (38) manufacture fabricated metal products sector in 1985. 1985-1990 is the shrink period for all sectors as the growth ratios for them fall sharply. In 1990-1998 period, all sectors, except (35) manufacture of chemicals sector, show an upward growth trend. The falling growth rate (%-0.33) of manufacture of chemicals sector (35) reverses its trend in 1995-1998 period by having a significant growth ratio of %8.26. The number of employees' growth rates reflects our observations in Table 3-b for the period 1981-1990. In 1990-1995 period (31) food sector, (32) textile sector and (35) manufacture of chemicals sector increase their growth rates except (38)

manufacture of fabricated metal products sector has a decline in its growth rate

when compared to growth rate of 1985-1990 period. For 1995-1998 period, (31)

food sector and (38) manufacture of fabricated metal products sector have higher

growth rates than the previous period whereas (32) textile and (35) manufacture of

chemicals sector growth rates diminish. There are slight differences between the

behaviour of two related variables, number of enterprises and employment, reported

in Table 3-a and Table 3-b for post-1990 period. This might be due to the fact that

after 1990, Turkey faced economic and fiscal crisis, which lead to not only a heavy

inflationary pressure, but also weakened savings and credit assurance problems.[22]

| Table 3-c. % share distribution and the growth rates of the value added for 4 important manufacturing sectors | | | | | | | |
|---|---|---|---|---|---|---|---|
| Inferior sectors years | 31 | | 32 | | 35 | | 38 |
| 1981 | 18.73 | | 13.41 | | 32.81 | | 16.11 |
| 1985 | 20.89 | (18,11) | 14.71 | (8,38) | 25.78 | (19,99) | 18.10 (12,20) |
| 1990 | 16.17 | (9,30) | 14.99 | (13,15) | 29.65 | (15,28) | 19.57 (31,49) |
| 1995 | 15.55 | (24,32) | 16.67 | (32,51) | 30.04 | (32,51) | 19.70 (21,52) |
| 1998 | 14.60 | (47,96) | 17.33 | (22,53) | 27.05 | (14,82) | 21.62 (18,24) |
| Table 3-d. % share distribution and the growth rates of the gross additions to fixed capital for 4 important manufacturing sectors | | | | | | | |
| Inferior sectors years | 31 | | 32 | | 35 | | 38 |
| 1981 | 7.64 | | 13.41 | | 17.25 | | 18.98 |
| 1985 | 8.49 | (-35,16) | 29.26 | (146,85) | 20.18 | (18,63) | 20.16 (29,39) |
| 1990 | 7.09 | (37,56) | 18.10 | (10,38) | 14.55 | (35,10) | 14.95 (27,83) |
| 1995 | 9.94 | (28,78) | 25.60 | (63,40) | 19.53 | (53,33) | 18.33 (-13,74) |
| 1998 | 13.73 | (62,65) | 24.82 | (4,12) | 17.14 | (18,91) | 21.92 (13,80) |

Source: Calculations are performed by the author using SIS data (Manufacturing Industry Censuses for 1981-1998). Values in the parenthesis are growth rates of the value added and gross additions to fixed capital of the enterprises to the preceding census value of the value added and gross additions to fixed capital of the enterprises, accordingly $(X_t - X_{t-1}/X_t)$. Value added and gross additions to fixed capital are deflated by 1981=100 manufacturing WPI.

Examining Table 3-c and Table 3-d, it is clear that (31) food sector's share of the

total value added created in the manufacturing industry follows a decreasing trend,

except for the period 1981-1985. However, it is noteworthy that the real value added

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[22] Metin-Ozcan, K. (2001).

in the sector shows positive growth rates: % 18.11 between 1981-1985, %9.30 in the period 1985-1990, %24.32 for 1990-1995 period and % 47.96 in the last period of our analysis (1995-1998). Taking the gross additions to fixed capital into consideration similar trend is observed. Although, insufficient credit conditions and involuntary economic effects of the 1981-1985 period, which leads the shrink of % 35.16, food sector soon recovers its position and makes an addition to its fixed capital in real terms (%37.56 in 1985-1990, % 28.78 for the period 1990-1995 and % 62.65 between 1995-1998). The gross addition for fixed capital share of the sector in the total decreases to %7.09 for the period 1985-1990, but with its high growth rates in the period 1990-1998 it increases its share to % 13.73 in 1998.

(32) Textile sector systematically increases its percentage share of the total value added created in the manufacturing industry between years 1981-1998. The real value added created by the sector is again has a growing trend and 1990-1995 is the period that growth of the textile sector is most recognizable (%32.51). Sector's gross addition to fixed capital has its higher share of the total manufacturing industry in 1981-1985 period with the real growth rate of % 146.85. In 1985-1990, the shrink in the real growth rate of gross additions of fixed capital is also reflected on the share of the industry and the sector loses nearly % 10 of its industry power. For the period 1990-1995, the sector recovers its important position in the total gross additions to fixed capital of the industry by its growth of %63.40 in real terms. In the last period of our analysis (1995-1998), the share of the sector in the manufacturing industry slightly decreases, as the real growth rate is % 4.12 that is so low for the period.

(35) Manufacture of chemicals sector has the greatest share of the value added created in the manufacturing industry in 1981 (%32.81) and it carries on its significant position despite the fluctuations in its share of the total manufacturing value added for the years 1981-1998. Between 1981-1985, the value added share of the sector is sharply decreased to %25.78 although there is %19.99 real growth tendency of the sector's value added. In the same period sector's gross additions to fixed capital share expands in line with its %18.63 growth in real terms. For 1985-1995 period similar characteristics for both value added and gross additions to fixed capital share of the sector is recognized. In this phase, the industry shares of the sector in both criteria's follow an upward trend with increasing real growth rates for the period. The highest real growth rates for value added and gross additions to fixed capital are recognized for the period 1990-1995, which is %32.51 and %53.33, respectively. The post-1995 period again the value added and gross additions to fixed capital have similar trends, in both of these criteria's the share of the manufacture of chemicals sector decreases according to the decline in the real growth rates, which are %14.82 and %18.91, respectively.

(38) Manufacture of fabricated metal products sector have an increasing tendency in its the value added share of the total. In 1981, it is the third sector of the manufacturing industry according to the comparison of the value added shares of the sectors (%16.11). However, in 1998, its value added share increases to %21.62 and becomes the second important sector of the manufacturing industry. In 1985-1990 period, important progress in the sector is reflected with the real growth rate of %31.49. Post-1990 period the real growth rate of the sector slows down, but this

does not affect the industry share of the sector. Manufacture of the fabricated metal products sector has contributed to the highest share of the gross additions to fixed capital of the industry during 1981. In spite of its increased share for 1981-1985 as well as its positive real growth rate, it becomes the third important sector considering gross additions to fixed capital. 1985-1995 is the recession period of the real growth of the sector's gross additions to fixed capital with a shrink of %13.74 in 1990-1995 period. Although, the sector shrinks in 1990-1995 period, its share in the total manufacturing industry increases to %18.33. In the post-1995 period with a real growth rate of %13.80, the sector increased its share of the gross additions to fixed capital to %21.92 in 1998 and takes part as the second important sector for the manufacturing industry's gross addition to fixed capital during 1998.

Furthermore, it is necessary to consider the characteristics of enterprises classified according to their size. Tables 1-6[23] give us a general view of the small-sized, medium-sized and large-size enterprises. Comparison of these tables shows us that in all sizes of enterprises employment level and enterprise number are distributed similarly between sectors whereas textile sector is the most important sector. Another important observation from this comparison is the direct relation between number of enterprises and level of employment. Similar trends are observed for small, medium and large-sized enterprises, when the growth rates and percentage shares of both employment level and number of enterprises are considered. The characteristic of food sector is an important issue, as it displays no difference considering the size definitions of enterprises. Moreover, it is clear that small-sized

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[23] See tables 1-6 in Appendix F.

and medium-sized enterprises have similar characteristics. For both of them textile sector increases its share in the industry through years. Food sector and manufacture of fabricated products sector have decreasing trend for their shares in the industry, except for the gross additions to fixed assets item whereas manufacture of chemicals sector has diminishing tendency in its industry share of all considered items. On the other hand, large enterprises have different characteristics than small-sized and medium-sized enterprises. Considering large enterprises, textile sector and manufacture of fabricated metal products sector have general upward trend in their shares but they have lower employment share and lower share of number enterprises, accordingly. Manufacture of chemicals sector's downward trend in its shares is observed generally, except for the employment share of the sector.

To sum up, expansion of number of enterprises and the increasing tendency of employment in these sectors is very sensitive to structural problems of the economy, national and foreign economic crisis, modification of the governmental policies and the size of the financial support reserved for SME's. Examining SME's real contribution to country's value added and their gross additions to country's fixed capital also supports this result[24].

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[24] See Metin-Ozcan (2001).

**3.2 SECTORAL CLASSIFICATION OF TOTAL INVESTMENT INCENTIVES**

In this section of the thesis, we investigate the investment incentives reserved for the manufacturing sub-sectors. Discussing this concept is crucial to understand whether government plays a role in the development of four important sectors mentioned in the previous subsection or not. If we can find out strong evidences that the government provided some funds to these sectors, then one can easily conclude that those incentives creates more employment and increase the level of output in these sectors.

In Figure2 and Figure3, the percentage share of the four important sectors of the previous analysis is shown according to sectoral classification of total investment and total number of incentive certificates in Turkey.

FIGURE.2 PERCENTAGE SHARE OF NUMBER OF INCENTIVE CERTIFICATES
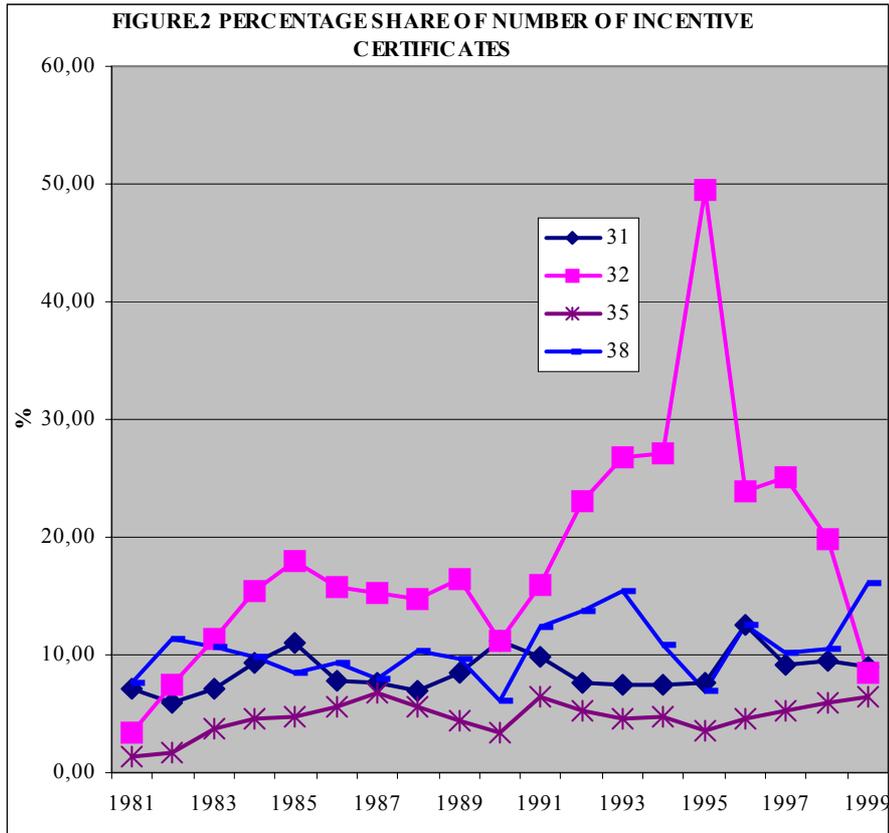
Generally, %5-6 of the total investment incentives in Turkey is reserved for (31) food sector. In 1981 with its %7.04 share of the total investment incentives in Turkey, it is the third important sector of the manufacturing industry. Then, the low level of the share of the food sector makes a peak in 1986 with %11.93 and it has the highest share of the total investment incentives in the manufacturing sector. In 1987 the investment level reserved for the food sector dramatically declines to %1.98 and reaches its lowest level in 1988 with %1.81. Examining Figure3, it is clear that the sight we gain by the share of the food sector in investment incentives is not really fit to the number of certificates' share of the sector. There is a declining trend for the number of incentive certificates' share of the sector through years except for 1985,1990 and 1996. The highest level of the number of incentive certificates share

29

reserved for the sector is in 1996 with %12.62, yet the percentage share of the investment incentives for the sector is not enough with %3.03.



FIGURE.3 PERCENTAGE SHARE OF AMOUNT OF INVESTMENT INCENTIVES
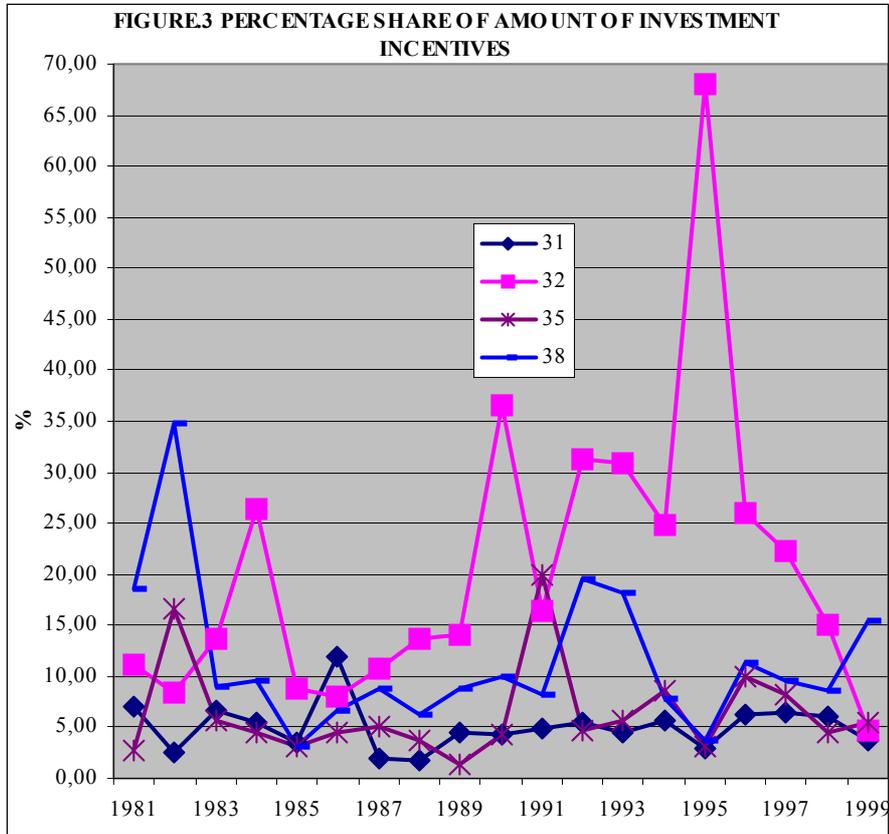
(32) Textile sector has a significant position regarding the total investment incentives and number of certificates reserved. The sector has %26.34 of the total investment incentives in 1984 and %36.50 of the total investment incentives in 1990. Between 1992-1997, textile sector improves its position by having nearly %30 of the total investment incentives. The importance given to textile sector is clearly seen by examining the graph of the percentage share of the total number of incentive certificates in Turkey reserved for the sector. Similar to total investment incentive share of the sector, in 1995 textile sector reaches its peak level of the percentage share of the total number of incentive certificates.

(35) Manufacture of chemicals sector's percentage shares of both the total number of incentive certificates and the total investment incentives are not so significant. But, the increasing trend of the total number of incentive certificates share of the sector implies that there is a significant support for the sector. For periods 1987-1990 and 1991-1995, this support diminishes as the total number of incentive certificates share of the sector decreases. In 1991, the ascending total number of incentive certificates share reserved for the sector is also reflected in investment incentives with %20.02 share of the sector. Trivial decrease in the trend of the sector between 1991-1995 is reflected on the percentage share of the total investment incentives of the sector with low reservation of the investment incentives, except for 1994. Instead of ascending graph of percentage share of the number of incentive certificates for the sector, there are fluctuations for the investment level reserved for the sector in total.

(38) Manufacture of fabricated metal products sector has higher share levels of investment incentives in 1981, 1992, and 1993 and makes a peak in 1982 by having %34.85 of the total investment incentives in Turkey. Number of incentive certificates reserved for the sector follows a fluctuating trend. The sector's number of incentive certificate shares make a peak in 1993 with %15.40 of the total and %18.27 of the total investment incentives are reserved for the same year. The lowest share level of the number of incentive certificates of the manufacture of fabricated metal products sector is in 1990 with %6.12, yet the percentage share of the total investment incentives for the sector is not so low with %9.97 of the total investment incentives in Turkey.

In the periods of economic fluctuation, the capacity utilization ability of SME's is affected negatively by the decline in their production and sales levels, which causes uncertain environment for wages, costs, employment and investments. In such a situation, small enterprises are more flexible than the large enterprises and they come over these crisis environments by their production diversity, which directs to an increase in their productivity level. In the process of industrialization, flexibility means to pass from one production process to another, and to regulate the production amount easily in the short-run[25]. SME's are affected less from the crisis as their level of flexibility increase. In 1994-which is also included in our research period-economic crisis and financing problems affect the activities and development of the SME's negatively.

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[25] See Kaya, Pecen (1999) for further discussion.

# CHAPTER 4

# LITERATURE SURVEY ON WAGES, EMPLOYMENT AND PRODUCTIVITY

After Phillips (1958) introduced the relationship between the wage rate (inflation) and the unemployment rate by using the famous Phillips Curve, determination of wages and its relation with unemployment became one of the main considerations of the labor economics. In our study, employment, which is the complement of unemployment, is used due to the fact that in Turkey unemployment is hard to figure out. Generally, most of the studies contribute to the relationship between wages and unemployment, but in this part of the thesis we investigate early literature considering the studies that either use employment rather than unemployment or display the relationship between productivity and wages.

Ioannides and Pissarides (1985) conduct a two period overlapping generations model considering the relation between wages and productivity in which both junior

and senior labor are assumed to maximize objective functions accordingly. Interestingly, they conclude that if the firm has monopsony power for junior workers in the market, wages of senior labor is set equal to their productivity whereas the productivity level of junior labor exceeds their wages. In contrast, if firms are not bounded to contractual commitments, senior wage level fall short of their productivity level.

Graafland and Lever (1994) investigate whether internal forces (productivity) or external forces (wages paid elsewhere and unemployment rate) are the main determinant of wages by GMM estimation. Their results display that the connection between wages and sectoral output prices and productivity in service sector is more visible than industrial sectors.

Amsden and Hoeven (1996) focus on manufacturing industry of developed, developing (excluding Asia) and Asian developing countries so as to examine the relation between wages, output, employment and production capacity. Results of the conducted regressions display that in developing countries wages are significantly linked to output rather than employment. The study includes Turkey under the Asian developing countries classification as a country having falling wages, falling or stagnant output, rising employment characteristics.

Arestis, Biefang and Mariscal (1997) estimate a vector autoregressive regression (VAR) model for the determination of labor productivity, real wages and unemployment. They report proportionality between labor productivity and real

wages implying that the productivity gains are absorbed by increases in wages without affecting unemployment. In the study unemployment is used as an instrument in the efficiency wage hypothesis.

Nordic Countries study by Alback, Asplund, Blomskog, Barth, Guamundsson, Karlsson and Madsen (1999) deviate from the main conclusions of the general wage curve analysis. They conclude that there is no evidence of a wage curve at regional level in the Nordic Countries as lagged wage rate comes out with a coefficient different from zero and the estimates of the lagged variable are not enough to show the existence of wage curve relation. Therefore, in this study they find no stable negative relation between wages and unemployment. Nevertheless, as the long-term relationship between regional wages and unemployment is negative, they conclude that productivity and labor market conditions have permanent effects on relative wages.

Generally, the wage curve is estimated by using the connection between wages and unemployment. However, for New Zealand, Morrison, Papps and Poot (2000) also find evidence for wage curve by using employment rate instead of unemployment and conclude that there is positive relation between employment rate and wages for males only. Instead, they include skill levels in their study and find that less mobile groups of workers are more responsive to changes in unemployment rate.

It is worth noting that, Guichard and Laffargue (2000) also report productivity has positive and significant impact on wages in all 16 countries they considered, except Greece, Spain and Portugal by their country specific productivity and employment rate model. Moreover, the negative relationship between unemployment and wage rate is supported by their study.

Another analysis is done by Bjornstad and Nymoen (2000). They examine the linkage between wage setting and profitability and conclude that the rate of return specification implied that wages are interlinked with value added, productivity and capital-labor ratio.

Borjas and Ramey (2000) study the relationship between initial industry wage premia and the adjustment of other economic variables. The evidence suggests that industries that had initially high wages experienced not only slower employment growth, but also slower GDP growth. Moreover, these industries also experienced significantly greater growth of labor productivity and capital-labor ratios.

There are also many other studies about the Turkish manufacturing industry. Metin (1995b), which composes a research for the manufacturing industry in order to examine the dynamic adjustment process of wage and price determination in Turkey by using the multi-cointegration analysis. Metin (1995b) concludes that real wages; labor productivity and inflation determine unemployment level.

In addition, Metin (1995a) analyses the effects of productivity on wage behaviour regarding Turkish iron steel basic industry and manufacture of industrial chemicals by the seasonal unit-root testing method, cointegration and OLS estimation. Concluding remarks of the analysis are that productivity is negatively related to real wages in chemical industry whereas positive impact of productivity on real wages are observed for iron and steel industry with slightly higher value exceeding one.

Yenturk (1997:34-42) conducts a research to find out the relation between wages, employment and investments in Turkish manufacturing industry. She concludes that Turkey has stagnationary regime, wages are mainly influenced by government policies and manufacturing industry's sub-sectors has growth that depends on the capacity usage ratio.

Yeldan and Voyvoda (1999) investigate the distributional consequences of post-1970 accumulation patterns and technological change in the Turkish manufacturing industries by considering 19 sub-sectors. They report that post-1980 export orientation of Turkish manufacturing industry could not lead to productivity gains in the leading sectors which means the strategy of industrialization is not viable.

Metin-Ozcan, Voyvoda and Yeldan (1999) constitute cyclical co-movements of economic variables in order to observe the dynamics of macroeconomic adjustment in Turkey. They find that manufacturing real wages in private sectors have weak correlations with average labor productivity and counter-cyclical correlations against real output.

Finally, Metin-Ozcan, Voyvoda and Yeldan (2000) investigate the accumulation patterns in the Turkish manufacturing industry and they conclude that real investments in the sector have direct relation with real wages and profit margins.

Metin-Ozcan (2001) discusses the importance of micro-small enterprises (employ 1-9 persons) and investigates the historical development in the four important sub-sectors of the manufacturing industry. She concludes that micro-small enterprises are highly sensitive to structural economic problems, policy implications, the change in incentives reserved and both domestic and foreign economic crisis.

The most recent studies support the evidence of relation between productivity and wages as well as employment-wage relationship also in Turkey, in this thesis the role of employment and productivity in wage determination process will be discussed and tested for Turkish manufacturing industry regarding both manufacturing sub-sectors and SME's.

# CHAPTER 5

## EMPIRICAL ANALYSIS

In this chapter of the thesis our aim is to test the the relationship between wages, productivity and employment using two different methodologies. First we used, Ordinary Least Squares (OLS) method to estimate the relationships. Secondly we calculate the descriptive growth rates to observe the existence of the relationships for the period of 1981-1998. However, it is important to note that the direction of the causality between employment and wages should be determined first before one starts with the empirical analysis (see Yenturk (1997:14). To determine the direction of causality, we applied Granger causality[26] test for 9 sub-sectors and the total manufacturing industry[27]. For most of the sectors Granger causality test is not found meaningful as the probabilities are insignificant. In (31) food sector, (36) manufacture of non-metalic mineral products sector and (37) basic mineral industries real annual payments to employees have predictive power for employment level for one lag. Therefore, the hypothesis that real annual payments to employees

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[26] For Granger Causality test see Gujarati, Damador N. Basic Econometrics, 3rd ed., Mc Graw-Hill, New York, 1995.
[27] The results of Granger causality test are tabulated in Appendix G Table1.

does not Granger cause of number of employees is strongly rejected. On the other hand, in (35) manufacture of chemicals sector and (36) manufacture of non-metalic mineral products sector number of employees have predictive power for wages and the hypothesis of no Granger causality is strongly rejected. Since the results of Granger causality test is producing mixed results, in the empirical analysis part of this thesis, we further concentrate on the OLS estimation results and decomposition analysis.

## 5.1 ANALYSIS OF LEAST SQUARES ESTIMATION

The least squares estimation method is applied in our thesis in order to determine the relationship between wage and productivity as well as wage and employment. In Table 4 the sectoral results of the estimation is listed for both cases.

TABLE.4 REGRESSION OUTPUT

| Sectors | wage-productivity | | | | wage-employment | | | |
|---------|------|----------|----------|--------|-------|----------|------------|--------|
| | ß | st.error | t-stat. | prob. | ß | st.error | t-stat. | prob. |
| 31 | 0.84 | 0.15053 | 5.557472 | 0 | -2.94 | 0.940845 | -3.1244569 | 0.0065 |
| 32 | 1.14 | 0.175224 | 6.502087 | 0 | 1.06 | 0.135089 | 7.837929 | 0 |
| 33 | 0.8 | 0.135159 | 5.919377 | 0 | 1.17 | 0.422785 | 2.758528 | 0.014 |
| 34 | 0.58 | 0.089899 | 6.496194 | 0 | 0.65 | 0.724839 | 0.892931 | 0.3851 |
| 35 | 1.12 | 0.108092 | 10.33066 | 0 | 2.74 | 0.551598 | 4.967853 | 0.0001 |
| 36 | 0.67 | 0.8247 | 8.129213 | 0 | 0.9 | 0.668135 | 1.349384 | 0.196 |
| 37 | 0.29 | 0.105627 | 2.813332 | 0.0125 | -0.83 | 0.513243 | -1.608978 | 0.1272 |
| 38 | 0.83 | 0.087219 | 9.497049 | 0 | 2.11 | 0.263266 | 8.017107 | 0 |
| 39 | 1.06 | 0.153041 | 6.943272 | 0 | 1.37 | 0.170316 | 8.024289 | 0 |
| total | 0.93 | 0.10803 | 8.599595 | 0 | 1.81 | 0.363654 | 4.965056 | 0.0001 |
| private | 1.02 | 0.123057 | 8.30623 | 0 | 1.64 | 0.174282 | 9.427853 | 0 |
| public | 0.31 | 0.147215 | 2.095008 | 0.0524 | 0.01 | 0.018652 | 0.661221 | 0.5179 |
| 10-49 | 0.75 | 0.093926 | 7.974227 | 0 | 1.59 | 0.562522 | 2.829512 | 0.0121 |
| 50-199 | 0.94 | 0.115705 | 8.128283 | 0 | 1.41 | 0.141973 | 9.935388 | 0 |
| 200+ | 0.691124 | 0.045186 | 15.29524 | 0 | 0.837713 | 0.676534 | 1.238243 | 0.2335 |

Regarding wage and productivity relation, we have clear evidence that a statistically significant increase in productivity level increases the wages. In (32) textile sector,

(35) manufacture of chemicals sector and (39) other manufacturing industries elasticities exceed one, so in these sectors wages are more responsive to productivity shocks. It is worth noting that (37) basic metal industries is the sector in which the wages are less responsive to the productivity shocks, this may be stemmed from its elastic characteristic.[28] Taking the size definition of enterprises into account,similar to large-sized enterprises, small and medium-sized enterprises have significant elasticities for wage-productivity relationship, they are more responsive to the productivity shocks than large-sized enterprises. Another critical point is that public sector do not display a significant productivity effect on wages, however, both private sector and total manufacturing industry are in line with the sub-sectors by having significant and high elasticities.

Wage-employment relationship shows very different characteristics among sectors. In (31) food sector employment has significant negative effect on wages. For (34) manufacture of paper sector, (36) manufacture of non-metallic mineral products sector and (37) basic metal industries relationship between wage and employment is not significant. In the rest of the manufacturing sectors wages are highly influenced by the changes in employment level. Considering enterprises according to size definitions[29], the relationship between wages and employment level is not significant for large enterprises. On the contrary, in small and medium-sized enterprises the relation between wages and employment level is obvious. Wage-employment relationship is also significant for both private sectors and manufacturing industry with elasticities exceeding 1.5. Examining the effects of

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[28] See Table 6 also.

production and employment on wages, it is noteworthy that the wages are more
sensitive to employment shocks rather than productivity shocks, except for large-
sized enterprises.

**TABLE.5 REGRESSION OUTPUT FOR SME's**

| Sectors | wage-productivity | | | | wage-employment | | | |
|---|---|---|---|---|---|---|---|---|
| | ß | st.error | t-stat. | prob. | ß | st.error | t-stat. | prob. |
| 31 | 0.73 | 0.105707 | 6.923025 | 0 | 1.09 | 1.453518 | 0.751439 | 0.4633 |
| 32 | 1.61 | 0.255656 | 6.280614 | 0 | 1.19 | 0.095999 | 12.3478 | 0 |
| 33 | 1.05 | 0.116652 | 8.982136 | 0 | 1.82 | 0.350029 | 5.191202 | 0.0001 |
| 34 | 0.6 | 0.092755 | 6.500799 | 0 | 2.42 | 0.376363 | 6.44321 | 0 |
| 35 | 0.58 | 0.233604 | 2.492306 | 0.024 | 2.25 | 0.49281 | 4.582768 | 0.0003 |
| 36 | 0.93 | 0.059977 | 15.44642 | 0 | 1.88 | 0.114865 | 16.36514 | 0 |
| 37 | -0.01 | 0.19585 | -0.046356 | 0.9636 | 0.09 | 0.922564 | 0.099179 | 0.9222 |
| 38 | 0.93 | 0.123466 | 7.502912 | 0 | 1.67 | 0.254408 | 6.568256 | 0 |
| 39 | 0.62 | 0.132043 | 4.671238 | 0.003 | 1.34 | 0.423373 | 3.157343 | 0.0061 |
| total | 1.05 | 0.147303 | 7.1072 | 0 | 1.69 | 0.187564 | 9.023467 | 0 |

To gain more sight into the case for SME's similar regression is computed for
manufacturing sub-sectors classified as small and medium enterprises in Table 5.
SME's resemble total manufacturing sub-sectors as the relationship between wages
and productivity is significant and positive for all SME sub-sectors, except (37)
basic metal industries.  Small and medium (32) textile and (33) manufacture of
wooden products sectors are positively related to the real wages with slightly higher
value than one. It is remarkable that small and medium textile enterprises display
similar characteristics with the total textile sector in manufacturing industry.
Analysing wage-employment relation, (31) food sector and (37) basic metal
industries do not display significant characteristics whereas both manufacture of
paper products and chemicals sectors are the most responsive to the variations in
employment level.

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[29] Which is SIS definition, used in our study.     42

It is observed for all classifications under manufacturing industry that the impact of employment on wages is greater than productivity's effect. As discussed in the previous sections, wages are one of the main instruments of the economic policies.[30] The government cannot directly control productivity however, the government using relevant economic policies regarding labor sector can shape employment level easily.

## 5.2 EMPIRICAL INVESTIGATION OF THE RELATIONSHIP BETWEEN WAGES, PRODUCTIVITY AND EMPLOYMENT

In this section of the thesis we focus on three sets of issues in order to characterize Turkish manufacturing sub-sectors and the industry regarding the number of employees of the enterprises: i) labor market elasticities manufacturing industry; ii) general growth patterns in manufacturing industry; and iii) sectoral labor densities in manufacturing sub-sectors. In this section we use different time periods that we used in chapter 2. namely: 1981-1988; 1989-1993 and 1994-1998, for eliminating the significant jumps in real wages in 1989 and 1994.

In order to examine the characteristics of Turkish manufacturing industry after 1980, it is necessary to deal with direct and indirect effects of the economical policies on wages. It is possible to say that basically two economical policies are significant in

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[30] Remember the characteristics of the periods we use, 1981-1988 is the wage suppression period and after 1989 with the election environment wage policy reversed direction and have expansion.

this period. Firstly, after 1980 Turkey is adapted to export-led growth policy, which is supported by devaluations, diminishing wages and export promotions. In Turkey these policies aiming to increase competitive power, which depends on lower wages, are applied till 1989. In this period, the growth of exports is stemmed from low wage policy and export promotions. Between 1981-1988 the economy did not also display a recessionary characteristics. Starting from 1988, the economy entered into new phase of exchange rate-based stabilization programs, and from 1990 excessive speculative capital inflow is observed. However, the economic growth has slowed down with the 1991 and 1994 recessions that were preceded by considerable appreciation of real exchange rate.[31]

## i) LABOR MARKET ELASTICITIES IN TURKISH MANUFACTURING INDUSTRY

In Turkish manufacturing industry in order to examine whether labor market is elastic or not, there is necessity for examining wage-employment relationship for all manufacturing sub-sectors and the industry considering the wage-value added and wage-productivity. Sub-sectors that have negative relationship between growth of wage and growth of employment levels are characterized as elastic[32]. In Table 6

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[31] Ertugrul, A. and Selcuk, F. (1998)

[32] Yenturk (1997).

growth rates of real wages, employment level, value added and productivity are given for the periods: 1981-1988, 1989-1994 and 1994-1998.[33]

**TABLE.6 ELASTICITY IN MANUFACTURING SUB-SECTORS AND THE INDUSTRY**

| | gr(emp) | gr(w) | gr(va) | gr(pr) | | gr(emp) | gr(w) | gr(va) | gr(pr) |
|---|---|---|---|---|---|---|---|---|---|
| **3** | **MANUFACTURING INDUSTRY** | | | | **35** | **MANUFACTURE OF CHEMICALS** | | | |
| **1981-1988** | 25.94 | -16.05 | 48.37 | 17.81 | **1981-1988** | 25.70 | -5.62 | 28.48 | 2.21 |
| **1989-1993** | -4.66 | 76.57 | 61.56 | 69.46 | **1989-1993** | -5.35 | 76.52 | 43.21 | 51.30 |
| **1994-1998** | 29.28 | 68.57 | 47.12 | 13.80 | **1994-1998** | 21.34 | 64.31 | 48.54 | 22.41 |
| **31** | **FOOD SECTOR** | | | | **36** | **MANUFACTURE OF NON-METALLIC MINERAL PRODUCTS** | | | |
| **1981-1988** | 6.61 | -41.47 | 30.40 | 22.32 | **1981-1988** | 36.33 | 6.75 | 60.14 | 17.47 |
| **1989-1993** | -9.99 | 98.76 | 63.81 | 82.00 | **1989-1993** | -20.12 | 49.73 | 70.11 | 112.95 |
| **1994-1998** | 10.79 | 39.33 | 45.33 | 31.18 | **1994-1998** | 22.45 | 66.99 | 29.58 | 5.82 |
| **32** | **TEXTILE SECTOR** | | | | **37** | **BASIC METAL INDUSTRIES** | | | |
| **1981-1988** | 20.84 | -2.38 | 64.68 | 36.28 | **1981-1988** | 14.68 | -34.02 | 91.29 | 66.81 |
| **1989-1993** | 36.04 | 54.79 | 58.19 | 16.28 | **1989-1993** | -18.94 | 67.58 | 10.78 | 36.67 |
| **1994-1998** | 29.23 | 103.00 | 47.11 | 13.83 | **1994-1998** | 5.28 | 20.32 | 33.43 | 26.74 |
| **33** | **MANUFACTURE OF WOOD SECTOR** | | | | **38** | **MANUFACTURE OF FABRICATED METAL PRODUCTS** | | | |
| **1981-1988** | 29.53 | -15.75 | 70.52 | 31.65 | **1981-1988** | 26.20 | -5.93 | 64.22 | 30.12 |
| **1989-1993** | 7.17 | 111.44 | 99.29 | 85.96 | **1989-1993** | 5.04 | 99.13 | 115.74 | 105.40 |
| **1994-1998** | 33.93 | 46.23 | 107.91 | 55.23 | **1994-1998** | 38.48 | 96.19 | 65.95 | 19.84 |
| **34** | **MANUFACTURE OF PAPER SECTOR** | | | | **39** | **OTHER MANUFACTURING INDUSTRIES** | | | |
| **1981-1988** | 26.18 | -17.09 | 74.75 | 38.49 | **1981-1988** | 41.57 | 22.70 | 31.86 | -6.86 |
| **1989-1993** | -4.61 | 51.06 | 91.11 | 100.35 | **1989-1993** | 5.13 | 51.86 | 25.45 | 19.33 |
| **1994-1998** | 8.50 | 51.42 | 3.74 | -4.39 | **1994-1998** | 48.20 | 130.58 | 67.35 | 12.92 |
| | **GOVERNMENT SECTOR** | | | | | **PRIVATE SECTOR** | | | |
| **1981-1988** | -3.44 | -44.45 | 9.69 | 13.59 | **1981-1988** | 40.85 | 5.70 | 81.34 | 28.74 |
| **1989-1993** | -16.09 | 81.46 | 18.16 | 40.82 | **1989-1993** | -0.90 | 74.20 | 84.99 | 86.66 |
| **1994-1998** | -26.91 | -12.00 | 45.89 | 99.59 | **1994-1998** | 44.19 | 113.78 | 47.51 | 2.30 |
| | **SMALL-SIZED ENTERPRISES** | | | | | **MEDIUM-SIZED ENTERPRISES** | | | |
| **1981-1988** | -1.26 | -23.42 | -4.85 | -3.63 | **1981-1988** | 39.79 | -2.49 | 37.43 | -1.68 |
| **1989-1993** | 14.50 | 75.41 | 94.66 | 70.00 | **1989-1993** | 10.52 | 84.42 | 96.76 | 78.03 |
| **1994-1998** | 21.99 | 99.33 | 34.90 | 10.59 | **1994-1998** | 43.53 | 100.64 | 53.40 | 6.87 |
| | **LARGE-SIZED ENTERPRISES** | | | | | | | | |
| **1981-1988** | 29.78 | -17.59 | 56.45 | 20.55 | | | | | |
| **1989-1993** | -13.22 | 75.25 | 53.77 | 77.20 | | | | | |
| **1994-1998** | 25.82 | 59.97 | 47.09 | 16.90 | | | | | |

**Data 's taken from SIS Manufacturing Annual Surveys; the author does calculations. Value added and wages are deflated by 1981=100 manufacturing WPI.

From the table, across 1981-1988 negative relation between employment and wages are observed for all sectors except for (36) manufacture of non-metallic mineral products and (39) other manufacturing industries sectors. These findings are expected for (36) manufacture of non-metallic mineral products sector since the growth rates of both productivity and value added exceed the growth rate of real

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[33]Growth of employment level [gr(emp)], growth of real wages [gr(w)], growth of value added [gr(va)] and growth of productivity [gr(pr)] are calculated by subtracting first year level from the last year level and this is divided by first year level. $((X_1-X_0)/X_0)$

wages due to the rapid development of the sector. The table reflects the general characteristics of 1981-1988; wage control is the most important consequence of the export-led policy of this period. Another important result driven by this policy is that low production costs lead to higher profits. During the period of *"unregulated financial liberalization"*[34] between 1989-1993, negative relation among wages and employment are witnessed for (31) food; (37) basic metal industries; (34) manufacture of chemicals; (35) paper products and (36) non-metallic mineral products sector. For only (38) manufacture of fabricated metal products sector the positive relation between wages and employment is due to the sectoral development as both value added and productivity growth exceeds the growth rate of the wages. According to the economic policy, which was directly affected by the elections, wages have significant boost in this period. Moreover, the growth on employment is negative or lower than %10, which leads to expansion of productivity; (32) textile sector and (37) basic metal industries are the exceptions.

For 1994-1998 period, positive relation between wages and employment level are observed for all of the manufacturing sub-sectors and development is witnessed only in (33) manufacture of wooden products sector. This period is characterized as *"financial crisis and re-invigoration of foreign capital-led growth"*[35], both employment level and wages display expansion but this cannot be named development period for the sectors as productivity diminishes. The characteristic of

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[34] Metin-Ozcan, Voyvoda, Yeldan (2000)

[35] Metin-Ozcan. Voyvoda, Yeldan (2000)

the period may be explained by the stagnationary[36] economic policies in which the growth of wages exceeds the growth of employment.

Although it is obvious that the wage formation is directly related with economic policies, it is worth characterizing the sectors regarding the relation between productivity growth and growth in wages. (31) Food sector, (32) textile sector and (35) manufacture of chemicals sector as well as the manufacturing industry have general tendency to increase wages above the growth in productivity except for the wage control regime period (1981-1988). In (34) manufacture of paper products, (36) non-metallic mineral products and (38) fabricated metal products sectors wages are lower than the growth in the productivity until 1993. Afterwards, with the stagnationary effects of the economic policies these sectors have their wage rate above the productivity level. In (33) manufacture of wooden products sector and (37) basic metal industries the growth of productivity is not responsed by the wages, except for the period of *"unregulated financial liberalization"* between 1989-1993.

Considering the size definitions of the enterprises, small-sized enterprises have negative growth between 1981-1988. On the contrary, both medium-sized and large-sized enterprises have growth in employment and value added as well as their elastic character. Post-1989 small-sized enterprises and medium-sized enterprises display similar characteristics; in both of these enterprises growth of employment level and growth of wages are observed. Large-sized enterprises carry on its elastic character for 1989-1993 period, but post-1994 it display similar features with small and

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[36] See Yenturk (1997)

medium-sized enterprises. However, in none of the periods, the positive relationship between wages and employment implies a development in these enterprises, as the growth of value added and productivity growth cannot exceed the growth of wages.

## ii) GROWTH PATTERNS IN MANUFACTURING INDUSTRY

In Table 7, growth rates of productivity and employment level, and investment value added ratios are given in order to see the growth characteristics of manufacturing

**TABLE.7 GROWTH PATTERNS**

| | gr(pr) | gr(emp) | ga/va | | | | gr(pr) | gr(emp) | ga/va | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **3** | MANUFACTURING INDUSTRY | | | | | **35** | MANUFACTURE OF CHEMICALS | | | | |
| **1981-1988** | 17,81 | 25,94 | 14,47 | path 1 | path 5 | **1981-1988** | 2,21 | 25,70 | 10,06 | path 3 | path 7 |
| **1989-1993** | 69,46 | -4,66 | 12,10 | path 2 | path 5 | **1989-1993** | 51,30 | -5,35 | 6,75 | path 2 | path 5 |
| **1994-1998** | 13,80 | 29,28 | 13,96 | path 1 | path 5 | **1994-1998** | 22,41 | 21,34 | 8,41 | path 1 | path 5 |
| **31** | FOOD SECTOR | | | | | **36** | MANUFACTURE OF NON-METALLIC MINERAL PRODUCTS | | | | |
| **1981-1988** | 22,32 | 6,61 | 7,83 | path 1 | path 5 | **1981-1988** | 17,47 | 36,33 | 20,82 | path 1 | path 6 |
| **1989-1993** | 82,00 | -9,99 | 6,12 | path 2 | path 5 | **1989-1993** | 112,95 | -20,12 | 19,25 | path 2 | path 5 |
| **1994-1998** | 31,18 | 10,79 | 10,10 | path 1 | path 5 | **1994-1998** | 5,82 | 22,45 | 20,32 | path 1 | path 6 |
| **32** | TEXTILE SECTOR | | | | | **37** | BASIC METAL INDUSTRIES | | | | |
| **1981-1988** | 36,28 | 20,84 | 20,69 | path 1 | path 6 | **1981-1988** | 66,81 | 14,68 | 23,18 | path 1 | path 6 |
| **1989-1993** | 16,28 | 36,04 | 14,59 | path 1 | path 5 | **1989-1993** | 36,67 | -18,94 | 28,58 | path 2 | path 6 |
| **1994-1998** | 13,83 | 29,23 | 20,64 | path 1 | path 6 | **1994-1998** | 26,74 | 5,28 | 19,85 | path 1 | path 5 |
| **33** | MANUFACTURE OF WOOD PRODUCTS | | | | | **38** | MANUFACTURE OF FABRICATED METAL PRODUCTS | | | | |
| **1981-1988** | 31,65 | 29,53 | 11,28 | path 1 | path 5 | **1981-1988** | 30,12 | 26,20 | 16,62 | path 1 | path 5 |
| **1989-1993** | 85,96 | 7,17 | 11,51 | path 1 | path 5 | **1989-1993** | 105,40 | 5,04 | 13,16 | path 1 | path 5 |
| **1994-1998** | 55,23 | 33,93 | 18,26 | path 1 | path 5 | **1994-1998** | 19,84 | 38,48 | 14,27 | path 1 | path 5 |
| **34** | MANUFACTURE OF PAPER PRODUCTS | | | | | **39** | OTHER MANUFACTURING INDUSTRIES | | | | |
| **1981-1988** | 38,49 | 26,18 | 18,05 | path 1 | path 5 | **1981-1988** | -6,86 | 41,57 | 16,66 | path 3 | path 7 |
| **1989-1993** | 100,35 | -4,61 | 15,10 | path 2 | path 5 | **1989-1993** | 19,33 | 5,13 | 24,78 | path 1 | path 6 |
| **1994-1998** | -4,39 | 8,50 | 17,38 | path 3 | path 7 | **1994-1998** | 12,92 | 48,20 | 20,25 | path 1 | path 6 |
| | GOVERNMENT SECTOR | | | | | | PRIVATE SECTOR | | | | |
| **1981-1988** | 13,59 | -3,44 | 9,86 | path 2 | path 5 | **1981-1988** | 28,74 | 40,85 | 17,44 | path 1 | path 5 |
| **1989-1993** | 40,82 | -16,09 | 7,55 | path 2 | path 5 | **1989-1993** | 86,66 | -0,90 | 13,99 | path 2 | path 5 |
| **1994-1998** | 99,59 | -26,91 | 5,43 | path 2 | path 5 | **1994-1998** | 2,30 | 44,19 | 16,62 | path 3 | path 7 |
| | SMALL-ENTERPRISES | | | | | | MEDIUM-ENTERPRISES | | | | |
| **1981-1988** | -3,63 | -1,26 | 10,45 | path 4 | path 9 | **1981-1988** | -1,68 | 39,79 | 16,07 | path 3 | path 7 |
| **1989-1993** | 70,00 | 14,50 | 13,51 | path 1 | path 5 | **1989-1993** | 78,03 | 10,52 | 13,79 | path 1 | path 5 |
| **1994-1998** | 10,59 | 21,99 | 15,66 | path 1 | path 5 | **1994-1998** | 6,87 | 43,53 | 16,17 | path 1 | path 5 |
| | LARGE-ENTERPRISES | | | | | | | | | | |
| **1981-1988** | 20,55 | 29,78 | 14,61 | path 1 | path 5 | | | | | | |
| **1989-1993** | 77,20 | -13,22 | 11,66 | path 2 | path 5 | | | | | | |
| **1994-1998** | 16,90 | 25,82 | 13,31 | path 1 | path 5 | | | | | | |

** Data is taken from SIS Manufacturing Industry Annual Surveys, calculations are done by the author. Gross additions to fixed capital and value added is deflated by 1981=100 manufacturing WPI.

sub-sectors and SME's.[37] Firstly, we interpret the productivity-employment and investment-productivity relation in detail to understand the general growth characteristics of the manufacturing industry. Then, these findings are combined and summarized in the last part of this section.

1)        *Productivity- Employment Relation*

Productivity-employment relation for Turkish manufacturing sub-sectors is given in Table 8. It is possible to characterize manufacturing industry and manufacturing sub-sectors as having growth path 1 when both productivity and employment increase and as having growth path 2 if the decrease in the employment of the sector is responded by higher level of productivity. On the contrary, if the growth in the productivity of the sector has declining trend and employment growth has growing tendency, then this kind of growth is named as growth path 3. The last growth pattern is the growth path 4 in which both productivity and employment growth diminishes. [38]

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[37] Growth in the variables are calculated as in the previous section and investment-value added (ga/va) ratio is calculated by taking the arithmetic average of the investment-value added ratio of the examined years.

[38] For these definitions see Yentürk (1997).

| TABLE.8 GROWTH PATTERNS IN TURKISH MANUFACTURING INDUSTRY REGARDING PRODUCTIVITY AND EMPLOYMENT RELATIONSHIP | | | |
|---|---|---|---|
| **1981-1988** | | | |
| **Growth Path 1** [gr(pr)+] [gr(emp)+] | **Growth Path 2** [gr(pr)+] [gr(emp)-] | **Growth Path 3** [gr(pr)-] [gr(emp)+] | **Growth Path 4** [gr(pr)-] [gr(emp)-] |
| Food sector(31) | GOVERNMENT SECTOR | Manufacture of chemicals(35) | SMALL ENTERPRISES |
| Textile sector(32) | | Other manufacturing industries(39) | |
| Manufacture of wood products(33) | | MEDIUM ENTERPRISES | |
| Manufacture of paper products(34) | | | |
| Manufacture of non-metallic mineral products(36) | | | |
| Basic metal industries(37) | | | |
| Manufacture of fabricated metal products(38) | | Other manufacturing industries(39) | |
| PRIVATE SECTOR | | | |
| LARGE ENTERPRISES | | | |

| **1989-1993** | | | |
|---|---|---|---|
| **Growth Path 1** [gr(pr)+] [gr(emp)+] | **Growth Path 2** [gr(pr)+] [gr(emp)-] | **Growth Path 3** [gr(pr)-] [gr(emp)+] | **Growth Path 4** [gr(pr)-] [gr(emp)-] |
| Textile sector(32) | Food sector(31) | | |
| Manufacture of wood products(33) | Manufacture of paper products(34) | | |
| Manufacture of non-metallic mineral products(36) | Manufacture of chemicals(35) | | |
| Manufacture of fabricated metal products(38) | Manufacture of non-metallic mineral products(36) | | |
| Other manufacturing industries(39) | Basic metal industries(37) | | |
| SMALL ENTERPRISES | LARGE ENTERPRISES | | |
| MEDIUM ENTERPRISES | GOVERNMENT SECTOR | | |
| | PRIVATE SECTOR | | |

| **1994-1998** | | | |
|---|---|---|---|
| **Growth Path 1** [gr(pr)+] [gr(emp)+] | **Growth Path 2** [gr(pr)+] [gr(emp)-] | **Growth Path 3** [gr(pr)-] [gr(emp)+] | **Growth Path 4** [gr(pr)-] [gr(emp)-] |
| Food sector(31) | GOVERNMENT SECTOR | Manufacture of paper products(34) | |
| Textile sector(32) | | PRIVATE SECTOR | |
| Manufacture of wood products(33) | | | |
| Manufacture of chemicals(35) | | | |
| Manufacture of non-metallic mineral products(36) | | | |
| Basic metal industries(37) | | | |
| Manufacture of fabricated metal products(38) | | | |
| Other manufacturing industries(39) | | | |
| SMALL ENTERPRISES | | | |
| MEDIUM ENTERPRISES | | | |
| LARGE ENTERPRISES | | | |

** See table 7 for details.

For 1981-1988 period, most general growth pattern for sub-sectors as well as large-sized enterprises and private sector is the growth path 1; this means growth in employment is related to productivity growth in the *"export-led"* period.[39] In this period both medium enterprises and public sector display characteristics of growth path 3, whereas small enterprises have path 4 growth characteristics. During 1989-1993, growth path 2 is most common growth pattern among manufacturing sectors, public and private sectors and SME's. (34) Manufacture of paper products; (35) Chemicals; (36) non-metallic mineral products; (31) food sector and (37) basic metal industries display this kind of growth and the rest have path 1 growth. It is worth noting that productivity growth rises for all sectors in this period. However, taking wage policy of the government into consideration, general negative growth in employment is not surprising which is reflected by the path 2 growth of the large enterprises. In financial crisis and re-invigoration of foreign capital-led growth phase (1994-1998) most of the sectors have growth path 1 that signifies both employment and productivity have expanding trend. In this period small-sized, medium-sized and large-sized enterprises have general positive trend in both productivity and employment level, so all have growth path 1 similar to manufacturing sub-sectors. However, the growth of both public and private enterprises differ from the general tendency as path 2 and path 1 growth patterns are observed, respectively.

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[39] See Table 8.

*2)*     *Investment-Productivity Relation*

| TABLE.9 GROWTH PATTERNS IN TURKISH MANUFACTURING INDUSTRY REGARDING PRODUCTIVITY AND INVESTMENT RELATIONSHIP | | | |
|---|---|---|---|
| **1981-1988** | | | |
| **Growth Path 5**<br><br>[gr(pr)+] [ga/va-] | **Growth Path 6**<br><br>[gr(pr)+] [ga/va+] | **Growth Path 7**<br><br>[gr(pr)-] [ga/va-] [gr(emp)+] | **Growth Path 8**<br><br>[gr(pr)-] [ga/va+] |
| Food sector(31)<br><br>Manufacture of wood products(33)<br><br>Manufacture of paper products(34)<br><br>Manufacture of fabricated metal products(38)<br>MEDIUM ENTERPRISES<br>LARGE ENTERPRISES<br>PUBLIC ENTERPRISES<br>PRIVATE ENTERPRISES | Textile sector(32)<br>Manufacture of non-metallic mineral products(36)<br>Basic metal industries(37) | Manufacture of chemicals(35)<br><br>Other manufacturing industries(39) | |
| **1989-1993** | | | |
| **Growth Path 5**<br><br>[gr(pr)+] [ga/va-] | **Growth Path 6**<br><br>[gr(pr)+] [ga/va+] | **Growth Path 7**<br><br>[gr(pr)-] [ga/va-] [gr(emp)+] | **Growth Path 8**<br><br>[gr(pr)-] [ga/va+] |
| Food sector(31)<br><br>Textile sector(32)<br><br>Manufacture of wood products(33)<br><br>Manufacture of paper products(34)<br>Manufacture of chemicals(35)<br><br>Manufacture of non-metallic mineral products(36)<br><br>Manufacture of fabricated metal products(38)<br>SMALL ENTERPRISES<br>MEDIUM ENTERPRISES<br>LARGE ENTERPRISES<br>PUBLIC ENTERPRISES<br>PRIVATE ENTERPRISES | Basic metal industries(37)<br>Other manufacturing industries(39) | | |
| **1994-1998** | | | |
| **Growth Path 5**<br><br>[gr(pr)+] [ga/va-] | **Growth Path 6**<br><br>[gr(pr)+] [ga/va+] | **Growth Path 7**<br><br>[gr(pr)-] [ga/va-] [gr(emp)+] | **Growth Path 8**<br><br>[gr(pr)-] [ga/va+] |
| Food sector(31)<br><br>Manufacture of wood products(33)<br><br>Manufacture of chemicals(35)<br>Basic metal industries(37)<br><br>Manufacture of fabricated metal products(38)<br>SMALL ENTERPRISES<br>MEDIUM ENTERPRISES<br>LARGE ENTERPRISES<br>PUBLIC ENTERPRISES | Textile sector(32)<br>Manufacture of non-metallic mineral products(36)<br>Other manufacturing industries(39) | Manufacture of paper products(34)<br><br>PRIVATE ENTERPRISES | |

** See Table 7 for details.

Investment-productivity relationship in Turkish manufacturing industry is given in Table 9. Regarding the relation between productivity and investment-value added ratio, growth patterns can be classified as: growth with rising productivity, falling investments (growth path 5), growth by rising productivity and investments (growth path 6), growth by falling productivity and investments (growth path 7) and growth by falling productivity and rising investments (growth path 8)[40]. In both growth path 5 and growth path 6, growth in productivity is positive whereas investment-value added ratio is negative and positive, respectively[41]. If productivity growth and investment-value added ratio are both negative despite a positive growth in employment, this kind of growth is named as growth path 7. Finally, if negative

During 1981-1988, (33) manufacture of wooden products, (34) paper products, (38) fabricated metal products and (31) food sectors have growth path 5, (36) manufacture of non-metallic mineral products, (37) basic metal industries and (32) textile sectors have growth path 6 and (35) manufacture of chemicals and (39) other manufacturing industries sectors have growth path 7. The general characteristic of the period is higher level of productivity and lower level of investments likewise public and private sectors. This observation fits with the wage control policy that leads to lower production costs. Between 1989-1993, (37) basic metal and (39) other manufacturing industries sectors have growth path 6 and the rest have growth path 5 and this common growth pattern is also backed by public and private sectors. This means in this period, investments have declining tendency whereas productivity in

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[40] Notice that the definition of Path 9 is not given, as it is not so common characteristics of manufacturing enterprises. In Path 9, growth of all considered items are negative and it leads to a reduction in the economy.

[41] Investment-value added ratio is considered negative if the ratio is below %20 likewise Yenturk (1997).

the industry continues its rising trend. For *"financial crisis and reinvigoration of short-term foreign capital-led growth phase"*[42] (1994-1998), (34) manufacture of paper products sector as well as private sector has growth path 7, (32) textile, (36) manufacture of non-metallic mineral products and (39) other manufacturing industries sectors have growth path 6 and the rest of the manufacturing sub-sectors have growth path 5. Generally, positive growth attitude of productivity and negative tendency of investments, which is the general characteristics of public enterprises, are recognized in this period.

Considering small, medium and large enterprises' growth path 5 is the pattern that describes the relation between productivity and investment behaviour through out the examined period. However, there is need to note that for 1981-1988 period small enterprises, as well as having growth path 4, display growth path 9.

One witnesses that between 1981-1998, productivity develops and investments diminish through the years. As there is no direct relationship between productivity and investments, it is evident that wages are affected mainly by political and economic conjuncture[43].

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[42] Voyvoda, Yeldan (1999).

[43] See Yenturk (1997) for an extensive discussion.

*Results*

It is clear from Table 7, Table 8 and Table 9 that the sectors that have path 1 growth combined with path 6 growth, which could create employment expansion more than the others. In this section, the relation between the growth levels of investments, productivity, wages and employment in manufacturing sub-sectors are summarized.

In Table 7 growth of productivity, growth of employment and investment-value added ratio are given. According to table widespread growth models can be summarized as follows:

- Growth path 1-growth path 5 for 1981-1988 period,

- Growth path 2-growth path 5 for 1989-1993 period,

- Growth path 1-growth path 5 for 1994-1998 period.

Examining the extensive growth models of the periods, 1981-1988 is the period in which both employment and productivity increase, however, as investments show a diminishing trend, this increase is related to the rise in capacity usage ratio. 1989-1993 is the period in which productivity increases but both level of employment and investments decline. 1994-1998 period has the same properties with 1981-1988 period. It is important to note that in none of the periods path 1 growth combined with path 6 growth leads to a speedy and permanent increase in employment is the extensive growth pattern, so there are temporary employment changes in the industry.

Yentürk (1997:38) noted that in pre-1980 period generally investments are directly related to productivity. Our analysis shows that for post-1980 investments have a negative growth trend and productivity have tendency to increase As productivity growth is not dependent on structural factor like investment, long-run trend in productivity growth and its reflection on wages is not expected. In these kinds of economies the wages are mostly affected by political and economic conjuncture and shrink period is generally followed by boost period.[44]

### iii) SECTORAL LABOR DENSITIES

In order to examine the sectoral developments of labor usage capacity in Table 10 labor coefficient (emp/va) and capital coefficient (ga/va) are calculated by dividing number of employees and gross additions to fixed assets to value added created. Capital-labor ratio (ga/emp) in the table is calculated by dividing gross additions to fixed assets to number of employees.

Labor and capital coefficients and capital-labor ratios are the coefficients that are used to observe the developments in the sectoral labor and capital densities. Labor coefficients show the relation between labor input and value added whereas capital coefficients display the relation between capital formation and value added. Capital-labor ratio is used as a basic indicator of the labor density. Labor density diminishes due to an increase in capital-labor ratio or a decrease in labor coefficient or an

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[44] Yenturk, N. (1997).

increase in capital coefficient. In addition, decrease in labor density may be stemmed from the decrease in both capital and labor coefficients if and only if reduction in labor coefficient is larger than the decrease in capital coefficient.

**TABLE.10 CAPITAL AND LABOR COEFFICIENTS, CAPITAL-LABOR RATIO**

| | emp/va | ga/va | ga/emp | gr(emp/va) | gr(ga/va) | gr(ga/emp) | | emp/va | ga/va | ga/emp | gr(emp/va) | gr(ga/va) | gr(ga/emp) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **3** | MANUFACTURING INDUSTRY | | | | | | **35** | MANUFACTURE OF CHEMICALS | | | | | |
| **1981-1988** | 0.60 | 14.47 | 0.24 | | | | **1981-1988** | 0.20 | 10.06 | 0.49 | | | |
| **1989-1993** | 0.38 | 12.10 | 0.32 | -36.65 | -16.42 | 32.10 | **1989-1993** | 0.13 | 6.75 | 0.52 | -35.61 | -32.94 | 7.32 |
| **1994-1998** | 0.33 | 13.96 | 0.42 | -12.54 | 15.45 | 30.48 | **1994-1998** | 0.11 | 8.41 | 0.76 | -15.09 | 24.62 | 45.62 |
| **31** | FOOD SECTOR | | | | | | **36** | NON-METALLIC MINERAL PRODUCTS | | | | | |
| **1981-1988** | 0.65 | 7.83 | 0.12 | | | | **1981-1988** | 0.67 | 20.82 | 0.32 | | | |
| **1989-1993** | 0.42 | 6.12 | 0.16 | -36.29 | -21.77 | 32.18 | **1989-1993** | 0.38 | 19.25 | 0.51 | -43.55 | -7.57 | 59.26 |
| **1994-1998** | 0.38 | 10.10 | 0.27 | -8.59 | 64.96 | 73.53 | **1994-1998** | 0.32 | 20.32 | 0.63 | -16.28 | 5.59 | 24.19 |
| **32** | TEXTILE SECTOR | | | | | | **37** | BASIC METAL INDUSTRIES | | | | | |
| **1981-1988** | 0.01 | 20.69 | 22.19 | | | | **1981-1988** | 0.63 | 23.18 | 0.39 | | | |
| **1989-1993** | 0.01 | 14.59 | 21.94 | -30.19 | -29.47 | -1.12 | **1989-1993** | 0.39 | 28.58 | 0.68 | -37.80 | 23.30 | 75.31 |
| **1994-1998** | 0.01 | 20.64 | 33.25 | -6.72 | 41.45 | 51.53 | **1994-1998** | 0.26 | 19.85 | 0.71 | -33.32 | -30.55 | 4.10 |
| **33** | MANUFACTURE OF WOOD PRODUCTS | | | | | | **38** | FABRICATED METAL PRODUCTS | | | | | |
| **1981-1988** | 1.24 | 11.28 | 0.09 | | | | **1981-1988** | 0.73 | 16.62 | 0.23 | | | |
| **1989-1993** | 0.77 | 11.51 | 0.16 | -38.21 | 2.00 | 71.62 | **1989-1993** | 0.41 | 13.16 | 0.34 | -43.84 | -20.83 | 49.19 |
| **1994-1998** | 0.68 | 18.26 | 0.28 | -11.54 | 58.66 | 75.29 | **1994-1998** | 0.35 | 14.27 | 0.41 | -15.20 | 8.46 | 18.64 |
| **34** | MANUFACTURE OF PAPER PRODUCTS | | | | | | **39** | OTHER MANUFACTURING INDUSTRIES | | | | | |
| **1981-1988** | 0.74 | 18.05 | 0.25 | | | | **1981-1988** | 1.13 | 16.66 | 0.15 | | | |
| **1989-1993** | 0.42 | 15.10 | 0.39 | -43.28 | -16.34 | 57.06 | **1989-1993** | 0.75 | 24.78 | 0.33 | -34.28 | 48.74 | 116.70 |
| **1994-1998** | 0.34 | 17.38 | 0.52 | -19.53 | 15.09 | 33.94 | **1994-1998** | 0.70 | 20.25 | 0.30 | -6.07 | -18.25 | -10.55 |
| | GOVERNMENT SECTOR | | | | | | | PRIVATE SECTOR | | | | | |
| **1981-1988** | 0.46 | 9.86 | 0.22 | | | | **1981-1988** | 0.69 | 17.44 | 0.25 | | | |
| **1989-1993** | 0.30 | 7.55 | 0.24 | -36.25 | -23.42 | 10.92 | **1989-1993** | 0.42 | 13.99 | 0.35 | -39.39 | -19.78 | 35.48 |
| **1994-1998** | 0.22 | 5.43 | 0.26 | -25.83 | -28.08 | 5.96 | **1994-1998** | 0.37 | 16.62 | 0.45 | -12.40 | 18.81 | 30.62 |
| | SMALL-SIZED ENTERPRISES | | | | | | | MEDIUM-SIZED ENTERPRISES | | | | | |
| **1981-1988** | 1.32 | 10.45 | 0.08 | | | | **1981-1988** | 0.77 | 16.07 | 0.21 | | | |
| **1989-1993** | 0.96 | 13.51 | 0.15 | -27.31 | 29.24 | 87.55 | **1989-1993** | 0.58 | 13.79 | 0.25 | -25.24 | -14.20 | 20.01 |
| **1994-1998** | 0.75 | 15.66 | 0.21 | -22.40 | 15.98 | 42.10 | **1994-1998** | 0.48 | 16.17 | 0.34 | -16.06 | 17.24 | 34.95 |
| | LARGE-SIZED ENTERPRISES | | | | | | | | | | | | |
| **1981-1988** | 0.50 | 14.61 | 0.29 | | | | | | | | | | |
| **1989-1993** | 0.30 | 11.66 | 0.39 | -39.32 | -20.22 | 30.85 | | | | | | | |
| **1994-1998** | 0.26 | 13.31 | 0.51 | -14.75 | 14.13 | 32.94 | | | | | | | |

\*\*Data 's taken from SIS Manufacturing Annual Surveys , the author does calculations. Value added and gross additions to capital is deflated by 1981=100 amnufacturing WPI.

Witnessing sectoral labor and capital coefficients and capital-labor ratios in Table 10, the increasing trend of the capital-labor ratio for all manufacturing sectors and SME's is noteworthy, owing to the growth in labor density is lower than the growth in capital density.

Investigating the developments of sectors and periods separately, the labor coefficient has a diminishing trend for all manufacturing sectors as well as SME's, public and private enterprises, which means there is a general tendency in manufacturing industry to have less labor density through years. Moreover, capital density also declines in 1989-1993 period, except for small-sized enterprises, (33) manufacture of wooden products sector and (37) basic metal industries, due to the high wage policies motivated by the election period. It is noteworthy that, instead of declining tendency of both capital and labor density in public sector, capital-labor ratio increases likewise other enterprises.

*General Results for SME's[45]*

Similar to total manufacturing sub-sectors SME sub-sectors have elastic character for 1981-1988, both level of employment and wages have upward trend between 1994-1998. However, in *"unregulated financial liberalization phase"* (1989-1993) unlike the total manufacturing sub-sectors, SME sub-sectors display similar characteristics with 1994-1998 period. SME sub-sectors also resemble total manufacturing sub-sector by having a general decreasing labor density and increasing capital-labor ratio through the years. The main difference between the total manufacturing sub-sectors and SME sub-sectors is witnessed in the concept of

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[45] The related tables for SME's regarding labor market elasticities, general growth patterns and sectoral labor densities are given in Appendix F, see tables 1-4.

growth patterns. SME sub-sectors respond the wage suppression period (1981-1988) by a growth in employment level, which is responded by a fall in both productivity and investments. Growth path 3 growth related to path 7 growth is the general growth pattern for SME sub-sectors. This characteristic is in line with the principle that claims that in the periods that have instability and uncertainty as well as having very low wage levels show property of growth path 7[46]. After 1989, SME sub-sectors display growth path 1 with rising productivity and falling investments by having improvement in both employment level and productivity. The feature presented by SME sub-sectors is the result of its flexible nature. It is noteworthy that throughout the examined period the level of investments in SME sub-sectors have general diminishing trend likewise total manufacturing sub-sectors.

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[46] Yenturk (1997:37)

# CHAPTER 6

## CONCLUSION AND DISCUSSION

The basic aim of this thesis is to analyse wage, employment and productivity relationship in Turkish manufacturing industry, using statistical tools, namely OLS technique and descriptive growth rate comparisons for the period of 1981-1998. Firstly, by giving the size definitions of manufacturing industry we form a basis for the classification used in this thesis. Next, historical development of the manufacturing enterprises are discussed according to the size criteria adapted. Both graphical analysis and historical development trends display that large enterprises contribute mainly to employment and manufacturing value added. However, small enterprises have significant share in number of enterprises and display approximately complement character of the large enterprises.

Then, we set up a sectoral analysis to clarify the role of manufacturing industry in Turkish economy by examining development of sub-sectors and investment

incentives reserved. General findings of this analysis present that food, textile, manufacturing of chemicals and fabricated metal products are the most important sectors of the manufacturing industry likewise SME's. In addition, the shares of these sectors in total investment incentives in Turkey are highly significant, as expected.

After forming the general outlook of the manufacturing industry, we conduct two models to find out both the wage-productivity and wage-employment relationships and apply OLS estimation, accordingly. Significant relationship between productivity and wages are observed for all manufacturing sub-sectors, SME sub-sectors, public and private sectors. Unlike productivity-wage relationship, the link between employment and wages are not extensively significant. Nevertheless, an important result is driven, which demonstrates that wages are mostly sensitive to employment shocks rather than productivity shocks.

For further analysis an empirical investigation of Yenturk (1997) is adapted to our data, regarding labor market elasticities, growth patterns and sectoral labor densities in manufacturing sub-sectors. For *"export-led"* period (1981-1988), in which the wages are under pressure, general elastic behaviour is backed by growth path 1 that mainly depend on rising productivity and falling investments, which is not expected by Yenturk (1997:37). Yenturk expected that sectors have growth by falling productivity and investments (path 7) for the low wage periods, which fits SME characteristics. During the period of *"unregulated financial liberalization"* (1989-1993), expansionary wage policy leads to lower employment in most of the sectors

and a combination of path 2 and path 5 growths is observed, generally. Elasticity is observed for some sectors in this period but not as dense as the previous period. In final period of our analysis (1994-1998), which includes financial crisis in 1994, path 1 growth with falling investment is witnessed for most of the sub-sectors. Neither elasticity, nor development is the common characteristics of this period. Moreover, considering labor densities, general upward trend of capital-labor ratio in manufacturing industry results from the declining labor density all over the sector. In other words, as the real wages display systematically increasing trend in post-1988 period, manufacturing enterprises choose to use more capital rather than labor.

The main consequence that can be drawn out from this thesis, similar to Yenturk (1997:25), is that even though the OLS estimations present general relationship between variables, in Turkey economic policy implications have an extensive power on wages and employment. In addition, the direction of the obvious relationship between wages and employment is mainly set by the economic policies. It is worth noting that, productivity is an indirect instrument that is mainly determined by the enterprises and general positive productivity trend displays the flexible characteristics of the manufacturing industry. Nevertheless, behaviour of productivity in SME sub-sectors is in line with the behaviour of wages.

In late 1990's, the developed countries have the consciousness of SMEs' locomotive role in the economies and put into practise new economic policies to assist the development of SME's. In a country like Turkey, in which the employment and economic instability are the major problems, SME's gain more importance. In the

view of the fact that SME's have capability to create employment opportunity with less investment costs, they play a significant role in Turkish manufacturing employment. In addition, SME's supply production diversity and make more production with less investment despite their trivial contribution to value added. So, the investment incentives reserved for SME's generally leads to a social and economic unrest. Since it is reported in chapter 6, the effect of wages on productivity is obvious in SME's, which gives us predictive power for productivity. On the contrary, large enterprises as can be recognized in chapter 3-with their technology based production-have great contribution to the value added. Although, the number of large enterprises is considerably below the SMEs' level, they provide most of the manufacturing employment. Therefore, it is clear that the incentives given to large enterprises conclude with high level of production and employment. In addition, as we discussed before SME's are the main complement of large enterprises by their intermediate production. Additionally in chapter 6, it is reported that the government mainly sets employment, wages and relation between them.  For that reason, governments must take SME's into consideration as well as large enterprises by setting a distributional balance among them.  However, Turkish financial system experienced two important crises at the end of 2000 and on February, 2001[47], which leads to insufficient domestic resources for the economy and higher input costs for manufacturing enterprises, simultaneously. As expected, the influences of these crises are mainly felt by SME's and create a major financing problem for them. In order to protect manufacturing enterprises, serious precautions must be taken, such as a back up and guide system for small producers to increase

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[47] Ertugrul and Selcuk (2001)

productivity and value added. Finally, the clear outcome of Turkish inflation is directly reflected as sharp declines in value added of enterprises. Therefore, the governments must practice powerful disinflationary programs, which lead to a secure environment for the development of manufacturing industry.

# BIBLIOGRAPHY

Albaek, K., R. Asplund, S. Blomskog, E. Barth, B.R. Guamundsson, V. Karlsson and E.S. Madsen. 1999. "A wage curve in the Nordic countries?," Paper summited to the SOLE conference, Boston, 1999.

Amsden, A.H. and R. Van Der Hoven. 1996. "Manufacturing Output , Employment and Real Wages in 1980s: Labour's Loss Until the Century's End," *Journal of Development Studies* 33(4): 506-530.

Arestis, P., I. Biefang, and F. Mariscal. 1997. "Conflict, Effort and Capital Stock in UK Wage Determination," *Empirica* 24: 179-193.

Bjornstad, R. and R. Nymoen. 2000. "Wages and profitability: Norwegian Manufacturing 1967q1-1998q2," Paper presented at the Conference of "Macroeconomic Transmission Mechanisms," at Norwegian University of Science and Technology, Trondheim, April 1999, and in seminars at Statistics Norway and at the University of Oslo.

Borjas, G.J. and V.A. Ramey. 2000. "Market Responses to Interindustry Wage Differentials," UCSD Economics Discussion Papers, University of California at San Diego, Department of Economics.

Boratav, K., A.H. Köse and A.E. Yeldan. 2000 "Globalization, Distribution and Social Policy: Turkey, 1980-1998" Working Paper No: 20. CEPA Working Paper Series I, New School University, New York.

Ertuğrul, A. and F. Selçuk. 2001 "A Brief Account of the Turkish Economy: 1980-2000" *Russian and East European Finance and Trade*, 37(6): 6-28.

Graafland, J.J. and M.C.H. Lever. 1994. "Internal and External Forces in Sectoral Wage Formation: Evidence from Netherlands," Research Memorandum. Central Planning Bureau, The Hague, The Netherlands.

Guichard, S. and J.P. Laffargue. 2000. "The wage curve: The lesson of an estimation over a panel of countries," CEPII, document de travail n° 2000-21.

Gujarati, Damador N. 1995. *Basic Econometrics*. 3$^{rd}$ ed. New York: Mc Graw-Hill.

Ioannider, Y.M. and C.A. Pissarides. 1985. "Monopsony and Lifetime Relation Between Wages and Productivity," *Journal of Labor Economics* 3(1): 91-100.

Kaya, N. and Ü. Peçen. 1999. "Küçük ve Orta Ölçekli İşletmelerin Karşılaştıkları Sorunlar ve Çözüm Yolları". İstanbul: EGS Bank Bilim, kültür ve Sanat Yayınları.

T.C. Sanayi ve Ticaret Bakanlığı. *Dünya'da ve Türkiye'de KOBİ Tanımları*. Ankara: KOSGEB Yayını.

Metin, K. 1995a. "The Effects of Productivity on Wage Behaviour: The Evidence from the Turkish Basic Metal and Chemical Industries," Paper presented at "Proceedings in 9$^{th}$ World Productivity Congress", June 5-7.

----. 1995b. *The Analysis of Inflation: The Case of Turkey (1948-1988).* Nurol Publishing Co., Capital Markets Board Publication No:20.

Metin-Özcan, K. 2001. "Türkiye'nin Sanayileşmesinde KOBİ'ler ve Sanayi Siteleri" chapter in A*nadolu'da Kalkınma Süreçleri ve Malatya Örneği.* Ankara: Imaj Yayınevi, 115-140.

----., E. Voyvoda  and A.E. Yeldan. 2000. "On the Patterns of Trade Liberalization, Oligopolistic Concentration and Profitability: Reflections from Post-1980 Turkish Manufacturing" Paper presented at "IVth Annual METU Conference on Economics", Ankara,September and "VIIth Annual Conference of the Economic Research Forum", Amman, October.

----., E. Voyvoda and A.E. Yeldan. 2001. "Dynamics of Macroeconomic Adjustment in a Globalized Economy: Growth, Accumulation and Distribution, Turkey 1969-1999," Canadian Journal of Development Studies 22(1): 219-253.

Ministry of Industry and Trade. 1999. *Turkey, Economic and Industrial Report.* Ankara: KOSGEB.

Morrison, P.S., K.L. Papps and J. Poot. 2000. "Wages and Unemployment: New Zealand Research on the Wage Curve in Regional Labour Markets," Paper summitted to the 6th PRSCO Summer Institute, Mexico ,2000.

Müftüoğlu, T. 1991. "Türkiye'de Küçük ve Orta Ölçekli İşletmeler ve Girişimcilik Olgusu" Küçük ve Orta Ölçekli Sanayi İşletmelerinin Sorunları, Uluslararası Sempozyum (17 Mayıs 1991) İstanbul: İstanbul Sanayi Odası Araştırma Dairesi.

Pieper, U. 1998. "Openness and Structural Dynamics of Productivity and Employment in Developing Countries: A Case of De-Industrialization?" Employment and Training Department, International Labour Office, Geneva.

Taymaz, E. 1997. *Small and Medium-Sized Industry in Turkey.* Ankara: Devlet İstatistik Enstitüsü Matbaası.

T.C. Başbakanlık Devlet İstatistik Enstitüsü. 1996. *Küçük Ölçekli İmalat Sanayi İstatistikleri: Kapsam ve Yöntem).* Ankara: Devlet İstatistik Enstitüsü Matbaası.

T.C. Başbakanlık Devlet İstatistik Enstitüsü. 1997b. *İmalat Sanayiinde Küçük ve Orta Ölçekli İşyerleri (Sorunlar, Çözümler, Öneriler).* Ankara: Devlet İstatistik Enstitüsü Matbaası.

T.C. Başbakanlık Devlet İstatistik Enstitüsü. 1999. *Küçük Ölçekli İmalat Sanayii İstatistikleri (1-9).* Ankara: Devlet İstatistik Enstitüsü Matbaası.

Voyvoda, E. and A.E. Yeldan. 1999. "Patterns of Productivity Growth and The Wage Cycle in Turkish Manufacturing" Paper presented at "3rd METU Conference on Economics", Ankara, September.

Yentürk, N. 1997. *Türk İmalat sanayiinde Ücretler, İstihdam ve Birikim* (Wage, Employment and Accumulation in Turkish Manufacturing Industry). Istanbul: Friedrich Eber Stiftung.

# APPENDIX A.

## Data and Definition of Variables

The data set is obtained from the State Institute of Statistics (SIS) Turkish Manufacturing Industry Annual Surveys over the period 1980-1998[48]. The survey contains data for all public and private sector establishments that employ: 10-24, 25-49, 50-99, 100-199, 200-499, 500-999, 1000+ and the total of the industry.[49] Number of employees (emp), number of enterprises (N), input (I), output (Q), gross additions to fixed assets (ga), value added (va) and annual payments to employees (w), manufacturing industry whole sales price index (wpi), number of incentive certificates (ni) and amount of investment incentives (ii) are also the series of

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[48] The data of number of incentive certificates and amount of investment incentives are obtained from internet site of the Undersecretariat of Treasury. (www.treasury.gov.tr)

[49] The number of enterprises, level of employment and value added shares in the total manufacturing industry according to the classification of the number of persons employed are given in Appendix B, Table1.

variables of this study. According to SIS survey[50], number of employees is the arithmetic average of the number of employees in February, May, August and November. The value of input is calculated by subtracting the value of the end-of-year stock from the total value of goods and services purchased or transferred, including electricity purchased and beginning-of-year stock. The value of output is calculated by subtracting the value of the beginning of the year stock from the total receipts from sales and services rendered to others, receipts from sales of transfers of electricity plus the value of the end-of-year stock. Gross additions to fixed assets is calculated by subtracting the sales value of the fixed assets sold during the year from the expenditures. Value added is obtained by subtracting the value of input from output. Annual payments to employees include all payments in the form of wages and salaries and perdiems gross of income tax, social security and pension fund premiums, excluding social security and pension fund premiums.

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[50] Definitions of the variables are taken from '*Definition of the terms*' part of the SIS Annual Manufacturing Industry Statistics.

# APPENDIX B.

<div style="writing-mode: vertical">Percentage share of the number of enterprises, number of employees and the value added in the TURKISH MANUFACTURING INDUSTRY</div>

| YEARS | | 10-24 | 25-49 | 50-99 | 100-199 | 200-499 | 500-999 | 1000+ |
|---|---|---|---|---|---|---|---|---|
| **1981** | Number of enterprises | 54,16 | 21,77 | 10,71 | 5,63 | 4,63 | 1,74 | 1,36 |
| | Number of employees | 9,42 | 8,56 | 8,41 | 8,99 | 16,82 | 13,64 | 34,18 |
| | value added | 4,39 | 4,39 | 5,95 | 8,20 | 24,14 | 14,31 | 38,63 |
| **1982** | Number of enterprises | 52,06 | 22,79 | 11,27 | 5,62 | 5,18 | 1,67 | 1,41 |
| | Number of employees | 9,00 | 8,86 | 8,81 | 8,88 | 18,53 | 13,00 | 32,93 |
| | value added | 4,18 | 4,49 | 5,73 | 7,67 | 25,34 | 13,68 | 38,91 |
| **1983** | Number of enterprises | 50,48 | 22,42 | 12,03 | 6,36 | 5,39 | 1,82 | 1,50 |
| | Number of employees | 8,39 | 8,30 | 8,82 | 9,37 | 18,41 | 13,46 | 33,26 |
| | value added | 3,32 | 4,26 | 5,61 | 8,71 | 21,77 | 14,90 | 41,43 |
| **1984** | Number of enterprises | 47,90 | 23,27 | 12,62 | 6,54 | 5,82 | 2,19 | 1,66 |
| | Number of employees | 7,46 | 7,96 | 8,52 | 8,93 | 18,50 | 14,73 | 33,91 |
| | value added | 2,67 | 5,09 | 5,96 | 8,45 | 20,31 | 15,91 | 41,62 |
| **1985** | Number of enterprises | 54,29 | 21,19 | 10,59 | 5,84 | 4,87 | 1,87 | 1,34 |
| | Number of employees | 9,67 | 8,44 | 8,38 | 9,31 | 17,85 | 14,66 | 31,68 |
| | value added | 3,59 | 4,76 | 5,58 | 8,00 | 21,05 | 17,87 | 39,16 |
| **1986** | Number of enterprises | 48,18 | 23,39 | 12,34 | 6,85 | 5,56 | 2,17 | 1,51 |
| | Number of employees | 7,85 | 8,38 | 8,74 | 9,85 | 18,24 | 15,43 | 31,52 |
| | value added | 2,33 | 3,89 | 7,92 | 7,55 | 20,22 | 17,09 | 41,00 |
| **1987** | Number of enterprises | 44,41 | 24,70 | 12,82 | 8,01 | 6,04 | 2,44 | 1,57 |
| | Number of employees | 6,73 | 8,34 | 8,51 | 10,76 | 18,57 | 16,36 | 30,72 |
| | value added | 2,49 | 4,35 | 5,52 | 9,38 | 18,92 | 20,43 | 38,91 |
| **1988** | Number of enterprises | 41,89 | 25,04 | 14,03 | 8,10 | 6,75 | 2,49 | 1,71 |
| | Number of employees | 5,94 | 8,15 | 8,90 | 10,40 | 19,57 | 15,92 | 31,11 |
| | value added | 1,99 | 3,65 | 5,53 | 7,57 | 17,95 | 19,80 | 43,51 |
| **1989** | Number of enterprises | 41,56 | 25,81 | 13,25 | 8,49 | 6,65 | 2,55 | 1,69 |
| | Number of employees | 5,84 | 8,42 | 8,47 | 10,93 | 19,42 | 16,36 | 30,56 |
| | value added | 2,08 | 3,50 | 5,05 | 7,76 | 21,63 | 17,39 | 42,58 |
| **1990** | Number of enterprises | 38,07 | 26,89 | 13,75 | 9,60 | 7,18 | 2,75 | 1,76 |
| | Number of employees | 5,07 | 8,29 | 8,22 | 11,57 | 19,54 | 16,58 | 30,74 |
| | value added | 1,93 | 3,60 | 5,20 | 7,75 | 20,76 | 20,19 | 40,57 |
| **1991** | Number of enterprises | 35,63 | 27,85 | 14,89 | 9,77 | 7,51 | 2,68 | 1,67 |
| | Number of employees | 4,92 | 8,60 | 9,08 | 11,84 | 20,39 | 16,33 | 28,85 |
| | value added | 1,77 | 3,52 | 5,03 | 8,31 | 22,21 | 20,02 | 39,15 |
| **1992** | Number of enterprises | 46,84 | 24,34 | 12,53 | 7,54 | 5,73 | 1,92 | 1,11 |
| | Number of employees | 8,07 | 9,76 | 9,87 | 11,84 | 20,40 | 15,06 | 24,99 |
| | value added | 2,67 | 4,27 | 5,89 | 8,54 | 23,53 | 18,11 | 36,99 |
| **1993** | Number of enterprises | 42,20 | 26,72 | 13,32 | 8,36 | 6,32 | 1,92 | 1,15 |
| | Number of employees | 6,93 | 10,20 | 9,96 | 12,53 | 21,52 | 14,36 | 24,49 |
| | value added | 2,45 | 4,28 | 5,87 | 9,73 | 24,43 | 18,97 | 34,27 |
| **1994** | Number of enterprises | 41,63 | 26,65 | 13,47 | 8,70 | 6,27 | 2,19 | 1,09 |
| | Number of employees | 6,94 | 10,17 | 10,16 | 13,05 | 20,73 | 16,17 | 22,78 |
| | value added | 2,24 | 5,90 | 6,48 | 9,81 | 25,03 | 18,37 | 32,17 |
| **1995** | Number of enterprises | 38,21 | 28,02 | 14,18 | 9,34 | 6,95 | 2,21 | 1,10 |
| | Number of employees | 6,32 | 10,35 | 10,30 | 13,56 | 22,18 | 15,88 | 21,41 |
| | value added | 2,35 | 4,52 | 5,92 | 10,60 | 25,03 | 18,97 | 32,60 |
| **1996** | Number of enterprises | 36,33 | 28,44 | 14,66 | 10,10 | 6,98 | 2,31 | 1,18 |
| | Number of employees | 5,88 | 10,32 | 10,38 | 14,26 | 21,77 | 16,05 | 21,33 |
| | value added | 2,21 | 4,90 | 7,13 | 10,81 | 24,16 | 19,21 | 31,57 |
| **1997** | Number of enterprises | 35,40 | 27,60 | 15,88 | 10,37 | 7,21 | 2,44 | 1,09 |
| | Number of employees | 5,62 | 9,84 | 11,04 | 14,52 | 22,35 | 16,84 | 19,80 |
| | value added | 2,04 | 4,85 | 6,15 | 10,68 | 23,79 | 17,79 | 34,69 |
| | | 10-49 | | 50-99 | 100-199 | 200-499 | 500-999 | 1000+ |
| **1998** | Number of enterprises | 63,58 | | 16,28 | 9,91 | 6,80 | 2,31 | 1,12 |
| | Number of employees | 16,15 | | 11,66 | 14,11 | 21,34 | 16,14 | 20,60 |
| | value added | 7,46 | | 6,67 | 10,31 | 21,69 | 17,71 | 36,15 |

Source: Calculations are performed by the author using SIS data (Manufacturing Industry Censuses for 1981-1998) and value added is million TL deflated by 1981=100 manufacturing WPI.

# APPENDIX C.

## Extended Definitions of Small and Medium Enterprises in Turkey:

### Definition of KOSGEB
*KOSGEB* classifies the industry into three categories based on the number of full time employees as:
- Small-Sized Industrial Enterprises: 1-49 workers
- Medium-Sized Industrial Enterprises: 50-150 workers
- Large Industrial Enterprises: more than 150 workers

### Definition of HALKBANK
*HALKBANK*'s definition on enterprise based on two criteria: number of employee and total asset. In the definition of *HALKBANK*, 150 workers and US 100 billion TL total asset are the upper limits for *SME*'s with incentive certificate and 250 workers and 100 billion TL are the upper limits for Normal *SME*'s .

### Definition of EXIMBANK
According to definition of *EXIMBANK*, in the context of short-term Turkish Lira credits, manufacturing enterprises that employ 1-200 employees that are devoted to "Small and Medium Sized Enterprises Export Credit" is classified as small and medium enterprises.

### Definition of Undersecretariat of Treasury
*Undersecretariat of Treasury* uses size of measure for businesses that have the net value of machinery and equipment, plants, vehicles, tools and appliances, furniture and fixed inventory excluding the land and buildings recorded in their legal books and documents is at most 400 billion TL as:
- Micro-size scale establishment 1-9 persons
- Small-size scale enterprises 10-49 persons
- Medium-sized establishments 50-250 persons.

### Definition Of Undersecretariat of Foreign Trade
*Undersecretariat of Foreign Trade* defines *SME*'s as (that qualify for the state aids): "Businesses that employ a maximum of 200 workers, the net value of machinery and

equipment, plants, vehicles, tools and appliances, furniture and fixed inventory excluding the land and buildings recorded in their legal books and documents is at most '2.000.000 US$.

### *Definition of SIS (The State Institute of Statistics)*
In the definition of *DIE* annual average number of persons engaged in manufacturing Industry is used as a size of measure as;
- Micro-sized Scale Establishment 1-9 persons
- Small-sized Scale Establishment 10-49 persons
- Medium-sized Scale Establishment 50-199 persons
- Large-Sized Scale Establishment 200 + persons.

### *Definition of TOSYÖV*
*TOSYOV* classifies the industry into three categories based on the number of full time employees as:
- Micro-sized Scale Establishment 1-5 persons
- Small-sized Scale Establishment 5-100 persons
- Medium-sized Scale Establishment 100-200 persons

### *Definition of TOBB*
*TOBB* uses size of measure for enterprises as:
- Small-sized Scale Establishment 1-50 persons
- Medium-sized Scale Establishment 51-150 persons

# APPENDIX D.

## Definition of Small and Medium-sized Enterprises Adopted by the EU COMMISSION (OJL 107.30.04.1994)

1. Small and medium-sized enterprises, hereinafter referred to as 'SMEs`, are defined as enterprises which:
- have fewer than 250 employees, and
- have either,
an annual turnover not exceeding ECU 40 million, or
an annual balance-sheet total not exceeding ECU 27 million,
- conform to the criterion of independence as defined in paragraph 3.
2. Where it is necessary to distinguish between small and medium-sized enterprises, the 'small enterprise` is defined as an enterprise which:
- has fewer than 50 employees and
- has either,
an annual turnover not exceeding ECU 7 million, or
an annual balance-sheet total not exceeding ECU 5 million,
- conforms to the criterion of independence as defined in paragraph 3.
3. Independent enterprises are those which are not owned as to 25 % or more of the capital or the voting rights by one enterprise, or jointly by several enterprises, falling outside the definition of an SME or a small enterprise, whichever may apply.
This threshold may be exceeded in the following two cases:
- if the enterprise is held by public investment corporations, venture capital companies or institutional investors, provided no control is exercised either individually or jointly,
- if the capital is spread in such a way that it is not possible to determine by whom it is held and if the enterprise declares that it can legitimately presume that it is not owned as to 25 % or more by one enterprise, or jointly by several enterprises, falling outside the definitions of an SME or a small enterprise, whichever may apply.
4. In calculating the thresholds referred to in paragraphs 1 and 2, it is therefore necessary to cumulate the relevant figures for the beneficiary enterprise and for all the enterprises, which it directly or indirectly controls through possession of 25 % or more of the capital or of the voting rights.
5. Where it is necessary to distinguish micro-enterprises from other SMEs, these are defined as enterprises having fewer than 10 employees.
6. Where, at the final balance sheet date, an enterprise exceeds or falls below the employee thresholds or financial ceilings, this is to result in its acquiring or losing the status of 'SME`, 'medium-sized enterprise`, 'small enterprise` or 'micro-enterprise` only if the phenomenon is repeated over two consecutive financial years.

7. The number of persons employed corresponds to the number of annual working units (AWU), that is to say, the number of full-time workers employed during one year with part-time and seasonal workers being fractions of AWU. The reference year to be considered is that of the last approved accounting period.

8. The turnover and balance sheet total thresholds are those of the last approved 12-month accounting period. In the case of newly established enterprises whose accounts have not yet been approved, the thresholds to apply shall be derived from a reliable estimate made in the course of the financial year.

# APPENDIX E.

## WAGE AND INPUT COSTS IN MANUFACTURING
## INDUSTRY
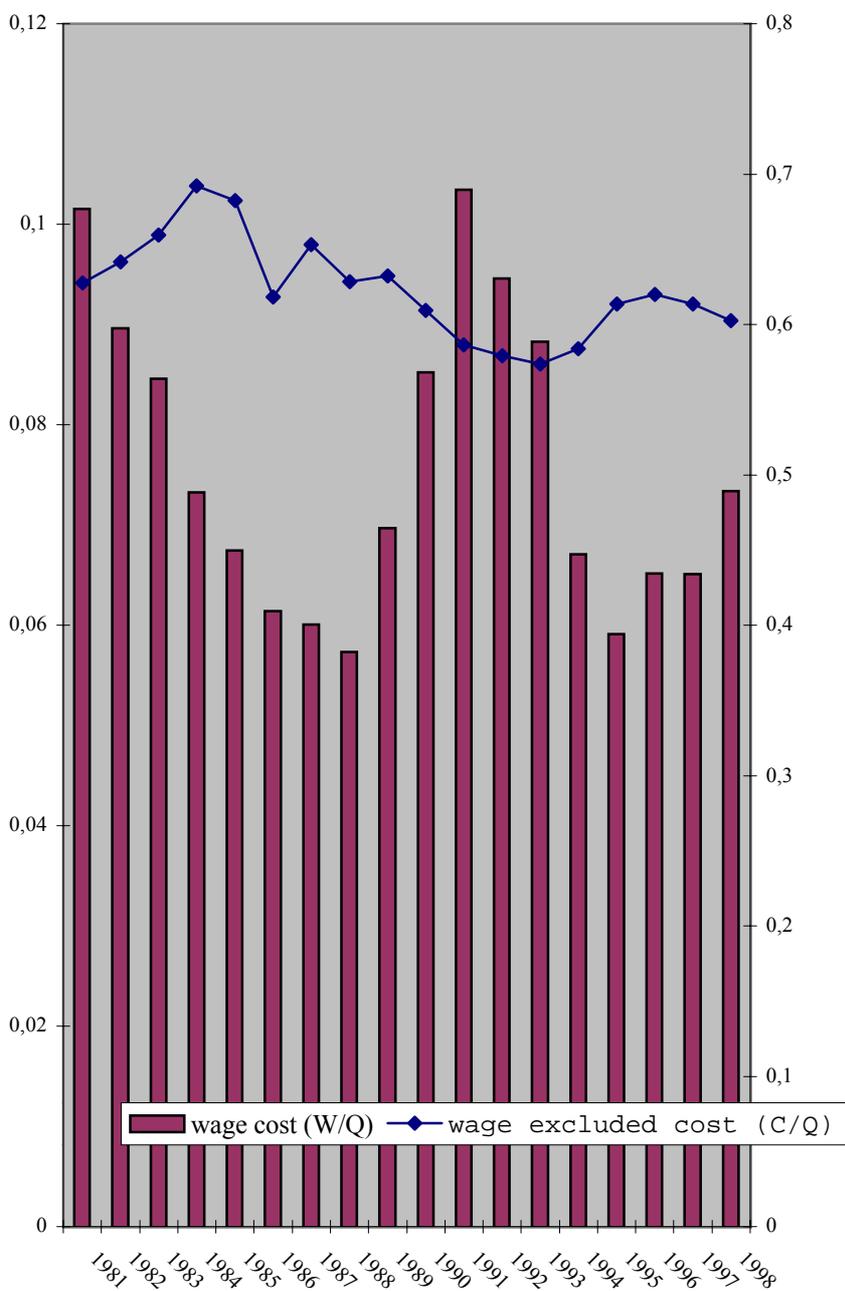


*Wage cost is calculated by dividing wage to output.*
*Wage excluded cost is calculated by dividing input to output.*

# APPENDIX F.

| Table 1. % share distribution of the number of enterprises, level of employment, value added and gross additions to fixed capital of 9 small-sized manufacturing sectors for 1998 | | | | |
|---|---|---|---|---|
| INFERIOR SECTORS | Number of enterprices | Level of employment | Value added | Gross additions to fixed capital during the year |
| 31 Manufacture of food, beverages and tobacco | 16,80 (3) | 14,96 (3) | 17,41 (3) | 16,79 (4) |
| 32 Textile, wearing apparel and leather industries | 28,29 (1) | 29,76 (1) | 25,64 (1) | 26,40 (1) |
| 33 Manufacture of wood and wood products including furniture | 4,81 | 4,44 | 2,52 | 2,73 |
| 34 Manufacture of paper and paper products; printing and publishing | 3,53 | 3,68 | 7,83 | 4,21 |
| 35 Manufacture of chemicals and chemical petroleum, coal, rubber and plastic products | 8,77 (4) | 8,83 (4) | 11,84 (4) | 16,89 (3) |
| 36 Manufacture of non-metalic mineral products, except products of petroleum and cool | 7,64 | 8,10 | 5,97 | 8,79 |
| 37 Basic metal industries | 3,36 | 3,53 | 2,91 | 3,55 |
| 38 Manufacture of fabricated metal products, machinery and equipment, transport equipment, professional and scientific and measuring and controlling equipment | 25,68 (2) | 25,64 (2) | 25,02 (2) | 19,56 (2) |
| 39 Other manufacturing industries | 1,12 | 1,07 | 0,86 | 1,07 |

**Source:** State Institute of Statistics, Ankara

* Values in the paranthesis enumerate 4 important inferior sectors.

| Table 2-a. % share distribution and the growth rates of the number of enterprises for 4 important small-sized manufacturing sectors | | | | | | | |
|---|---|---|---|---|---|---|---|
| Inferior sectors years | 31 | | 32 | | 35 | | 38 | |
| 1981 | 22,24 | | 19,47 | | 11,94 | | 25,86 | |
| 1985 | 22,16 | (27,31) | 24,07 | (52,52) | 9,32 | (4,61) | 24,17 | (20,32) |
| 1990 | 23,00 | -(11,78) | 24,51 | -(0,21) | 9,06 | -(0,38) | 22,96 | -(18,53) |
| 1995 | 18,29 | -(5,64) | 28,73 | (2,37) | 8,65 | -(5,02) | 23,15 | -(5,49) |
| 1998 | 16,80 | (4,43) | 28,29 | (6,26) | 8,77 | (10,06) | 25,68 | (17,12) |

Source: Calculations are performed by the author using SIS data ( Manufacturing Industry Censuses for 1981-1998). Values in the parenthesis are growth rates of the number of enterprises to the preceding census value of the number of enterprises $(X_t-X_{t-1}/X_t)$

| Table 2-b. % share distribution and the growth rates of the level of employment for 4 important small-sized manufacturing sectors | | | | | | | |
|---|---|---|---|---|---|---|---|
| Inferior sectors years | 31 | | 32 | | 35 | | 38 | |
| 1981 | 21,52 | | 19,53 | | 11,95 | | 25,54 | |
| 1985 | 20,55 | (18,08) | 23,90 | (41,91) | 9,69 | (5,26) | 24,53 | (17,25) |
| 1990 | 19,75 | -(9,36) | 25,80 | (0,57) | 9,80 | (2,91) | 22,92 | -(12,41) |
| 1995 | 16,54 | (1,34) | 30,22 | (6,07) | 8,90 | -(3,69) | 22,65 | -(3,46) |
| 1998 | 14,96 | (6,14) | 26,40 | (9,93) | 8,83 | (8,38) | 25,64 | (16,95) |

Source: Calculations are performed by the author using SIS data ( Manufacturing Industry Censuses for 1981-1998). Values in the parenthesis are growth rates of the employment level of enterpises to the preceding census value of the employment level of enterprises $(X_t-X_{t-1}/X_t)$

| Table 2-c. % share distribution and the growth rates of the value added for 4 important small-sized manufacturing sectors | | | | | | | |
|---|---|---|---|---|---|---|---|
| Inferior sectors years | 31 | | 32 | | 35 | | 38 | |
| 1981 | 20,76 | | 18,00 | | 13,96 | | 23,44 | |
| 1985 | 21,70 | (6,96) | 24,82 | (43,34) | 12,22 | (21,51) | 21,47 | (17,91) |
| 1990 | 21,11 | (5,42) | 22,85 | (18,01) | 15,35 | (24,48) | 22,47 | (11,55) |
| 1995 | 19,96 | (27,58) | 28,42 | (17,79) | 13,48 | (20,99) | 20,14 | (22,26) |
| 1998 | 17,41 | (19,95) | 25,64 | (44,34) | 11,84 | (11,50) | 25,02 | (49,80) |

Source: Calculations are performed by the author using SIS data ( Manufacturing Industry Censuses for 1981-1998). Values in the parenthesis are growth rates of the value added of enterprises to the preceding census value added of the enterprises $(X_t-X_{t-1}/X_t)$. Value added is deflated by 1981=100 manufacturing WPI.

| Table 2-d. % share distribution and the growth rates of the gross additions to fixed capital for 4 important small-sized manufacturing sectors | | | | | | | |
|---|---|---|---|---|---|---|---|
| Inferior sectors years | 31 | | 32 | | 35 | | 38 | |
| 1981 | 15,06 | | 7,64 | | 17,21 | | 37,93 | |
| 1985 | 17,54 | -(17,13) | 22,30 | (8,17) | 11,86 | -(61,68) | 23,15 | -(17,28) |
| 1990 | 16,45 | -(9,00) | 31,92 | (64,43) | 15,51 | (17,38) | 19,06 | -(19,20) |
| 1995 | 16,23 | (106,79) | 29,52 | (84,92) | 15,54 | -(48,75) | 16,57 | -(51,06) |
| 1998 | 16,79 | (45,05) | 26,40 | -(8,17) | 16,89 | (60,31) | 19,56 | (3,20) |

Source: Calculations are performed by the author using SIS data ( Manufacturing Industry Censuses for 1981-1998). Values in the parenthesis are growth rates of the gross additions to fixed assets of enterprises to the preceding census value of the gross additions to fixed capital of enterprises $(X_t-X_{t-1}/X_t)$. Gross additions to fixed capital is deflated by 1981=100 manufacturing WPI.

**Table 3. % share distribution of the number of enterprises, level of employment, value added and gross additions to fixed capital of 9 medium-sized manufacturing sectors for 1998**

| INFERIOR SECTORS | Number of enterprices | Level of employment | Value added | Gross additions to fixed capital during the year |
|---|---|---|---|---|
| 31 Manufacture of food, beverages and tobacco | 11,28 (3) | 11,43 (3) | 16,39 (3) | 15,56 (3) |
| 32 Textile, wearing apparel and leather industries | 36,53 (1) | 37,32 (1) | 24,24 (1) | 27,88 (1) |
| 33 Manufacture of wood and wood products including furniture | 3,18 | 3,12 | 2,20 | 2,00 |
| 34 Manufacture of paper and paper products; printing and publishing | 3,52 | 3,61 | 5,40 | 8,51 |
| 35 Manufacture of chemicals and chemical petroleum, coal, rubber and plastic products | 8,56 (4) | 8,45 (4) | 14,37 (4) | 13,63 (4) |
| 36 Manufacture of non-metalic mineral products, except products of petroleum and cool | 8,56 (4) | 8,35 | 9,42 | 12,11 |
| 37 Basic metal industries | 3,43 | 3,36 | 3,81 | 3,39 |
| 38 Manufacture of fabricated metal products, machinery and equipment, transport equipment, professional and scientific and measuring and controlling equipment | 23,89 (2) | 23,34 (2) | 23,31 (2) | 16,08 (2) |
| 39 Other manufacturing industries | 1,05 | 1,02 | 0,86 | 0,84 |

**Source:** State Institute of Statistics, Ankara

* Values in the paranthesis enumerate 4 important inferior sectors.

| Table 4-a. % share distribution and the growth rates of the number of enterprises for 4 important medium-sized manufacturing sectors | | | | | | | |
|---|---|---|---|---|---|---|---|
| Inferior sectors years | 31 | | 32 | | 35 | | 38 | |
| 1981 | 17,99 | | 22,85 | | 11,06 | | 23,92 | |
| 1985 | 17,37 | (2,01) | 23,66 | (9,52) | 10,46 | (3,98) | 24,29 | -(1,85) |
| 1990 | 16,55 | -(1,72) | 30,45 | (2,77) | 9,36 | (0,52) | 22,88 | (7,73) |
| 1995 | 13,80 | -(2,92) | 35,55 | (11,47) | 8,86 | (12,11) | 21,21 | (6,25) |
| 1998 | 11,28 | -(0,27) | 36,53 | (9,44) | 8,56 | (5,32) | 23,89 | (12,03) |

**Source**: Calculations are performed by the author using SIS data ( Manufacturing Industry Censuses for 1981-1998). Values in the parenthesis are growth rates of the number of enterprises to the preceding census value of the number of enterprises $(X_t-X_{t-1}/X_t)$

| Table 4-b. % share distribution and the growth rates of the level of employment for 4 important medium-sized manufacturing sectors | | | | | | | |
|---|---|---|---|---|---|---|---|
| Inferior sectors years | 31 | | 32 | | 35 | | 38 | |
| 1981 | 18,27 | | 22,68 | | 10,62 | | 24,07 | |
| 1985 | 18,26 | (8,42) | 23,79 | (9,54) | 9,76 | (4,06) | 24,32 | -(0,48) |
| 1990 | 16,89 | -(1,37) | 30,45 | (2,75) | 9,36 | (1,51) | 22,57 | (9,13) |
| 1995 | 14,30 | -(3,15) | 35,79 | (12,02) | 8,77 | (13,61) | 20,69 | (6,63) |
| 1998 | 11,43 | -(2,82) | 27,88 | (8,49) | 8,45 | (5,20) | 23,34 | (12,83) |

**Source**: Calculations are performed by the author using SIS data ( Manufacturing Industry Censuses for 1981-1998). Values in the parenthesis are growth rates of the employment level of enterpises to the preceding census value of the employment level of enterprises $(X_t-X_{t-1}/X_t)$

| Table 4-c. % share distribution and the growth rates of the value added for 4 important mesium-sized manufacturing sectors | | | | | | | |
|---|---|---|---|---|---|---|---|
| Inferior sectors years | 31 | | 32 | | 35 | | 38 | |
| 1981 | 21,45 | | 17,70 | | 19,94 | | 22,38 | |
| 1985 | 21,77 | (12,40) | 16,41 | (20,43) | 16,62 | (0,98) | 23,20 | (5,32) |
| 1990 | 18,95 | (13,11) | 20,68 | (3,70) | 15,81 | (7,50) | 25,03 | (39,53) |
| 1995 | 17,28 | (18,71) | 22,80 | (8,59) | 16,21 | (20,03) | 20,68 | (27,25) |
| 1998 | 16,39 | (28,51) | 24,24 | (32,72) | 14,37 | (17,22) | 23,31 | (22,24) |

**Source**: Calculations are performed by the author using SIS data ( Manufacturing Industry Censuses for 1981-1998). Values in the parenthesis are growth rates of the value added of enterprises to the preceding census value added of the enterprises $(X_t-X_{t-1}/X_t)$. Value added is deflated by 1981=100 manufacturing WPI.

| Table 4-d. % share distribution and the growth rates of the gross additions to fixed capital for 4 important medium-sized manufacturing sectors | | | | | | | |
|---|---|---|---|---|---|---|---|
| Inferior sectors years | 31 | | 32 | | 35 | | 38 | |
| 1981 | 11,22 | | 25,37 | | 9,66 | | 24,72 | |
| 1985 | 16,95 | (164,83) | 43,49 | (491,50) | 13,12 | (60,69) | 15,86 | -(11,36) |
| 1990 | 16,50 | (75,85) | 24,15 | (32,40) | 14,55 | -(4,25) | 20,77 | (28,24) |
| 1995 | 15,26 | (68,51) | 29,55 | (42,44) | 13,02 | (13,34) | 18,87 | (89,53) |
| 1998 | 15,56 | (68,16) | 27,88 | (8,84) | 13,63 | (24,10) | 16,08 | (10,57) |

**Source**: Calculations are performed by the author using SIS data ( Manufacturing Industry Censuses for 1981-1998). Values in the parenthesis are growth rates of the gross additions to fixed assets of enterprises to the preceding census value of the gross additions to fixed capital of enterprises $(X_t-X_{t-1}/X_t)$. Gross additions to fixed capital is deflated by 1981=100 manufacturing WPI.

**Table 5.  % share distribution of the number of enterprises, level of employment, value added and gross additions to fixed capital of 9 large-sized manufacturing sectors for 1998**

| INFERIOR SECTORS | Number of enterprices | Level of employment | Value added | Gross additions to fixed capital during the year |
|---|---|---|---|---|
| 31 Manufacture of food, beverages and tobacco | **19,46 (3)** | **17,37 (3)** | **13,93 (4)** | **12,91 (4)** |
| 32 Textile, wearing apparel and leather industries | **34,89 (1)** | **34,64 (1)** | **14,96 (3)** | **23,79 (2)** |
| 33 Manufacture of wood and wood products including furniture | **1,82** | **1,37** | **0,87** | **1,58** |
| 34 Manufacture of paper and paper products; printing and publishing | **3,09** | **2,58** | **1,65** | **3,30** |
| 35 Manufacture of chemicals and chemical petroleum, coal, rubber and plastic products | **9,65 (4)** | **9,35 (4)** | **31,41 (1)** | **18,17 (3)** |
| 36 Manufacture of non-metalic mineral products, except products of petroleum and cool | **6,17** | **5,37** | **6,19** | **8,59** |
| 37 Basic metal industries | **4,51** | **7,01** | **9,98** | **7,58** |
| 38 Manufacture of fabricated metal products, machinery and equipment, transport equipment, professional and scientific and measuring and controlling equipment | **19,70 (2)** | **21,88 (2)** | **20,91 (2)** | **23,81 (1)** |
| 39 Other manufacturing industries | **0,71** | **0,43** | **0,11** | **0,27** |

**Source:** State Institute of Statistics, Ankara

\* Values in the paranthesis enumerate 4 important inferior sectors.

| Table 6-a. % share distribution and the growth rates of the number of enterprises for 4 important large-sized manufacturing sectors | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Inferior sectors years | 31 | | 32 | | 35 | | 38 | |
| 1981 | 23,91 | | 23,21 | | 9,99 | | 23,49 | |
| 1985 | 22,30 | -(4,48) | 23,46 | (1,51) | 10,22 | (6,02) | 21,84 | (0,53) |
| 1990 | 21,79 | -(2,59) | 27,97 | (5,84) | 10,22 | (1,92) | 19,86 | (3,52) |
| 1995 | 20,95 | (7,31) | 33,05 | (12,66) | 9,81 | (5,10) | 18,95 | (7,57) |
| 1998 | 19,46 | (6,96) | 34,89 | (0,68) | 9,65 | (5,17) | 19,70 | (0,40) |

Source: Calculations are performed by the author using SIS data ( Manufacturing Industry Censuses for 1981-1998). Values in the parenthesis are growth rates of the number of enterprises to the preceding census value of the number of enterprises $(X_t-X_{t-1}/X_t)$

| Table 6-b. % share distribution and the growth rates of the level of employment for 4 important large-sized manufacturing sectors | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Inferior sectors years | 31 | | 32 | | 35 | | 38 | |
| 1981 | 23,05 | | 25,62 | | 8,82 | | 19,48 | |
| 1985 | 21,34 | -(6,76) | 25,87 | -(3,66) | 9,34 | (8,05) | 20,15 | (3,98) |
| 1990 | 18,46 | -(4,27) | 28,91 | (0,71) | 10,00 | (2,36) | 20,45 | (8,55) |
| 1995 | 18,76 | (0,51) | 32,27 | (10,84) | 9,97 | (0,95) | 20,27 | (0,48) |
| 1998 | 17,37 | (7,96) | 23,79 | (2,16) | 9,35 | -(0,01) | 21,88 | (5,70) |

Source: Calculations are performed by the author using SIS data ( Manufacturing Industry Censuses for 1981-1998). Values in the parenthesis are growth rates of the employment level of enterpises to the preceding census value of the employment level of enterprises $(X_t-X_{t-1}/X_t)$

| Table 6-c. % share distribution and the growth rates of the value added for 4 important large-sized manufacturing sectors | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Inferior sectors years | 31 | | 32 | | 35 | | 38 | |
| 1981 | 18,01 | | 12,10 | | 37,32 | | 14,12 | |
| 1985 | 20,65 | (20,65) | 13,33 | (1,30) | 28,83 | (22,23) | 16,85 | (13,22) |
| 1990 | 15,39 | (8,96) | 13,56 | (15,15) | 32,82 | (15,65) | 18,51 | (31,79) |
| 1995 | 14,78 | (25,43) | 14,30 | (14,86) | 34,51 | (34,37) | 19,46 | (20,21) |
| 1998 | 13,93 | (58,91) | 14,96 | (16,29) | 31,41 | (14,70) | 20,91 | (14,45) |

Source: Calculations are performed by the author using SIS data ( Manufacturing Industry Censuses for 1981-1998). Values in the parenthesis are growth rates of the value added of enterprises to the preceding census value added of the enterprises $(X_t-X_{t-1}/X_t)$. Value added is deflated by 1981=100 manufacturing WPI.

| Table 6-d. % share distribution and the growth rates of the gross additions to fixed capital for 4 important large-sized manufacturing sectors | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Inferior sectors years | 31 | | 32 | | 35 | | 38 | |
| 1981 | 6,50 | | 11,89 | | 18,49 | | 16,63 | |
| 1985 | 6,21 | -(55,98) | 26,57 | (114,78) | 22,12 | (21,57) | 20,92 | (44,83) |
| 1990 | 5,27 | (35,36) | 16,54 | (3,46) | 14,50 | (44,81) | 13,92 | (33,12) |
| 1995 | 7,59 | (3,87) | 23,95 | (69,53) | 21,95 | (100,58) | 18,39 | -(20,20) |
| 1998 | 12,91 | (63,30) | 23,79 | (4,10) | 18,17 | (15,21) | 23,81 | (15,38) |

Source: Calculations are performed by the author using SIS data ( Manufacturing Industry Censuses for 1981-1998). Values in the parenthesis are growth rates of the gross additions to fixed assets of enterprises to the preceding census value of the gross additions to fixed capital of enterprises $(X_t-X_{t-1}/X_t)$. Gross additions to fixed capital is deflated by 1981=100 manufacturing WPI.

# APPENDIX G.

**TABLE 1. Granger Causality Test Results for Manufacturing Sectors**

| SECTORS | lags | Direction of causality | Number of observations | F | Probability | F$_{critical}$ | Decision |
|---------|------|------------------------|------------------------|---|-------------|----------------|----------|
| **31** | **1** | W→E | 17 | **9,456** | 0,008 | 4,54 | **Reject** |
| | | E→W | 17 | **0,200** | 0,661 | 4,54 | **Do not reject** |
| | **2** | W→E | 16 | **0,457** | 0,645 | 3,81 | **Do not reject** |
| | | E→W | 16 | **3,531** | 0,065 | 3,81 | **Do not reject** |
| **32** | **1** | W→E | 17 | **4,245** | 0,058 | 4,54 | **Do not reject** |
| | | E→W | 17 | **2,152** | 0,164 | 4,54 | **Do not reject** |
| | **2** | W→E | 16 | **0,637** | 0,547 | 3,81 | **Do not reject** |
| | | E→W | 16 | **1,580** | 0,249 | 3,81 | **Do not reject** |
| **33** | **1** | W→E | 17 | **0,115** | 0,739 | 4,54 | **Do not reject** |
| | | E→W | 17 | **0,486** | 0,497 | 4,54 | **Do not reject** |
| | **2** | W→E | 16 | **0,244** | 0,788 | 3,81 | **Do not reject** |
| | | E→W | 16 | **0,059** | 0,943 | 3,81 | **Do not reject** |
| **34** | **1** | W→E | 17 | **1,648** | 0,220 | 4,54 | **Do not reject** |
| | | E→W | 17 | **0,804** | 0,385 | 4,54 | **Do not reject** |
| | **2** | W→E | 16 | **2,527** | 0,125 | 3,81 | **Do not reject** |
| | | E→W | 16 | **3,805** | 0,055 | 3,81 | **Do not reject** |
| **35** | **1** | W→E | 17 | **0,634** | 0,439 | 4,54 | **Do not reject** |
| | | E→W | 17 | **9,477** | 0,008 | 4,54 | **Reject** |
| | **2** | W→E | 16 | **4,885** | 0,030 | 3,81 | **Reject** |
| | | E→W | 16 | **0,344** | 0,717 | 3,81 | **Do not reject** |
| **36** | **1** | W→E | 17 | **5,241** | 0,038 | 4,54 | **Reject** |
| | | E→W | 17 | **5,666** | 0,032 | 4,54 | **Reject** |
| | **2** | W→E | 16 | **2,915** | 0,096 | 3,81 | **Do not reject** |
| | | E→W | 16 | **0,979** | 0,406 | 3,81 | **Do not reject** |
| **37** | **1** | W→E | 17 | **9,318** | 0,009 | 4,54 | **Reject** |
| | | E→W | 17 | **0,760** | 0,398 | 4,54 | **Do not reject** |
| | **2** | W→E | 16 | **0,023** | 0,977 | 3,81 | **Do not reject** |
| | | E→W | 16 | **5,251** | 0,025 | 3,81 | **Reject** |
| **38** | **1** | W→E | 17 | **0,029** | 0,868 | 4,54 | **Do not reject** |
| | | E→W | 17 | **3,093** | 0,100 | 4,54 | **Do not reject** |
| | **2** | W→E | 16 | **1,508** | 0,264 | 3,81 | **Do not reject** |
| | | E→W | 16 | **0,057** | 0,945 | 3,81 | **Do not reject** |
| **39** | **1** | W→E | 17 | **0,019** | 0,893 | 4,54 | **Do not reject** |
| | | E→W | 17 | **2,739** | 0,120 | 4,54 | **Do not reject** |
| | **2** | W→E | 16 | **0,711** | 0,512 | 3,81 | **Do not reject** |
| | | E→W | 16 | **0,072** | 0,931 | 3,81 | **Do not reject** |
| **TOTAL** | **1** | W→E | 17 | **0,640** | 0,437 | 4,54 | **Do not reject** |
| | | E→W | 17 | **9,164** | 0,009 | 4,54 | **Reject** |
| | **2** | W→E | 16 | **3,822** | 0,055 | 3,81 | **Reject** |
| | | E→W | 16 | **0,548** | 0,593 | 3,81 | **Do not reject** |

**\*\*W→E** represents that annual payments to employees does not Granger cause number of employees

**\*\*\*E→W** represents that number of employees does not Granger cause annual payments to employees