**İSTANBUL TECHNICAL UNIVERSITY ★ INSTITUTE OF SOCIAL SCIENCES**

# A DECOMPOSITION ANALYSIS OF LABOR FORCE PARTICIPATION TRENDS IN TURKEY: 1988-2006

**M.A. Thesis by**
**Serkan DEĞİRMENCİ**

**Department : Economics**

**Programme : Economics**

**JUNE 2009**

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**Supervisor (Chairman) : Assoc. Prof. Dr. İpek İLKKARACAN AJAS (ITU)**
**Members of the Examining Committee : Assoc. Prof. Dr. Haluk LEVENT (GSU)**
**Assis. Prof. Dr. Mehtap HİSARCIKLILAR (ITU)**

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**İSTANBUL TEKNİK ÜNİVERSİTESİ ★ SOSYAL BİLİMLER ENSTİTÜSÜ**

# TÜRKİYE'DE İŞGÜCÜNE KATILIM EĞİLİMLERİNİN BİR AYRIŞTIRMA ANALİZİ: 1988-2006

**YÜKSEK LİSANS TEZİ**

**Serkan DEĞİRMENCİ**
**(412071021)**

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**Tez Danışmanı : Doç. Dr. İpek İLKKARACAN AJAS (İTÜ)**
**Diğer Jüri Üyeleri : Doç. Dr. Haluk LEVENT (GSÜ)**
**Yrd. Doç. Dr. Mehtap HİSARCIKLILAR (İTÜ)**

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## FOREWORD

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## ABBREVIATIONS

**CBRT:** Central Bank of the Republic of Turkey
**CDF:** Cumulative Distribution Function
**CIS:** Commonwealth of Independent States
**CPS:** Current Population Survey
**EU:** European Union
**FLFP:** Female Labor Force Participation
**GDP:** Gross Domestic Product
**HLFS:** Household Labor Force Survey
**ILO:** International Labour Organization
**LIS:** Luxembourg Income Study
**LFP:** Labor Force Participation
**LFPR:** Labor Force Participation Rate
**OECD:** Organisation for Economic Co-operation and Development
**OLS:** Ordinary Least Squares
**SIPP:** Survey of Income and Program Participation
**TFR:** Total Fertility Rate
**TURKSTAT:** Turkish Statistics Institute
**US:** United States
**WB:** World Bank

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**A DECOMPOSITION ANALYSIS OF LABOR FORCE PARTICIPATION TRENDS IN TURKEY: 1988-2006**

## SUMMARY

The labor force participation rate in Turkey has witnessed a steady decline in the last two decades. While the average values for the labor market have been declining, there have been substantial variations in the dynamics of participation amongst different sectors of the population, including rural-urban dynamics and male-female dynamics. The Turkish labor market is characterized by substantially higher male LFP rates than female and higher rural LPF rates than urban. This study aims to explore the changes in the determinants of labor force participation in Turkey for different population groups during the years 1988 to 2006.

The micro data of 1988, 2000, and 2006 Household Labor Force Surveys executed by TURKSTAT were employed in the study's empirical analyses. The first step entailed the determination of factors affecting the participation of the working age population in the labor force by means of logit regression models. Then via empirical analyses, the urban male and female subsamples were examined, and the study attempts to bring to light the differentiations in labor force participation probabilities among these subsamples for the period 1988 to 2006. A non-linear decomposition analysis has been employed to explore these differentiations.

Logit regression estimations show that factors like age, education level, marital status, whether or not one is head of a household, the presence of children below the age of 14, and household size are significant determinants of labor force participation for all of the working age population. The marginal effects of these factors however, differ substantially for urban males and females. The effects of these determinants change over time.

According to the results of the decomposition analyses, we find that the difference between the labor force participation probabilities of urban males and females has decreased over time. In addition to the increase in the labor force participation probabilities of women, the decrease in male participation probabilities has been notably influential in the narrowing of the gender-based participation gap.

Decomposition analysis shows that the changes in the explanatory variables included in our model (i.e. the observable and measurable factors) provide only a limited explanation of the observed changes in LFP trends in the 1988-2006 period.

We find that a substantial portion of the change in LFP trends through time is due to changes in the coefficients i.e. the so-called "unexplained" part.

**TÜRKİYE'DE İŞGÜCÜNE KATILIM EĞİLİMLERİNİN BİR AYRIŞTIRMA ANALİZİ: 1988-2006**

## ÖZET

Son yirmi yıllık dönemde Türkiye'de işgücüne katılım oranı sürekli azalan bir eğilim izlemiştir. İşgücü piyasasının genel ortalama oranı düşmekteyken, kır-kent veya erkek-kadın gibi farklı nüfus grupları arasında katılım dinamiklerinde önemli farklılıklar vardır. Türk işgücü piyasası önemli ölçüde kadınlarınkinden yüksek erkek işgücüne katılım oranları ve kentsel kesimden yüksek kırsal kesim işgücüne katılım oranları ile karakterize olmuştur. Bu çalışma Türkiye'deki farklı nüfus grupları için 1988-2006 periyodunda işgücüne katılımın belirleyicilerindeki değişimleri araştırmaktadır.

Ampirik analizlerde Türkiye İstatistik Kurumu tarafından yapılan 1988, 2000 ve 2006 Hanehalkı İşgücü Anketlerinin mikro verileri kullanılmaktadır. İlk olarak, logit regresyon modelleri ile çalışma çağı nüfusunun işgücüne katılımını etkileyen faktörler tespit edilmektedir. Daha sonra, ampirik analizlerle, kentsel kesim erkek ve kadın alt örneklemlerine odaklanılmakta ve 1988-2006 periyodunda bu alt örneklemler arasındaki işgücüne katılım olasılıkları farklılaşmalarının kaynaklarına ulaşılmaya çalışılmaktadır. Bu farklılaşmaları araştırmak için lineer olmayan bir ayrıştırma analizi kullanılmaktadır.

Logit regresyon tahminleri göstermektedir ki yaş, eğitim düzeyi, medeni durum, hanehalkı reisi olma, hanede 14 yaşından küçük çocuğun varlığı ve hanehalkı büyüklüğü gibi faktörler bütün çalışma çağı nüfusunun işgücüne katılımının anlamlı belirleyicileridir. Bu faktörlerin marjinal etkileri ne var ki, kentsel kesim erkek ve kadınları için oldukça farklılaşmaktadır. Bu belirleyicilerin etkileri zaman içinde değişmektedir.

Ayrıştırma analizlerinin sonuçlarına göre, kentsel kesim erkek ve kadınları arasındaki işgücüne katılım olasılıklarındaki farkın zamanla azaldığını buluyoruz. Cinsiyete dayalı katılım farkının daralmasında, kadınların işgücüne katılma olasılıklarındaki artışın yanında, erkeklerin katılma olasılıklarındaki düşüş oldukça etkili olmuştur.

Ayrıştırma analizi gösteriyor ki modelimize dâhil ettiğimiz açıklayıcı değişkenlerdeki (yani gözlemlenebilen ve ölçülebilen faktörlerdeki) değişimler, 1988-2006 periyodunda işgücüne katılım eğilimlerindeki gözlemlenen değişimlerin sadece kısıtlı bir açıklamasını sağlıyor.

Zaman içinde işgücüne katılım eğilimlerindeki değişimin önemli bir bölümünün katsayılardaki değişim yani "açıklanamayan" kısımdan dolayı olduğunu buluyoruz.

## 1. INTRODUCTION

Although Turkey has been suffering to achieve a sustainable economic growth performance in the long-run, high growth rates have been relatively experienced until recent years.[1] The post-crisis reforms implemented after 2001 have provided low inflation rates and ameliorated public expenditures. Rising export and foreign direct investment revenues have accompanied this rapid growth. The volume of international trade has expanded and financial capital inflows accelerated during this period. But, all of these were not the pure consequences of increments in total factor productivity or domestic economic progress or just political stability as alleged, but rather they were the significant reflections of global liquidity expansion into the Turkish economy. However, this rapid growth neither created enough additional employment opportunities nor stimulated labor force participation, and thus job creation performance in Turkey has been consistently weak since the 1980s.[2] Encouraging more extensive participation and increasing the employment levels of the adult population, as well as long-term growth, are Turkey's main policy challenges.

Nowadays the devastating results of the ongoing economic contraction is much more striking in labor markets due to the pervasive effects of the recent worldwide financial crisis into the real sectors of Turkey and in other developing economies.[3] A large number of firms are going bankrupt or are at the cusp of bankruptcy, both in the real and financial sectors. Rather than creating new job opportunities and employing additional workers, firms have started to cut production and lay off experienced workers, leading to a skyrocketing of unemployment rates.

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[1] The annual average economic growth rate of the Turkish economy was 5 % from 1950 to 2007, about 4 % between 1987 and 2007, and 6.74 % in 2002-2007 (CBRT & TUSIAD, 2008).

[2] According to the "Growth Dynamics of Turkish Economy" report of CBRT (2008), total employment has increased on average 1.3 % (annually) between 1987 and 2007 in the Turkish economy. Job creation potential of the economy was relatively strong in 1980s and it weakened in the 1990s. Although rapid economic growth was experienced in the early 2000s, employment has not increased as expected. This can be referred to as "jobless growth."

[3] According to the annual Global Employment Trends report (2009) of ILO, the global economic crisis is expected to lead to a dramatic increase in the number of people joining the ranks of the unemployed, working poor and those in vulnerable employment.

According to the recent news bulletin of the Turkish Statistical Institute (TURKSTAT) regarding labor market statistics,[4] the total unemployment rate in March term of 2009 was 15.8%. The non-agricultural unemployment rate for the same term was 18.9%. Even worse, the total unemployment rate of the young generation (aged between 15 and 24) was 27.5%. However, real effects of this recession and its net results on the Turkish economy cannot be analyzed merely by considering current increases in unemployment rates. The first reason for this can be linked to a World Bank (WB) report in 2006 regarding the labor market in Turkey, which asserted that the gap between the labor force and employment (unemployment) does not provide a full indicator of slackness in the labor market, because of a large non-participant share[5] in the adult population. Another reason is that officially announced unemployment rates cannot reflect the real extent of unemployment in periods of economic crisis, and participation behavior in the labor market changes with economic contraction.[6] For these reasons, in addition to other indicators of the labor market, the dynamics and trends of labor force participation rates should be monitored and analyzed to make sound assessments both in the short- and long-run. The first aim of this research study is to provide a clear and comprehensive analysis to understand the trends and dynamics of labor force participation patterns in Turkey.

While annual total employment, labor force participation and unemployment rates were 52.6%, 57.5%, and 8.4%, respectively, in 1988,[7] these same indicators were respectively 39.2%, 46.5%, and 15.8%[8] in March 2009. These long-run demand- and supply-sided contractions in the Turkish labor market are challenging. There are primary and well-known causes for these declines, documented in the literature. One cause is the evolution of a production structure which is shifting from agriculture to industry and service sectors (referred to as "disintegration" in the agricultural employment), and the second is substantial internal migration movements from rural to urban areas (a rapid pattern of urbanization from 1960 onwards has been

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[4] This bulletin was announced at 15 June 2009 by TURKSTAT.
[5] The annual average share of non-participants in the adult population as of January 2009 was 54.1 % in Turkey.
[6] Added or discouraged workers may predominate in recession periods. Details of this argument will be given in Chapter 2.
[7] These statistics are from the October round of 1988 HLFS.
[8] In 2007, the average unemployment rate (5.6 %) of all OECD countries was its lowest level since 1980. Unfortunately, Turkey was one of the countries that raised this average for that year (OECD Employment Outlook, 2008).

witnessed). These two long-run movements entail shifts in economic and demographic structures. Transformations of these two crucial pillars have influential implications for labor market indicators. That is the reason this study will mention demographic factors in addition to economic factors while analyzing labor force participation trends.

In summary, dramatic changes in the labor supply indicators of the recent two decades do not only arise from the macro economic conditions of growth and crises, but also stem from demographic transitions[9] and socio-cultural transformations. Hence, they may change over time as well as within different population groups.[10] In this study, the accentuated time interval is the last two decades (1988-2006) and the analyzed population groups are disaggregated by gender, location of residence (rural and urban), age, and education levels. Generally, the changing participation decisions and behaviors of individuals who are male or female, rural or urban residents, of different ages[11] and education levels depend on different structural determinants over time, so these types of disintegrations are necessary for a comprehensive analysis of LFP, especially for Turkey. The second aim of this study is to identify and outline the determinants of LFP, decomposing the changes according to different population groups over time.

With these aims in mind, it will be useful to summarize some recent labor market indicators. Female and male labor force participation rates as of March 2009 were 24.4% and 69.5%, respectively. In the same term, the employment rate for women was 20.6% and for men 58.5%. Both indicators point out a significant gender gap in favor of males in the labor market, suggesting that the strictly male-dominant structure of the Turkish labor market still prevails since 1950s.[12] Labor force participation and employment rates for rural women were 30% and 28.1%, for urban women the

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[9] The demographic transition has meant a rapid increase in the working age population over the last 20 years.

[10] As Turkey has urbanized and families have moved out of agriculture, employment rates for women have fallen significantly. A significant number of women who are not working are not looking for employment, a principal reason for the low labor force participation rates (WB, 2006).

[11] For example, by age 55, participation in the labor market drops considerably in Turkey. The average employment rate for the 55-64 age group is 33 percent in 2006 (WB, 2006).

[12] According to the results of population censuses and household labor force surveys executed by TURKSTAT, the female labor force participation rate was 72.0 percent in 1955, 26.6 percent in 2000 percent and 24.4 percent in 2007. On the other hand, according to the ILO (2008) average female labor force participation rates in developed economies and the European Union were 52.7 percent, 26.1 percent in North Africa and 33.3 percent in the Middle East.

corresponding rates were lower, 22% and 17.3%. But this difference does not intimate that rural women are participating in the labor force for the sake of decent work conditions or for high wages. Rural women's high participation and employment rates have historically been linked to the unpaid family (farm) working structure in small-scale based agricultural sectors of rural areas. With the migration of rural families to urban areas, women's integration into labor markets has started to be problematic. Different working conditions of urban areas which demand job qualifications and which introduce new out-of-home work environs have hindered women's participation in labor markets. Women's difficulties integrating into the labor market cannot be explained with just these two arguments, however. Gender-based division of labor taboos (based on conventional Turkish family idealizations of "home-maker" women's roles and "decision-maker" male roles), gender-based occupational segregation and other rigid hindrances preventing women from participating in (working) life are facts of Turkish society.

The location differentiation of residence does not reflect heavily on participation and employment rates of males. The participation and employment rates for urban men are 69.1% and 57.4%; for rural men these are 70.3% and 61.1%. Historically, youths' (15-24 age group) participation and employment rates are usually lower than adults.' The total youth labor force participation rate is 36.8% and the employment rate is only 26.6%. This can be interpreted in two ways. Increasing years of schooling defers the integration of young people into the labor force or this integration process is also problematic.[13] Therefore, women's and youths' (the two most vulnerable groups) disadvantaged positions in the Turkish labor market should be a research topic for a further study.

Although these statistics for March 2009 give some cursory ideas for the recent state of the Turkish labor market, they only represent the static characteristics and current situation of the labor market. To understand participation dynamics and patterns, a longitudinal comprehensive empirical analysis based on sound designed models and survey data is crucially needed. These types of detailed analytical investigations of

[13] The second option seems likely for Turkey. Educated young people especially have difficulties finding jobs, and therefore unemployment rates are high for them. Here, both the factors of demand and supply are likely to important. The economy may not be generating jobs that can absorb educated young, but also the educated young may not be well-suited to the job market. Older workers appear to find jobs more readily than younger workers, independent of their education levels (WB, 2006).

LFP trends will be conducted in Chapter 4, Chapter 5, and Chapter 6. Following a short summary of national labor market statistics, we will then turn our attention to comparing and placing Turkey among the world's developed and developing economies.

According to the EUROSTAT's statistics (2007), Turkey has the lowest total employment, the seventh lowest male employment, and the lowest female employment rates among the European Union member and candidate countries. Most of the E.U. countries' concerns about the full membership (and access to a full labor-mobility) of Turkey to the E.U. stem from Turkey's low level of employment and weak participation performance, which are far from the Lisbon targets of the E.U. for these labor market indicators.[14] Furthermore, there is a serious youth unemployment problem in Turkey which is higher than the E.U. average; nevertheless, Turkey is not alone on this issue. In many E.U. countries, depending on the age of the population, youth unemployment seems to be a structural issue, with various policies of encouragement aimed at alleviating the problem.[15]

Furthermore, according to the International Labour Organization's study (ILO), "Key Indicators of the Labour Market" (Fifth Edition, 2007), the average female labor force participation rate in 2006 was 25.8% for North Africa, 32.5% for the Middle East, 36.1% for South Asia and 49.6% for Central & South Eastern Europe (non-EU) & CIS. Turkey's female labor force participation was only 24.9% in 2006, much lower than these regional averages.

The OECD statistics (2008) also verify the job deficit problem in Turkey. Between 1993 and 2006, although Turkey is the third-fastest growing economy, after China and India (in terms of the annual change in real GDP growth), Turkey has the lowest total (male and female) employment rate (as average annual growth in percentage) among OECD member countries.

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[14] The European Council meeting in Lisbon in 2000 adopted an employment rate target of 70 percent to be met by 2010. With a population that is still growing, Turkey will have to generate about 14 million jobs to reach the Lisbon target employment rate. According to the report of World Bank (2006), with the current trends of the GDP and employment growth, only 1.5 million jobs will be created by 2010. The targets for the female employment rate and employment for workers over 55 are even more difficult. The magnitude of the job deficit suggests that immediate action is needed.

[15] The average youth (less than 25 years-old) unemployment rate of Turkey in 2007 was 16.8% and the EU-15 average was 14.7%.

Both national and international labor market statistics show in sharp relief that Turkish authorities' initiatives have been inadequate in encouraging participation (especially for women and the youth) and in creating new employment opportunities (jobs) for those newly joining the workforce. Many studies concerning labor force participation and employment in Turkey have tried to put these cases clearly and to reveal the plausible reasons for these problems, providing several prescriptions to remedy them.

These studies on labor force participation, particularly in terms of female employment, are unanimous in suggesting that the level of education (increasing enrollment rates, schooling years and/or quality) is necessary to raise participation rates and to improve employment opportunities. However, most of the empirical models employed in these studies neglect the fact that just identifying the determinants of participation and testing their statistical significances are not enough to understand and reveal the composition of changes in participation over time. After conventional estimations of LFP equations, interpretations of obtained coefficients should be undertaken in regards to their economic significance. Further empirical techniques are needed to be able to undertake these detailed interpretations, following estimations. Studies considering the participation dynamics of the Turkish labor market within this framework are limited. One of the main aims of this study is to fulfill this empirical gap employing alternative techniques with LFP analyses.

To sum up, the benefit of this thesis will be realized by conducting a comprehensive empirical analysis, including a full evaluation of the changes in participation and noting whether the shifts in participation rates from 1988 to 2006 are due to disparities in observed characteristics (endowments) or to differences in estimated coefficients. Following such an analysis, it is hoped that it will be easier to make more accurate inferences and to suggest more effective (feasible) policies for the existent problems of the Turkish labor market.

Briefly, the objectives of this thesis are to:

- explore the patterns in Turkey during 1988-2006 and determinants of LFP for different sectors of population disaggregated by rural and urban location and gender.

- using decomposition analysis, study the sources of changes in LFP patterns of these different population groups, based on the Household Labor Force Surveys (HLFS) micro data of three different years; 1988, 2000 and 2006.
- explore the changes in LFP trends of these different population groups through time, namely from 1988 to 2006 (the first and the last year of availability of HLFS as of date).

The study proceeds as follows: Chapter 2 provides a survey of fundamental theories which set the theoretical background of labor supply. Chapter 3 classifies the studies which employ logit/probit regression analysis and decomposition techniques frequently used in the literature and also provides technical summaries of these studies both from the national and international literature. Chapter 4 provides an overview of the Turkish labor market's post-1988 era disaggregated by gender, residence, age, and education level. Chapter 5 employs the analyzed years' (1988, 2000, 2006) micro data to determine and test the statistical significances of the determinants of labor force participation in urban areas by using logit regression models. Chapter 6 decomposes the differences in predicted participation probabilities between urban males and females over time (from 1988 to 2006) into explained and unexplained parts by emphasizing the contributions of estimated coefficients to the total explained part. Chapter 7 concludes the study.

## 2. THEORETICAL FRAMEWORK

The topic of labor supply has been theorized and illustrated within both basic and sophisticated models by economists. These theories and models have attempted to grasp the factors effect and determine the individual/household labor supply/participation decisions and some of them criticize these determinants on the basis of endogeneity. A summary of these fundamental economists' thoughts and their schools' core views about labor supply will be given throughout the chapter. This theoretical survey comprises the main arguments of neoclassical (mainstream), its extensions and other alternative (heterodox) schools, respectively and comparatively.

### 2.1 The Labor Supply Model of Neoclassical School and Its Extensions

According to the neoclassical theory (predominant school of contemporary economic theory) of labor supply, every individual trades off between consuming a good and consuming leisure (assuming leisure is a normal good).[16] This approach of neoclassical school is based on the traditional microeconomic model of consumer choice. With it, we can elucidate the properties of labor supply and begin to understand the conditions of participation in the labor market.

The supply of individual labor is positive if the current wage exceeds the reservation wage,[17] which depends on preferences and non-wage income. If labor supply is positive, the marginal rate of substitution between consumption and leisure is equal to the hourly wage (wage rate). The relation between the individual supply of labor and the hourly wage is the result of combined substitution and income effects. The

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[16] This trade off includes two assumptions of basic neoclassical model. First, there are only two possible uses of time: labor (to consume), and leisure. Second, each individual choose the optimal combination of work hour and leisure to maximize his or her individualistic utility.

[17] The reservation wage is the wage that makes a person indifferent between working and not working. A person enters the labor market when the market wage rate exceeds the reservation wage. An increase in the nonlabor income raises the reservation wage and thus lowers the probability that a person enters the labor market; an increase in the wage rate raises the probability that a person works. (Borjas, 2000:65). Generally, this wage can be interpreted as a function of an individual's preferences and unearned income.

substitution effect implies an increasing relation between the wage and labor supply, while the income effect works in opposite direction if leisure is a normal good. The supply of labor generally rises with the wage at low wage levels (the substitution effect prevails) and falls off when the wage reaches higher levels (the income effect prevails).[18] In the neoclassical theory of labor supply, the labor force participation rate[19] corresponds to the proportion of individuals whose reservation wage is less than the current ruling wage.

When an individual has the opportunity to devote a part of his or her endowment of time to household production, at the optimum, the hourly wage is equal to the marginal productivity of household work. Household production increases the elasticity of the individual supply of wage work.[20] As a general rule, the mechanism of substitution of leisure over time implies that the permanent component of the evolution of real wages has a feeble effect on labor supply, whereas the transitory component affects this variable more strongly. The elasticity of labor supply by women is, in general, greater than that of men, which is small. Moreover, variations in the total number of hours worked in an economy flow principally from variations in participation rather than from variations in hours worked by individuals. The methodology of natural experiments confirms the results of more traditional econometric studies, showing that financial incentives significantly influence labor supply of women. Finally, the neoclassical theory of labor supply permits the explanation of certain characteristics of long-term tendencies in amount of time worked and male and female participation rates.

Overall, the theory of labor supply sheds much light, often in agreement with empirical observations; on the manner in which agents decide how long to be active as wage-earners. It does not, however, allow us to understand why there should be

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[18] Economic theory cannot say which effect will dominate, and in fact individual labor supply curves could be positively sloped in some ranges of the wage and negatively sloped in others. The person's desired hours of work increase (substitution effect dominates) when wages go up as long as wages are low. At higher wages, however, further increases result in reduced hours of work (the income effect dominates); economists refer to such a curve as backward bending. (Ehrenberg and Smith, 2003:172)

[19] The labor force participation rate is the percentage of a given population that either has a job or is looking for one. (Ehrenberg and Smith, 2003:164)

[20] There are economic incentives for some members of the household to specialize in the household sector and other members to specialize in the labor market. The household members who specialize in the labor market will tend to have higher wage rates or be less productive in the household sector. (Borjas, 2000:100)

unemployed people looking for work, since this category of the population has no reason to exist in a universe where information is perfect. The theory of the job search abandons the hypothesis of such a universe and succeeds in explaining the simultaneous presence of unemployed people and nonparticipants. It marks an important advance in the analysis of the functioning of the labor market. (Cahuc and Zylberberg, 2004)

So far, the neoclassical model of labor supply depicted has been for a single decision maker, who was assumed to be trying to maximize his or her own utility. Another perspective to the labor supply decision in the neoclassical school is the joint (family) labor supply decision within the household.

> For a long time, neoclassical economics concerned itself largely with the behavior of "economic man." It was, of course, acknowledge that this man interacted with others, in competition or in cooperation, but it was his individual well-being that he would attempt to maximize. Consumer economics had long recognized the existence of the family and its importance as a unit of consumption.[21] However, not until the 1960s, with the path-breaking work of Gary Becker and Jacob Mincer, did mainstream economists begin to concern themselves with the issues confronted by men and women in allocating their time and wealth so as to maximize family well-being. Since then using sophisticated theory and advanced econometric methods, models have been developed and tested that have produced important insights in this area. Yet many of these models are not altogether satisfactory, for there is still a tendency to treat even this multiperson family as a single-minded, indivisible, utility-maximizing unit. (Blau, Ferber, and Winkler, 1998:31-32)

For those who live with partners, however, some kind of joint decision-making process must be used to allocate the time of each and to agree on who does what in the household. This process is complicated by emotional relationships between the partners, and their decisions about market and household work are also heavily influenced by custom. Nevertheless, economic theory may help provide insight into at least some of the forces that shape the decisions all households must make. The formal models of decision-making among married couples have been developed. All of which are based on principles of utility maximization, fall into three general categories. The simplest models extend the assumption of a single decision maker to marriage partners, either by assuming they both have exactly the same preferences or by assuming that one makes all the decisions. A second type of model assumes that

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[21] Besides, family is itself an economic unit with different kinds of production circulating in it.

the partners engage in a bargaining process in making household decisions; each is assumed to have resources that affect their bargaining power. Finally, some models assume that the partners act independently to maximize their own utility, but each does so by considering the likely actions, and reactions, of the other. Whatever process partners use to decide on the allocation of their time, and it may be different in different households, there are certain issues that nearly all households must face. For example, a couple deciding whether one partner should stay home more and perform most of the child-rearing would want to consider what gains and losses are attendant on either the husband or the wife assuming this responsibility. The losses from staying home are related to the market wage of each, while the gains depend on their enjoyment of, and skill at, child-rearing. If a given woman's wage rate is lower than her husband's and the woman is more productive in child-rearing, the family gives up less in market goods and gains more in child-rearing if the wife takes primary responsibility in this area. What the theory of household production emphasizes is that the distribution of household work may well change as wages, incomes, and home productivities change. Thus, decisions of about household labor supply must be made in full consideration of the market and household productivities of both partners (Ehrenberg and Smith, 2003).

To sum up, according to these extensions of simple neoclassical labor supply model for families (households), labor force participation decision processes of spouses depend on their comparative productivities in the market and home by emphasizing the gains from division of labor (among household members) under perfect information assumption. The fundamental and visible measure of this productivity is the wage rate.

> Evidently the wage an individual can demand constitutes an important factor in the choice of the quantity of labor supplied. But it is not the only factor taken into account. Personal wealth, income derived from sources outside the labor market, and even the familial environment also play a decisive role. In reality the allocation of one's time depends on trade-offs more complex than a simple choice between work and leisure. In the first place, the counterpart of paid work is not simply leisure in the usual sense, for much of it consists of time devoted to ''household production'' (the preparation of meals, housekeeping, minor repairs and upkeep, the raising of children, etc.), the result of which substitutes for products available in the consumer goods market. This implies that the supply of wage labor takes into account the costs and benefits of this household production, and that most often it is the result of planning, and even actual negotiation, within the family. The family situation, the

> number of children, the income a person enjoys apart from any wage labor (personal wealth, illegal work, spousal income, etc.), all weigh heavily in this choice. Decisions concerning labor supply also depend on trade-offs over the course of time that make the analysis of the decisions of agents richer and more complex. (Cahuc and Zylberberg, 2004:4)

Besides, in some conjectural adverse economy-wide occasions such as in recessions (which cause widespread mass unemployment), family's basic labor supply decision can alter not only depending on the wage rate of spouses but on the changes in the family income (budget). At these times, the participation decisions of the family (household) members are determined not only with the joint decision of the household but also with the labor demand potential of the economy. Therefore, labor supply and demand mechanisms start to work adversely. The empirical questions arise here. While the labor demand is getting tighter, what happens to the aggregate labor supply? Does labor force participation rate increase or decrease?

The inclusion of two crucial effects into the labor market analysis which are named, added-and discouraged-worker effects constitute the important part for the answers of these empirical questions. Because, the size of the added- and discouraged-worker effects almost determine the net effect on overall participation rates and reveals the real unemployment rate different from the official statistics announced in these recessions terms.

> Consider, for example, a "traditional" family in which market work is performed by the husband and in which the wife is employed full-time in the home. What will happen if a recession causes the husband to become unemployed? The husband's market productivity declines, at least temporarily. The drop in his market productivity relative to his household productivity (which is unaffected by the recession) makes it more likely that the family will find it beneficial for him to engage in household production. If the wage his wife can earn in paid work is not affected, the family may decide that, to try to maintain the family's prior level of utility (which might be affected by both consumption and savings level), she should seek market work and he should substitute for her in home production for as long as the recession lasts. He may remain a member of the labor force as an unemployed worker awaiting recall, and as she begins to look for work, she becomes an added member of the labor force.[22] Thus, in the face of falling family income, the number of family members seeking market work may increase. This potential response is akin to the income effect in

[22] This type of response to the recession is called as the added worker effect. The added-worker effect is the idea that when the primary breadwinner in a family loses his or her job, other family members will temporarily enter the labor force in the hope of finding employment to offset the decline in the family's income. (McConnell, Brue, and Macpherson, 2006:75)

> that, as family income falls, fewer commodities are consumed-and less time spent in consumption tends to be matched by more desired hours of work for pay.
>
> At the same time, however, we must look at the wage rate someone without a job can expect to receive if he or she looks for work. This expected wage, denoted by E(W), can actually be written as a precise statistical concept, $E(W) = \Pi W$, where W is the wage rate of people who have the job and $\Pi$ is the probability of obtaining the job if out of work. For someone without a job, the opportunity cost of staying home is E(W). The reduced availability of jobs that occurs when the unemployment rate rises causes the expected wage of those without jobs to fall sharply for two reasons. First, an excess of labor supply over demand tends to push down real wages (for those with jobs) during recessionary periods. Second, the chances of getting a job fall in a recession. Thus, both W and $\Pi$ fall in a recession, causing E(W) to decline.
>
> Noting the substitution effect that accompanies a falling expected wage, some have argued that people who would otherwise have been looking for work become discouraged in a recession and tend to remain out of the labor market. Looking for work has such a low expected payoff for them that such people decide that spending time at home is more productive than spending time in job search. The reduction of the labor force associated with discouraged workers in a recession is a force working against the added-worker effect,[23] just as the substitution effect works against the income effect. (Ehrenberg and Smith, 2003:213-214)

These two effects influence the overall labor force participation rate oppositely at the same time. The added worker effect increases and the discouraged worker decreases the overall labor force participation rate and the labor force size during the recessions. Here is the critical question is which of these two effects dominate in these periods. To determine what actually happens to participation rates over the business cycle, further empirical analyses are needed.

## 2.2 Criticisms of the Neoclassical Labor Supply Model

As it is mentioned in the previous section, according to the simple neoclassical model of labor supply, in core, labor force participation decisions depend on utility maximization aim both in individual and household levels and the unique way to get it is to allocate the time between paid and unpaid works optimally, considering comparative productivities of specializing in these different works and so gained

[23] The discouraged worker effect argues that many unemployed workers find it almost impossible to find jobs during a recession, and simply give up. Rather than incur the costs associated with fruitless job search activities, these workers decide to wait out the recession and drop out of the labor force. (Borjas, 2000:76)

utilities or wages from them. However, some heterodox economists dreadfully opposed especially to these sharp-edged ideas which accept the division of labor as the unique way of utility maximization for both spouses, of the neoclassical school and they give separate emphasizes to the men's and women's positions within family and in the society.

According to the book, titled "The Economics of Women, Men, and Work", of Blau, Ferber, and Winkler (1998), substantially different interpretations of the existing division of labor within the family and its relation to the position of women and men in the labor market are offered by a variety of heterodox economists.[24] The main views are of Marxists, Marxist feminists, and radical feminists. There is by no means total agreement among the adherents of these alternative views, particularly with respect to the role of capitalism and patriarchy as causes of the inferior status of women. What they have in common is that they all emphasize the role of power relations and exploitation, both between capitalists and workers in the labor market, and between men and women in the family. These are concerns that are entirely absent from the abovementioned traditional neoclassical models of the family.

Capitalism describes an economy where the preponderance of capital is privately owned and controlled, even though government may also play a large part, as in the case in the United States and other capitalist countries. Marxists see such economies as one in which capitalists wield power over workers who do not own the means of production and are therefore forced to sell their labor. Patriarchy is the name given to a system in which men's dominance as a group over women as a group is the real source of gender inequality. In addition, Folbre (1994) argues, patriarchal power is also based on age and genderual difference.

Marxists argue that capitalists exploit workers and doubly exploit women who are unpaid homemakers providing the reproductive services in the family that enable the capitalists to hire the workers for such low wages. Therefore, it is capitalists, not men, who cause women's inferior status. According to their doctrine, women were not oppressed before the appearance of capitalism and their problems will vanish with capitalism's disappearance. Hence, women's support of feminism is merely a

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[24] Heterodox views or theories are those that are alternative to neoclassical or orthodox economics, which is the established mainstream view.

form of false consciousness and an undesirable distraction from the true struggle of men and women against the injustices of capitalism.

Radical feminists, on the other hand, see the family as the true locus of women's oppression. In addition, although they recognize both the existence of emotional ties and of some unified interests within the family, they also see it as the locus of struggle. Radical feminists were also the ones who originated the slogan "the personal is political." In this view, when Jane is responsible for taking care of the household and the children, while John "helps her" by clearing the table, taking out the garbage, and putting the children to the bed, this is not merely the result of a private decision of these individuals but is to a considerable extent influenced by patriarchal tradition and, in turn, serves to perpetuate patriarchal tradition. Furthermore, radical feminists assert that the patriarchal tradition existed long before capitalism and would continue even if capitalism disappeared. Hence, they believe that the particular economic system is irrelevant to their concern with the economic system.

The Marxist feminist interpretation of the situation is different from either of the other two. Adherents of this view believe that the present status of women is the result of a long process of interaction between patriarchy and capitalism. They argue that patriarchy preceded capitalism and helped to shape its present form, but that capitalism in turn has helped to shape patriarchy as it exists today. Specifically, they claim that the primary mechanism for maintaining male superiority in the capitalistic economy has been occupational segregation, the restriction of women in the labor market to a relatively small number of predominantly female jobs. This job segregation, caused and perpetuated not only by capitalists but also by male workers and their unions, depresses wages for women and thus makes them economically dependent on men. At the same time, the traditional division of labor in the home reinforces occupational segregation in the labor market. Therefore, Marxist feminists argue that if women's subordination is to end, and if working men are to escape class oppression, occupational segregation and the traditional division of labor in the household will both have to end. In order to achieve freedom for everyone, men must be persuaded, or forced if need be, to join with women in the struggle against patriarchal capitalism, the embodiment of the stratified society par excellence. (Blau, Ferber, and Winkler, 1998:37-39)

To sum up, heterodox economists believe there are some influential factors leads to the conflictions of social classes within the capitalist system that are neglected by neoclassical models, revoke the implications of mainstream idea in several points in individuals' life-cycles and in the ongoing historical track of societies.

Regarding these views of heterodox colleagues against neoclassical model, this thesis study aims to give distinct places to different groups of society while considering the factors determine their participation dynamics and patterns in the entire empirical analyses. Both within the qualitative and quantitative analysis, this study ventures to investigate whether the neoclassical "free" choice theoretic determinants of labor force participation does still in progress or whether these determinants are inadequate to reflect the dynamics of current capitalist production relations on labor markets.

## 3. EMPIRICAL LITERATURE

Both inter-and intra-country empirical studies analyzing labor force participation patterns use one of the different types of attainable data and employ an (sometimes more than one) appropriate econometric methodology to dissect the determinants of and changes in these observed patterns. Labor force participation data are generally obtained from special (household) surveys or derived from census data and formed at different formats as cross-section and panel. Each data type has some relative intrinsic advantages and disadvantages. In this chapter of the thesis, wide summaries of the studies employing different types of data and using alternative methodologies will be given systematically. The classification of these empirical studies will be made upon the followed analyses by them.

### 3.1 Analyzing the Determinants of LFP and Trends through Time

As it was outlined in the previous chapter, labor force participation of an individual does not only depend on expected wages but also linked with unearned income and preferences in the neoclassical model. Within these determinants, preferences are exogenously determined. However, these 'exogenous' factors assumed to be determined outside play an important role for participation decision. This drawback of neoclassical labor supply model has been usually fulfilled by including proxies of these preferences into the models as independent variables within empirical studies. These observed applications of studies show that individualistic participation behavior needs to gather various factors inclusively at the same time. Individual characteristics, household (characteristics) livelihood needs, regional and cultural factors are the fundamental and mostly cited determinants of LFP in the empirical literature. Here, in this section, studies concerning LFP from the supply-side will be summarized.

#### 3.1.1 Logit/Probit regression analysis

Starting with the collection of individual level micro data and improvement of statistical and econometric software packages, empirical studies on the labor force

participation issue in the literature rapidly accumulated in the last two recent decades. Although, the real life adaptability competence of the models designed within these studies is controversial, majority of them approximately estimates an average person's LFP probability and the determinants for the happening of the participation event. Logit/probit regression analysis is one of these estimation techniques. The advantage of the logit/probit regression analysis is to allow binary (discrete) dependent and independent variables within the same specification. Here the binary dependent variable is LFP decision. Being married or not, being household head or not, being graduated from high school or not etc. are some examples to the binary independent variables. In this section, some studies using logit/probit regression models in the LFP analysis will be summarized from both national and international literature.

Gunderson (1980) in his note titled, "Probit and Logit Estimates of Labor Force Participation", states that empirical studies of LFP based on individuals as the unit of observation normally (1) utilize a binary dependent variable, coded one if the person participates in the labor force, and zero if the person does not participate, and (2) use ordinary least squares (OLS) regression analysis to estimate the linear probability function of participation. While pointing out OLS regression analysis as an empirical option for the estimation of LFP, Gunderson (1980) notes that conventional OLS regression suffers from at least two serious defects. First, the error terms are heteroskedastic[25] and second, the linear probability function is inherently a wrong functional form since predicted probabilities could fall outside of the unit interval.[26] Author argues that these issues were generally acknowledged but not satisfactorily addressed in most of the empirical studies that estimate a linear probability function for labor force participation. Gunderson (1980) shows Bowen and Finegan (1969), Cohen, Rea, and Lerman (1970, 1971), Ostry (1968), Spencer and Featherstone (1970) and Skoulas (1974) as the examples to these studies.

According to Gunderson (1980), what is required is a functional form that constraints the predicted values to the unit interval so that the expected value can be interpreted

[25] Heteroskedasticity, simply, means that the error terms are not constant but rather are related in a systematic fashion to the explanatory variables.
[26] This creates an inconsistency in the interpretation of the expected value as the probability of the event occurring.

as the probability of the event occurring. He suggests two such nonlinear functional forms whose predicted values asymptotically approach zero and one. These are the logistic function and the probit function. Gunderson (1980) argues that both of these functional forms are conceptually superior to the linear probability function because they constrain the predicted values to the interval in the estimation procedure itself. In this note, he uses the probit and logit analyses to estimate a labor force participation equation with micro data drawn from the 1971 Canadian Census, where the unit observation is the individual who either participates or does not participate in the labor force.[27] Gunderson (1980) compares the results of these analyses with those of the linear probability function and concludes that when the probability of the LFP is .50 (near the mean participation rate of the sample), the results of all three statistical techniques are similar, however, when the actual probability of participation is nearer to zero or one, then the probit or logit results differ substantially from the linear probability function.

After this convincing study of Gunderson (1980) for the superiority of logit and probit analyses over linear probability function in labor force participation equation estimations, it is time to look first for some studies using these methodologies in their empirical parts.

Tunali (1997) uses logit regression analysis in his study which he stresses the strong link between education and labor force participation. Using the October round of 1994 Household Labor Force Survey, author analyzes the determinants of urban females' LFP behaviors in Turkey. In his analysis, Tunali (1997), first, uses some indicators of educational attainment, age, age squared, and regional dummies of females to estimate his binary logit models. He finds that with the higher level of education LFP probability first increases but then weakens and decreases along the life cycle of women. In the second analysis, he takes into account the husbands to estimate the LFP equations of married women. For this aim, his LFP equations include husbands' age, education and participation status in addition to other independent variables. However, Tunali (1997) finds no strong relation between the

[27] Gunderson (1980) notes that the computer program utilized was NUPROLD. This program is for basic probit and logit analyses developed by Anderson (1973). Today, mostly used statistical and econometric programs (like STATA, SPSS, E-views…etc.) can analyze several types of data with several estimation techniques.

husband's education level (except the husband is university graduate) and spouse's LFP. Within this study, another important LFP determinant of wives is the presence of children aged between 0 and 14 in the household. According to the estimation results mentioned by author, a women's probability to participate is four times higher if she has no children aged between 0 and 14. Author evidences that females participation have been increasing with the increasing level and duration of education, so, he notes that urban females in Turkey are indeed at, or near the bottom of the U-shaped labor force participation profile. Therefore, Tunali (1997) anticipates that with the increase of female labor force participation, the total LFP growth will be met in the future. But unfortunately, author is not hopeful for the employment growth.

Another logit application from national literature is Ozar and Gunluk-Senesen (1998). This study's difference is its viewpoint analyzing the LFP. Because Ozar and Gunluk-Senesen (1998) takes their motivations from the conventional studies that just look for the determinants of participation but ignore the determinants of non-participation. They use the data of a field survey conducted in four big cities of Turkey, namely Istanbul, Ankara, Izmir, and Adana during fall 1995. In their two logistic regression models, one for all women (non-participation behavior of 911 women), other one for married women (non-participation behavior of the subsample of 559 married women), the independent variables are classified as women's personal characteristics, household characteristics and economic factors. These are the age, education level, the region of origin and city life experience for women's characteristics. Marital status, number of children, children's age group and husband's education level are for household characteristics. The income level of the household, the number of the working members of the household and the dependency ratio are for the economic factors. The dependent variable of these two models is the nonparticipation behavior as a binary variable. In the first model considering all women, the only significant evidence is that the higher education level, the lower the nonparticipation probability. In the second model for married women, the participation behavior of women concentrates in the lower income group. Another important point emphasized in Ozar and Gunluk-Senesen (1998) is that the number of children's obscuring role for the women's integration into labor market is more significant than the age of children. They link all of these empirical

results to the importance of the role of women as "wives and mothers" in the household as a determinant of nonparticipation.

Dayioglu and Kasnakoglu (1997) can be showed as an example of probit analysis. In their study, titled "Labor Force Participation of Men and Women in Urban Turkey and Earnings Inequality between Genders", they use probit analysis to investigate the determinants of LFP of urban men and women utilizing the data from the 1987 Household Income and Consumption Expenditures Survey. Their classification for independent variables is similar to Ozar and Gunluk-Senesen (1998). As individual factors they ask for age, education level, marital status, whether the person is household head or not. The number of children aged 0-6 and 7-11, household size and the education level of household head constitute the household (family) characteristics. Household income other than the individual's income and the individual's non wage income are for the socio-economic factors. They also employ regional dummy variables to distinguish the effects of being one of the five different geographical regions in Turkey. Their core finding is that the most important determinant of female labor force participation (FLFP) is education. According to the study, with the increasing level of education maximum participation probability of women is provided if she is a university graduate. Same interdependence between education and participation is not strongly evidenced for males. Contrary, primary school graduate males' participation probability is higher than secondary and high school graduate males. Another interesting result from this study is that the higher participation probability of single men than married men.

Other findings of authors are accordance with the expectations. While being a household head of women increases her LFP, the number of children aged 0-6 and 7-11 decreases her LFP probability. Their results for the socio-economic variables are that women's non-wage income and having household income other than individual income decreases the LFP probability of women. Authors attribute these results to the perceived "secondary worker" roles of women. But throughout the study the mostly emphasized factor is the education. According to their predictions, the rise of women's education level makes their LFP probabilities also rises.

One more instance for probit analysis is of Dayioglu (2000). Following the same classification manner for independent variables, author analyzes her independent variables under three headings, namely personal characteristics, family

characteristics, and socio-economic background variables. She uses data from 1987 and 1994 Household Income and Consumption Expenditure Survey and employs probit models to estimate the variables affect female LFP decisions for both separate years. Different from other studies, Dayioglu (2000) takes the employment as labor force participation due to lack differentiation between unemployed and nonparticipant ones in her data set. From the empirical findings of her models, she results that women's participation increase with the increase in level of education. She also reports that being married and having a higher number of children reduce the LFP probability of women. These results of Dayioglu (2000) are in accordance with aforementioned studies in this section. In addition to these conventional analyses and empirical findings, author brings the two years data together (1987 and 1994) and investigates how the relative importance of the LFP determinants has changed over time. According to her results, all education level variables' (except university graduate level) impacts on LFP decrease in 1994 relative to 1987. Author links these findings to the economic crisis in 1994. With the contraction of economy, raising unemployment caused to the discouragement of women. So, firstly preferred ones for employment are from university graduates, especially for women.

Baslevent and Tunali (2002) analyze the participation choices of prime age (20-54) married women whose husbands are employed. They use October round of 1988 Household Labor Force Survey data from urban Turkey and control for regional labor market effects by including province level variables into their analyses. Their most important difference from other studies is their estimation the probability of participation choices which were examined in four categories, namely non-participation, self-employment, wage labor, and unemployment within reduced form and structural labor force participation equations via maximum likelihood estimation technique. Their independent variable classification triplet includes individual, household and labor market characteristics. The individual characteristics are composed from age (as a proxy of experience) and education level dummies. In addition to these classic individual characteristics, authors also add a dummy variable which identifies women married to self-employed husbands. As household characteristics they use household size, the presence of children in age groups of 0-2, 3-5, and 6-14 distinguished by sex and interactions between household size children dummies. The share of textiles in total manufacturing employment in 1988, the GDP

shares of finance and agriculture and the net migration rate are the labor market characteristics utilized in the study. According to their findings, women take her position in the labor market up to her unobservable tastes and preferences.

Yildirim and Dogrul (2008) attempt to explore the factors influencing women's decision not to enter the labour force in urban Turkey just like Ozar and Gunluk-Senesen (1998). Authors emphasize the family and socio-demographic characteristics of women as the adopted approach in their study. They use data from 2003 Household Budget Survey and employ two logistic regression models. One of these models considers whole data set and the other one is for the subset of married women. The independent variables in those models consider individual, household characteristics and family's economic situation. According to the findings of the study, the determinants of non-participation are related with marital status, husband's education level, economical status of family and the number of children. Authors indicate that odds of non-participation decreases for the unmarried status, university and higher level graduates more likely participate into the labor market and when the income situation of family improves women tend not to participate in the labor force. In addition to these expected findings, authors argue that it is not the age groups of children, but the number of children is the major determinant of non-participation for married women.

To sum up, logit and probit regression analyses are frequently preferred methodologies in the national literature while examining the determinants of LFP from the supply-side. This paper will also pursue a supply-side analysis of LFP since used HLFS micro data in the empirical part does not provide any information for a demand-side analysis.

### 3.1.2 Decomposition analysis

Decomposition analysis is generally the second methodological step after the core estimations of the models done. It has been used to detect the sources of changes in determinants of dependent variable. Decomposition analysis, first, was called with the names of Blinder-Oaxaca (1973). Their proposed decomposition technique was for the linear models. Then this technique is extended for non-linear models. In Chapter 6, the details of both Blinder-Oaxaca's linear and other recent non-linear decomposition techniques will be given. Here, in this section, some of the theoretical

and empirical studies will be summarized to get an idea about the improvement of decomposition analysis in the empirical literature of economy.

Yun (2000) introduces a new and basic decomposition method for a binary choice model that is similar to the Blinder-Oaxaca (1973)[28] decomposition analysis for wage differentials. In his paper, titled "Decomposition Analysis for a Binary Choice Model", this decomposition method is first developed for a single probit model and then generalized to a simultaneous equations model. Author also notes that the decomposition analysis developed in this paper is based on the probit model; however it can be extended to a logit model. According to Yun (2000), based on the probit analysis, using Taylor expansion, he approximates the observed differences in the probabilities of choosing option 1 over option 0 between two groups may be explained by differences in "each" individual characteristic and differences in "each" coefficients (behavioral response or discrimination). Author finds this method helpful in answering some research questions. For example, "Why are the participation rates in labor market different by race or gender?", or "Why have the participation rates in the labor market been changed over time?", or "Who chooses a union job?", or "Who receives a job offer from a firm?" and so on. Yun explains his contributions to the decomposition analysis for a probit model are twofold. First, he argues that he is able to find the effects of "each" individual characteristic and "each" coefficient using an approximation method (a first order Taylor expansion) for the differences between two groups in the probability of choosing option 1. According to him, this approximation method is introduced because the probabilities are estimated using nonlinear function (standard normal cumulative distribution function (CDF)). Second, he extends the decomposition analysis to the case where the choice equation is estimated jointly with other equations. He measures differences in the probabilities caused by the differences in the observed individual characteristics and their coefficients when the stochastic component (unobserved individual characteristics) of the binary choice equations for both groups has the same shape (i.e., same normal distribution with mean zero and variance one), and differences in the probabilities caused by the differences in the distribution of the

[28] In the Blinder-Oaxaca decomposition analysis for wage differentials, the observed (log) wage gap between two groups is decomposed into a part explained by differences in the average individual characteristics, and a part explained by differences in coefficients (discrimination) (Yun, 2000).

unobserved individual characteristics.[29] Author illustrates his first contribution by the implantation of the decomposition method to racial differences in labor market participation rates using the female sample from the March 1995 current population survey (CPS) and finds that the racial gap of participation rates among women can be almost exclusively explained by the differences in the coefficients.

In a latter study, Yun (2004) extents the usage of this simple methodology for decomposing differences in the first moment into characteristics and coefficient effects. According to Yun, this methodology provides a way to apply the Blinder-Oaxaca decomposition[30] to a non-linear function for both aggregate and detailed decompositions. This paper proposes a general and systematic methodology for the detailed decomposition of differences in the first moment, i.e., differences in the mean value of the variable of interest. The proposed detailed decomposition methodology of Yun (2004) does not depend on the functional form as long as the dependent variable is a function of a linear combination of independent variables and the function is once differentiable. Therefore, the standard Blinder-Oaxaca decomposition methodology is included as a special case of the methodology proposed in this paper.

One other important study that answers one of the questions of Yun (2000) investigating the changes in labor force participation rates is Hotchkiss (2006). In her paper titled "Changes in Behavioral and Characteristic Determination of Female Labor Force Participation, 1975-2005", Hotchkiss (2006) emphasizes the importance of identifying the factors contributing to observed changes in labor force participation trends over time is so important for setting appropriate policies regarding the nation's productivity or output potential by policymakers. She thinks that although the factors contributing to such changes over the past six decades have been well documented in the U.S., more recent trends (after 2000) in women's labor

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[29] Yun (1999) introduces a similar approach for decomposing wage differentials when there are selection issues, the "generalized selection bias (GSB) approach" to decomposition analysis for wage differentials. It divides the wage differentials into two parts. The first are differentials predicted by the observed individual characteristics and their coefficients in the wage equation assuming the mean value of the stochastic component of wages to be zero. The second are remaining differentials representing the effects of differences in unobserved individual characteristics (selection effects) (Yun, 2000).

[30] The basic idea of the Blinder-Oaxaca decomposition is that differences in wages can be explained by the differences in characteristics and by the differences in OLS coefficients (Yun, 2004).

force participation beg further scrutiny. In her detailed scrutiny, Hotchkiss (2006) dissects the changes in the labor force participation rate over the past thirty years among women aged twenty-five to fifty-four. Using the March Current Population Survey data (as used in Yun (2000)) from the Bureau of Labor Statistics, the author focuses especially on the unprecedented 2.7 percentage point decline in women's participation rate between 2000 and 2005. The analysis of this paper delves deeper to disentangle changes in characteristics from changes in behavior, with given characteristics, of women over a long period of time. Used data in the empirical part of the paper are cross-sectional, so separate labor force participation equations were estimated for each year to "decompose" the changes in the labor force participation rate into changes in behavior (differences in estimated parameter coefficients across years) and changes in characteristics (differences in regressor values across years). While Hotchkiss (2006) is explaining her methodology in this way, she also suggests an alternative strategy for her analysis. This alternative strategy is to construct a "synthetic panel" of cohorts[31] to determine whether the observed trends are the result of collective changes within a certain group of women. She points that the additional benefits of this alternative strategy were assessed by her, but she determined that, except for older than fifty-five years, group behavior did not vary significantly across the sample period. Weighted and unweighted performed analyses give the similar results to her.

The theoretical part of Hotchkiss (2006) makes a useful classification upon the sources of the changes in observed labor force participation. According to the author, changes in observed labor force participation rates can arise from three sources. One source is change in characteristics. She claims that a woman's characteristics may change by being a mother of children and it is expected that this would raise her reservation wage, ceteris paribus or attaining more education (or higher level education) also may change a woman's characteristics which would raise her expected market wage. These types of changes in characteristics would be reflected in changes in the explanatory variables.[32] To Hotchkiss (2006), second source of change is a change in behavior (a change in the way a woman's characteristics) and

[31] A typical cohort definition is based on year of birth (Hotchkiss, 2006).
[32] Hotchkiss (2006) notes while the unemployment rate is not a characteristic of the woman making the labor force participation decision per se, it is a characteristic of the environment in which the decision is made.

these changes in behaviors will be reflected in changes in the estimated parameter coefficients, given a specific set of characteristics. She argues that changes in parameter coefficients in a labor force participation equation can be thought of as reflecting changes in the marginal utility generated by the characteristics. She gives some examples to extent her argument. If the additional utility from participating in the labor market as a married woman increases as a result of a decrease in the relative market returns for men, then the parameter coefficient on the marriage indicator variable will increase. Or, if discriminatory behaviors against women decline, the labor market returns to high educated women might increase and so this raises the marginal utility from participating in the labor market for women with university degree. This change would manifest itself in an observed change in change in behavior among college women (resulting greater labor force participation) and a larger positive parameter coefficient on the high education level degree indicator variable. One another example of Hotchkiss (2006) is the change in responsiveness. Accordingly, a change in the responsiveness to labor market conditions can also affect observed labor force participation. A change in responsiveness will be reflected though a change in the estimated parameter coefficient associated with the state unemployment rate. Third and the last source for change in labor force participation decisions is the unobservable effects. Various factors enter into a woman's decision process to participate into the labor market that is not observed and these factors are totally embedded in the estimated intercept term. She thinks that these factors might include changes in women's preferences not captured by observables or changes in the labor market structures or institutions that affect the labor market valuation of human characteristics and thus, at the end, the market wage. Although Hotchkiss specified these third source for change in labor force participation decisions as unobservable factors, this source cannot be considered in the policy implications due to their uncertainty.

In the empirical results of her paper, depending on these three sources of changes, Hotchkiss (2006) points while changes in both observed characteristics and behaviors have contributed to the decline in female labor force participation since 2000 in the U.S., unobserved-and thus unpredictable changes are the largest contributors.

A recent study, following the methodology proposed by Yun (2004), is of Contreas et al. (2008)[33], stress the low labor force participation problem of Chile by comparison with most countries in the OECD area, especially among females and youths, in their paper titled "Encouraging Labor Force Participation in Chile". They analyze both genders' labor force participation behaviors regarding their age groups. According to the given labor force statistics in this paper pertaining to Chile, in the case of women, labor supply has risen steadily over time for prime-age and older individuals, against a background of relative stability for men and with regards to youths, participation rates are trending down, primarily as a result of rising school enrollment, especially for males, while remaining fairly low and stable over the years for young females. According to the authors, the main policy challenge in this area is to raise female labor supply further, for both prime-age individuals and youths, as a means of making a better use of labor inputs in support of long-term growth. They believe that this can be achieved essentially by removing provisions in the labor code that constrain the allocation of working time and by improving access to affordable child care for mothers with young children. Policies aimed at fostering human capital accumulation for the population as a whole would also contribute, because educational attainment is one of the most powerful determinants of labor force participation for Chile.

Contreas et al. (2008) reach these results and suggestions by implementing a detailed empirical analysis which, first, identifies the determinants of labor force participation and employment for prime-age and youth male and females via probit models for the years 1990, 1996 and 2003, and then they employ a decomposition analysis based on the methodology proposed by Yun (2004) using the results of the probit regressions to decompose the changes in participation rates over time between differences in variables and differences in coefficients over the period 1990-2003.

According to the results of these probit regressions and decomposition analyses, during 1990-2003, prime-age female participation rose by 14 percentage points. Changes in both variables and coefficients contributed to the increase. Most of the change in variables was due to changes in educational attainment, which contributed to raising participation, age effects, and the number of young children in the

[33] This paper relates to the 2007 Economic Survey of Chile (www.oecd.org/eco/surveys/chile).

household and head-of-household status. As for changes in coefficients, the findings are less clear-cut, but changes in educational attainment suggest that returns to education increased considerably during the period of analysis. Changes in the number of children aged less than 3 years and between 6 and 17 years reduced participation, possibly suggesting that obstacles related to access to child care became more stringent in 2003 relative to 1990. Changes in regional coefficients were also important. In the case of female youths, the participation rate rose by almost 3 percentage points during 1990-2003. Changes in variables accounted for the bulk of this increase, especially educational attainment, the number of young children in the household (less than 6 years of age) and residency in urban areas. In the case of coefficients, most of the overall change is explained by age effects. With regards to male, in the case of prime-age individuals, participation rose by 0.2 percentage points during 1990-2003 due essentially to changes in variables. The variable whose change contributed the most is educational attainment, while age effects and changes in head-of-household status decreased participation. With regards to youths, there was a sizeable drop in the participation rate, although it remains higher than that of females. Changes in variables accounted for most of this trend, especially in the case of educational attainment (above 11 years of schooling), age effects, residency in an urban area and household income. Changes in coefficients also reduced participation, predominantly through age effects (Contreas et al., 2008).

The labor force participation decisions can also vary due to regional differentiations. The studies analyzing regional variations in labor force participation rates generally use the rural-urban dichotomy. Kilkenny and Huffman (2003) is one of these studies. Their study, titled "Rural/Urban Welfare Program and Labour Force Participation", is about how labor force and income support program participation varies across Midwestern rural and urban areas. Their initial observations show that nonmetro poor in the Midwest of U.S. participates more in the labor force and less in welfare programs than metro poor. They formalize how household composition, capital, labor market conditions, and state-specific regulations define opportunity sets, and

then they estimate a bivariate binomial probit model[34] of work and program participation choices.

After this estimation procedure they show that the rural poor have different opportunities and react differently than the urban poor. Econometric evidence is obtained by applying an Oaxaca decomposition method to an estimated bivariate binomial probit model. Their findings challenge the stereotype that Midwestern urban poor have a weaker work ethic than rural poor, and show that even spatially neutral policies can have systematically different local effects.

These mean that they present a model of the simultaneous choice to work and to participate in the labor market or not, given that the transfer programs render the opportunity set nonconvex. First they estimate reduced-form discrete choice models using data from the Survey of Income and Program Participation (SIPP). Then they compare the metro and nonmetro outcomes of all types of Midwestern low-income householders with children, not just married couples only or female-headed households only. For differences between rural (nonmetro) and urban (metro) behaviors they conduct an Oaxaca decomposition to compare differences in characteristics to differences in behavior in explaining the two groups' choices. They find no behavioral basis for the difference in labor market participation. And while most of the lower Midwestern nonmetro welfare program participation is due to demographics, some is due to different life-cycle behavior (Kilkenny and Huffman, 2003).

Thus far, the summarized studies above analyzed the labor force participation movements within the context of gender and location differentiations. However, participation movements also linked to the structural social and demographic backgrounds. In this regard, Juhn and Peter (2006), in their studies titled "Changes in Labor Force Participation in the United States", reviews the social and demographic trends that contributed to the movements in the labor force participation rate in the second half of the twentieth century. According to their shared observations in their paper, the labor force participation rate in the United States increased almost continuously for two-and-a-half decades after the mid-1960s, pausing only briefly during economic downturns, and lastly the pace of growth slowed considerably

[34] This model is used simply in analyzing two binomial probit models simultaneously.

during the 1990s, however, and after reaching a record high of 67.3 percent in the first quarter of 2000, participation had declined by 1.5 percentage points by 2005. Thence they also examine the manner in which developments in the 2000s reflect a break from past trends and consider implications for the future. Before analyzing these movements empirically they highlight two main reasons why understanding changes in the labor force participation is so important. According to authors, first, the share of the adult population that participates in the labor force-either by working or by looking for work-determines the size of the labor force, which in turn is central to constructing a measure of potential GDP and for making projections of future GDP growth. Second, the labor force participation rate is also important for assessing the extent of slack in the labor market. The unemployment rate alone, without understanding participation behavior, has become a less reliable indicator of labor market conditions. Despite they do not employ any econometric techniques in their studies, with only statistical quantitative investigations using tables and figures, Juhn and Peter decomposes the changes in the labor force participation rate into changes in population weights for each subgroup and changes in the labor force participation rate of particular subgroups. As an example of a change in population weights, they show the aging of the baby boom cohort has caused the prime-age 25–54 years-old population to increase from approximately 50 percent of the over-16 population in 1975 to nearly 58 percent in 1996. They argue that since prime-age men and women tend to have higher participation rates than either younger or older groups, this trend contributes to an increase in the aggregate participation rate.

Brusentsev (2002) examines cross-national variation in the labor force participation of married women in Australia, Canada and the U.S.. Using data from the Luxembourg Income Study (LIS), a basic neoclassical model of labor force participation is presented initially. In addition to this model two applications of the estimates are employed in the paper. These are a simulation and a decomposition of the differential. The results of these applications confirm that variation in the probability of participation for married women can be explained by both country-specific characteristics and the differences in the responses to those characteristics.

Euwals et al. (2007) investigates the increase of participation over the successive generations of women, and produces an educated guess for future participation for the Netherland's labor market. But for this purpose they do not employ a

decomposition analysis additionally. They implement the decomposition process in their unique model and estimate a binary age-period-cohort model for the generations born between 1925 and 1986, using data from the Dutch Labour Force Survey 1992-2004. The first principal goal of their paper is to decompose the growth in the female participation over the period 1992-2004. There are two main research questions of their study, "Do younger cohorts have a larger probability to be employed than older cohorts?", or "Did the favorable economic conditions in the late 1990s encourage women to participate in the labor market?". Their modeling approach allows them to make a full decomposition of the observed growth during the period mentioned. Their second aim is to determine which factors will remain important in the upcoming decades. Their model specification includes various explanatory variables, such as education and household situation. Moreover, the paper employs two different identification strategies to disentangle the unexplained participation growth into unobserved age, period, and cohort effects. According to authors' interpretation, the age effect includes individual life-cycle decisions, like the timing of education and marriage. Period effects include cyclical and unobserved instantaneous effects, e.g. effects of policy changes. The unobserved cohort effect may be interpreted as societal changes in the orientation towards paid employment that are unrelated to education or children (i.e. these changes are not the result of a higher educational attainment and a lower fertility of the younger generations). Of course, apart from these unobserved effects, the model specification also includes age, period, and cohort effects which are correlated with observed variables. For instance, a part of the cohort effect is correlated with included variables such as educational attainment and fertility. The results of the paper indicate that the increasing level of education, the diminishing negative effect of children, and unobserved cohort effects have played an important role in the growth of female participation rates. Estimation results of the paper also show that both the observed and unobserved cohort effects have been crucial in spurring the female participation rate in the Netherland. According to authors, time effects have also played an important role during the 1990s. The negative relation between the unemployment rate and the participation rate suggests an "encouraged worker effect", i.e. the favorable market conditions during the 1990s have attracted many females to participate in the labour market. An important finding of the study is that observed factors (such as education and household situation) can fully explain participation growth of generations born after

1955, but that unobserved cohort effects play an important role for the older cohorts. This is inferred that the unobserved factors, like social norms, have only been important for cohorts born before 1955. Social norms are an appealing explanation as sociological research on social norms and attitudes with respect to the combination of employment and family care responsibilities finds an almost identical development over the cohorts. Furthermore, authors think that birth control may also have played a role as oral contraceptives became available in the years the cohorts born in the 1950s became mature. Euwals et al. (2007) observe that future participation growth importantly depends on the evolvement of attitudes towards the combination of paid work and children. They have therefore constructed two alternative future scenarios, the first with constant norms with respect to this factor, and the second with a further evolvement. It is estimated that the remaining growth will compensate for about one third of the structural fiscal deficit caused by population ageing in the Netherlands.

To the authors, the empirical literature on female labour supply is broad, and varies from structural econometric modeling of financial incentives and life cycle decision making (for an overview, see Blundell and MaCurdy, 1999) to more qualitative, historical analysis of changing life courses of women (see Goldin 2004, 2006). In between there is a quantitative literature that describes changes in labour market behavior over time on the basis of panel data and repeated cross sections. The interesting part of this paper is considering added and discouraged worker effects as time effects. Euwals et al. (2007) has a separate part to define and survey the literatures of these two effects.

Although many studies' aim is to reveal the reasons of labor force participation patterns up to this point, some studies question the meaning of these movements and inquire what they can signal for the labor markets or for the other agents of overall economy. In this context, Aaronson et al. (2006) is an appropriate study examines whether the decline in the participation rate of U.S. since 2000 primarily reflects cyclical forces-the tendency for individuals to withdraw from the labor force during periods of reduced job opportunities-or longer-lasting structural influences. They argue that if the weakness in participation since 2000 is largely cyclical in nature, the current unemployment rate could be significantly understating the degree of slack in the labor market—and perhaps overstating the potential upside pressures on wage

and price inflation; moreover, the outlook for longer-term economic growth would be buoyed by a higher labor force participation trend. If instead much of the decline results from structural developments in the labor market, the unemployment rate may be giving the appropriate signal of current economic slack and the implications for potential economic growth would be less favorable. To decide which of these options is valid, this paper attempts to parse the recent decline into its cyclical and structural components. After a brief overview of the data, they examine the effects of changing demographics on the aggregate participation rate and review the facts and past research on a number of other potential influences, including trends in human capital accumulation, relative wages, family structure, and income support programs. They then use a cohort-based model of the participation rate that attempts to account for these factors to estimate and project forward the underlying trend in the participation rate. Next they supplement the model-based results with analyses of recent changes in labor force participation using state-level data, gross labor force flows, and information on the incidence and duration of labor force attachment. Finally, they report briefly on two other components of the aggregate supply of labor, the size of the working-age population and the length of the average workweek.

To sum up, many studies concerning labor force participation trends in the literature employ different decomposition analyses. The major aim in these studies to understand the observed trends and dynamics of labor force participation. While decomposing the aggregate labor force participation rates into components, researchers can consider different factors. For instance, some of them think that these decompositions should be on the regional basis, some of think that these decompositions should be on the genderual basis or on the time basis. Hence, this choice of decomposition axis is a goal-oriented process. This paper aims to identify the sources of LFP differential trough the time and on the basis of gender gap.

## 4. AN OVERVIEW OF THE TURKISH LABOR MARKET'S POST-1988 ERA

Departure from the adopted theoretical background and findings of empirical analysis, this and the next two chapters present, first, a detailed long-run qualitative analysis of LFP patterns by disaggregating them according to gender, location of residence, age, and education level over time and then empirical analyses of LFP. The analyzed term is from 1988 to 2006 which is from the first executed year of regular HLFS to the last year of available micro data.

Following the theoretical background and empirical literature, the first part of empirical analysis is composed from econometric models of three years (1988, 2000, and 2006) for urban males and females. Within these models, the investigation of the LFP determinants takes important place. These determinants, namely individual characteristics (age, education), household characteristics (being married, being household head, having children, household size) and regional factors, are estimated by logistic regression analyses. Second part of the empirical analysis employs a non-linear decomposition analysis which will enable us to detect and capture the sources of changes in LFP and contributions of its structural determinants on the basis of sexual and historical differentials.

In this chapter, the general trends of LFP will be given by tables and figures based on gender, location of residence, age and education level, derived from the HLFS data to track the dynamics of labor supply in Turkey for the post-1988 era. The evolution of working-age population constitutes the basis of labor supply. The number of working-age population (15 years-old and above) increased from nearly 33 million to 50 million in the last 20 years in Turkey. However, the total labor force participation rate indicates what proportion of this population participates into the labor force, and it decreased from 57.5% to 45.8%. This means that economically active population of Turkey has been never met with the increasing number of adult population. Labor force increased just only 4 million within this term. Therefore, it is crucial to understand the dynamics of LFP rates to resolve this deficit.

Five possibilities arise in here. First, there may be a decrease in the total labor force, given the working-age population; or, second, may be an increase in the working-age population, given the labor force; or, third, may be an increase both in the number of labor force and working-age population, while the increase in working-age population is more than labor force; fourth, an increase in the working-age population, while the decrease in the labor force; and lastly, a deep decrease in the labor force, while a slight decrease in working-age population. Each of these possibilities sources from different reasons. But their common consequence is the increase in the number of non-participants, so the decrease of the proportion of economically active population within adult population. In Turkey, it is evident that the weak increase of labor force can not compensate the increase in the adult population. So the decrease in LFPR is inevitable. This decrease in the active population is the bad news for long-term growth. As it is aforementioned, these movements of LFP do not just only arise due to economic events, but also source from the demographic, social and cultural transformations. Considering these alternative sources of LFP changes, this chapter will evaluate Turkish labor market's post-1988 era up to January of 2009.

## 4.1 Demographic Trends

### 4.1.1 Population growth

According to the recent results (of Address Based Population Registration System Data Base) of TURKSTAT, the population of Turkey is composed from 35.901.154 males and 35.615.946 females; so in total, it is 71.517.100 on December 31, 2008. Male and female populations are nearly equal. Another striking feature is that half of this total population is younger than 28,5 old-years (median age of Turkey) and working-age (15-64) population constitutes 66.9% of total population. Other age groups (which can be called dependent population) (0-14 and 65+ age groups) is 33.1% of population. 16.3% of working age population is aged between 15 and 24 and urban population is 75% of total population.

Besides, the annual population growth rate of Turkey in 2008 was realized as 13.1 per thousand. This is the result of ongoing decline in average annual population growth rates following the term 1990-2000. After 1945, for the first time, annual population growth rate realized below 20 per thousand at this term. According to the

projections of TURKSTAT, total population growth and total population will be around 7.4% and 83 million by 2025.

Therefore, annual population growth rates are declining consistently and it is expected to decline in the long-run. This decrease can be advantageous to create more employment opportunities for adult population. Thereby, the intensity of wage earners increases in society and the income distribution can be refined. On the other hand, the possible decrease of young population can be problematic for the supply of labor in future. Nevertheless, population growth has outpaced employment growth for many years in Turkey (WB, 2006). The labor supply deficit does not seem to be likely for the near future.

### 4.1.2 Fertility rate

Total fertility rate (TFR) is an indicator showing the number of children owned by women at the end of their fertility term. TFR was calculated as 5.5 in 1970. In 1980 and 1990, it decreased to 3.4 and 2.7, respectively. Tunali (2004) notes that despite the striking declines in TFR, the majority of population at fertility ages suppressed further decreases in population growth rates. For 2009, TFR was expected to be around 2.1. These downtrends in TFR cause to the changes in the age composition of population and shift the mean age of population to higher levels.

### 4.1.3 Age composition of population

According to the projections of TURKSTAT about the age composition of population, the population of younger cohorts is expected to decrease, but rapid increases in the mature and older cohorts of population are expected. These demographic transitions cause an extension in the working age population, and bring the opportunities and challenges together. An increased working age population means an increased potential of economically active labor force. If new employment opportunities were presented then the conclusion would be higher level social welfare, but if not, then unemployment and poverty would be the major problems of upcoming cohorts. In summary, the dynamics of population growth is so crucial for the long-term size and composition of labor force. So, LFPR should be trailed with these demographic trends simultaneously.

## 4.2 Gender Based Trends of LFP

The labor force participation rates have been declining over time in Turkey.[35] Male labor force participation declined from 95% in 1955 to about 70% in 2009. Female labor force participation also declined from 72% in 1955 to about 25% in 2009. Female labor force participation is persistently lower than that of males. So there is an evident gender gap in the labor force participation rates in Turkey. Furthermore, the decline of women's participation rates has been faster than that of men since the mid 1950s.[36]

Male participation rate is 69.1% in January of 2009; female participation rate is strikingly lower, 23.5%. While male participation rate is close to international averages (EU or OECD), female participation rate in Turkey is far below from these averages. These stats show that females are in a disadvantaged position in the context of participation. Both national and several international gender based comparisons of LFP verify this position of women as mentioned in Chapter 1. The seriousness of low female participation rates does not only depend on the current situation, but stems from the declining trend since 1960s, even 1950s. Figure 4.1 shows the trends of LFP rates for males and females from 1988 to 2009. In this figure, participation rates between 1988 and 1999 are the averages of April and October rounds of HLFS. Participation rates of 2008 are of the December rates. As it can be seen from that figure, the narrowing of gender participation gap through time is not so much noticeable. Participation rates of males and females shift downward parallel and make decrease the total participation rates at the same extent. However, the female participation rates decline faster than that of males. As it was mentioned in Chapter 1 particularly, rapid urbanization has caused some transformations in the division of labor within households. In the urban areas, market structures are very different from rural ones and demand more educated and qualified labor force. Unfortunately, women migrating from rural to urban are inadequate for that demands of urban markets. The reservation wages of urban females also increase with the increasing cost level of urban areas.

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[35] In a different manner, it can be said that the labor force has been increasing at a slower pace than the adult population.

[36] The labor force participation data between 1955 and 1990 is calculated by census of population by TURKSTAT.

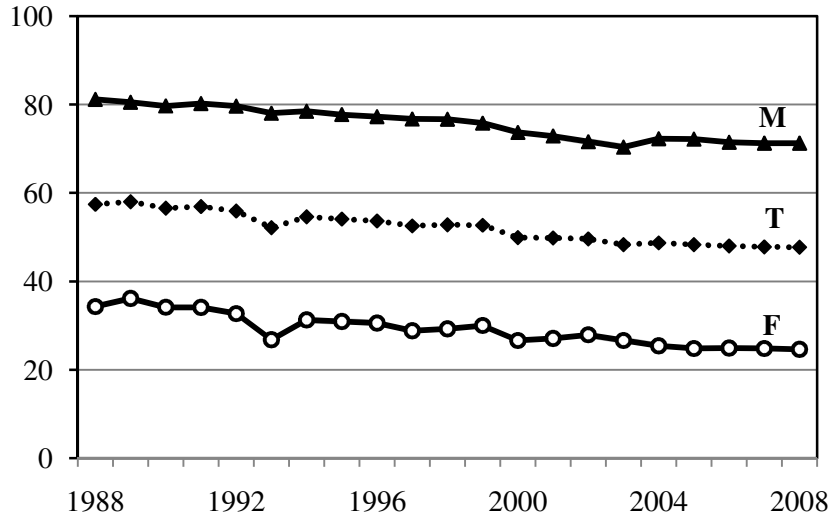


**Figure 4.1 :** Labor force participation rates by gender and year, 1988-2008

**Source:** TURKSTAT

### 4.3 Rural and Urban Based Trends of LFP

Table 4.1 and Figure 4.2 show the labor force participation rates of men and women according to urban-rural dichotomy based on HLFS data during 1988-2008.[37] Rural participation rates are always observed to be higher than the urban participation rates. Highest participation rates are of rural males and the lowest participation rates are of urban females. The movement of urban participation rates is slower than rural ones. In the urban, female participation rates seem much more stabilized than that of rural. Here is the most striking trend already pertains rural women. There are high volatility and sharp back tracking in the rural female participation rates. The previous studies analyze this declining trend explain this situation with the transformation in the demographic and economic structures, an internal migration movement (with rapid urbanization) of labor from rural to urban and the integration problem of rural women to urban labor markets are indicated as the main sources of exceptionally low female participation rates.

[37] January LFPR of 2009 is also added to Table 4.1 based on the latest new bulletin (15.04.2009) of TURKSTAT.

**Table 4.1:** Labor force participation rates by gender and location, (%)

| Years | Total | | Male | | Female | |
|---|---|---|---|---|---|---|
| | **Rural** | **Urban** | **Rural** | **Urban** | **Rural** | **Urban** |
| **1988** | 67,0 | 48,3 | 84,7 | 78,1 | 50,7 | 17,7 |
| **1989** | 69,4 | 47,6 | 84,8 | 76,8 | 55,1 | 17,8 |
| **1990** | 66,9 | 47,2 | 83,0 | 76,8 | 52,0 | 17,1 |
| **1991** | 69,6 | 46,3 | 84,2 | 77,0 | 55,6 | 15,7 |
| **1992** | 67,4 | 46,8 | 83,1 | 76,8 | 52,0 | 17,0 |
| **1993** | 60,8 | 45,2 | 81,6 | 75,2 | 40,6 | 15,7 |
| **1994** | 65,5 | 46,2 | 82,6 | 75,4 | 49,0 | 17,4 |
| **1995** | 65,8 | 45,2 | 82,6 | 74,1 | 49,3 | 16,8 |
| **1996** | 66,1 | 44,5 | 82,9 | 73,2 | 49,8 | 16,0 |
| **1997** | 63,3 | 44,8 | 82,0 | 73,0 | 45,0 | 16,9 |
| **1998** | 64,4 | 44,7 | 82,5 | 72,8 | 46,9 | 16,8 |
| **1999** | 64,0 | 44,9 | 81,2 | 72,2 | 47,5 | 17,8 |
| **2000** | 58,7 | 44,1 | 77,9 | 70,9 | 40,2 | 17,2 |
| **2001** | 58,7 | 44,0 | 76,4 | 70,6 | 41,7 | 17,4 |
| **2002** | 57,6 | 44,4 | 74,5 | 69,8 | 41,4 | 19,1 |
| **2003** | 55,5 | 43,8 | 72,9 | 68,9 | 39,0 | 18,5 |
| **2004** | 55,4 | 44,5 | 74,7 | 70,8 | 36,7 | 18,3 |
| **2005** | 53,1 | 45,5 | 73,5 | 71,5 | 33,7 | 19,3 |
| **2006** | 52,2 | 45,5 | 72,7 | 70,8 | 33,0 | 19,9 |
| **2007** | 52,0 | 45,4 | 72,6 | 70,6 | 32,7 | 20,2 |
| **2008**[1] | 50,9 | 46,0 | 72,6 | 70,6 | 30,1 | 21,6 |
| **2009**[2] | 48,4 | 44,7 | 69,7 | 68,8 | 28,5 | 21,3 |

1. December's statistics.
2. January's statistics.

**Source:** TURKSTAT

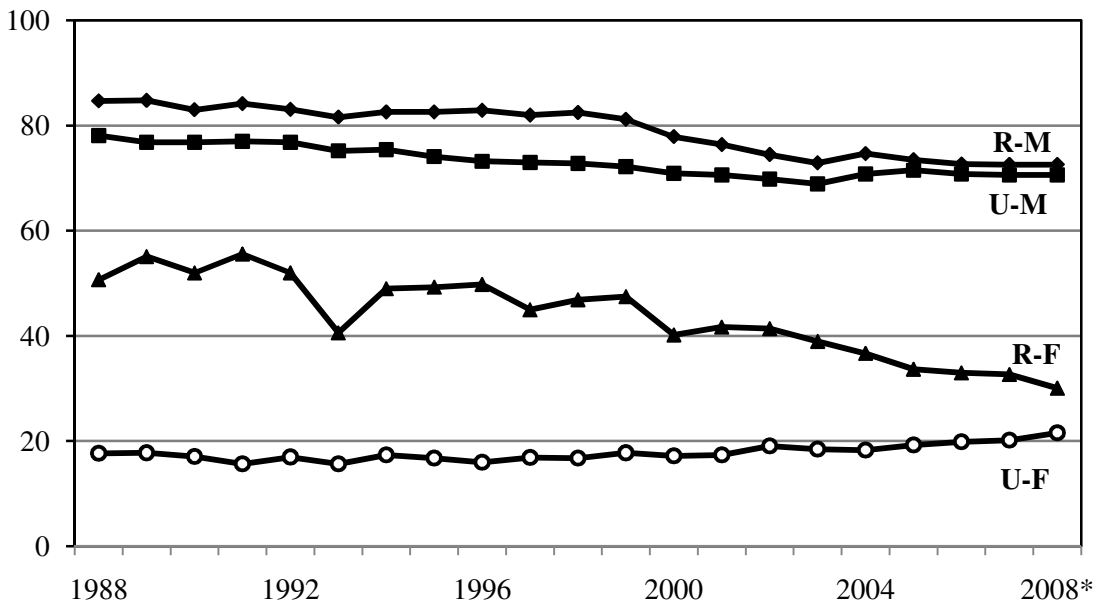


**Figure 4.2 :** Labor force participation rates by gender and location

**Source:** TURKSTAT

According to the Figure 4.2, participation trends of rural males and females are declining and diverging. In 1988, gender participation gap is 30% in rural. This gap is 41.2% by January of 2009. Although males' and females' participation trends are moving more sluggishly in urban, gender participation gap has been narrowing (from 60.4% to 47.5%), but still high. Here is the main argument about the sources of these differentials is the different working conditions and economic structures of rural and urban labor markets. In the rural areas, majority of women employed in agricultural sector (81.2% of employees) and most of them work as unpaid family workers (78.7% of agricultural employees). On the contrary, most of women work in non-agricultural sectors in urban (industry and especially in services sector, 69.7% of employees). Because, the production structures of these two places demand different qualifications and sacrifices from women. Hence, women in residing urban or rural have different level of reservation wages up to her socio-economic conditions (endowments). Considering these mentioned differences between urban and rural areas, the logit regression models of the next chapter will run regressions for urban areas.

### 4.4 Age Based Trends of LFP

As it is mentioned in section 4.1, decreasing fertility rates caused to change the age composition of population. However, there are many other factors affect the age structure of population. The importance of the age composition is related with the size of working age population and labor force at present. Here is the underlying influential determinants for both genders are schooling year (or enrollment rates) and retirement age.[38] In addition to these determinants, there is compulsory military service for men as a space in the early years of their careers. Marriage, child bearing and rearing activities can be stated as non-participation reasons for young women. Figure 4.3 shows LFPR of males and females for different standardized age groups through years (1988, 2000, and 2006). Over years, age-LFPR curves of both genders shifts to the downward. Another point that should be underlined is the shape of these age patterns. Their shapes reflect the life-cycle for each gender. Basically, males start to participate, work for ages, and finally retire. This type of life-cycle for men is parallel with expectations. However, an M-shaped life-cycle is proposed for females in the literature. According to this proposed pattern, females first start to participate into the labor market, but then with marriage and child bearing and rearing activities, their participations are cut. Some of them leave the labor market. But some of them resume participating into the labor force and than exit because of aging and/or retirement. So their age-participation pattern first shows an upward trend, than a downward trend twice trough their life-cycle. Fersh, this is a theoretically anticipated movement. Considering Figure 4.3 it is difficult to observe the M-shaped pattern of LFP for females in Turkey.

[38] The retirement age is an important factor in falling participation rates of older workers. The elimination of minimum retirement age in 1993 has made fastened this decline in older-aged participation. The early retirement system has continued up to 2001.

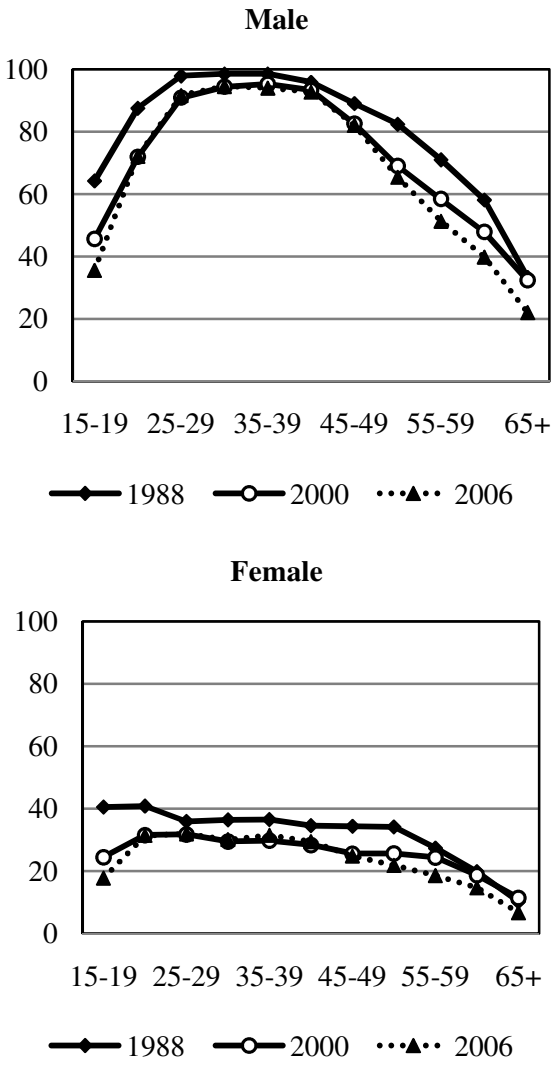


**Figure 4.3 :** Labor force participation rates by age and year, 1988-2000-2006

**Source:** TURKSTAT

As it is observed in Table 4.2 and Figure 4.3, men's participation intensity is higher between 20-24 and 45-49 age groups for each year. However, women's participation concentrates in their early ages and than weakens for coming ages. This skewed participation distribution of women falter as time passes.

**Table 4.2:** Labor force participation rates by age and year, (%)

| Age Groups | 1988 | | 2000 | | 2006 | |
|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | Male | Female |
| **15-19** | 64,2 | 40,5 | 45,6 | 24,4 | 35,5 | 17,7 |
| **20-24** | 87,5 | 40,8 | 71,9 | 31,5 | 72,1 | 31,4 |
| **25-29** | 97,9 | 35,9 | 90,9 | 31,7 | 91,6 | 31,9 |
| **30-34** | 98,5 | 36,4 | 94,4 | 29,4 | 94,5 | 30,1 |
| **35-39** | 98,5 | 36,5 | 95,3 | 29,7 | 94,0 | 31,5 |
| **40-44** | 95,8 | 34,5 | 93,3 | 28,3 | 92,7 | 29,4 |
| **45-49** | 89,0 | 34,3 | 82,6 | 25,5 | 82,0 | 24,8 |
| **50-54** | 82,4 | 34,1 | 69,0 | 25,6 | 65,4 | 21,8 |
| **55-59** | 71,0 | 27,3 | 58,4 | 24,3 | 51,3 | 18,5 |
| **60-64** | 58,1 | 19,8 | 47,8 | 18,6 | 39,8 | 14,6 |
| **65+** | 33,3 | 10,1 | 32,3 | 11,3 | 22,0 | 6,6 |

**Source:** TURKSTAT

### 4.5 Education Level Based Trends of LFP

Table 4.3, Figure 4.4, and Figure 4.5 give an idea about the labor force participation rates by educational attainment for 1988, 2000, and 2006. LFPRs increase sharply above middle school and highest rates are reached at university level for females. For males highest participation rates are at the primary school level and the university level. The gender participation gap is smallest at the university level.

**Table 4.3:** LFPR by education level and gender, (%), total, 1988-2000-2006

| Education Levels | Male | | | Female | | |
|---|---|---|---|---|---|---|
| | 1988 | 2000 | 2006 | 1988 | 2000 | 2006 |
| **Illiterate** | 70,5 | 56,7 | 40,4 | 32,3 | 25,2 | 16,2 |
| **Literate without Diploma** | 76,3 | 55,8 | 50,6 | 31,7 | 22,2 | 19,5 |
| **Primary School** | 88,9 | 81,1 | 77,3 | 34,3 | 24,5 | 23,1 |
| **Basic Education** | - | 14,4 | 30,9 | - | 7,9 | 14,1 |
| **Secondary School** | 61,4 | 62,8 | 83,0 | 19,5 | 15,3 | 23,9 |
| **High School** | 75,5 | 67,0 | 67,9 | 45,7 | 28,1 | 28,2 |
| **Occupational High School** | 82,8 | 79,0 | 81,1 | 52,5 | 42,4 | 37,0 |
| **University** | 89,5 | 83,2 | 84,1 | 82,5 | 70,1 | 69,8 |

**Source:** TURKSTAT

Figure 4.4 depicts the LFPR of males at different education levels over time. Primary school and university graduates have highest participation rates in 1988. This pattern of male participation has not changed so much by 2006.

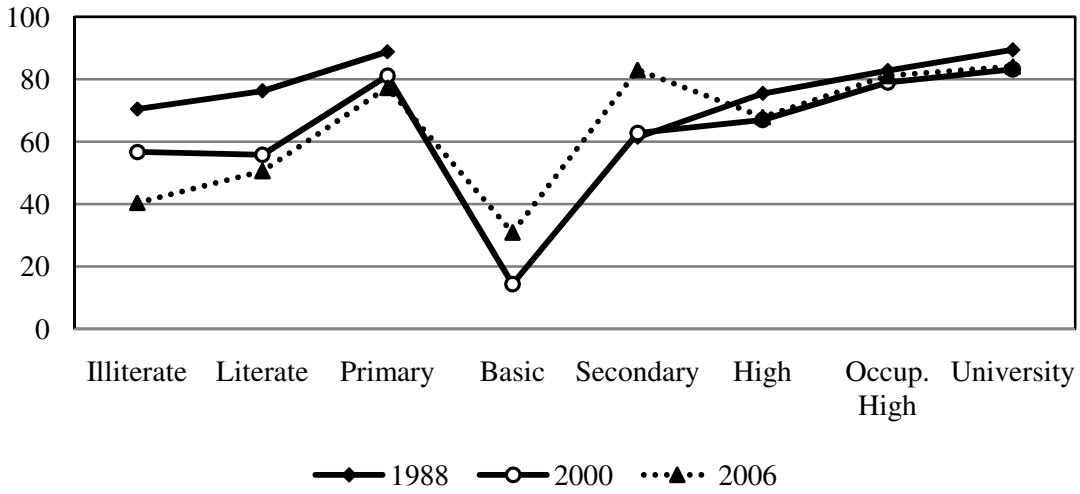


**Figure 4.4 :** Male LFPR by education level and year, (%)

**Source:** TURKSTAT

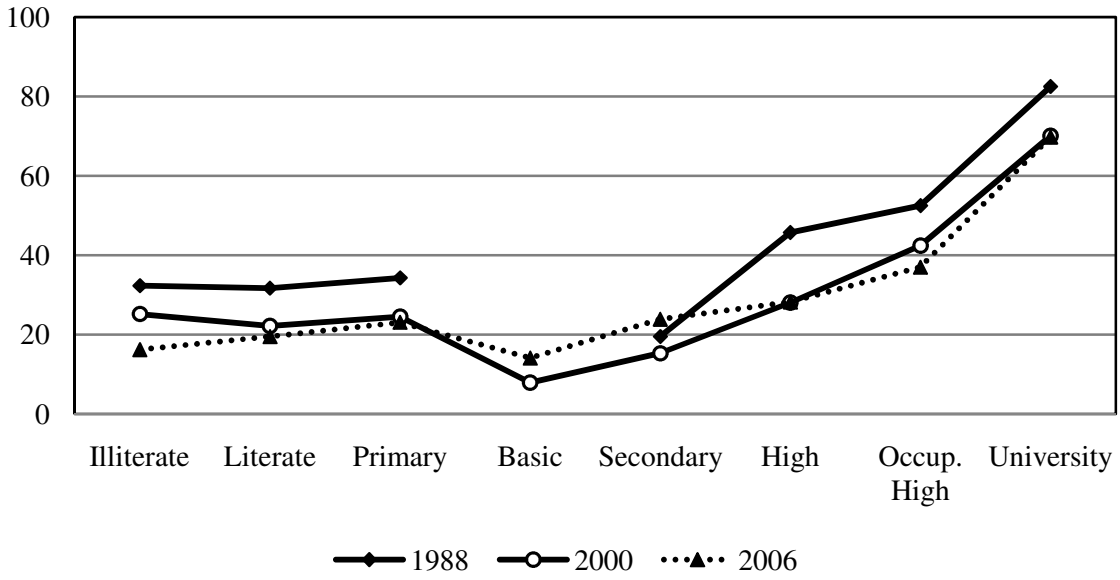


**Figure 4.5 :** Female LFPR by education level and year, (%)

**Source:** TURKSTAT

Female participation rates by education levels show a different pattern. The sensitivity of female participation to higher education levels is more striking than that of males (Figure 4.5). This differentiation varies also by the location of residence. Table 4.4 reports the participation rates of urban males and females

disaggregated by different education levels for the mentioned years. Sharp decrease in the illiterate group's participation implies that literacy problem among participants has been solved in due course. The higher participation rate of secondary school graduates than high school graduates is interesting for urban males. Another interesting point is the decrease in the participation rates of university graduated urban females.

**Table 4.4:** LFPR by education level and gender, (%), urban, 1988-2000-2006

| Education Levels | Urban Male | | | Urban Female | | |
|---|---|---|---|---|---|---|
| | 1988 | 2000 | 2006 | 1988 | 2000 | 2006 |
| **Illiterate** | 70,5 | 44,7 | 36,4 | 32,3 | 5,1 | 5,6 |
| **Literate without Diploma** | 76,3 | 45,3 | 50,1 | 31,7 | 7,9 | 10,1 |
| **Primary School** | 88,9 | 78,4 | 75,9 | 34,3 | 10,4 | 13,3 |
| **Basic Education** | - | 6,9 | 27,6 | - | 2,7 | 9,4 |
| **Secondary School** | 61,4 | 62,1 | 82,5 | 19,5 | 13,6 | 20,4 |
| **High School** | 75,5 | 64,7 | 65,9 | 45,7 | 27,5 | 27,6 |
| **Occup. High School** | 82,8 | 77,3 | 80,2 | 52,5 | 39,9 | 35,6 |
| **University** | 89,5 | 82,1 | 83,3 | 82,5 | 69,6 | 69,8 |

**Source:** TURKSTAT

Table 4.5 displays the participation rates of rural male and females by education levels. In the rural areas of Turkey, the participation rates are higher. For lower education levels, urban males' participation rates are also higher over time. This means that an important part of labor force is uneducated in a formal way and works in agriculture which does not demand higher education. Participation disparity between rural males and females decreases by the higher education levels, but still there exists an important gap between them.

**Table 4.5:** LFPR by education level and gender, (%), rural, 1988-2000-2006

| Education Levels | Rural Male | | | Rural Female | | |
|---|---|---|---|---|---|---|
| | 1988 | 2000 | 2006 | 1988 | 2000 | 2006 |
| **Illiterate** | 74,1 | 62,4 | 43,7 | 47,1 | 38,2 | 25,6 |
| **Literate without Diploma** | 80,7 | 63,6 | 51,2 | 51,2 | 39,2 | 30,3 |
| **Primary School** | 91,7 | 84,1 | 79,3 | 55,0 | 42,5 | 38,2 |
| **Basic Education** | - | 35,1 | 37,1 | - | 30,4 | 21,6 |
| **Secondary School** | 65,7 | 64,1 | 84,0 | 27,5 | 21,3 | 33,7 |
| **High School** | 79,2 | 75,3 | 73,7 | 50,3 | 32,4 | 30,3 |
| **Occup. High School** | 84,8 | 84,8 | 83,6 | 64,6 | 54,9 | 43,0 |
| **University** | 96,4 | 89,9 | 87,9 | 89,8 | 75,5 | 69,8 |

**Source:** TURKSTAT

To sum up, LFPR substantially vary by sex, age, location, and education level in Turkey during 1988-2006. Within this term, structural economic and demographic transformations have been seen. However, the adoption of population to those changes is not realizing rapidly. Therefore, the changes in the determinants of LPF are inevitable.

# 5. LOGISTIC REGRESSION ANALYSIS

After the overview of labor market, the next step is to introduce the empirical analysis. As it is mentioned in Chapter 3, logistic regression is useful for situations in which you want to be able to predict the presence or absence of a characteristic or outcome based on values of a set of predictor variables. It is similar to a linear regression model but is suited to models where the dependent variable is binary. Logistic regression outputs can be used to calculate the marginal effects or odds ratios for each of the independent variables in the model. In the logistic regression outputs, estimated coefficients' numerical values do not have economic interpretation. Their just signs show the direction of their effects on dependent variable. However, calculated marginal effects after logit estimations tell us the effect of change in an independent variable on dependent variable while holding other variables constant at their mean values. For dichotomous independent variables the marginal effect is the change from 0 to 1 holding all others constant. Therefore, after logit estimations it will be convenient to consider the marginal effects of estimated coefficients. In this chapter, several logit models will be estimated and interpreted based on the HLFS micro data of three different years (1988, 2000, and 2006).

## 5.1 Data

In this research study 1988, 2000 and 2006 Household Labor Force Surveys' micro data (HLFS, executed by TURKSTAT) are used. 1988 (October round) HLFS is the initial nationwide survey in ILO standards which was conducted with 102 062 individuals living in 22 320 households. This survey is suitable to compare with the recent surveys. 2000 HLFS is used as the middle year for the long-run empirical analysis that will be done in this and the next chapter. This year is chosen to see how the labor force participation trends changes from 1980s to 1990s and to 2000s. Since data for 1990s is not available, the best alternative is to use 2000 HLFS. By using 2000 data after 1988 data, a period of high growth from 1980s to 2000s (with financial liberalization) will be observed. The other reason of choosing 2000 HLFS

data is the comparability of it with 2006 HLFS data. However, there is a disadvantage of inserting 2000 data into analyses due to lack of regional variables in 2000 HLFS. Because of that the regressions will be run with regions and without regions to see how that affects the analyses. 2000 HLFS was conducted with 288 735 individuals living in 74 368 households. 2006 HLFS is used since it was the most recent survey available when this study started and it is also used as the terminal year for the long-run analysis. Another reason of using 2006 data is to see the effects of economic crisis from 2000 onwards resulting high rates of unemployment which continues to persist. It was conducted with 497 137 individuals living in 129 527 households.

### 5.1.1 Subsamples

To do clear-cut empirical analyses, it is necessary to draw the border lines of the research. In this study, first, whole of working age population will be handed for 1988, 2000, and 2006 data. Than, the urban side of the adult population will be considered since 52.4%, 70.3%, and 62.9% of participants in 1988, 2000, and 2006 data residing in urban. Emphasized age groups in that subsamples are the working age population that is 12 and over for 1988 data, but 15 and above for 2000 and 2006 data.[39] Working age population comprises 70.4%, 71.3%, and 71.7% of 1988, 2000, and 2006 data, respectively. Each year's data will be disaggregated by gender in the second subsample. To sum up, the subsamples for empirical analyses are, first, all of the working age population including rural and urban, male and female; second, working age males and females living in urban areas. Table 5.1 summarizes the sample and subsample sizes of used data. Distributions of each subsample size within their data are similar for every year.

[39] Working age is determined legally with the end of compulsory education. Compulsory education duration has been five years until 1997 in Turkey. It was determined as eight years in 1997. The upper bound of working age is not determined in HLFS data. In some countries' HLFS data this is determined as 65 years.

**Table 5.1:** Sample and subsample sizes, 1988-2000-2006 HLFS

| | 1988 HLFS | | | | 2000 HLFS | | | | 2006 HLFS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All Sample | | 12+ | | All Sample | | 15+ | | All Sample | | 15+ | |
| | Level | % | Level | % | Level | % | Level | % | Level | % | Level | % |
| **Total** | 102.062 | 100 | 71.894 | 100 | 288.735 | 100 | 205.833 | 100 | 497.137 | 100 | 356.390 | 100 |
| **Male** | 50.701 | 49,7 | 35.116 | 48,8 | 142.576 | 49,4 | 99.448 | 48,3 | 242.310 | 48,7 | 169.483 | 47,6 |
| Rural | 19.673 | 19,3 | 13.327 | 18,5 | 35.722 | 12,4 | 23.822 | 11,6 | 80.480 | 16,2 | 54.701 | 15,4 |
| **Urban** | 31.028 | 30,4 | **21.789** | 30,3 | 106.854 | 37,0 | **75.626** | 36,7 | 161.830 | 32,5 | **114.782** | 32,2 |
| **Female** | 51.361 | 50,3 | 36.778 | 51,2 | 146.159 | 50,6 | 106.385 | 51,7 | 254.827 | 51,3 | 186.907 | 52,4 |
| Rural | 19.800 | 19,4 | 13.940 | 19,4 | 36.227 | 12,5 | 25.685 | 12,5 | 87.346 | 17,6 | 62.722 | 17,6 |
| **Urban** | 31.561 | 30,9 | **22.838** | 31,8 | 109.932 | 38,1 | **80.700** | 39,2 | 167.481 | 33,7 | **124.185** | 34,8 |

**Source:** TURKSTAT (1988, 2000, 2006 HLFS micro data)

30.3% of the male adults and 31.8% of the female adults aged 12 and above reside in urban locations in October 1988 HLFS. Among those 44 627 urban residents, there are 19 814 participants which makes 44.4% of these adults. 80.4% of these participants are male, 19.6% are females. 24 813 are non-participants.

In 2000 HLF data, there are 156 326 adults (aged 15 and above) living in urban locations. 64 060 are participants and 92 266 are non-participants. 80% of participants are male. 73.5% of non-participants are female.

48.1% of 2006 HLFS data is comprised from urban adult males and females. Of these urban adults 45.8% are participants. 74.2% of participants are male, 74.1% of non-participants are female. Other summarized characteristics of the subsamples are given in the Appendix A.

## 5.2 Methodology: Logistic Regression Analysis

In the logistic regression analysis the dependent variable is the occurrence probability of an event, so it must be between 0 and 1. But the independent variables (predictors) can be binary, categorical and continuous or some combinations of these.

In logit analysis it is hypothesized that the probability of the occurrence of an event is determined by the function

$$p_i = F(Z_i) = 1 / (1 + e^{-Z_i}) \quad \textbf{(5.1)}$$

where $Z = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \ldots + \beta_iX_i$ . As Z tends to infinity, $e^{-Z}$ tends to 0 and p has a limiting upper bound of 1. As tends to minus infinity, $e^{-Z}$ tends to infinity and p has a limiting lower bound of 0. Hence there is no possibility of getting predictions of the probability being greater than 1 or less than 0.

The marginal effect of Z on the probability, which will be denoted f(Z), is given by the derivative of this function with respect to Z:

$$f(Z) = dp / dZ = e^{-Z} / (1 + e^{-Z})^2 \quad \textbf{(5.2)}$$

The model is fitted by maximum likelihood estimation and this uses an iterative process to estimate the parameters.

The logistic equation can be inverted into a linear relation by manipulating the probability into a log odds or logit:

$$Pr(y=1) + e^{-Z} Pr(y=1) = 1 \quad \textbf{(5.3)}$$

$$e^{-Z} Pr(y=1) = 1 - Pr(y=1) \quad \textbf{(5.4)}$$

$$e^{-Z} = (1 - Pr(y=1)) / (Pr(y=1)) \quad \textbf{(5.5)}$$

$$\log e^{-Z} = \log [(1 - Pr(y=1)) / (Pr(y=1))] \quad \textbf{(5.6)}$$

$$-Z = \log [(1 - Pr(y=1)) / (Pr(y=1))] \quad \textbf{(5.7)}$$

$$-Z = \log (1- Pr(y=1)) - \log (Pr(y=1)) \quad \textbf{(5.8)}$$

$$Z = \log (Pr(y=1)) - \log (Pr(y=0)) \quad \textbf{(5.9)}$$

Therefore;

$$\log [Pr(y=1) / Pr(y=0)] = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \ldots + \beta_iX_i \quad \textbf{(5.10)}$$

After these manipulations, we get a relation that is similar to linear models. But here, each change in explanatory variables corresponds to a change not in the directly dependent variable but in log odds. Here, odds is equal to Pr(y=1)/Pr(y=0). Interpretation of the estimated coefficients is also different from linear models. These coefficients' numerical values cannot be interpreted as any increase or decrease in the binary dependent variable, but can be interpreted as one-point increase (decrease) in a explanatory variable increases (decreases) the of the occurrence of the event depending on the sign of this variable. Besides we need to calculate marginal effects to calculate the probabilities of each explanatory variable and to detect their self

marginal contributions to the occurrence probability of the event holding all other variables at their mean values.

In the models of this study, the dependent variable LFP takes 0 when a person is non-participant and 1 when a person is participant. The estimates of LFP which are determined by the estimation of all explanatory variables within a model, take values ranging from 0 to 1.

The categorization of the explanatory variables is threefold in the empirical analysis: individual variables, household variables and regional variables. These variables are determined under the constraint of 1988 HLFS data, because the decomposition analysis by year (will be mentioned in the next chapter) necessitates the usage of common variables in logit estimations for each considered year in the analysis.

Age and education level are individual variables. Age and education level in fact reflect the human capital variables owned by a person, hence, in our variable classification, they are considered as individualistic. Age at some extent is also a measure of work experience. In different age levels, women and men show different participation patterns. For women, age actually represents a life-cycle pattern, entrances and exits happen due to marriage or child bearing and rearing activities.[40] Men's participation pattern is generally more continuous than women, except the compulsory military service term. Age variables in the models are dummy variables for different standardized age groups.[41]

Education level is also one of the basic determinants of LFP. In the literature, it is expected that education level makes increase the level of expected wage and returns from participation. Education level variables in the models are dummy variables for each completed education level. [42]

Marital status, household size, relationship to the household head and presence of children in the household below the age 14 are household variables. Marital status is an important determinative household variable in the participation decision. To be

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[40] This situation is the commonly known in the literature as M-shape characteristic of female labor force participation leading a life-cycle pattern.

[41] There groups are like the following: W-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65+. W is the initial legal working age. W=12 for 1988, W=15 for 2000 and 2006 data.

[42] There levels are illiterate, literate without diploma, primary school, secondary school, high school, occupational school and university.

single, married, divorced or widowed means different economic responsibilities within households. Each of these marital statuses affects the individual participation decision in different ways. It is expected that single women's participation probability will be more than married women. By the same token, married men's high participation is expected. This situation usually arises from the breadwinner role of men and homemaker role of women in conventional Turkish family structure. Marital status variable is considered as dummy variable in analyses whether the person is married or not since the marriage is thought as most influential marital status in participation. In 2006 HLFS, living with a partner and married but separate categories are included into the married category. Household size is expected to promote the participation, because the more members of a household means more months are needed to feed. However, this idea may not be valid for women, because the need for household reproduction facilities increases with the expansion of household size. This variable is the single continuous explanatory variable in our models. Relationship to the household head means the status of a person in the household. This is a categorical variable in surveys including the categories, namely household head, spouse, children, parents, relatives, and non-relatives in the household. It is expected that being a household head increase the probability of participation for both men and women. However, being a spouse (especially being a housewife), children, and parent are expected to lower the probability of participation. In the analyses, being household head is represented with a dummy variable, coded with 1 for household heads and 0 for others. Presence of children in the household below the age 14 is expected to lower the participation probability of women while encouraging the participation decision of men. This is a dummy variable which takes 0 in the absence of children below the age 14 and takes 1 in presence of children below the age 14 in the household.

Other group of variables is the regional variables. In 1988 and 2006 data, geographical regions are categorized into 5 parts, and dummy variables are created for each region. These regions are Aegean and Marmara, Mediterranean, Central Anatolia, Black Sea, and East and South East Anatolia. The effects of regions on participation probability are expected to be mixed since the employment opportunities and cultural factors differ for each region. Urbanization, sectoral

distribution of employment and socio-cultural factors play important roles in participation decision.

Table 5.2 lists the explanatory variables with their created names in the STATA outputs and their expected signs (positive/negative/uncertain) on participation probability.

STATA 10 version is used to run the logit regressions of this chapter and apply non-linear decomposition analyses for the next chapter. STATA is appropriate and widely used software especially in studies employing cross-sectional data by estimating logit and probit regressions.

**Table 5.2:** Explanatory variables and their expected signs

| Variables | Male | Female |
|---|---|---|
| **Standardized Age Groups** | | |
| ageW_19 | + | + |
| age20_24 | + | + |
| age25_29 | + | + |
| age30_34 | + | + |
| age35_39 | + | + |
| age40_44 | + | + |
| age45_49 | + | + |
| age50_54 | + | + |
| age55_59 | + | + |
| age60_64 | + | + |
| age65 | - | - |
| **Education Levels** | | |
| illiterate | - | - |
| literatewithoutdiploma | + | + |
| primarysch | + | + |
| secondarysch | + | + |
| highsch | + | + |
| occuphighsch | + | + |
| univ | + | + |
| **Geographical Regions** | | |
| ageanandmarmara | u | u |
| mediterranean | u | u |
| centralanatolia | u | u |
| blacksea | u | u |
| eastandsoutheast | u | u |
| **Household Characteristics** | | |
| married | + | - |
| hhhead | + | u |
| phhchildren0_14 | + | - |
| hhsize | + | u |

(+): positive effect, (-): negative effect, (u): uncertain

### 5.3 Results of the Logistic Regression Analyses

The estimations in our logistic regression analyses using the following samples are:

1. Working age population in 1988, 2000 and 2006 HLFS (without regions)
2. Urban males aged 12 and above in 1988 HLFS
3. Urban females aged 12 and above in 1988 HLFS
4. Urban males aged 15 and above in 2006 HLFS
5. Urban females aged 15 and above in 2006 HLFS
6. Urban males aged 12 and above in 1988 HLFS (without regions)
7. Urban females aged 12 and above in 1988 HLFS (without regions)
8. Urban males aged 15 and above in 2000 HLFS (without regions)
9. Urban females age 15 and above in 2000 HLFS (without regions)
10. Urban male aged 15 and above in 2006 HLFS (without regions)
11. Urban female aged 15 and above in 2006 HLFS (without regions)

Each year data is used to estimate the LFP probabilities for both urban male and female subsamples. In the first five estimations all explanatory variables are used (additionally sex and rural variables are used in the first estimation) and same. But in the remaining six estimations, region variables are not used to compare the 1988 and 2006 HLFS with 2000 HLFS which does not contain any regional variables or categories. To see the effects of regions, refer to the Appendix B.

#### 5.3.1 Working age population in 1988, 2000 and 2006 HLFS

Table 5.3 shows the marginal effects after logit estimations based on the sample of working age population in 1988, 2000 and 2006 HLFS data.[43] The logit estimations are in the Appendix B (see Table B.1). Although estimated coefficients in logit regressions tell us the direction of effects, marginal effects give us the numerical comparison opportunity additionally. The predicted participation probability of working age population at average characteristics is 55.4% in 1988. This probability decreases to 40.7% in 2000, and 47.9% in 2006. Hence it can be said that participation probability is decreasing over the years depending on the mean values of mentioned characteristics.

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[43] Appendix D depicts the marginal effects of Table 5.3.

In these analyses for 1988, 2000 and 2006, all marginal effects are statistically significant.[44] Sex variable considered in this regression is a dummy variable, taking 0 for females and 1 for males. According to the results, the marginal effect of being male is increasing from 1988 to 2006. This means that the dominance of males in the LFP in Turkey does not change and still continues to persist. Therefore, sex, in a broad sense, gender does still play an important role as a determinant of participation. Rural variable is another dummy variable, taking 0 for urban and 1 for rural. The marginal effects of rural variable are decreasing over time. This points out that the participation probability of one who has average characteristics residing in rural areas is decreasing relative to one residing in urban. This is related with the disintegration of agricultural sector in rural. Hence gender and location of residence are influential determinants of participation. Participation should be considered disaggregating sample data by gender and location of residence. In this study, working age males and females residing in urban will be analyzed in the next section.

According to being aged 65 and over category, the marginal effects of W-19 age categories (W is 12 for 1988, 15 for 2000 and 2006 HLFS) are decreasing from 1988 to 2006. The reason of that decrease can be explained with increasing of schooling years. From the beginning of 1998-1999 term, compulsory education year has been increased to 8 years. For 20-24 age group, marginal effect first increase from 1988 to 2000 and than decrease from 2000 to 2006. This pattern of participation is seen for the other age groups up to 50. This should be related with the economic conjecture. After 2001 crisis, higher rates of unemployment have been experienced and this created discouraged workers who have withdrawn from labor market. Contrary, the marginal effects for participation decrease from 1988 to 2000 and increase from 2000 to 2006 between the ages 50 and 64. This is linked with the early retirement scheme that went in effect by 1993 and abolished by 2001.

According to the trend of marginal effects of education variables, there is an upward shift from 1988 to 2000 in literate without diploma, secondary school, occupational high school and university categories. However, this movement can not be seen for literate without diploma, occupational high school and university categories after

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[44] ***, **, and * denote 1%, 5% and 10% significance levels during all the empirical results. Standard errors are in the parentheses below coefficients. Base categories are age65, illiterate, and eastandsoutheast for all empirical models in this study.

2000. Secondary school's marginal effect is stable. Here is the most striking finding is of high school level. The marginal effect of being graduate from high school is decreasing over time. This is an important problem that should be considered by policymakers of education and labor market.

The marginal effects of household variables are also important indicators of participation trends over time. The marginal effect of being married variable is increasing from 1988 to 2006, but negatively. The reason of that finding is the dominance of females in the sample. For females, being married is an important obstacle for participation. The marginal effects of household head are decreasing over time. Household heads are expected to be the primary responsible from the income level of family. However, the economic conditions that are getting harder by time necessitate the participation of other family members into labor market. Presence of children variables' negative marginal effects also decrease. The reason of that movement is parallel with the previous explanations about the livelihoods of families. But the marginal effects decrease for household size variable over time. This is related with the dominance of females in the sample. Because the participation probability of females within crowded household is lower due to need in the household production.

To sum up, gender and location of residence are important determinants of LFP for each year mentioned above. Because of that participation of different population groups who male or female and residing in urban or rural should be considered within separate analyses. However, the variables used in this study determining the LFP are not so much explanatory for rural areas due to production structure of rural based on the small scale family farms. The status of the most employees is self-employed or unpaid family worker. The participation decisions and behaviors of those groups are different from urban side. Hence urban side of the working age population will be analyzed in this study.

**Table 5.3:** Marginal effects of logit models (1988, 2000 and 2006)

| | | 1988 | 2000 | 2006 |
|---|---|---|---|---|
| **Pr(lfp)** | | **55,4%** | **40,7%** | **47,9%** |
| **INDIVIDUAL CHARACRTERISTICS** | **sex** | 0,4252 | 0,4436 | 0,4567 |
| | | (0,0053)*** | (0,0031)*** | (0,0023)*** |
| | **rural** | 0,3770 | 0,3036 | 0,2445 |
| | | (0,0044)*** | (0,0033)*** | (0,0023)*** |
| | **ageW_19** | 0,4749 | 0,4501 | 0,3611 |
| | | (0,0092)*** | (0,0066)*** | (0,0047)*** |
| | **age20_24** | 0,4906 | 0,5478 | 0,5211 |
| | | (0,0047)*** | (0,0042)*** | (0,0024)*** |
| | **age25_29** | 0,4998 | 0,5896 | 0,5568 |
| | | (0,0044)*** | (0,0033)*** | (0,002)*** |
| | **age30_34** | 0,4958 | 0,5877 | 0,5570 |
| | | (0,0041)*** | (0,0033)*** | (0,0019)*** |
| | **age35_39** | 0,4864 | 0,5901 | 0,5527 |
| | | (0,004)*** | (0,0033)*** | (0,0018)*** |
| | **age40_44** | 0,4615 | 0,5674 | 0,5459 |
| | | (0,004)*** | (0,0034)*** | (0,0019)*** |
| | **age45_49** | 0,4368 | 0,4970 | 0,4946 |
| | | (0,0045)*** | (0,0045)*** | (0,0023)*** |
| | **age50_54** | 0,4151 | 0,3946 | 0,4242 |
| | | (0,0051)*** | (0,0061)*** | (0,0031)*** |
| | **age55_59** | 0,3454 | 0,2996 | 0,3359 |
| | | (0,0078)*** | (0,0079)*** | (0,0042)*** |
| | **age60_64** | 0,2430 | 0,1766 | 0,2345 |
| | | (0,0121)*** | (0,0094)*** | (0,0058)*** |
| | **literatewithoutdip.** | 0,1520 | 0,2125 | 0,1957 |
| | | (0,0084)*** | (0,008)*** | (0,0043)*** |
| | **primarysch** | 0,2583 | 0,2216 | 0,1677 |
| | | (0,0054)*** | (0,004)*** | (0,0032)*** |
| | **secondarysch** | 0,2912 | 0,3054 | 0,3083 |
| | | (0,0072)*** | (0,0054)*** | (0,0033)*** |
| | **highsch** | 0,3578 | 0,3118 | 0,2499 |
| | | (0,0057)*** | (0,0051)*** | (0,0038)*** |
| | **occuphighsch** | 0,3567 | 0,3904 | 0,3310 |
| | | (0,0072)*** | (0,0055)*** | (0,0036)*** |
| | **univ** | 0,4104 | 0,5148 | 0,4355 |
| | | (0,0048)*** | (0,0034)*** | (0,0026)*** |
| **HOUSEHOLD CHARACTHERISTICS** | **married** | -0,0425 | -0,0600 | -0,0812 |
| | | (0,0075)*** | (0,0043)*** | (0,0032)*** |
| | **hhhead** | 0,3242 | 0,2835 | 0,1892 |
| | | (0,0072)*** | (0,0047)*** | (0,0034)*** |
| | **phhchildren0_14** | -0,1120 | -0,0254 | -0,0402 |
| | | (0,0057)*** | (0,0033)*** | (0,0026)*** |
| | **hhsize** | 0,0283 | 0,0200 | 0,0121 |
| | | (0,0011)*** | (0,0007)*** | (0,0005)*** |

### 5.3.2 Urban males and females in 1988, 2000, and 2006 HLFS

Table 5.4 presents the calculated marginal effects of explanatory variables from the logistic regressions conducted for adult urban males and females of 1988, 2000, and 2006. The logit estimation results are in the Appendix B (see Table B.2) and visual display of marginal effects are in Appendix D. The predicted probabilities of participation are 88.6%, 77.6%, and 84% for males, 12.4%, 10.4%, and 16.8% for females in 1988, 2000, and 2006, respectively. So it is clear that participation increases for urban females and decreases for urban males in 1988-2006 term. All of the calculated marginal effects are statistically significant. Marginal effects of age variables increase from 1988 to 2000, but than decrease from 2000 to 2006 for urban males. However, the marginal effects of age variables decrease from 1988 to 2000, but than increase from 2000 to 2006 for urban females. That can be explained with economic conjecture as it was mentioned in the previous section. After 2001 economic crises, added worker effect prevails for urban females whose husbands became unemployed and their family income reduced. The marginal effects of education level variables show the same movements for urban males. Up to secondary school level (except literate without diploma level) the marginal effects of education levels for urban females are similar to that of males. The striking findings for education level variables start from the high school level to university level. There is a persistent decline in the marginal effects of upper education levels of urban females. These depreciations sign that the sensitivity of female participation to higher level education decreases from 1988 to 2006. Figure 5.1 depicts this decrease clearly.

Being married, being household head and increasing household size continue to provide positive marginal effects on the likelihood of men's participation. Being married is historically preventive for the women's participation and its negative marginal effect for women in average characteristics increase over time. Being household head variable's marginal effects also turn to negative values in 2000s. Although the negative marginal effects for the presence of children on the participation probability have weakened over time, they are found negative for urban females in all years. Household size variable's marginal effects on participation go down for urban males and turn to negative for urban females. These results are in accordance with the findings of previous section.

**Table 5.4:** Marginal effects of logit models (urban male and urban female)

| | | 1988 | | 2000 | | 2006 | |
|---|---|---|---|---|---|---|---|
| | | Male | Female | Male | Female | Male | Female |
| | Pr(lfp) | 88,6% | 12,4% | 77,6% | 10,4% | 84,0% | 16,8% |
| INDIVIDUAL CHARACTERISTICS | ageW_19 | 0,2564 | 0,4298 | 0,3066 | 0,3666 | 0,2166 | 0,4852 |
| | | (0,0102)*** | (0,0531)*** | (0,0041)*** | (0,0248)*** | (0,0028)*** | (0,0172)*** |
| | age20_24 | 0,1744 | 0,6277 | 0,2974 | 0,5109 | 0,2330 | 0,6714 |
| | | (0,0058)*** | (0,0490)*** | (0,0032)*** | (0,0240)*** | (0,0025)*** | (0,0121)*** |
| | age25_29 | 0,2177 | 0,6616 | 0,3278 | 0,5881 | 0,2767 | 0,7087 |
| | | (0,0063)*** | (0,0461)*** | (0,0032)*** | (0,0226)*** | (0,0027)*** | (0,0108)*** |
| | age30_34 | 0,1986 | 0,7186 | 0,3260 | 0,6171 | 0,2677 | 0,7321 |
| | | (0,0057)*** | (0,0393)*** | (0,0030)*** | (0,0219)*** | (0,0025)*** | (0,0098)*** |
| | age35_39 | 0,1811 | 0,6947 | 0,3250 | 0,6283 | 0,2443 | 0,7411 |
| | | (0,0058)*** | (0,0424)*** | (0,0031)*** | (0,0215)*** | (0,0025)*** | (0,0093)*** |
| | age40_44 | 0,1490 | 0,6422 | 0,2954 | 0,5707 | 0,2352 | 0,7091 |
| | | (0,0053)*** | (0,0490)*** | (0,0031)*** | (0,0236)*** | (0,0026)*** | (0,0106)*** |
| | age45_49 | 0,1283 | 0,5695 | 0,2444 | 0,4169 | 0,1914 | 0,6090 |
| | | (0,0049)*** | (0,0575)*** | (0,0031)*** | (0,0273)*** | (0,0023)*** | (0,0144)*** |
| | age50_54 | 0,1125 | 0,4978 | 0,1966 | 0,3278 | 0,1602 | 0,4941 |
| | | (0,0046)*** | (0,0637)*** | (0,0036)*** | (0,0280)*** | (0,0023)*** | (0,0180)*** |
| | age55_59 | 0,0930 | 0,3627 | 0,1540 | 0,1973 | 0,1271 | 0,3861 |
| | | (0,0049)*** | (0,0697)*** | (0,0046)*** | (0,0278)*** | (0,0025)*** | (0,0210)*** |
| | age60_64 | 0,0670 | 0,1282 | 0,0981 | 0,0796 | 0,0892 | 0,2368 |
| | | (0,0064)*** | (0,0621)* | (0,0067)*** | (0,0235)** | (0,0036)*** | (0,0239)*** |
| | literatewithoutdiploma | 0,1077 | 0,0495 | 0,2049 | 0,0597 | 0,1507 | 0,0574 |
| | | (0,0043)*** | (0,0127)*** | (0,0030)*** | (0,0097)*** | (0,0020)*** | (0,0065)*** |
| | primarysch | 0,2527 | 0,0601 | 0,3717 | 0,0386 | 0,2278 | 0,0425 |
| | | (0,0085)*** | (0,0061)*** | (0,0053)*** | (0,0034)*** | (0,0037)*** | (0,0036)*** |
| | secondarysch | 0,1241 | 0,1660 | 0,2406 | 0,1110 | 0,1871 | 0,1459 |
| | | (0,0046)*** | (0,0163)*** | (0,0031)*** | (0,0077)*** | (0,0023)*** | (0,0063)*** |
| | highsch | 0,1133 | 0,3961 | 0,2175 | 0,1843 | 0,1409 | 0,1643 |
| | | (0,0045)*** | (0,0179)*** | (0,0033)*** | (0,0074)*** | (0,0023)*** | (0,0061)*** |
| | occuphighsch | 0,1060 | 0,4902 | 0,2149 | 0,3295 | 0,1637 | 0,2603 |
| | | (0,0044)** | (0,0245)*** | (0,0030)*** | (0,0116)*** | (0,0022)*** | (0,0076)*** |
| | univ | 0,1143 | 0,7276 | 0,2442 | 0,6193 | 0,1744 | 0,5582 |
| | | (0,0045)*** | (0,0165)*** | (0,0030)*** | (0,0092)*** | (0,0023)*** | (0,0069)*** |
| HOUSEHOLD CHARACTERISTICS | married | 0,1154 | -0,1541 | 0,1371 | -0,1331 | 0,1583 | -0,1752 |
| | | (0,0137)*** | (0,0087)*** | (0,0096)*** | (0,0044)*** | (0,0077)*** | (0,0040)*** |
| | hhhead | 0,1595 | 0,0236 | 0,1556 | -0,0017 | 0,0716 | -0,0130 |
| | | (0,0170)*** | (0,0125) | (0,0105)*** | (0,0047) | (0,0065)*** | (0,0043)** |
| | phhchildren0_14 | -0,0136 | -0,0435 | 0,0493 | -0,0154 | 0,0385 | -0,0342 |
| | | (0,0054)** | (0,0055)*** | (0,0046)*** | (0,0025)*** | (0,0031)*** | (0,0025)*** |
| | hhsize | 0,0124 | 0,0039 | 0,0122 | -0,0034 | 0,0090 | -0,0071 |
| | | (0,0011)*** | (0,0010)*** | (0,0011)*** | (0,0007)*** | (0,0007)*** | (0,0006)*** |

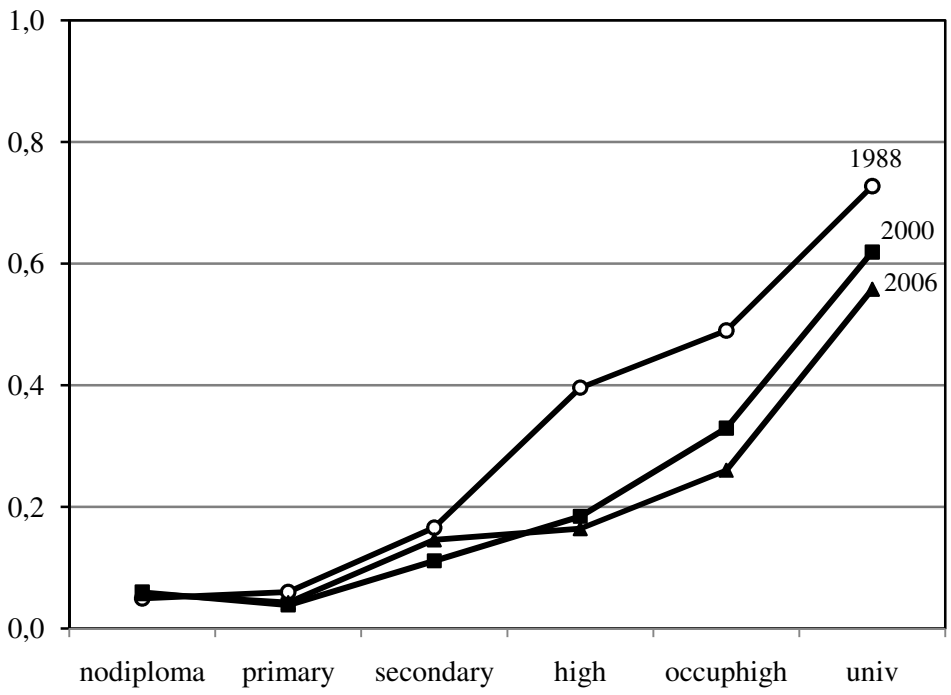


**Figure 5.1 :** Marginal effects of education levels for urban females

**Source:** Calculated and graphed by author

To sum up, the relative importance of fundamental LFP determinants in the urban side of Turkey change over time. However, the extent of these changes in the determinants is not so puzzling. Household characteristics increasingly continue to be preventive for the participation of urban females. Education's strong effect on the participation of females has weakened from 1988 to 2006. Nevertheless, the predicted participation probability of urban female increased in that term. This can be explained with the factors out of these LFP equations. Economic crisis are the primary sources of high urban female participation and low participation of males.

Note that regional variables are not used in the last two regression analyses due to lack of them in 2000 HLFS data. However, the estimations which consider the effects of regions are run, but the difference is merely. The logit estimations and the calculated marginal effects of 1988 and 2006 HLFS data with region variables are in the Appendix B. See Table B.3 and Table B.4 for logit estimations and marginal effects, respectively.

## 6. DECOMPOSITION ANALYSIS

After examining labor market qualitatively in Chapter 4 and running the logit regression models disaggregated by gender in the urban over time in Chapter 5, the next step is to deepen the analysis with further techniques. One of these techniques is applying a detailed decomposition analysis. In this study, decomposition will be used to examine the sources of observed shifts in LFP due to gender gap and time gap (from 1988 to 2006) and interactions of these two dichotomies.

In social sciences, identifying the causes of differences in the outcomes (gender, region etc. differences) has been the aim of many empirical studies in the literature. Within these types of studies, perhaps the most commonly used method is to decompose inter-group differences in mean levels of an outcome into those due to different observable characteristics or "endowments" across groups and those due to different effects of characteristics or "coefficients" of groups. This technique is usually called with the names of Blinder (1973) and Oaxaca (1973). These two studies are frequently cited articles in the empirical literature of economy.[45]

### 6.1 Blinder-Oaxaca Decomposition Technique: Linear Decomposition Analysis

The Blinder-Oaxaca decomposition technique[46] is a very popular descriptive tool in empirical economics that is especially useful for identifying and quantifying the separate contributions of group differences in measurable characteristics, such as education, experience, marital status, and geographical location, to racial and gender gaps in outcomes.[47] The technique is easy to apply and only requires coefficient estimates from linear regressions for the outcome of interest and sample means of the

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[45] Fairlie (2003) states that more than 1000 citations to these two articles are found in the Social Sciences Citation Index as of June 2003.

[46] The counterfactual decomposition technique popularized by Blinder (1973) and Oaxaca (1973) is widely used to study mean outcome differences between groups. For example, the technique is often used to analyze wage gaps by gender or race.

[47] Although it is not commonly used, the technique is also useful for identifying the causes of geographical (e.g. urban/rural or cross-country), time period, or other categorical differences in outcomes (Fairlie, 2003).

independent variables used in the regressions. This method is generalized by Juhn, Murphy, and Pierce (1991), Neumark (1988) and Oaxaca and Ransom (1988, 1994).

So far, these decomposition methods have mainly been applied in the context of linear regression models. In many cases, however, the outcome variable is non-linear as cited in Chapter 3, requiring the estimation of non-linear models because OLS yields inconsistent parameter estimates and in turn misleading decomposition results. In particular, since the parameter estimates of non-linear models typically differ from the marginal effects of the latent outcome variable, they cannot be used to perform a standard Blinder-Oaxaca decomposition (Bauer and Sinning, 2006).

Therefore, following the logit regression analyses of the previous chapter, the standard Blinder-Oaxaca decomposition technique will not be directly used for the decompositions of changes in labor force participation within this chapter. To extend the Blinder-Oaxaca decomposition analysis for models with binary dependent variables a new technique has been developed by Fairlie (1999, 2003). In this chapter, Fairlie (2003) will be followed methodologically as an extension of Blinder-Oaxaca decomposition technique.

## 6.2 Non-Linear Decomposition Analysis

In this chapter, abovementioned extension version of Blinder-Oaxaca decomposition is used that can be applied to non-linear models, which allows the differences in a non-linear outcome variable between two groups to be decomposed into a part that is explained by differences in observed characteristics and a part attributable to differences in the estimated coefficients.

Fairlie (2003) describes a relatively simple method of performing a decomposition that uses estimates from a logit or probit model. In his study titled, “An Extension of Blinder-Oaxaca Decomposition Technique to Logit and Probit Models”, he provides a more thorough discussion of how to apply the technique, an analysis of the sensitivity of the decomposition estimates to different parameters, and the calculation

of standard errors expanding on the original application of the technique in Fairlie (1999).[48]

Fairlie (2003) states that the non-linear decomposition technique described in his article may be useful for identifying the causes of racial, gender, geographical or other categorical differences in a binary outcome in which a logit or probit model is used.[49]

For a linear regression model of LFP which is estimated separately for two genders (male and female), the standard Blinder-Oaxaca decomposition of the gender participation gap in the average value of the dependent variable, Y, can be expressed as[50]:

$$\overline{Y}^{M} - \overline{Y}^{F} = \left[ \left( \overline{X}^{M} - \overline{X}^{F} \right) \hat{\beta}^{M} \right] + \left[ \overline{X}^{F} \left( \hat{\beta}^{M} - \hat{\beta}^{F} \right) \right] \qquad \textbf{(6.1)}$$

where $\overline{X}^{j}$ is a row vector of average values of the independent variables and $\hat{\beta}^{j}$ is a vector of coefficient estimates for gender j. Following Fairlie (1999, 2003), the decomposition for a nonlinear equation, such as $Y = F\left( X\hat{\beta} \right)$ can be written as:

$$\overline{Y}^{M} - \overline{Y}^{F} = \left[ \sum_{i=1}^{N^{M}} \frac{F\left( X_i^{M} \hat{\beta}^{M} \right)}{N^{M}} - \sum_{i=1}^{N^{F}} \frac{F\left( X_i^{F} \hat{\beta}^{M} \right)}{N^{F}} \right] + \left[ \sum_{i=1}^{N^{F}} \frac{F\left( X_i^{F} \hat{\beta}^{M} \right)}{N^{F}} - \sum_{i=1}^{N^{F}} \frac{F\left( X_i^{F} \hat{\beta}^{F} \right)}{N^{F}} \right] \qquad \textbf{(6.2)}$$

where $N^{j}$ is the sample size for gender j. This alternative expression for the decomposition is necessary because $\overline{Y}$ does not necessarily equal $F\left( \overline{X}\hat{\beta} \right)$. Both in the original Blinder-Oaxaca equation and in Fairlie (2003)'s extended equation, the first term in brackets represents the part of the gender gap that is due to group differences in distributions of X, and the second term represents the part due to

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[48] A relatively simple method of performing a decomposition that uses estimates from a logit or probit model was first described in Fairlie's (1999) analysis of the causes of the black/white gap in self-employment rates.

[49] Jann (2006) created the STATA module for Fairlie (2003) and wrote the command "fairlie" for this non-linear decomposition analysis. This module can be installed to STATA 10 program. It is available from http://ideas.repec.org/c/boc/bocode/s456727.html.

[50] This decomposition can also be thought for the LFP differences through the time.

differences in the group processes determining levels of Y. The second term also captures the portion of the gender gap due to group differences in immeasurable or unobserved endowments.

To calculate the decomposition, define $\overline{Y}^{j}$ as the average probability of the binary outcome of interest for gender j and F is the cumulative distribution function from the logistic distribution. Alternatively, Fairlie (2003) notes that for a probit model F would be defined as the cumulative distribution function from the standard normal distribution.

An equally valid expression for the decomposition can be expressed following Fairlie (2003):

$$\overline{Y}^{M} - \overline{Y}^{F} = \left[ \sum_{i=1}^{N^{M}} \frac{F\left(X_i^{M}\hat{\beta}^{F}\right)}{N^{M}} - \sum_{i=1}^{N^{F}} \frac{F\left(X_i^{F}\hat{\beta}^{F}\right)}{N^{F}} \right] + \left[ \sum_{i=1}^{N^{F}} \frac{F\left(X_i^{M}\hat{\beta}^{M}\right)}{N^{M}} - \sum_{i=1}^{N^{F}} \frac{F\left(X_i^{M}\hat{\beta}^{F}\right)}{N^{M}} \right] \quad \textbf{(6.3)}$$

In this case, the female coefficient estimates, $\hat{\beta}^{F}$ are used as weights for the first term in the decomposition, and the male distributions of the independent variables, $\overline{X}^{M}$ are used as weights for the second term. This alternative method of calculating the decomposition often provides different estimates, which is the familiar index problem with the Blinder-Oaxaca decomposition technique.

A third alternative, used in Neumark (1988) and Oaxaca and Ransom (1994), is to weight the first term of the decomposition expression using coefficient estimates from a pooled sample of the two groups. Ultimately, the choice across these alternative methods of calculating the first term of the decomposition is difficult and depends on the application with many studies reporting results for more than one specification. There is also a problem of potential sensitivity of the results with respect to the choice of the reference group.[51]

The first terms in these two alternative expressions provide an estimate of the contribution of gender differences in the entire set of independent variables to the

[51] These are the classic problems of original Blinder-Oaxaca decomposition. Non-linear models' decomposition analyses also share these problems.

gender gap in labor force participation. Estimation of the total contribution is relatively simple as one only needs to calculate two sets of predicted probabilities and take the difference between the average values of the two.

Identifying the contribution of group differences in specific variables to the gender participation gap, however, is not as straightforward. To simplify, first assume that $N^M = N^F$ and that there exists a natural one-to-one matching of male and female observations.

Using coefficient estimates from a logit regression for a pooled sample, $\hat{\beta}^*$, the independent contribution of $X_1$ to the gender gap can then be expressed as:

$$\frac{1}{N^F}\sum_{i=1}^{N^F} F\left(\hat{\alpha}^* + X_{1i}^M \hat{\beta}_1^* + X_{2i}^M \hat{\beta}_2^*\right) - F\left(\hat{\alpha}^* + X_{1i}^F \hat{\beta}_1^* + X_{2i}^M \hat{\beta}_2^*\right) \qquad \textbf{(6.4)}$$

Similarly, the contribution of $X_2$ can be expressed as:

$$\frac{1}{N^F}\sum_{i=1}^{N^F} F\left(\hat{\alpha}^* + X_{1i}^F \hat{\beta}_1^* + X_{2i}^M \hat{\beta}_2^*\right) - F\left(\hat{\alpha}^* + X_{1i}^F \hat{\beta}_1^* + X_{2i}^F \hat{\beta}_2^*\right) \qquad \textbf{(6.5)}$$

The contribution of each variable to the gap is thus equal to the change in the average predicted probability from replacing the female distribution with the male distribution of that variable while holding the distributions of the other variable constant. A useful property of this technique is that the sum of the contributions from individual variables will be equal to the total contribution from all of the variables evaluated with the full sample.

Standard errors can also be calculated for these estimates. Following Oaxaca and Ransom (1998), Fairlie (2003) uses the delta method to approximate standard errors. To simplify notation, rewrite (6.4) as

$$\hat{D}_1 = \frac{1}{N^F}\sum_{i=1}^{N^F} F\left(X_1^{MM}\hat{\beta}^*\right) - F\left(X_1^{FM}\hat{\beta}^*\right) \qquad \textbf{(6.6)}$$

The variance of $\hat{D}_1$ can be approximated as:

$$\mathrm{Var}(\hat{D}_1) = \left(\frac{\delta \hat{D}_1}{\delta \hat{\beta}^*}\right)' \mathrm{Var}(\hat{\beta}^*) \left(\frac{\delta \hat{D}_1}{\delta \hat{\beta}^*}\right) \qquad \textbf{(6.7)}$$

where $\frac{\delta \hat{D}_1}{\delta \hat{\beta}^*} = \frac{1}{N^F} \sum_{i=1}^{N^F} f(X_i^{MM} \hat{\beta}^*) X_i^{MM} - f(X_i^{FM} \hat{\beta}^*) X_i^{FM}$ and f is the logistic probability density function.

In practice, the sample sizes of the two groups are rarely the same and a one-to-one matching of observations from the two samples is needed to calculate (6.4), (6.5), and (6.7). In this example, it is likely that the male sample size is slightly smaller than the female sample size (details about sample sizes were mentioned in Chapter 5). To address this problem, Fairlie (2003) suggests, first, using the pooled coefficient estimates to calculate predicted probabilities, $\hat{Y}_i$, for each female and male observation in the sample. Next suggested step by author is to draw a random subsample of females equal in size to the full male sample ($N_M$). Each observation in the female subsample and full male sample is then separately ranked by the predicted probabilities and matched by their respective rankings. This procedure matches females who have characteristics, such as age and education, placing them at the bottom (top) of their distribution with males who have characteristics placing them at the bottom (top) of their distribution. The decomposition estimates obtained from this procedure depend on the randomly chosen subsample of females. Ideally, the results from the decomposition should approximate those from matching the entire female sample to the male sample. A simple method of approximating this hypothetical decomposition is to draw a large number of random subsamples of females, match each of these random subsamples of females to the male sample, and calculate separate decomposition estimates. The mean value of estimates from the separate decompositions is calculated and used to approximate the results for the entire female sample. In the decomposition outcomes reported below, STATA 10 applies 100 replications with alternative specifications by default.

### 6.3 Results of the Decomposition Analyses

Based on the methodology proposed by Fairlie (2003), described in the previous section, the results of the logit regressions can be used to decompose changes in participation rates by sex and over time between differences in variables and differences in coefficients. The decomposition analysis conducted in this research study focuses on changes in LFP over the period 1988-2006. These decompositions are computed for the following subsamples:

1. Urban males and females aged 12 and above in 1988 HLFS (by sex)
2. Urban males and females aged 15 and above in 2006 HLFS (by sex)
3. Urban males and females aged 15 and above in 2000 HLFS (by sex)
4. Urban males aged 12/15 and above in 1988 and 2006 HLFS (by year)
5. Urban females aged 12/15 and above in 1988 and 2006 HLFS (by year)
6. Urban males aged 12/15 and above in 1988 and 2000 HLFS (by year)
7. Urban females aged 12/15 and above in 1988 and 2000 HLFS (by year)
8. Urban males aged 15 and above in 2000 and 2006 HLFS (by year)
9. Urban females aged 15 and above in 2000 and 2006 HLFS (by year)

First five subsamples will be investigated and their results will be interpreted in this section. The remaining decomposition outputs are in the Appendix C (see Table C.1 and Table C.2).

#### 6.3.1 Decomposition by sex in 1988, 2000 and 2006 HFLS

Table 6.1 summarizes the decomposition estimations conducted for urban adult males and females in 1988, 2000, and 2006 HLFS. According to the Table 6.1, the proportion of explained part in the difference is 9.3%, 4.9%, and 5.9% for 1988, 2000 and 2006, respectively. 2000 HLFS is used here to provide continuity of the analyses over time and increase the comparability of decomposition outputs as it was like in logit analyses, viz, the reason for the usage of 2000 data is same as before.

From 1988 to 2006, the contributions of variables to the explained part of gender participation gap (LFP difference) changes. The sum of all coefficients estimated from decomposition analyses is equal to the total explained part. So while interpreting the findings of decompositions the coefficients will be classified as the ones which broaden the gap and narrow the gap.

**Table 6.1:** Decomposition by sex (1988, 2000 and 2006)

| | Variables | 1988 | 2000 | 2006 |
|---|---|---|---|---|
| INDIVIDUAL CHARACTERISTICS | **ageW_19** | -0,0621 | -0,0378 | -0,0374 |
| | | (0,0101)*** | (0,0031)*** | (0,0016)*** |
| | **age20_24** | 0,0028 | -0,0123 | -0,0087 |
| | | (0,0013)* | (0,0005)*** | (0,0002)*** |
| | **age25_29** | -0,0038 | -0,0088 | -0,0138 |
| | | (0,0013)** | (0,0003)*** | (0,0002)*** |
| | **age30_34** | -0,0016 | -0,0040 | -0,0101 |
| | | (0,0010) | (0,0004)*** | (0,0002)*** |
| | **age35_39** | 0,0126 | 0,0165 | 0,0114 |
| | | (0,0021)*** | (0,0010)*** | (0,0003)*** |
| | **age40_44** | 0,0121 | 0,0183 | 0,0199 |
| | | (0,0017)*** | (0,0010)*** | (0,0004)*** |
| | **age45_49** | 0,0067 | 0,0046 | 0,0079 |
| | | (0,0008)*** | (0,0002)*** | (0,0003)*** |
| | **age50_54** | 0,0100 | 0,0070 | 0,0063 |
| | | (0,0012)*** | (0,0005)*** | (0,0002)*** |
| | **age55_59** | 0,0049 | 0,0027 | 0,0067 |
| | | (0,0008)*** | (0,0003)*** | (0,0004)*** |
| | **age60_64** | 0,0014 | 0,0009 | 0,0030 |
| | | (0,0007)* | (0,0003)*** | (0,0003)*** |
| | **literatewithoutdiploma** | 0,0002 | 0,0007 | 0,0015 |
| | | (0,0001)** | (0,0001)*** | (0,0002)*** |
| | **primarysch** | -0,0035 | -0,0004 | -0,0001 |
| | | (0,0004)*** | (0,0001)*** | (0,0000) |
| | **secondarysch** | -0,0051 | -0,0043 | -0,0054 |
| | | (0,0004)*** | (0,0002)*** | (0,0002)*** |
| | **highsch** | -0,0035 | -0,0056 | -0,0021 |
| | | (0,0001)*** | (0,0001)*** | (0,0001)*** |
| | **occuphighsch** | -0,0073 | -0,0070 | -0,0075 |
| | | (0,0003)*** | (0,0002)*** | (0,0002)*** |
| | **univ** | -0,0215 | -0,0155 | -0,0172 |
| | | (0,0006)*** | (0,0003)*** | (0,0003)*** |

Here, in Table 6.1, the coefficients with positive signs represent the first group and the coefficients with negative signs represent the second group. The coefficients of age variables are negative for early ages. This means that in these age groups (up to 35) the predicted participation probability of females is higher than males. The relatively higher tendency to continue onto higher education levels and mandatory military service are disadvantages of males in those ages. Relatively lower tendency of females to go on with higher education that they are not married at young ages works to close the gap. Hence it can be said that females enter into the labor market

but do not stay. But in the prime ages, the coefficients are positive and so broaden the gap. The sources of gender participation gap related with age variables are as such. All the signs of education variables are negative except the literate without diploma level. So with the increasing level of education the gender participation gap decreases. To sum up, in the early age levels and high education levels the gap between female and male participations decrease for each year. However, as time passes, from 1988 to 2006, these improvements depreciate.

For household characteristics, same interpretations can be made. The coefficient of being married is positive for all years and increases from 1988 to 2000, than decreases from 2000 to 2006. So it broaden the gap, but at a decreasing rate over time. For being household head, presence of children in the household below age 14 and the household size, same interpretations are valid.

**Table 6.1 (contd.):** Decomposition by sex (1988, 2000 and 2006)

| | Variables | 1988 | 2000 | 2006 |
|---|---|---|---|---|
| HOUSEHOLD CHARACTERISTICS | **married** | 0,0166 | 0,0179 | 0,0083 |
| | | (0,0015)*** | (0,0007)*** | (0,0004)*** |
| | **hhhead** | -0,0123 | 0,0010 | 0,0072 |
| | | (0,0064) | (0,0030) | (0,0024)*** |
| | **phhchildren0_14** | 0,0009 | 0,0005 | 0,0007 |
| | | (0,0002)*** | (0,0001)*** | (0,0001)*** |
| | **hhsize** | 0,0006 | 0,0005 | 0,0009 |
| | | (0,0002)** | (0,0001)*** | (0,0001)*** |
| | **Number of Observations** | 44.627 | 156.326 | 238.967 |
| | **N of Obs G=0** | 22.838 | 80.700 | 124.185 |
| | **N of Obs G=1** | 21.789 | 75.626 | 114.782 |
| | **Pr(Y!=0 \| G=0)** | 0,1702 | 0,1595 | 0,2279 |
| | **Pr(Y!=0 \| G=1)** | 0,7309 | 0,6769 | 0,7080 |
| | **Difference** | -0,5607 | -0,5174 | -0,4801 |
| | **Total Explained** | -0,0521 | -0,0252 | -0,0284 |

### 6.3.2 Decomposition by year in 1988 and 2006 HFLS

Another decomposition analysis is done to reveal the differences of the same population groups (urban males and females) over years. By this way, our analysis considers the LFP changes from 1988 to 2006.[52] This dynamic perspective gives us idea about the evolution of structural LFP determinants of urban males and females. Table 6.2 shows the estimated coefficients for urban adult males and females computed by non-linear decomposition analysis. In this analysis, reference category is 1988 HLFS. For urban males the predicted LFP probability goes down from 73.1% to 70.8%. This probability increases for urban females from 17% to 22.8%. Note that total explained for males and females are negative again. This means that the outcome difference between the years could be expected to be even larger if the covariate distributions would be the same.

Age variables' contributions to the total explained portion of the gap for urban males are negative from 30 to 60 years old. However, for females early ages' contributions are negative from the beginning of working age up to 35 years old. The likelihood of participation for urban men increases in their middle-ages. But, however, women's participation probability increases with their early ages and decreases after middle ages from 1988 to 2006. This is in accordance with the aforementioned life-cycle patterns of women and with the analysis of previous section.

The contributions of education level to the total explained part are negative after the primary school level for both population groups. These results are parallel with human capital theory. As time passes schooling increases the probability of participation. Additionally, the contributions of high education levels in the urban female subsample are higher than males. This indicates that the higher education levels' positive effect on females is more explanatory than males while narrowing the participation gap from 1988 to 2006.

While being married narrows the participation gap over time for males, it broadens the gap for females. Being household head is not a significant contributor for females' participation gap over year. Contrary, it is significant for males and it

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[52] This decomposition analysis can be disaggregated into two parts, 1988-2000 and 2000-2006. See Appendix C for the results of these two parts (see Table C.1 and Table C.2).

narrows the gap for males. Here the striking result is about the presence of children in the household below 14 age. This variable is significant for both males and females and narrows the gap for both of them. This finding is parallel with our coefficient estimations in the logit regressions. It can be argued that presence of children, especially aged above primary school level needs women's participation into the labor market due to increasing livelihood needs in the family. Household size variable supports this idea. For both males and females it narrows the participation gap. So the increasing level of household size requires the increasing level of participation probability.

**Table 6.2:** Decomposition by year (urban male and urban female)

| | Variables | 1988-2006 | |
|---|---|---|---|
| | | Male | Female |
| INDIVIDUAL CHARACTERISTICS | **ageW_19** | 0,0570 | -0,0081 |
| | | (0,0011)*** | (0,0029)** |
| | **age20_24** | 0,0307 | -0,0150 |
| | | (0,0006)*** | (0,0008)*** |
| | **age25_29** | 0,0449 | -0,0164 |
| | | (0,0009)*** | (0,0008)*** |
| | **age30_34** | -0,0086 | -0,0068 |
| | | (0,0003)*** | (0,0007)*** |
| | **age35_39** | -0,0200 | 0,0137 |
| | | (0,0005)*** | (0,0014)*** |
| | **age40_44** | -0,0383 | 0,0032 |
| | | (0,0008)*** | (0,0008)*** |
| | **age45_49** | -0,0167 | 0,0030 |
| | | (0,001)*** | (0,0005)*** |
| | **age50_54** | -0,0152 | 0,0054 |
| | | (0,0014)*** | (0,0006)*** |
| | **age55_59** | -0,0039 | 0,0039 |
| | | (0,0003)*** | (0,0005)*** |
| | **age60_64** | -0,0001 | 0,0007 |
| | | (0,0001) | (0,0003) |
| | **literatewithoutdiploma** | 0,0090 | 0,0002 |
| | | (0,0005)*** | (0,0001)** |
| | **primarysch** | 0,0317 | 0,0016 |
| | | (0,0017)*** | (0,0002)*** |
| | **secondarysch** | -0,0139 | -0,0036 |
| | | (0,0007)*** | (0,0003)*** |
| | **highsch** | -0,0114 | -0,0118 |
| | | (0,0007)*** | (0,0004)*** |
| | **occuphighsch** | -0,0115 | -0,0159 |
| | | (0,0008)*** | (0,0006)*** |
| | **univ** | -0,0157 | -0,0280 |
| | | (0,0011)*** | (0,0007)*** |

**Table 6.2 (contd.):** Decomposition by year (urban male and urban female)

| Variables | | 1988-2006 | |
|---|---|---|---|
| | | Male | Female |
| HOUSEHOLD CHARACTERISTICS | **married** | -0,0238 | 0,0218 |
| | | (0,0025)*** | (0,0013)*** |
| | **hhhead** | -0,0269 | -0,0006 |
| | | (0,0032)*** | (0,0003) |
| | **phhchildren0_14** | -0,0029 | -0,0050 |
| | | (0,0012)** | (0,0006)*** |
| | **hhsize** | 0,0115 | 0,0041 |
| | | (0,001)*** | (0,0011)*** |
| | **Number of Observations** | 136.571 | 147.023 |
| | **N of Obs G=0** | 21.789 | 22.838 |
| | **N of Obs G=1** | 114.782 | 124.185 |
| | **Pr(Y!=0 \| G=0)** | 0,7309 | 0,1702 |
| | **Pr(Y!=0 \| G=1)** | 0,7080 | 0,2279 |
| | **Difference** | 0,0229 | -0,0576 |
| | **Total Explained** | -0,0244 | -0,0532 |

To sum up, the LFP differences of urban males and females within same or different years can be explained at some extent with the factors we have determined. More precisely, the observable determinants of LFP from household labor force surveys accounts for the little part of total explained portion of difference between different population groups and different years. Anyway, individual and household characteristics give us important signs for the sources of LFP differentials.

The probability of participation increases at early ages of females, but decreases by the following prime ages. This is in opposite in males. So it is evident that the life-cycle of urban female and male does not change so much from 1988 to 2006. Higher education levels' marginal effects on the probability of participation for females decrease over the mentioned period. Hence depreciation in the sensitivity of education on female participation is experienced. In the household characteristics, the striking findings are about the household size and presence of children aged below 14. With the increase of household size and presence of children aged below 14, the livelihood needs of families increase. So women start to participate into labor force to be supportive for the family income. These featured findings of the empirical analyses summarize the evolution of LFP determinants from 1988 to 2006.

## 7. CONCLUSION

The main findings and conclusions of this study are described in this chapter. This study has aimed to explore LFP trends between 1988 and 2006. The results of the empirical analyses conducted with 1988, 2000, and 2006 HLFS micro data revealed that the fundamental LFP determinants are not static over time. Their relative importance and impact on the probability of participation vary among different population groups over time.

The labor force participation equations of urban males and females were first estimated via logit regressions and then decomposed by gender and year. According to the results of logit estimations and non-linear decomposition analyses, the marginal effects and the contributions of individual and household characteristics towards the total explained portion of participation gaps differ for urban males and females, both within the same year and in different years.

The age composition of male and female groups has shifted, due to an increase of levels of schooling and the abolishment of early retirement. The marginal effects of higher education levels on the likelihood of participation are always higher for women but decrease over time. Household characteristics once again reveal the conventional family structure of Turkish society. Women's perceived role as homemaker and men's as breadwinner have persisted, ruling the division of labor within households. Being married and having children are the main obstacles for women's participation. The coefficients of the household size variable depreciate over time for urban women. There is even depreciation to some extent in the variable for the presence of children. These two structural differentiations are linked to the economic contraction of households.

The total explained parts of LFP differences according to gender and time are negative in most of the decomposition analyses. Total explained parts constitute a small portion of differences in all analyses. This can be interpreted in two ways. One is the inadequacy of the models representing the LFP behaviors of individuals. The other is that the extent of the unexplained part could be so large due to immeasurable

and unobserved factors. The models employed in this research study may be inadequate to reflect the determinants of individualistic LFP decisions to some extent. Basic human capital variables and household characteristics are used based on HLFS questions. Household labor force surveys represent the supply characteristics of the labor market. So, these variables included in regression models reflect supply side characteristics, but there is no indicator regarding demand. The first interpretation is more likely. While some factors are encapsulated by HLFS, however, many of them cannot be.

The contributions of decomposition estimates to the total explained part vary by variable and even by category. The participation probability of prime-aged males and young females are higher in regards to other age groups. So the age variables within these intervals contribute to the total explained part, which increases proportionately. This stems from the aging of the population and the increase in years of schooling. The contribution to the total explained part of education variables increases with the level of completed degrees of education for both urban males and females in all of the years analyzed. Over time, however, the contribution of education variables decreases. The contributions of household variables change sluggishly, as family structures are more rigidly designated in Turkish households and as a result relations between household heads and spouses do not change rapidly. So the inertia in the improvement of household variables can be interpreted as normal.

To sum up, the economic and demographic structures of Turkey changed between the years 1988 and 2006. Labor market indicators were primarily affected by these structural transformations. Raw labor force participation data, somehow, in particular reflects these changes. However, the logit estimations and non-linear decomposition analyses allowed us to detect the observable and measurable sources of changes both by gender and by time in this research study. While these endowments of individuals explain some portion of the differences, most of the differences remained unexplained. These unexplained parts should also be analyzed, but require further measures and studies.

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## APPENDICES

**APPENDIX A:** Summarized Characteristics of Samples

**Table A.1 :** LFP and non-LFP levels and rates of age groups

| Age Groups | 1988 | | | | 2000 | | | | 2006 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LFP=0 | | LFP=1 | | LFP=0 | | LFP=1 | | LFP=0 | | LFP=1 | |
| | Level | % | Level | % | Level | % | Level | % | Level | % | Level | % |
| **ageW_19** | 10.803 | 59,4 | 7.393 | 40,6 | 22.159 | 70,6 | 9.230 | 29,4 | 31.178 | 69,4 | 13.763 | 30,6 |
| **age20_24** | 3.381 | 40,8 | 4.908 | 59,2 | 13.200 | 55,0 | 10.810 | 45,0 | 16.961 | 45,1 | 20.627 | 54,9 |
| **age25_29** | 2.839 | 35,1 | 5.240 | 64,9 | 9.676 | 42,9 | 12.878 | 57,1 | 14.171 | 35,5 | 25.748 | 64,5 |
| **age30_34** | 2.378 | 34,0 | 4.626 | 66,0 | 8.945 | 41,7 | 12.511 | 58,3 | 13.192 | 35,2 | 24.246 | 64,8 |
| **age35_39** | 2.205 | 34,5 | 4.185 | 65,5 | 8.714 | 40,3 | 12.894 | 59,7 | 11.314 | 34,1 | 21.841 | 65,9 |
| **age40_44** | 1.843 | 37,2 | 3.106 | 62,8 | 8.144 | 42,1 | 11.195 | 57,9 | 12.933 | 36,6 | 22.389 | 63,4 |
| **age45_49** | 1.760 | 40,3 | 2.612 | 59,7 | 7.982 | 49,9 | 8.012 | 50,1 | 12.661 | 44,0 | 16.145 | 56,0 |
| **age50_54** | 1.817 | 45,8 | 2.146 | 54,2 | 8.107 | 59,5 | 5.518 | 40,5 | 14.501 | 53,7 | 12.490 | 46,3 |
| **age55_59** | 2.010 | 52,8 | 1.798 | 47,2 | 6.548 | 66,5 | 3.292 | 33,5 | 12.954 | 63,0 | 7.621 | 37,0 |
| **age60_64** | 1.759 | 64,1 | 987 | 35,9 | 6.829 | 75,6 | 2.209 | 24,4 | 10.973 | 72,0 | 4.276 | 28,0 |
| **age65** | 3.285 | 80,2 | 813 | 19,8 | 14.466 | 85,2 | 2.514 | 14,8 | 31.364 | 86,2 | 5.042 | 13,8 |

**Source:** TURKSTAT (1988, 2000 and 2006 HLFS)

**Table A.2 :** LFP and non-LFP levels and rates of education levels

| Education Levels | 1988 | | | | 2000 | | | | 2006 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LFP=0 | | LFP=1 | | LFP=0 | | LFP=1 | | LFP=0 | | LFP=1 | |
| | Level | % | Level | % | Level | % | Level | % | Level | % | Level | % |
| **illiterate** | 25.899 | 81,4 | 5.909 | 18,6 | 56.989 | 90,5 | 6.010 | 9,5 | 44.684 | 80,9 | 10.526 | 19,1 |
| **literatewithoutdiploma** | 3.057 | 50,0 | 3.061 | 50,0 | 6.183 | 71,0 | 2.526 | 29,0 | 17.994 | 66,6 | 9.006 | 33,4 |
| **primarysch** | 12.723 | 39,1 | 19.840 | 60,9 | 52.375 | 54,2 | 44.239 | 45,8 | 69.282 | 48,8 | 72.733 | 51,2 |
| **secondarysch** | 1.297 | 33,7 | 2.547 | 66,3 | 6.909 | 42,1 | 9.520 | 57,9 | 14.050 | 38,0 | 22.905 | 62,0 |
| **highsch** | 937 | 28,1 | 2.392 | 71,9 | 8.957 | 44,6 | 11.116 | 55,4 | 11.852 | 40,6 | 17.359 | 59,4 |
| **occuphighsch** | 396 | 23,9 | 1.263 | 76,1 | 3.239 | 36,0 | 5.757 | 64,0 | 6.730 | 29,9 | 15.748 | 70,1 |
| **univ** | 299 | 13,5 | 1.918 | 86,5 | 2.915 | 23,1 | 9.715 | 76,9 | 4.653 | 19,6 | 19.130 | 80,4 |

**Source:** TURKSTAT (1988, 2000 and 2006 HLFS)

**Table A.3 :** LFP and non-LFP levels and rates of regions

| Geogeraphical Regions | 1988 | | | | 2006 | | | |
|---|---|---|---|---|---|---|---|---|
| | LFP=0 | | LFP=1 | | LFP=0 | | LFP=1 | |
| | Level | % | Level | % | Level | % | Level | % |
| **ageanandmarmara** | 21.080 | 63,2 | 12.266 | 36,8 | 127.411 | 62,9 | 75.212 | 37,1 |
| **mediterranean** | 9.776 | 64,9 | 5.276 | 35,1 | 33.729 | 61,3 | 21.297 | 38,7 |
| **centralanatolia** | 13.784 | 62,8 | 8.157 | 37,2 | 44.446 | 66,4 | 22.484 | 33,6 |
| **blacksea** | 4.466 | 55,3 | 3.606 | 44,7 | 35.273 | 58,1 | 25.450 | 41,9 |
| **eastandsoutheast** | 15.141 | 64,0 | 8.510 | 36,0 | 82.090 | 73,4 | 29.745 | 26,6 |

**Source:** TURKSTAT (1988 and 2006 HLFS)

**Table A.4 :** LFP and non-LFP levels and rates of marital statuses

| Marital Status | 1988 | | | | 2000 | | | | 2006 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LFP=0 | | LFP=1 | | LFP=0 | | LFP=1 | | LFP=0 | | LFP=1 | |
| | Level | % | Level | % | Level | % | Level | % | Level | % | Level | % |
| **never got married** | 11.753 | 50,5 | 11.535 | 49,5 | 49.843 | 68,0 | 23.436 | 32,0 | 43.623 | 49,9 | 43.754 | 50,1 |
| **married** | 19.392 | 43,2 | 25.494 | 56,8 | 72.579 | 52,6 | 65.511 | 47,4 | 117.506 | 48,4 | 125.046 | 51,6 |
| **living together** | - | - | - | - | - | - | - | - | 119 | 52,2 | 109 | 47,8 |
| **married but living separately** | - | - | - | - | - | - | - | - | 724 | 55,8 | 573 | 44,2 |
| **divorced** | 223 | 49,3 | 229 | 50,7 | 989 | 50,8 | 958 | 49,2 | 2.009 | 46,7 | 2.291 | 53,3 |
| **widowed** | 2.712 | 83,0 | 556 | 17,0 | 9.649 | 89,3 | 1.158 | 10,7 | 18.223 | 88,3 | 2.415 | 11,7 |

**Source:** TURKSTAT (1988, 2000 and 2006 HLFS)

**Table A.5 :** LFP and non-LFP levels and rates of households with children

| Presence of Children Below Age 14 in the Households | 1988 | | | | 2000 | | | | 2006 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LFP=0 | | LFP=1 | | LFP=0 | | LFP=1 | | LFP=0 | | LFP=1 | |
| | Level | % | Level | % | Level | % | Level | % | Level | % | Level | % |
| **phhchildren=1** | 48.093 | 67,5 | 23.123 | 32,5 | 127.461 | 71,8 | 50.041 | 28,2 | 203.647 | 69,5 | 89.434 | 30,5 |
| **phhchildren=0** | 16.154 | 52,4 | 14.692 | 47,6 | 70.211 | 63,1 | 41.022 | 36,9 | 119.302 | 58,5 | 84.754 | 41,5 |

**Source:** TURKSTAT (1988, 2000 and 2006 HLFS)

**Table A.6 :** LFP and non-LFP levels and rates of household heads

| Household Head Status of Urban Males and Females | 1988 | | | | 2000 | | | | 2006 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LFP=0 | | LFP=1 | | LFP=0 | | LFP=1 | | LFP=0 | | LFP=1 | |
| | Level | % | Level | % | Level | % | Level | % | Level | % | Level | % |
| **urban males** | 2.187 | 16,7 | 10.889 | 83,3 | 12.950 | 25,6 | 37.688 | 74,4 | 19.128 | 25,1 | 57.198 | 74,9 |
| **urban females** | 1.097 | 80,4 | 267 | 19,6 | 5.960 | 83,5 | 1.179 | 16,5 | 10.032 | 80,0 | 2.515 | 20,0 |

**Source:** TURKSTAT (1988, 2000 and 2006 HLFS)

**Table A.7 :** LFP and non-LFP levels and rates of households with different sizes

| Household Size | 1988 | | | | 2000 | | | | 2006 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LFP=0 | | LFP=1 | | LFP=0 | | LFP=1 | | LFP=0 | | LFP=1 | |
| | Level | % | Level | % | Level | % | Level | % | Level | % | Level | % |
| **hhsize>4** | 42.140 | 64,7 | 23.021 | 35,3 | 96.935 | 71,1 | 39.388 | 28,9 | 158.477 | 68,6 | 72.637 | 31,4 |
| **hhsize<4** | 10.127 | 57,4 | 7.502 | 42,6 | 49.014 | 64,9 | 26.498 | 35,1 | 85.598 | 60,6 | 55.541 | 39,4 |

**Source:** TURKSTAT (1988, 2000 and 2006 HLFS)

**APPENDIX B:** Logistic Regression Outputs

**Table B.1 :** Estimation results of logit models (1988, 2000 and 2006)

| Variables | | 1988 | 2000 | 2006 |
|---|---|---|---|---|
| INDIVIDUAL CHARACRTERISTICS | **sex** | 1,8401 | 1,9588 | 1,9731 |
| | | (0,0261)*** | (0,0157)*** | (0,0118)*** |
| | **rural** | 1,6517 | 1,2545 | 1,0002 |
| | | (0,0222)*** | (0,0143)*** | (0,0097)*** |
| | **ageW_19** | 2,3759 | 1,9839 | 1,6116 |
| | | (0,0646)*** | (0,0372)*** | (0,0264)*** |
| | **age20_24** | 3,1682 | 2,7006 | 2,9023 |
| | | (0,0628)*** | (0,0348)*** | (0,0244)*** |
| | **age25_29** | 3,3396 | 3,1275 | 3,3061 |
| | | (0,0628)*** | (0,0339)*** | (0,0239)*** |
| | **age30_34** | 3,4572 | 3,1334 | 3,3714 |
| | | (0,0647)*** | (0,0343)*** | (0,0243)*** |
| | **age35_39** | 3,3997 | 3,1564 | 3,4258 |
| | | (0,0651)*** | (0,0343)*** | (0,0248)*** |
| | **age40_44** | 3,1964 | 2,9638 | 3,2644 |
| | | (0,0659)*** | (0,0339)*** | (0,0239)*** |
| | **age45_49** | 2,8503 | 2,3804 | 2,7357 |
| | | (0,066)*** | (0,0339)*** | (0,0238)*** |
| | **age50_54** | 2,5712 | 1,7243 | 2,0922 |
| | | (0,0659)*** | (0,0342)*** | (0,0235)*** |
| | **age55_59** | 1,8284 | 1,2472 | 1,5160 |
| | | (0,0654)*** | (0,0368)*** | (0,0248)*** |
| | **age60_64** | 1,1288 | 0,7144 | 0,9879 |
| | | (0,0704)*** | (0,0383)*** | (0,0274)*** |
| | **literatewithoutdip.** | 0,6495 | 0,8633 | 0,8068 |
| | | (0,0387)*** | (0,0335)*** | (0,0191)*** |
| | **primarysch** | 1,0765 | 0,9270 | 0,6772 |
| | | (0,0238)*** | (0,0172)*** | (0,013)*** |
| | **secondarysch** | 1,4187 | 1,2695 | 1,3389 |
| | | (0,0481)*** | (0,025)*** | (0,017)*** |
| | **highsch** | 1,9567 | 1,2969 | 1,0535 |
| | | (0,0518)*** | (0,0234)*** | (0,0179)*** |
| | **occuphighsch** | 2,0162 | 1,7144 | 1,4837 |
| | | (0,0743)*** | (0,0312)*** | (0,0208)*** |
| | **univ** | 2,6863 | 2,5711 | 2,2059 |
| | | (0,0758)*** | (0,0299)*** | (0,0221)*** |

**Table B.1 (contd.) :** Estimation results of logit models (1988, 2000 and 2006)

| | Variables | 1988 | 2000 | 2006 |
|---|---|---|---|---|
| HOUSEHOLD CHARACTHERISTICS | **married** | -0,1724 | -0,2468 | -0,3255 |
| | | (0,0307)*** | (0,0177)*** | (0,0128)*** |
| | **hhhead** | 1,4229 | 1,1787 | 0,7660 |
| | | (0,0361)*** | (0,0201)*** | (0,0143)*** |
| | **phhchildren0_14** | -0,4579 | -0,1054 | -0,1612 |
| | | (0,0235)*** | (0,0138)*** | (0,0102)*** |
| | **hhsize** | 0,1146 | 0,0827 | 0,0484 |
| | | (0,0042)*** | (0,0029)*** | (0,0021)*** |
| | **_cons** | -5,4733 | -5,4133 | -4,7219 |
| | | (0,0655)*** | (0,0367)*** | (0,0253)*** |
| | **Number of Observations** | 71.894 | 205.833 | 356.390 |
| | **Log Likelihood** | -31907,617 | -92498,567 | -166005,23 |
| | **Pseudo $R^2$** | 0,3585 | 0,3454 | 0,3278 |

**Source:** Author's calculations

**Table B.2 :** Estimation results of logit models (urban male and female)

| | Variables | 1988 | | 2000 | | 2006 | |
|---|---|---|---|---|---|---|---|
| | | Male | Female | Male | Female | Male | Female |
| INDIVIDUAL CHARACRTERISTICS | **ageW_19** | 4,0610 | 2,5878 | 3,2881 | 2,2549 | 3,2600 | 2,3615 |
| | | (0,1703)*** | (0,2684)*** | (0,0714)*** | (0,1167)*** | (0,062)*** | (0,0805)*** |
| | **age20_24** | 5,1218 | 3,2989 | 3,9860 | 2,8789 | 4,7406 | 3,3275 |
| | | (0,1685)*** | (0,2674)*** | (0,068)*** | (0,1144)*** | (0,0599)*** | (0,0788)*** |
| | **age25_29** | 6,4246 | 3,4535 | 4,8552 | 3,2036 | 5,9102 | 3,5790 |
| | | (0,2014)*** | (0,269)*** | (0,0681)*** | (0,1149)*** | (0,0655)*** | (0,0791)*** |
| | **age30_34** | 6,2378 | 3,7737 | 4,9602 | 3,3285 | 5,9211 | 3,7486 |
| | | (0,2319)*** | (0,27)*** | (0,0742)*** | (0,1156)*** | (0,0742)*** | (0,0796)*** |
| | **age35_39** | 5,5902 | 3,5958 | 4,7752 | 3,3804 | 5,3817 | 3,8141 |
| | | (0,2077)*** | (0,2708)*** | (0,0736)*** | (0,1156)*** | (0,0706)*** | (0,0799)*** |
| | **age40_44** | 4,3109 | 3,2511 | 4,0618 | 3,0671 | 4,7453 | 3,5636 |
| | | (0,1539)*** | (0,2724)*** | (0,0642)*** | (0,1157)*** | (0,0585)*** | (0,0795)*** |
| | **age45_49** | 3,0580 | 2,8604 | 2,7487 | 2,3559 | 3,2360 | 2,9159 |
| | | (0,1238)*** | (0,2774)*** | (0,0527)*** | (0,1191)*** | (0,0444)*** | (0,0808)*** |
| | **age50_54** | 2,3463 | 2,5265 | 1,8310 | 1,9592 | 2,1859 | 2,3435 |
| | | (0,1181)*** | (0,2809)*** | (0,0503)*** | (0,1233)*** | (0,0402)*** | (0,0831)*** |
| | **age55_59** | 1,5500 | 1,9558 | 1,2510 | 1,3472 | 1,4813 | 1,8621 |
| | | (0,1119)*** | (0,2918)*** | (0,0532)*** | (0,1392)*** | (0,0415)*** | (0,0888)*** |
| | **age60_64** | 0,9236 | 0,8818 | 0,6793 | 0,6728 | 0,8777 | 1,2349 |
| | | (0,1196)*** | (0,3393)*** | (0,057)*** | (0,1618)*** | (0,0467)*** | (0,1029)*** |
| | **literatewithoutdip.** | 1,9703 | 0,4024 | 2,2765 | 0,5313 | 2,1854 | 0,3709 |
| | | (0,0896)*** | (0,0897)*** | (0,0649)*** | (0,0731)*** | (0,0466)*** | (0,0384)*** |
| | **primarysch** | 2,4745 | 0,5331 | 2,3608 | 0,4068 | 1,9514 | 0,2973 |
| | | (0,0532)*** | (0,0522)*** | (0,0338)*** | (0,0357)*** | (0,0312)*** | (0,0244)*** |
| | **secondarysch** | 2,5609 | 1,0892 | 2,4005 | 0,8865 | 2,4871 | 0,8420 |
| | | (0,0974)*** | (0,0834)*** | (0,0428)*** | (0,0484)*** | (0,0344)*** | (0,0307)*** |
| | **highsch** | 2,2307 | 2,1063 | 1,9144 | 1,3262 | 1,5826 | 0,9322 |
| | | (0,109)*** | (0,0755)*** | (0,0391)*** | (0,0399)*** | (0,0333)*** | (0,0292)*** |
| | **occuphighsch** | 2,1252 | 2,4519 | 2,2174 | 1,9348 | 2,1484 | 1,3459 |
| | | (0,1248)*** | (0,1058)*** | (0,0499)*** | (0,0496)*** | (0,0401)*** | (0,0325)*** |
| | **univ** | 2,3204 | 3,7206 | 2,6388 | 3,2239 | 2,3190 | 2,6382 |
| | | (0,1176)*** | (0,1254)*** | (0,0483)*** | (0,0474)*** | (0,0404)*** | (0,0343)*** |

**Table B.2 (contd.) :** Estimation results of logit models (urban male and female)

| | Variables | 1988 | | 2000 | | 2006 | |
|---|---|---|---|---|---|---|---|
| | | Male | Female | Male | Female | Male | Female |
| HOUSEHOLD CHARACTHERISTICS | married | 1,0232 | -1,2510 | 0,7361 | -1,2146 | 1,0287 | -1,1146 |
| | | (0,1094)*** | (0,062)*** | (0,0492)*** | (0,0342)*** | (0,0453)*** | (0,0226)*** |
| | hhhead | 1,3904 | 0,2034 | 0,8337 | -0,0180 | 0,5015 | -0,0952 |
| | | (0,1334)*** | (0,1017)* | (0,0538)*** | (0,0511) | (0,0436)*** | (0,0325)** |
| | phhchildren0_14 | -0,1370 | -0,3865 | 0,2833 | -0,1658 | 0,2861 | -0,2457 |
| | | (0,0544)* | (0,0472)*** | (0,0264)*** | (0,0267)*** | (0,023)*** | (0,0183)*** |
| | hhsize | 0,1233 | 0,0364 | 0,0702 | -0,0363 | 0,0665 | -0,0509 |
| | | (0,0108)*** | (0,0097)*** | (0,0064)*** | (0,0074)*** | (0,0053)*** | (0,0047)*** |
| | _cons | -6,0926 | -4,5594 | -5,6085 | -4,2643 | -5,4207 | -3,8543 |
| | | (0,1745)*** | (0,2691)*** | (0,0759)*** | (0,1175)*** | (0,0638)*** | (0,0794)*** |
| | Number of Observations | 21.789 | 22.838 | 75.626 | 80.700 | 114782 | 124.185 |
| | Log Likelihood | -6.817,87 | -8.411,4 | -28992,288 | -27543,380 | -39.328,866 | -53.403,736 |
| | Pseudo $R^2$ | 0,4627 | 0,1928 | 0.3907 | 0.2222 | 0.4327 | 0,1987 |

**Source:** Author's calculations

**Table B.3 :** Estimation results of logit models (1988 and 2006)

| | Variables | 1988 | | 2006 | |
|---|---|---|---|---|---|
| | | Male | Female | Male | Female |
| INDIVIDUAL CHARACTERISTICS | **ageW_19** | 4,0359 | 2,5771 | 3,2709 | 2,3471 |
| | | (0,1717)*** | (0,2684)*** | (0,0621)*** | (0,0805)*** |
| | **age20_24** | 5,1177 | 3,2822 | 4,7605 | 3,3736 |
| | | (0,1700)*** | (0,2675)*** | (0,0601)*** | (0,0788)*** |
| | **age25_29** | 6,4061 | 3,4358 | 5,9314 | 3,6344 |
| | | (0,2020)*** | (0,2691)*** | (0,0657)*** | (0,0791)*** |
| | **age30_34** | 6,2452 | 3,7597 | 5,9349 | 3,7830 |
| | | (0,2319)*** | (0,2700)*** | (0,0743)*** | (0,0797)*** |
| | **age35_39** | 5,6195 | 3,5885 | 5,3968 | 3,8296 |
| | | (0,2080)*** | (0,2708)*** | (0,0707)*** | (0,0799)*** |
| | **age40_44** | 4,3440 | 3,2473 | 4,7558 | 3,5688 |
| | | (0,1541)*** | (0,2723)*** | (0,0586)*** | (0,0796)*** |
| | **age45_49** | 3,0953 | 2,8551 | 3,2451 | 2,9212 |
| | | (0,1240)*** | (0,2773)*** | (0,0445)*** | (0,0809)*** |
| | **age50_54** | 2,3691 | 2,5187 | 2,1871 | 2,3392 |
| | | (0,1181)*** | (0,2808)*** | (0,0403)*** | (0,0832)*** |
| | **age55_59** | 1,5802 | 1,9422 | 1,4822 | 1,8692 |
| | | (0,1122)*** | (0,2917)*** | (0,0415)*** | (0,0889)*** |
| | **age60_64** | 0,9334 | 0,8736 | 0,8780 | 1,2542 |
| | | (0,1197)*** | (0,3391)** | (0,0467)*** | (0,1029)*** |
| | **literatewithoutdiploma** | 1,9706 | 0,4044 | 2,1858 | 0,4299 |
| | | (0,0901)*** | (0,0897)*** | (0,0467)*** | (0,0389)*** |
| | **primarysch** | 2,5176 | 0,5530 | 1,9607 | 0,2259 |
| | | (0,0542)*** | (0,0528)*** | (0,0313)*** | (0,0249)*** |
| | **secondarysch** | 2,5996 | 1,1073 | 2,4944 | 0,7821 |
| | | (0,0979)*** | (0,0838)*** | (0,0345)*** | (0,0312)*** |
| | **highsch** | 2,2531 | 2,1195 | 1,5789 | 0,8877 |
| | | (0,1095)*** | (0,0759)*** | (0,0334)*** | (0,0296)*** |
| | **occuphighsch** | 2,1603 | 2,4715 | 2,1578 | 1,2772 |
| | | (0,1251)*** | (0,1061)*** | (0,0402)*** | (0,0330)*** |
| | **univ** | 2,3856 | 3,7551 | 2,3247 | 2,6203 |
| | | (0,1185)*** | (0,1259)*** | (0,0405)*** | (0,0348)*** |

**Table B.3 (contd.) :** Estimation results of logit models (1988 and 2006)

| Variables | | 1988 | | 2006 | |
|---|---|---|---|---|---|
| | | Male | Female | Male | Female |
| REGIONS | ageanandmarmara | -0,5006 | -0,1243 | -0,0449 | 0,7520 |
| | | (0,0695)*** | (0,0640) | (0,0286) | (0,0266)*** |
| | mediterranean | -0,1716 | -0,0178 | 0,3721 | 1,2412 |
| | | (0,0814)* | (0,0739) | (0,0375)*** | (0,0319)*** |
| | centralanatolia | -0,5465 | -0,2217 | -0,0486 | 0,5588 |
| | | (0,0755)*** | (0,0702)** | (0,0341) | (0,0315)*** |
| | blacksea | -0,6962 | 0,0240 | 0,0658 | 0,9962 |
| | | (0,1185)*** | (0,1018) | (0,0377) | (0,0330)*** |
| HOUSEHOLD CHARACTERISTICS | married | 1,0315 | -1,2526 | 1,0233 | -1,1397 |
| | | (0,1100)*** | (0,0620)*** | (0,0454)*** | (0,0229)*** |
| | hhhead | 1,3138 | 0,1948 | 0,5161 | -0,0965 |
| | | (0,1344)*** | (0,1020) | (0,0438)*** | (0,0326)** |
| | phhchildren0_14 | -0,1411 | -0,3901 | 0,2780 | -0,2320 |
| | | (0,0546)** | (0,0473)*** | (0,0231)*** | (0,0184)*** |
| | hhsize | 0,0927 | 0,0303 | 0,0669 | -0,0149 |
| | | (0,0114)*** | (0,0101)** | (0,0055)*** | (0,0048)** |
| | _cons | -5,5325 | -4,4227 | -5,4548 | -4,6854 |
| | | (0,1884)*** | (0,2764)*** | (0,0707)*** | (0,0838)*** |
| | Number of Observations | 21.789 | 22.838 | 114.782 | 124.185 |
| | Log Likelihood | -6.775,1849 | -8.403,3094 | -39.230,482 | -52.497,211 |
| | Pseudo $R^2$ | 0,4660 | 0,1936 | 0,4341 | 0.2123 |

**Source:** Author's calculations

**Table B.4 :** Marginal effects of logit models (1988 and 2006)

| | | 1988 | | 2006 | |
|---|---|---|---|---|---|
| | | Male | Female | Male | Female |
| | Pr(lfp) | 88,6% | 12,3% | 84,0% | 16,3% |
| INDIVIDUAL CHARACTERISTICS | ageW_19 | 0,2549 | 0,4273 | 0,2163 | 0,4780 |
| | | (0,0103)*** | (0,0531)*** | (0,0028)*** | (0,0173)*** |
| | age20_24 | 0,1742 | 0,6244 | 0,2328 | 0,6767 |
| | | (0,0057)*** | (0,0493)*** | (0,0025)*** | (0,0120)*** |
| | age25_29 | 0,2172 | 0,6583 | 0,2765 | 0,7151 |
| | | (0,0063)*** | (0,0465)*** | (0,0027)*** | (0,0106)*** |
| | age30_34 | 0,1986 | 0,7164 | 0,2673 | 0,7356 |
| | | (0,0057)*** | (0,0396)*** | (0,0025)*** | (0,0098)*** |
| | age35_39 | 0,1814 | 0,6934 | 0,2440 | 0,7425 |
| | | (0,0058)*** | (0,0426)*** | (0,0025)*** | (0,0093)*** |
| | age40_44 | 0,1493 | 0,6414 | 0,2348 | 0,7088 |
| | | (0,0053)*** | (0,0491)*** | (0,0026)*** | (0,0108)*** |
| | age45_49 | 0,1287 | 0,5683 | 0,1911 | 0,6076 |
| | | (0,0049)*** | (0,0577)*** | (0,0023)*** | (0,0146)*** |
| | age50_54 | 0,1129 | 0,4958 | 0,1597 | 0,4897 |
| | | (0,0046)*** | (0,0638)*** | (0,0023)*** | (0,0181)*** |
| | age55_59 | 0,0938 | 0,3592 | 0,1268 | 0,3841 |
| | | (0,0049)*** | (0,0696)*** | (0,0025)*** | (0,0210)*** |
| | age60_64 | 0,0674 | 0,1265 | 0,0890 | 0,2381 |
| | | (0,0064)*** | (0,0618)* | (0,0036)*** | (0,0239)*** |
| | literate withoutdiploma | 0,1076 | 0,0497 | 0,1502 | 0,0662 |
| | | (0,0043)*** | (0,0124)*** | (0,0020)*** | (0,0067)*** |
| | primarysch | 0,2572 | 0,0624 | 0,2282 | 0,0314 |
| | | (0,0087)*** | (0,0062)*** | (0,0037)*** | (0,0035)*** |
| | secondarysch | 0,1247 | 0,1694 | 0,1869 | 0,1314 |
| | | (0,0046)*** | (0,0165)*** | (0,0023)*** | (0,0062)*** |
| | highsch | 0,1137 | 0,3991 | 0,1403 | 0,1524 |
| | | (0,0045)*** | (0,0180)*** | (0,0023)*** | (0,0060)*** |
| | occuphighsch | 0,1066 | 0,4946 | 0,1636 | 0,2407 |
| | | (0,0044)*** | (0,0245)*** | (0,0022)*** | (0,0076)*** |
| | univ | 0,1154 | 0,7321 | 0,1742 | 0,5517 |
| | | (0,0045)*** | (0,0162)*** | (0,0022)*** | (0,0071)*** |

**Table B.4 (contd.) :** Marginal effects of logit models (1988 and 2006)

| | | 1988 | | 2006 | |
|---|---|---|---|---|---|
| | | **Male** | **Female** | **Male** | **Female** |
| **Pr(lfp)** | | **88,6%** | **12,3%** | **84,0%** | **16,3%** |
| **REGIONS** | **ageanandmarmara** | -0,0520 | -0,0134 | -0,0061 | 0,1049 |
| | | (0,0076)*** | (0,0069) | (0,0038) | (0,0038)*** |
| | **mediterranean** | -0,0181 | -0,0019 | 0,0453 | 0,2256 |
| | | (0,0090)* | (0,0079) | (0,0041)*** | (0,0070)*** |
| | **centralanatolia** | -0,0621 | -0,0229 | -0,0066 | 0,0866 |
| | | (0,0097)*** | (0,0069)** | (0,0047) | (0,0054)*** |
| | **blacksea** | -0,0889 | 0,0026 | 0,0087 | 0,1731 |
| | | (0,0187)*** | (0,0112) | (0,0049) | (0,0069)*** |
| **HOUSEHOLD CHARACTERISTICS** | **married** | 0,1164 | -0,1542 | 0,1571 | -0,1763 |
| | | (0,0138)*** | (0,0087)*** | (0,0077)*** | (0,0040)*** |
| | **hhhead** | 0,1494 | 0,0225 | 0,0736 | -0,0129 |
| | | (0,0169)*** | (0,0125) | (0,0066)*** | (0,0042)** |
| | **phhchildren0_14** | -0,0140 | -0,0439 | 0,0373 | -0,0316 |
| | | (0,0054)** | (0,0056)*** | (0,0031)*** | (0,0025)*** |
| | **hhsize** | 0,0093 | 0,0033 | 0,0090 | -0,0020 |
| | | (0,0012)*** | (0,0011)** | (0,0007)*** | (0,0007)** |

**Source:** Author's calculations

**APPENDIX C:** Decomposition Outputs

**Table C.1 :** Decomposition by year (1988-2000)

| | Variables | 1988-2000 | |
|---|---|---|---|
| | | Male | Female |
| INDIVIDUAL CHARACTERISTICS | **ageW_19** | 0,0479 | -0,0227 |
| | | (0,001)*** | (0,0046)*** |
| | **age20_24** | 0,0268 | -0,0219 |
| | | (0,0006)*** | (0,0012)*** |
| | **age25_29** | 0,0518 | -0,0070 |
| | | (0,001)*** | (0,0007)*** |
| | **age30_34** | -0,0150 | -0,0016 |
| | | (0,0006)*** | (0,0013) |
| | **age35_39** | -0,0245 | 0,0116 |
| | | (0,0006)*** | (0,0014)*** |
| | **age40_44** | -0,0316 | 0,0060 |
| | | (0,0007)*** | (0,001)*** |
| | **age45_49** | -0,0176 | 0,0055 |
| | | (0,0011)*** | (0,0006)*** |
| | **age50_54** | -0,0126 | 0,0055 |
| | | (0,0012)*** | (0,0006)*** |
| | **age55_59** | -0,0029 | 0,0047 |
| | | (0,0002)*** | (0,0006)*** |
| | **age60_64** | -0,0002 | 0,0010 |
| | | (0,0001) | (0,0004)* |
| | **literatewithoutdiploma** | 0,0105 | 0,0012 |
| | | (0,0005)*** | (0,0003)*** |
| | **primarysch** | 0,0200 | -0,0030 |
| | | (0,0013)*** | (0,0003)*** |
| | **secondarysch** | -0,0091 | -0,0017 |
| | | (0,0005)*** | (0,0002)*** |
| | **highsch** | -0,0134 | -0,0191 |
| | | (0,0008)*** | (0,0006)*** |
| | **occuphighsch** | -0,0067 | -0,0064 |
| | | (0,0005)*** | (0,0003)*** |
| | **univ** | -0,0139 | -0,0216 |
| | | (0,0009)*** | (0,0006)*** |

**Table C.1 (contd.) :** Decomposition by year (1988-2000)

| Variables | | 1988-2000 | |
|---|---|---|---|
| | | Male | Female |
| HOUSEHOLD CHARACTERISTICS | **married** | -0,0210 | 0,0215 |
| | | (0,0022)*** | (0,0014)*** |
| | **hhhead** | -0,0234 | -0,0003 |
| | | (0,0029)*** | (0,0002) |
| | **phhchildren0_14** | -0,0027 | -0,0049 |
| | | (0,0011)* | (0,0006)*** |
| | **hhsize** | 0,0102 | 0,0041 |
| | | (0,0008)*** | (0,0011)*** |
| | **Number of Observations** | 97.415 | 103.538 |
| | **N of Obs G=0** | 21.789 | 22.838 |
| | **N of Obs G=1** | 75.626 | 80.700 |
| | **Pr(Y!=0 \| G=0)** | 0,7309 | 0,1702 |
| | **Pr(Y!=0 \| G=1)** | 0,6769 | 0,1595 |
| | **Difference** | 0,0540 | 0,0108 |
| | **Total Explained** | -0,0276 | -0,0488 |

**Source:** Author's calculations

**Table C.2 :** Decomposition by year (2000-2006)

| | Variables | 2000-2006 | |
|---|---|---|---|
| | | Male | Female |
| INDIVIDUAL CHARACTERISTICS | ageW_19 | 0,0058 | -0,0258 |
| | | (0,0003)*** | (0,0021)*** |
| | age20_24 | 0,0200 | -0,0124 |
| | | (0,0003)*** | (0,0005)*** |
| | age25_29 | 0,0467 | -0,0124 |
| | | (0,0004)*** | (0,0003)*** |
| | age30_34 | 0,0110 | -0,0021 |
| | | (0,0001)*** | (0,0002)*** |
| | age35_39 | -0,0242 | 0,0139 |
| | | (0,0003)*** | (0,0007)*** |
| | age40_44 | -0,0323 | 0,0144 |
| | | (0,0003)*** | (0,0008)*** |
| | age45_49 | -0,0144 | 0,0055 |
| | | (0,0004)*** | (0,0002)*** |
| | age50_54 | -0,0054 | 0,0049 |
| | | (0,0003)*** | (0,0003)*** |
| | age55_59 | -0,0017 | 0,0022 |
| | | (0,0001)*** | (0,0003)*** |
| | age60_64 | 0,0008 | 0,0008 |
| | | (0,0001)*** | (0,0002)*** |
| | literatewithoutdiploma | 0,0004 | -0,0016 |
| | | (0,0001)*** | (0,0003)*** |
| | primarysch | 0,0411 | -0,0002 |
| | | (0,0011)*** | (0,0001)** |
| | secondarysch | -0,0081 | -0,0022 |
| | | (0,0002)*** | (0,0001)*** |
| | highsch | 0,0004 | 0,0029 |
| | | (0,0001)*** | (0,0002)*** |
| | occuphighsch | -0,0110 | -0,0053 |
| | | (0,0004)*** | (0,0001)*** |
| | univ | -0,0130 | -0,0045 |
| | | (0,0005)*** | (0,0001)*** |

**Table C.2 (contd.) :** Decomposition by year (2000-2006)

| Variables | | 2000-2006 | |
|---|---|---|---|
| | | Male | Female |
| HOUSEHOLD CHARACTERISTICS | **married** | -0,0062 | 0,0161 |
| | | (0,0004)*** | (0,0006)*** |
| | **hhhead** | -0,0052 | 0,0000 |
| | | (0,0004)*** | 0,0000 |
| | **phhchildren0_14** | 0,0001 | 0,0005 |
| | | (0)*** | (0,0001)*** |
| | **hhsize** | 0,0005 | 0,0003 |
| | | (0,0001)*** | (0,0001)*** |
| | **Number of Observations** | 190.408 | 204.885 |
| | **N of Obs G=0** | 75.626 | 80.700 |
| | **N of Obs G=1** | 114.782 | 124.185 |
| | **Pr(Y!=0 \| G=0)** | 0,6769 | 0,1595 |
| | **Pr(Y!=0 \| G=1)** | 0,7080 | 0,2279 |
| | **Difference** | -0,0311 | -0,0684 |
| | **Total Explained** | 0,0052 | -0,0050 |

**Source:** Author's calculations

**APPENDIX D:** Figures of Marginal Effects

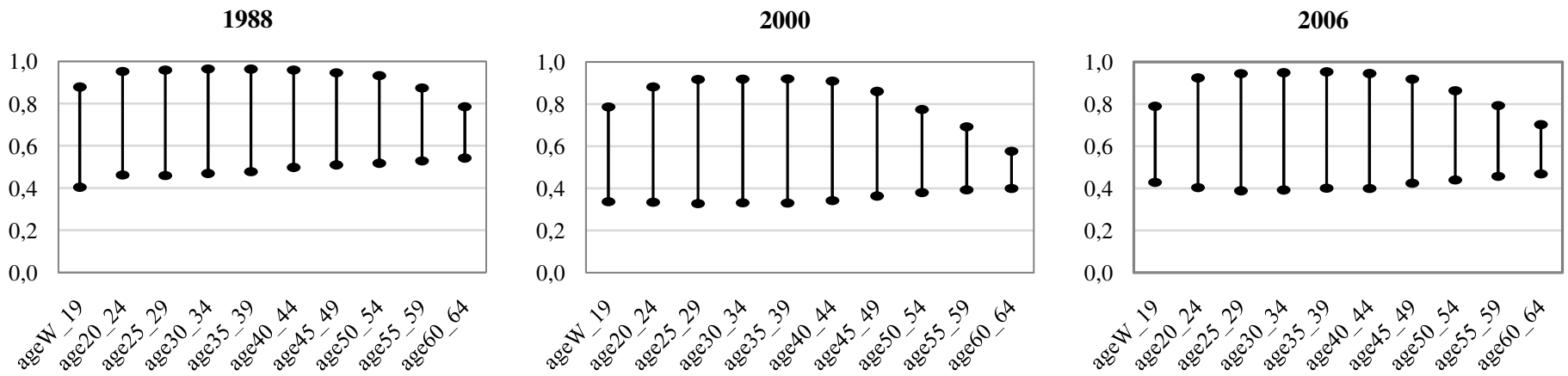


**Figure D.1 :** Marginal effects of age variables (from Table 5.3)

**Source:** Author's calculations

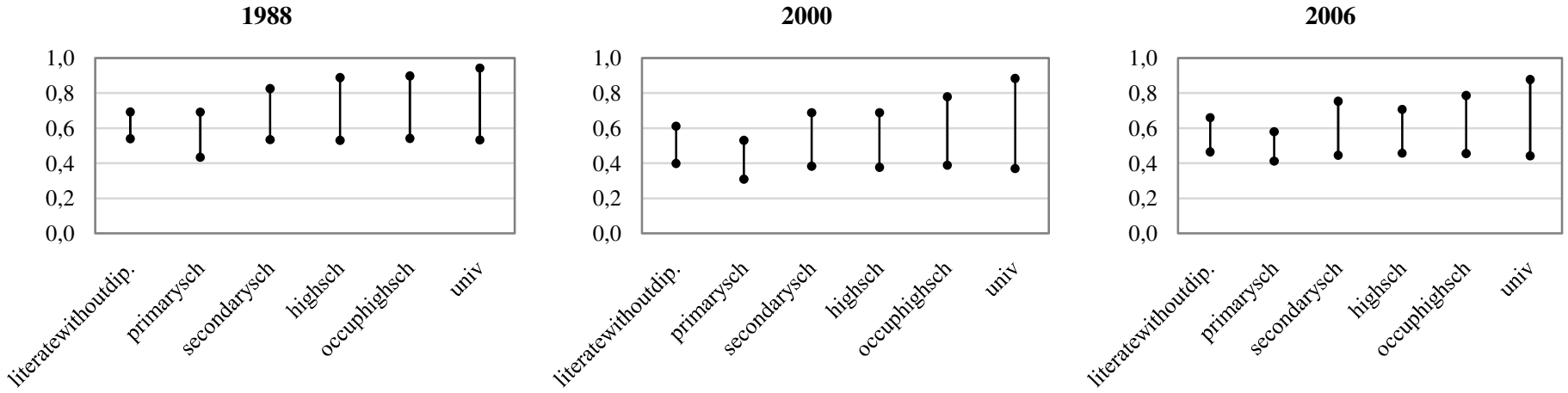


**Figure D.2 :** Marginal effects of education variables (from Table 5.3)

**Source:** Author's calculations

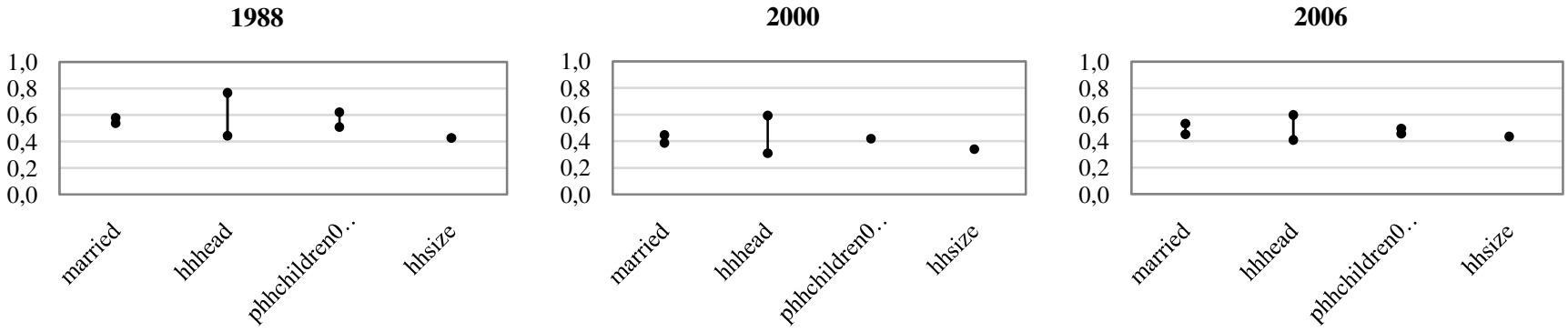


**Figure D.3 :** Marginal effects of household variables (from Table 5.3)

**Source:** Author's calculations

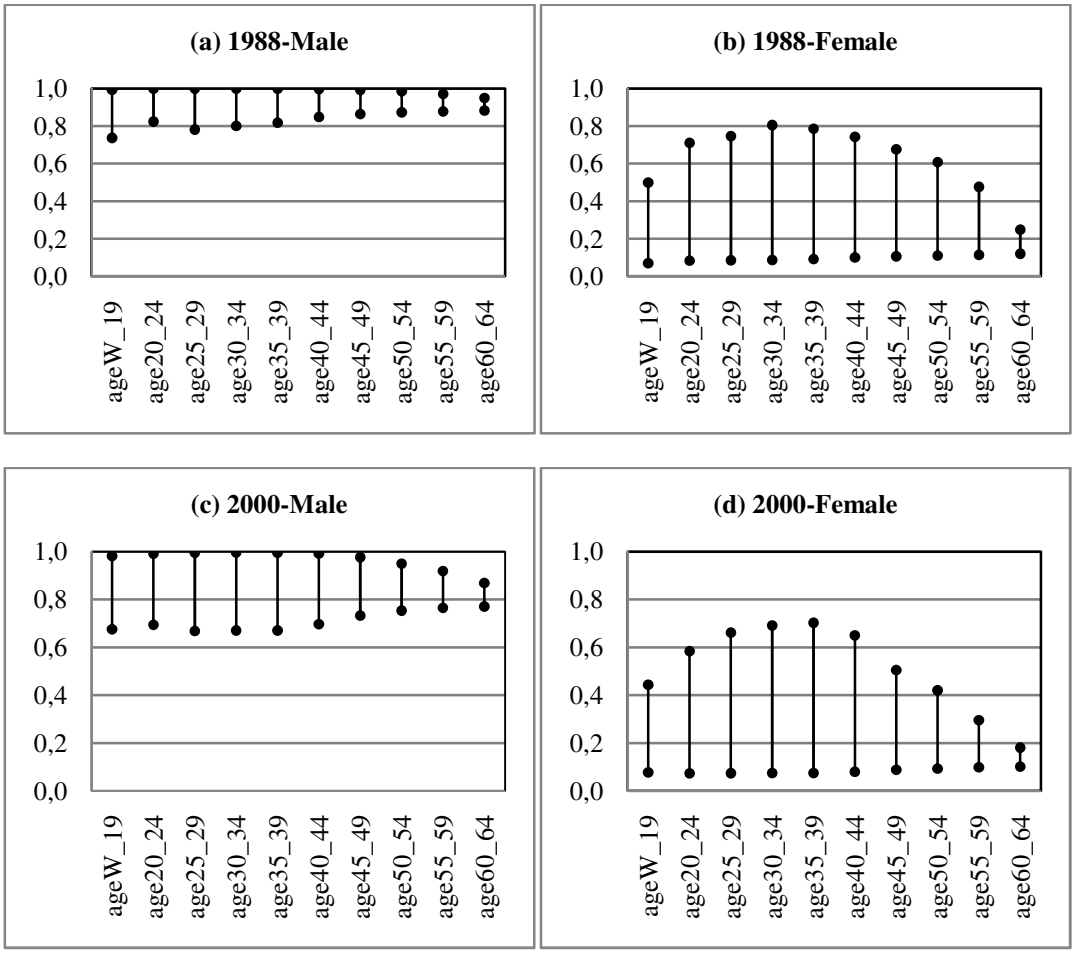


**Figure D.4 :** Marginal effects of age variables (from Table 5.4)

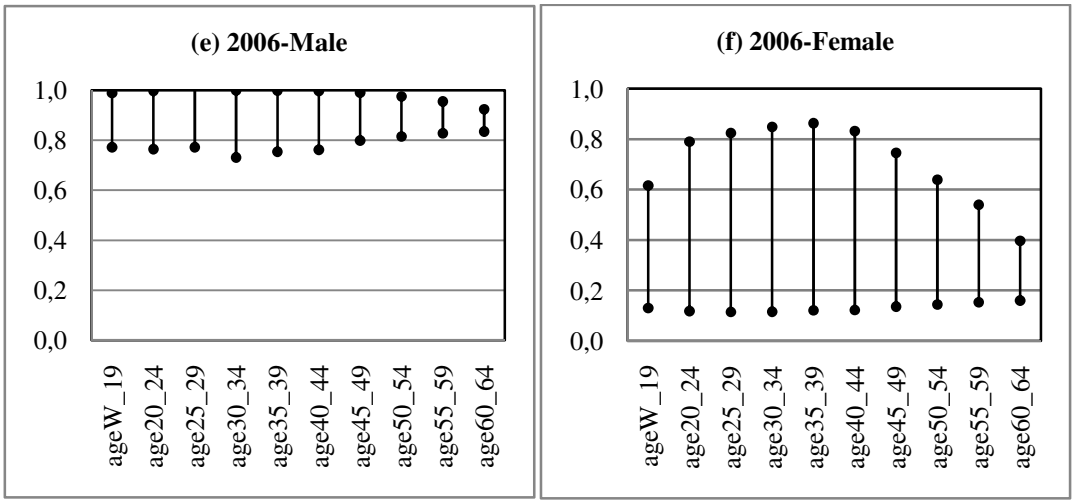


**Figure D.4 (contd.) :** Marginal effects of age variables (from Table 5.4)

**Source:** Author's calculations

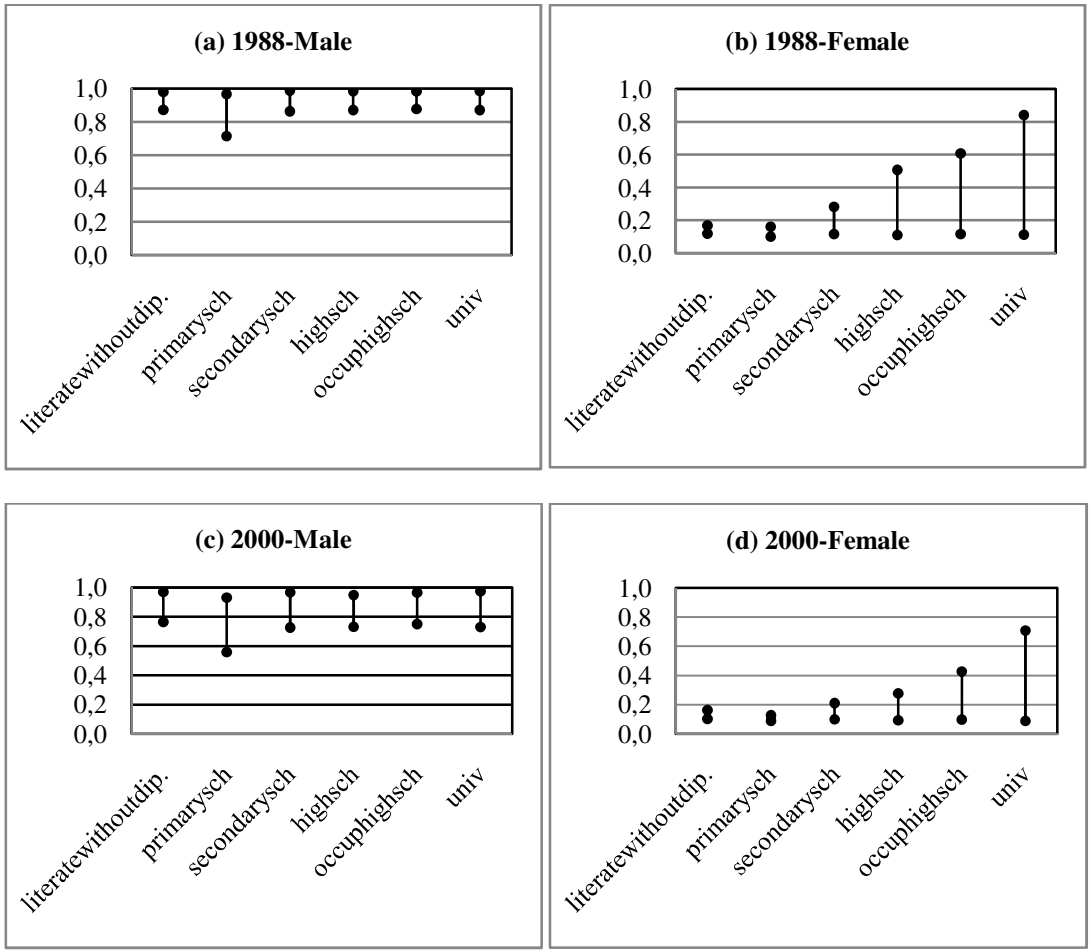


**Figure D.5 :** Marginal effects of education variables (from Table 5.4)

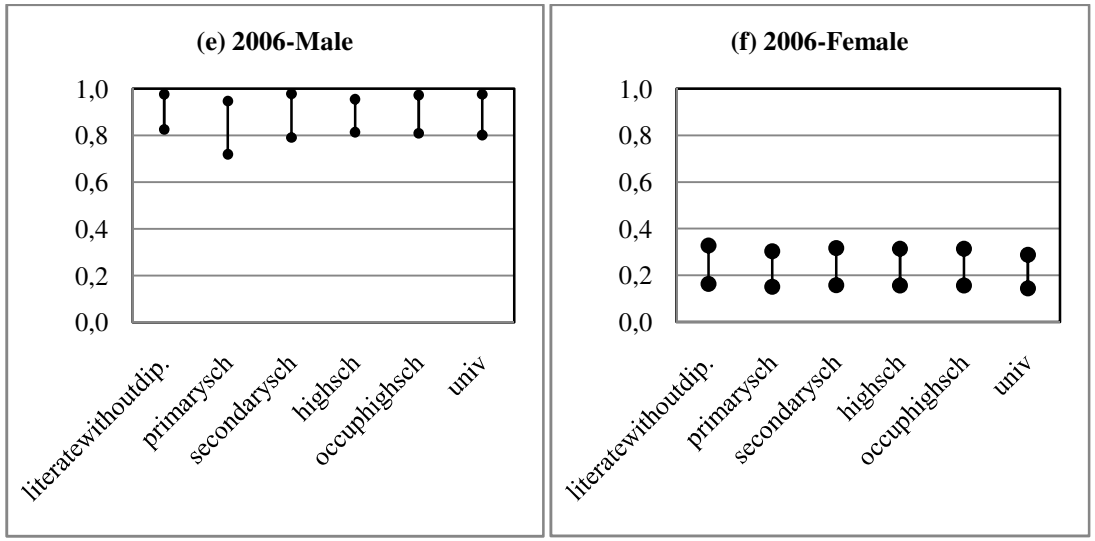


**Figure D.5 (contd.) :** Marginal effects of education variables (from Table 5.4)

**Source:** Author's calculations

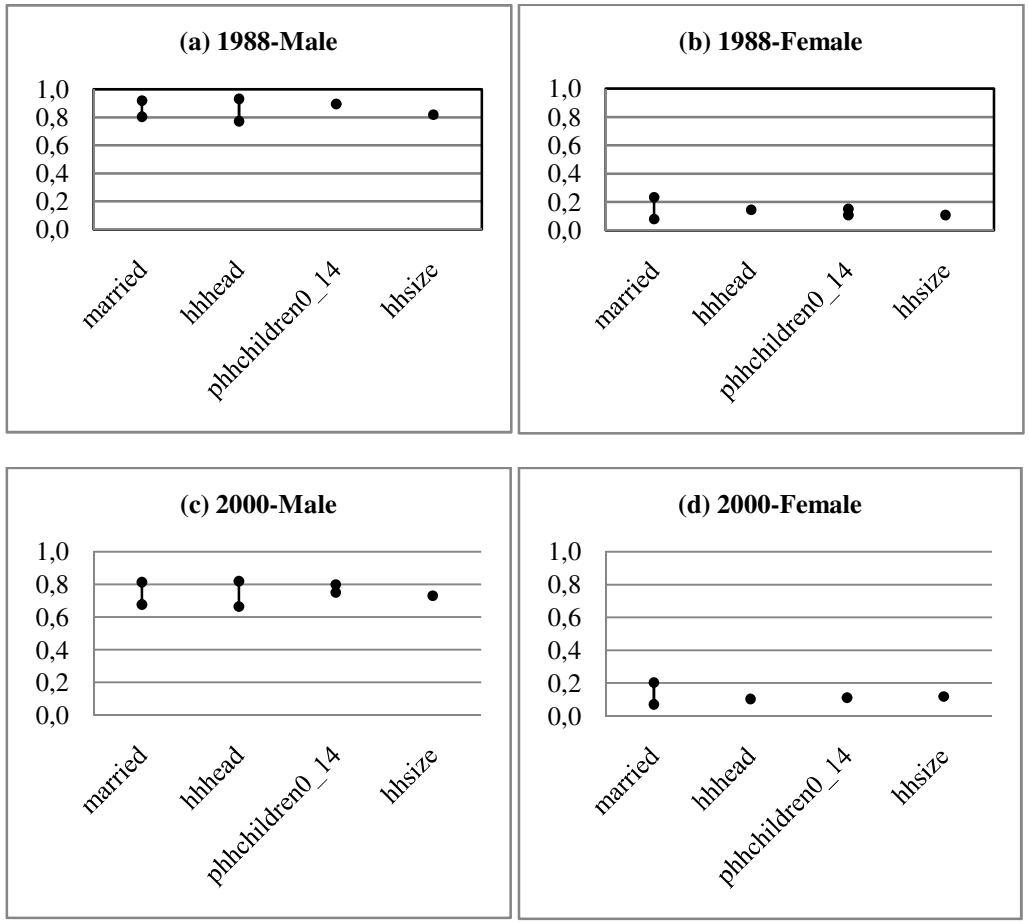


**Figure D.6 :** Marginal effects of household variables (from Table 5.4)

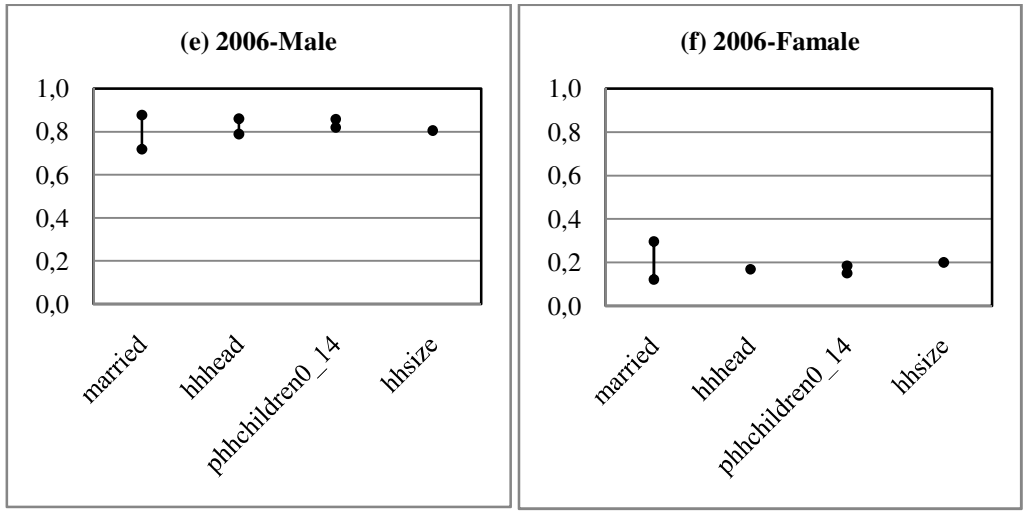


**Figure D.6 (contd.) :** Marginal effects of household variables (from Table 5.4)

**Source:** Author's calculations

**CURRICULUM VITA**

**Candidate's full name:** Serkan Değirmenci

**Place of birth:** Denizli

**Date of birth:** 09.05.1985

**High School:** Private Fatih Sultan College

**Undergraduate:** Marmara University - Department of Economics